

Full Length Research Paper

Emergence of discursive voices and simulation of polyphony: The identity of science in a Brazilian magazine

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The aim of this paper is to analyze the construction of identity of science in a Brazilian magazine that covers science. We take identity as a discursive construction and use theories of Discourse Analysis and polyphony of Bakhtin to unfold which discursive voices are present in the magazine's discourse. Our analysis is divided in three stages: 1) localization of speakers and enunciators, 2) description of ideological formations that originate these enunciation positions, 3) investigation of voices that compose the magazine's discourse. Results show identities of science in the magazine built by the confluence of modern and postmodern discursive voices. Effects of polyphony are only applied to scientific community, giving space to scientific debates. Voices of ordinary people are used to support scientific discoveries.

Key words: Identity of science, polyphony, discourse analysis, discursive voices, science, media, journalism.

INTRODUCTION

Contemporarily, it is often common to find news and information in media about science contents and discoveries. Scientists appear in television programs and weekly magazines offering scientific explanations of our behaviors or announcing new scientific solutions to our daily problems.

In Brazil, journalistic products specialized in science constitute an important editorial market niche. According to Gomes (2000), since the decade of 1980 there has

been a space opening movement for scientific journalism in Brazilian press, with the conquest of scientific editorials in daily press, as *Folha de São Paulo*, *O Globo* and *Jornal do Brasil*, besides the emergence of specialized magazines, as *Ciência Hoje*, and *Super interessante*.

The boom of media products interested in science coverage is related to marketing and cultural needs of our society. Publications specialized in translating scientific researches to ordinary language have become important

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in modernity context where science holds place as what Giddens (1990) calls an abstract system which brings security to man in a fragmented world in constant transformation. This subject searches science news in media as a reliable safety point about the world.

Inevitably, science news produces identities and values about scientific activity. These gain importance in a scenario where media plays a central role as reference to social reality and has power to influence social beliefs and values (Fairclough, 1995). This instance can determinate particular ways of representing the world and works as a social control by reproducing accepted forms of representation and denying others.

Coracini (2003) affirms that science exposure in media is less a discourse of the scientific activity, and really representations about science constructed by media. Science representations in media are also studied by Moura (2006), who says that instead of offering an accessible knowledge to the public, media reiterates the inaccessibility of science by the construction of images of science activity. According to Zamboni (2001), this process would work as an ideological procedure that legitimates scientists as competent and authorized people to talk about science where lay people as deprived of this knowledge.

Besides having enough space, Tucherman (2006) says that the activities of science divulgation in Brazil still use the deficit model, presenting a decontextualized knowledge packed to an audience supposedly illiterate in science. This configuration entails the process of science divulgation as unidirectional, from complex (science and scientists) to simple (lay people). It makes available to the public a finished science knowledge with the aim to transform them to scientific literate. According to Hilgartner (1990), the deficit model serves scientists' interests, as it makes them the authorities that determine which science representations are suitable and which are not.

The results of Pechula (2007) on Brazilian television programs of science show that its representations in media are derived from a mythic and sacred imaginary that positions science activity as a magical and enchanted one, capable of solving the problems of humanity. Science representations move away from the ones produced at universities, since the last one "shall continuously pass by a contentious debate, whose boundaries are always called into question by scientists themselves [...]" (Pechula, 2007, p.220).

The study of Pechula corroborates statements of Melo (1982), who affirms that the contemporary framing of journalism marked by sensationalism and atomization makes science news in the media to be fantastic and sensational. In this context, science is transformed into myth, treated as sacred and apolitical, and does not allow the public to see its defects and limitations.

In this article, we focused on the construction of

identities of science in the Brazilian magazine, *Galileu*. Our questions involve which discursive voices are present in the magazine's discourse and how does it display the relation between science and other social discourses. The investigation can offer subsidies to understand how scientific discourse is positioned in our society, that is, to what extent do we rely on science as a solution to human problems or have relative independency of scientific discourse.

Launched in 1991, *Galileu* is a monthly magazine published by the Brazilian Editora Globo; it is directed by young audience of 18 to 35 year olds, of both sexes. It has a national circulation of approximately 109.880 copies per month and shares space in publishing among other magazines, *Superinteressante*, which has a monthly circulation of 312.806 copies¹. The magazine explains the world from a scientific point of view, and with the slogan, "The future before", it intends to anticipate trends addressing technological, scientific and cultural innovations.

Assuming the identity as a discursive construction, we, therefore, use theories of Discourse Analysis to unfold the function of the magazine's discourse. With the aim to study the emergence of discursive voices, we use the operational concepts of speakers and enunciators of Ducrot (1984) to locate in the text the subjects of the discourse. The originality of the research is to articulate Ducrot's categories with the concept of ideological formations (Pecheux, 1975) and the theory of polyphony of Bakhtin (1984). This can bring answers about the politic dimensions of these voices, contributing to other polyphony and discourse studies.

Studies of science journalism and identities of science in media

The study of polyphony specifically in media content about science has been discussed by several Brazilian researchers in journalism studies. The consensus among them is that science journalism in Brazil does not allow other voices to discuss science, besides scientists. This argument is pointed out by Teixeira (2002), who affirms that science journalism rarely handles scientific facts with different versions and point of views, and usually brings only version of the scientist, without questioning its conclusions.

The lack of contradictory in media science stories is also highlighted by França (2005), who believes that, for many journalists, news about science have to be beautiful, pleasant and instructive. The researcher criticizes this kind of journalistic approach by showing that it derives from the deficit model of science communication and, therefore, journalists end up contributing to the divulgation of science instead of making real journalism.

Instead of creating images of a monological and finished science, science journalism should be an activity

that mediates social interests of different social actors. As Castelfranchi (2008) points out, like any journalist, the duty of the science journalist is not only to inform, to entertain or to educate. It may also assume a role of watchdog, that brings ethical questions of science to public debate. This perspective is also shared by Bueno (2010), who sees the science journalist as a social actor that must be engaged with a critical perspective of scientific knowledge production processes.

In a general sense, according to Caldas (2004), the adoption of a critical perspective of science production by journalists could make science journalism create a Brazilian scientific culture outside science field, by enhancing the public's understanding of science and having a greater share in discussions and decisions about science policy in the country. This would increase dialogue between social actors and the opening of science to other social discourses.

Studies have pointed that this scenario of a multiplicity of voices in science journalism has not yet been conquered. For Teixeira (2002), this happens because journalists have an overconfidence in the power of science journalism, which imposes a lower position to journalists and lays people against scientific results. In this situation, she said, journalism eventually propagates science as the supreme knowledge of Western civilization.

According to Rublescki (2009), the absence of contradictory points of view in science news can transform them monotonously and monophonically. The researchers say that monophonic news predominates in scientific journalism, marked by the use of the same sources belonging to the competent discourse of science. The only voice active in science journalism is the scientific one; so science is presented as the irrefutable truth that cannot be denied by other social knowledge.

Previous linguistic researchers have already investigated the polyphony of science news. Based on Critical Discourse Analysis, Motta-Roth and Lovato (2011) analyzed enunciative positions in science popularization news and had concluded that reporters tend to give space for scientists reinforcing the hegemonic power of science discourse. Our study seeks to combine the study of polyphony addressed by this previous research with the identity of science constructed in the magazine.

In journalism and communication researches, our literature review has pointed to only one study of Gomes et al. (2003), which focused on the identity of science, and of the science constructed by three weekly Brazilian magazines. Its results have shown that these magazines represent science as a neutral institution and absolute truth; they do not present contrary visions of scientific procedures. Our study aims to give continuity to this previous study by approaching an empirical object that has not been investigated: a monthly magazine specialized in science journalism, *Galileu*. Given its

specialization, we assume that it might have more sense about how science works.

THEORETICAL CONCEPTUAL FRAMEWORK

Discourse analysis and polyphony

French Discourse Analysis drifts many of its theoretical frameworks from Foucault's (1966) thoughts of regularity and dispersion of the discourse. These theories allow Discourse Analysis to manage the subject of the discourse as instituted by discursive practices. This perspective also enriches the study of identities, which are presented as a mobile structure conformed between unity and dispersion of the discourse, by displacements and repetitions (Orlandi, 1998).

Other studies of identity, as Cultural Studies, endorse the relation between identity production and history, assuming identity as produced in specific historical moments and constructed by cultural and social elements of the period in which they arise (Hall, 1996). In this sense, we can relate the production of identities with specific discursive and ideological formations, structures that conform to spaces in the discourse.

The concepts of discursive formation (DF) and ideological formation (IF) are explicated specifically by Pêcheux and Fuchs (1975). They set discursive formations as responsible by demarcating what can and must be said in a specific situation. In another way, ideological formations are assumed by the researchers as external structures formed by several discursive formations and that help to demarcate these spaces. Together, these two structures define the subject positions and places to be filled in the discourse.

Discourse Analysis is focused on understanding how subjects are constructed in the discourse. As decentered and disperse positions occupied by empirical subjects (Foucault, 1966), they are determined by historic and social contexts and appear as replaceable enunciators (Maingueneau, 1987). It is important to notice the difference between social subjects and subjects of the discourse, as the first ones are physical human beings and the last ones have existence only inside the discourse.

The influence of production conditions and IFs on the discourse constitution shows discourse as configured in specific historic contexts, demarcated by certain ideologies. In this sense, science identities have place in specific contexts and are demarcated by discursive functioning. However, elements of science identities of the past are reactualized in contemporary discourses of society by movements of regularity and dispersion, maintaining relation with inter-discourse and discursive memory.

Assuming that the identity of science in *Galileu* magazine is crossed by several discursive and

ideological formations, which refer to specific ideological positions and discursive voices, we aim to discover how this discourse and its voices are displayed. For thus, it is necessary to study the polyphony of this discourse – if it is constructed in a closed way, crystallized in scientific answers or as an open structure, giving space to the convergence of different opinions about science.

Polyphony is a widespread concept in Discursive Analysis and is directly related to heterogeneity of language and studies of the Circle of Bakhtin. In France, the concept of enunciation as functioning by the emergence of heterogeneous voices, is focused on by representative authors such as Maingueneau (1987, 1991), Authier-Revuz (1982) and Ducrot (1984). Brazilian researcher, Fiorin (2008) helps us to explain the specificities of Bakhtin's polyphony.

Bakhtin (1984) relates polyphony to several masks assumed by the texts' author, voices that express themselves at the same time without the preponderance of one upon the others. Therefore, bakhtinian polyphony is not about the appearance of these voices, but is marked by the *equipollence*, *plenivalence* and *immiscibility* of them, properties that make them have the same conditions of expression and maintain their interdependency from each other.

According to Fiorin (2008), the no preponderance of a specific unifying voice shows the politic dimension of polyphony voices, which may have terms of equality in the discourse. The expression of several voices and the equality between them become important in a scenario where media is a privileged contemporary public arena and where symbolic battles for representations are displayed.

Framework of the analysis

In our analysis, we aim to articulate approaches of polyphony of Bakhtin and Ducrot to analyze media texts. This is accomplished by the use of Bakhtin's theory of polyphony and the schema of subjects of the discourse presented by Ducrot (1984) to systematize our analysis. The schema shows itself operational, as it can be used in linguistic level.

Ducrot uses narrative theory of Genette to operate his analysis of enunciations by distinguishing among speakers and enunciators. Speakers are compared to Genette's narrator, which is the source of the speech and assumes responsibility for it. Enunciators are related to Genette's center of perspective and are points of view expressed in the enunciation. The discursive subject of the enunciator can be divided into figures of speakers and enunciators of Ducrot (Figure 1), that play different roles in the discourse.

Speakers appear in the discourse by textual marks of direct and indirect citations that indicate the assuming of

words by verbal and mental processes. Direct citations are constituted by the appearance of a second speaker in an enunciation attributed to a first one (Ducrot, 1984), while the indirect ones can be identified by verbs that denote delivery of speech, such as *to speak*, *to affirm*, *to cite*, etc.

In another way, enunciators are points of view assumed by speakers and can be located in the text by words and opinions expressed by them.

The appropriation of the concept of polyphony of Bakhtin and the applicability of Ducrot's categories can show paths for the localization of discursive voices in the text – by the categories of subjects of Ducrot – without losing the historicity and politic dimension of these voices present in Bakhtin's theory. Focusing on the voices present in the discourse and its relation with IFs, in the next topic we present our *corpus* selection.

METHODS

Corpus and data treatment

The *corpus* of this study is composed of 6 cover stories of the Brazilian magazine, *Galileu* selected in April 2010 to July 2011. As *Galileu* is directed to a general public and makes science more attractive, media identities of science constructed by it gain importance, for it is the main reference of scientific activity.

The period was reduced because the magazine had passed by many editorial reformulations during its trajectory, which made its theme treatment modified substantially. As the aim of the study was not to trace the magazine's historic panorama, we focused only on the last year of the publication.

The reason for selecting only 6 reports from the period was that we opted to select cover reports that gave science and scientific discoveries a central role in the narrative, differently from the other reports that placed science in a secondary role, as narrative background. We understand that identity of science gains more importance in narratives with this approach, as it is possible to analyze the influence of scientific announces to other social discourses. Also, we chose to select reports about health and cognition, which is the topic most treated by science news in Brazil.

The cover reports of *Galileu* magazine have from 8 to 10 pages of extension and contain texts, photographs, illustrations and boxes with secondary texts. These elements illustrate and, sometimes, refer to other research and opinions on the subject of the report, which could not be inserted along the main text. In this sense, besides knowing that the production senses derives from the union of these elements, we focused on verbal material of central and secondary texts of these reports.

The research analysis was divided into three stages: 1) localization of speakers and enunciators; 2) description of IFs that originate these enunciation positions; 3) investigation of voices that compose the magazine and analysis if these intend to a monophonic or a polyphonic tone.

Our central preoccupation was to articulate Ducrot's categories of subjects of enunciation with the category of IF, from theoretical and methodological basis of Discourse Analysis. This articulation could bring us answers about the subject positions of the discourse of the magazine and its polyphony.

The analysis was made by primarily focusing on the linguistic surface (location of speakers) and then going to discursive process (location of enunciators and description of IFs). We made two

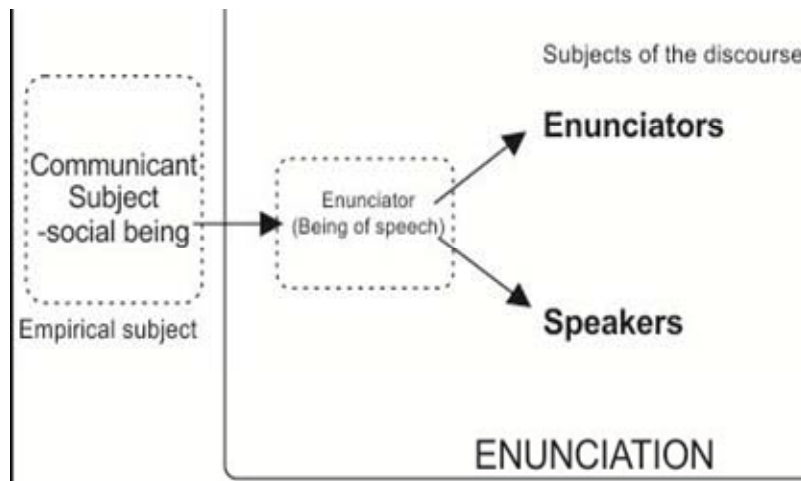


Figure 1. The subjects of the discourse according to Ducrot (1984).

activities: 1) reading of empirical material and 2) articulation between textual and external categories.

Focus on empirical material used operational distinction between speakers and enunciators proposed by Ducrot (1984). These subjects were identified by two procedures: 1) reading of all material and location of speakers pronounced by direct and indirect citations and 2) reading of these citations and localization of words and opinions expressed by speakers about the report theme, which leads to enunciators.

The first procedure, about the location of speakers, was concentrated in 130 linguistic discursive structures, divided into 84 direct citations and 46 indirect citations and excerpts of opinions of the reporter. These structures constitute our empirical material.

The description of IFs in the second stage constructed two models of IF using literature of History and Philosophy of Sciences (Santos, 2006; Japiassú, 1982) and modernity and postmodernity (Lyotard, 1984; Harvey, 1992). They served as guide to our textual analysis, which made two movements: 1) location of marks in the enunciators related to characteristics of these models and 2) identification of these marks on textual material.

The third stage investigated how voices of modernity and postmodernity established relations with each other. Relations were analyzed in enunciator level and can suggest if the magazine's discourse adopts a monophonic or polyphonic tone. We classified them into two categories, related to the positions that enunciators assumed about the theme of the report: opposition and complementation. In the first case, enunciators diverged about the report theme and showed up in confront, bringing marks of equipollence, plenivalence and immiscibility. In the second case, these would complement themselves and be subjugated to the same opinion, keeping distance from the principles of polyphony of Bakhtin. Textual marks of these relations were also located.

RESULTS

The subjects of the discourse: scientists and ordinary people

Our analysis shows that ordinary people and researchers take place as speakers, assuming different roles in the

magazine's discourse. While ordinary people are presented as characters of the narrative and illustrate the theme of the report, researchers are used as authorities consulted to approach a specific theme. Researchers predominate in the *corpus*, especially in R4, R5 and R6 (Table 1).

Ordinary people are a strategy to approximate scientific universe of readers, as they express daily experiences and demonstrate that scientific researches are useful in simple life. Their role of illustration can be observed in the way these characters complement scientific opinions, even when they occupy different enunciation positions of researchers. Example 1 shows them as a distinct enunciator of scientific community (E1), but using personal experiences to affirm the scientific thesis that happiness is all about small pleasures (E2).

Example 1: [E1] "A relação entre felicidade e pequenos prazeres é três vezes maior do que entre felicidade e riqueza", diz o psicólogo Jordi Quiodbach, que conduziu o estudo (Galileu, Sept, 2010).

["The relation between happiness and small pleasures is three times greater than that between happiness and wealth", says psychologist Jordi Quiodbach, who conducted the study].

Example 1: [E2] "É legal entrar em uma loja sem olhar o preço, mas no final das contas o que me faz melhor hoje é passar tempo com as pessoas de que gosto". (Galileu, Sept.2010)

["It's nice to walk into a store without looking at the price, but in the end what I do best now is to spend time with people I like"].

Researchers as speakers use a vulgarized discourse that does not have the density of science discourse (Zamboni,

Table 1. Number of speakers in the *corpus*.

Reports	Ordinary people	Researchers	Reporter	Total
R1	4	7	1	12
R2	5	8	1	14
R3	5	8	1	14
R4	1	10	1	12
R5	2	8	1	11
R6	0	13	1	14
Total	17	54	6	77

Table 2. Speakers and enunciators of corpus.

Reports	Speakers		Enunciators
	Ordinary people	Researchers	
R1	4	7	4
R2	5	8	4
R3	5	8	2
R4	1	10	2
R5	2	8	4
R6	0	13	6

Table 3. Enunciators of IF of modernity.

Report	Scientific determinism
R1	E1 – Science proves that depression has a good side.
R2	E1 – Science is about to discover a pill to erase memories, which would be positive
R3	E2 – Happiness is related to small pleasures, which is proven by science.
R4	E1 – Science points to new treatments to combat aging, which represents a breakthrough for humans.
Report	Homogeneity of scientific field
R5	E2 – Human motivations are driven by the search, which is being discovered by science.
	E1 – Human motivations are driven to seek pleasure all the time.
R6	E1 – The evil refers to the lack of empathy, related to biological traits identified by science.
	E4 – The lack of empathy can be identified and treated by chemicals.

2001) to explain experimental procedures and how human body works. Unlike ordinary people, they assume a plurality of enunciation positions, expressing different opinions about the reports' theme. They are pro or against the discovery that depression has a good side (R1), that a pill to erase memories would be positive (R2), of new therapies to combat aging (R4) and that evil is a matter of biological factors (R6). In *corpus*, the report that has only scientific community speakers (R6) has more positions of enunciation (Table 2).

Discursive voices: between modernity and postmodernity

Models of IF of modernity and IF of postmodernity

configure enunciators of *Galileu's* discourse, making appear subtle oppositions in the way it portrays relation between science and society and scientific field.

IF of modernity understands science as the unique knowledge capable of making absolute propositions and of discovering all the truths of the world. It is related to the thought of scientific rational instruments as providers of technological and social advances to humanity (Harvey, 1992) and occurs in enunciators marks of science-society deterministic relation and homogeneity of scientific field (Table 3).

Textual marks of scientific determinism among society assume science as a power that interferes directly in our lives and is capable to *prove*, *indicate* and *propose* ways of dealing with daily problems. In R2, this approach

represents science as showing how to get to happiness by positioning scientists as holders of the path to happiness (example 3) and science as responsible of the evidence of how to be happy (example 4). Textual marks such as *following the steps* and *proved* show science as capable to provide absolute answers to pursuit of happiness. This position is reiterated by the absence of other studies or elements that indicate contrary results to what is being proposed.

Example 3: Por outro lado, dinheiro não pode ser um vilão— desde que se saiba gastá-lo *seguindo os passos* dos cientistas. (*Galileu*, Sept.2010)

[On the other hand, money can not be a villain - as long as you know how to spend it by *following the steps* of scientists].

Example 4: Afinal, a ciência *provou* que todos nós estamos fadados à felicidade. (*Galileu*, Sept.2010).

[After all, science has *proven* that we are all doomed to happiness.]

Modernity enunciators, sometimes, offer promises to the reader, showing science as a magical solution to problems treated in the reports. In example 5, the textual marks *hope* and *promises* position science as an answer to effectively combat aging. As Tucherman et al. (2010) affirm, the use of promises is a common characteristic of journalistic reports about science, which use media to obtain visibility for scientific researches.

Example 5: Mais uma pesquisa que mostra que há esperanças para prolongar a vida mesmo quando o corpo já está desgastado. Esta também é a promessa da medicina regenerativa. (*Galileu*, Feb.2011)

[Another research that shows that there is hope to extend life even when the body is already worn. This is also the promise of regenerative medicine].

Marks related to modernity include specific characteristics of science in this period, such as scientific homogeneity. Usually, these cases are deflagrated by the presentation of explanations of biological axis of modern paradigm of science. This axis converts human being into an internal biological regulation and makes superficial data, as culture and tradition, loose value in determination of human actions (Japiassú, 1982). Biological sciences are presented as legitimate to offer rational explications about all sort of themes (Tucherman et al., 2010), such as biological mechanisms that bring us happiness (example 6). The absence of other studies with different approaches and results show science as a field without contradictions.

Example 6: Da mesma forma que o sistema imunológico físico protege o nosso corpo contra bactérias, vírus e

outros organismos que nos fariam adoecer, o psicológico seria capaz de fazer as pessoas mudarem suas visões de mundo para se sentirem melhor com a realidade, seja ela qual for. Isso ocorreria por meio de processos cognitivos, principalmente, inconscientes. (*Galileu*, Sept.2010) [Just as the physical immune system protects the body against bacteria, viruses and other organisms that make us sick, the psychological would be able to make people change their world views to feel better with reality whatsoever. This would occur through cognitive processes, especially unconscious].

IF of post modernity refers to enunciation positions that understand science as one of many solutions for human problems. It is expressed by marks of relativization of science power, knowledge outside the scientific field and heterogeneity and construction of this field (Table 4).

In post modernity, science does not appear as absolute truth, but as a relative knowledge that would bring some answers to humanity, although not all. Some enunciators adopt this position of relativization of scientific discourse when they affirm, for example, that the cure for aging that is being discovered by science would not solve all human problems (example 7). Relativization of power of science occurs by the citation that aging involves many other social and cultural factors like, for instance, social security plan to assure life quality to people.

Example 7: Mesmo que a medicina conseguisse fazer com que as pessoas tivessem saúde e disposição para trabalhar até os 100, provavelmente não haveria mercado para todos. Com uma superpopulação de idosos, a previdência social certamente iria quebrar. “Não adianta chegarmos aos 200 anos se não resolvermos esses problemas” [...]. (*Galileu*, Feb.2011)

[Even if the medicine could cause people to have health and willingness to work up to 100, probably there would be no market for everyone. With an overpopulation of the elderly, social security would surely break. "There is no use to get 200 years if we do not solve these problems"].

The relativization of science allows the emergence of other social discourses capable to propose other solutions. This approach occurs, for example, in enunciators that refer to depression as having a good side (example 8) and happiness related to small pleasures (example 9), both thesis proved by personal experiences.

Example 8: *Intuitivamente*, ela entendeu o que a ciência vem se esforçando para demonstrar: que a depressão tem seu lado bom e que dela podemos tirar proveito se percebermos seu potencial transformador. (*Galileu*, May 2010)

[Intuitively, she understood what science has been trying to demonstrate: that depression has its good side and

Table 4. Enunciators of IF of post modernity.

Reports	Relativization of science power and outside knowledge
R1	E2 – Depression has its good side, which is proven by my personal experience. E3 – Depression has no good side and should be treated. E4 – Depression is a social construction that causes dependence on medication.
R2	E3 – A pill to erase memories discovered by science would erase learning by the trauma, what’s negative. E4 – You do not need a pill to erase memories to deal with bad memories.
R3	E1 – Happiness is related to small pleasures, which is proved by my personal experience.
R4	E2 – The search for a cure for aging is a narcissist pretention that doesn’t solve all the social and psychological problems of man.
Reports	Heterogeneity and construction of scientific field
R2	E2 – There are still many studies for science to produce a pill to erase memories and this is efficient.
R5	E3 – Human motivations have become complex with modern life style, such as internet, etc. E4 – Human motivations are driven by something larger (intrinsic factors), which is being discovered by science.
R6	E2 – Evil refers to the lack of empathy, which is not determined only by genetics, but by social situations. E3 – Cruelty is not related only to individuals with low empathy but is related to social situations that the person is submitted. E5 – Lack of empathy doesn’t have right treatment and involves ethical and cultural issues that still need to be discussed. E6 – You must treat society and not the individual.

that we can take advantage of it if we realize its transformative potential].

Example 9: Mayara concluiu, sozinha, o que os pesquisadores estão tentando nos mostrar. Gastos exorbitantes não tornam ninguém mais feliz no longo prazo. (Galileu, Sept.2010)

[Mayara concluded, alone, what researchers are trying to show us. Exorbitant expenses do not make someone happier in the long run].

The textual marks intuitively and alone suggest that common sense knowledge about depression and happiness were produced independent from scientific discourse. The examples bring also the idea that ordinary people discovered before scientists thesis about these themes. Although even being produced outside research laboratories, common sense knowledge does not oppose to scientific theses, but complements and illustrates them.

IF of post modernity also expresses itself by specific references to scientific field as a human construction which understands science as a process and not a finished product. In example 10, the textual marks *for now* and *but still can not* suggest that researches of a pill to erase memories are still in progress. Science is presented in constant construction and transformation, still with unpredictable results.

Example 10: *Por enquanto*, a eficiência só pode ser comprovada em ratinhos. “As descobertas sugerem que podemos atuar sobre lembranças de traumas em humanos, *mas ainda não* conseguimos prever quando isso irá acontecer”, diz o neurofisiologista americano Gregory Quirk, que está à frente de uma equipe de 40 estudiosos. (Galileu, Jul.2010)

[For now, the efficiency can only be proven in mice. "The findings suggest that we can work on memories of trauma in humans, but still can not predict when this will happen," says the American Neurophysiologist Gregory Quirk, who is leading a team of 40 scientists].

Heterogeneity refers to scientific field as a space of a diversity of sciences, which have different methods, objects and theories and can not be reduced to just one scientific model (SANTOS, 2006). R6, for instance, presents evil by the points of view of natural and social sciences. While the first one represents a modern perspective of science that uses genetic determinism to explain arguments, the second refers to social environment as an influence to emergence of evil, contesting the biological approach.

Lastly, we identified in the *corpus* textual marks of the postmodern understanding of *continuum* between researcher and object, a possible interference of this individual in the researched object assumed by

Table 5. Opposition relations between enunciators of modernity and post modernity

Opposition relations	
	IF of postmodernity
R1	E1 – Science proves that depression has a good side. E3 – Depression has no good side and should be treated. E2 – There are still many studies for science to produce a pill to erase memories and this is efficient.
R2	E1 – Science is about to discover a pill to erase memories, which would be positive. E3 – A pill to erase memories discovered by science would erase learning by the trauma, what's negative. E4 – You do not need a pill to erase memories to deal with bad memories.
R4	E1 – Science points to new treatments to combat aging, which represents a breakthrough for humans. E2 – The search for a cure for aging is a narcissist pretention that doesn't solve all the social and psychological problems of man. E2 – Evil refers to the lack of empathy, which is not determined only by genetics, but by social situations.
R6	E1 – The evil refers to the lack of empathy, related to biological traits identified by science. E3 – Cruelty is not related only to individuals with low empathy but is related to social situations that the person is submitted. E4 – The lack of empathy can be identified and treated by chemicals. E5 – Lack of empathy doesn't have right treatment and involves ethical and cultural issues that still need to be discussed. E6 – You must treat society and not the individual.

postmodern theories (Santos, 2006). In this sense, before being placed in a position of impartiality where his interpretations and subjectivity are curtailed, the researcher is portrayed as emotionally bounded with his research theme (example 11).

Example 11: Judeu, Baron-Cohen cresceu ouvindo histórias sobre as atrocidades que seus parentes e os amigos de seus pais sofreram, mas não se refere a nazistas como sádicos que optaram pela crueldade. Ele os considera doentes (*Galileu*, Jul.2011).

[Jew, Baron-Cohen grew up hearing stories about the atrocities that his relatives and friends of your parents suffered, but does not refer to Nazis as sadists who opted for cruelty. He believes they are ill].

In example 11, the life history of a Jewish researcher complements and illustrates his opinion about evil studies. This report shows scientist as a person that has stories and emotions and makes choices from them. However, this is the only report in *corpus* in which life stories of researchers appear.

Simulation of polyphony: opening to scientific debates

The relations between enunciators of modernity and postmodernity of complementation and opposition occur in the same quantity and show effects of polyphony in *Galileu* magazine discourse.

Opposition relations between IFs indicate a possible opening to a diversity of voices, some of them not even

from the scientific sphere. This situation occurs predominantly in R2 and R4 (Table 5), in which appear, respectively, oppositions in relation to the discovery and benefit of a pill to erase memories and the benefit of new treatments to combat aging.

Textual marks show the plurality and contraposition between these voices in R4 (example 12), where enunciators as distributed in two equipollent positions of specialists. They, respectively, assume themselves as defenders of science and its new techniques of anti-aging or critical of these techniques and their consequences.

Example 12: A visão de que vale a pena manipular nosso corpo a qualquer custo para ser jovem para sempre encontra olhares críticos (*Galileu*, Feb.2011).

[The view that it is worthwhile to manipulate our body at any cost to be forever young has critical opinions].

Complementation relations could indicate the subjugation of certain voices to other ones. Usually, science voice subjugates other discursive voices, producing a monophony effect and the trust in scientific answers. The appearance of these relations predominates in R3 and R5 (Table 6).

In R3, common sense voice is subjugated to the scientific proof that happiness is related to small pleasures, showing that this truth can be applied in real life. Example 13 shows the complementation between enunciators, which scientific voice appears as a final answer:

Example 13: Afinal, a ciência provou que todos nós

Table 6. Complementation relations between enunciators of modernity and post modernity.

Complementation relations		
	IF of modernity	IF of postmodernity
R1	E1 – Science proves that depression has a good side.	E2 – Depression has its good side, which is proven by my personal experience.
R3	E2 – Happiness is related to small pleasures, which is proven by science.	E1 – Happiness is related to small pleasures, which is proved by my personal experience.
R5	E2 – Human motivations are driven by the search, which is being discovered by science.	E3 – Human motivations have become complex with modern life style, such as internet, etc.
	E1 – Human motivations are driven to seek pleasure all the time.	E4 – Human motivations are driven by something larger (intrinsic factors), which is being discovered by science.
R6	E1 – The evil refers to the lack of empathy, related to biological traits identified by science.	E2 – Evil refers to the lack of empathy, which is not determined only by genetics, but by social situations.

estamos fadados à felicidade. (*Galileu*, Sept.2010)

[After all, science has proven that we are all doomed to happiness].

Lastly, two reports of *corpus* (R1 and R6) have the occurrence of both relations between enunciators. These work opinions in a complex way, showing both agreement and divergence between modern and postmodern points of view. In R1, the scientific proof that depression has a good side (E1) is complemented by personal experience (E2) and denied by a third enunciator that thinks the disease does not have a good side and needs treatment. The complexity of these relations occurs in the final part of the report (example 14), where depression is assumed as a disorder that needs treatment, but that science has produced advances showing its good side:

Example 14: Remédios, psicanálise, psicologia, cada um deve procurar o tratamento que julgar melhor para aliviar o sofrimento. Mas as recentes teorias sobre depressão trazem uma inovação preciosa ao nos mostrar que a tristeza e o pessimismo podem não ser de todo ruim, ajudando-nos a compreender nossas reações humanas de uma maneira mais natural. (*Galileu*, May.2010)

[Medicine, psychoanalysis, psychology, each one should seek treatment as it deems best to alleviate suffering. But recent theories about depression bring a valuable innovation by showing us that sadness and pessimism may not be all bad, helping us understand our human reactions to a more natural way].

In R6, the evidence that evil is related to lack of empathy and can be located by genetic marks (E1) is complemented by the point of view that has social environment as influence to evil (E2). Opposition relations emerge as predominant in this report, which present the contraposition between biological and social sciences to explain evil (example 15). The expression *often contested* assume that biological science is not the only discipline

able to bring answers about the question and, thus, permit the equipollence and plenivalence of social and biological voices. Example 16 shows equipollence between voices of scientific field by assuming that none of the methods presented in the report solves the problem. These voices are positioned, then, in positions of equality.

Example 15: A abordagem farmacológica é bastante contestada por outro grupo de especialistas que estuda a questão, os psicólogos sociais. (*Galileu*, Jul.2011)

[The pharmacological approach is *often contested* by another group of experts studying the issue, social psychologists].

Example 16: Por enquanto, nenhuma das terapias surgidas da compreensão dos mecanismos da maldade chega a ser uma resposta definitiva. (*Galileu*, Jul.2011)

[So far, none of the therapies arising from understanding the mechanisms of evil becomes a definitive answer].

The equipollence between voices in *corpus* is not applied to relation between common sense voices and scientific voices, since they appear only in one opposition relation (R2) (Table 3). In R2, common sense voices do not represent a confrontation to science voices, as both are distributed in the same positions pro and against a pill to erase memories.

DISCUSSION

The study articulated theoretical contribution of identity of science with theoretical and methodological contribution of Discourse Analysis to unfold the configuration of media identities of science in *Galileu* magazine. These contributions allowed us to consider the construction of identities of science, explained below.

The results show identity of science in *Galileu*, built by

the confluence of fragments of modernity and post-modernity. This movement promotes fragmented identities that are composed of different voices according to the historicity of their discursive formations. The research points the importance to study identity as conformed by ideological and discursive formations and, therefore, related to *interdiscourse* and *discursive memory*. To study the motive of reiteration and of silencing of these discursive elements becomes essential to understand the *relations of power* (Hall, 1996) displayed by identities and why some of them are maintained over others.

In *Galileu* magazine, the equipollence between voices of scientific community and the illustration function of common sense voices functions by demarcating places of science and common sense discourses, reiterating ideological positions of scientist and science as the unique answer and excluding ordinary people from discusses of science. In this sense, our analysis corroborates the research of Motta-Roth and Lovato (2011) that indicate the reinforcement of science discourse as hegemonic in science news.

The position of the public as a spectator of science world and its debates occurs because of the dynamics of contemporary media, which transforms participant citizens of public sphere into what Fairclough (1995) calls mere consumers of products and media realities. Public is represented as not having discordant ideas or, even, important opinions about scientific themes. In this case, a steady and closed identity of science is presented which relates to the modern and progressive past of science.

Contemporary journalism uses scientific discourse to prescribe behavioral and health conducts considered correct and healthy. In *Galileu*, scientific researches' results of biological axis of science lead the reader by the complexity of modern life, by showing implicitly correct ways of acting and thinking about a particular subject. The results of researches presented in the magazine's reports, which procedures are hardly questioned, acquire status of truth for the lay reader – position reiterated by the complementation and support of other discursive formations.

Fragments of postmodernity construct a second identity of science in the magazine related to knowledge in process of construction that produces results whose benefits deserve to be balanced. Precautionary attitude towards scientific applicability is established, in which comes into play several opinions of researchers. The effects of polyphony deflagrated by the confluence of modern and postmodern voices allow the installation of scientific debates and portray science as a heterogeneous community.

In this second case, there is the promotion of a more critical journalistic approach of science that brings a diversity of points of enunciation of scientific community to discuss scientific applicability. Therefore, our results are opposed to Teixeira (2002)'s and Rublescki (2009)'s

observations, as the analyzed reports give space to diversity of points of view and create a polyphonic sphere. The effects of polyphony are applied only to voices from ideological positions of science.

The articulation between Bakhtin and categories of subjects of Ducrot (1984) demonstrates ways to operationalize polyphonic theory of Bakhtin to a *corpus* of media texts taking into account the politic dimension of discursive voices. In the same way, the relation established between IFs and enunciators of the discourse allows us to approach discursive construction in a more complex way, related to the discourse historicity. This methodological contribution shows the necessity to explore the complexity of discursive representations of media and can indicate paths to other investigations of discursive voices and media polyphony.

NOTES

Data are taken from the site of Brazilian National Association of Publishers of Magazines (www.aner.org.br), and refer to the last update of magazines' circulation, January to August 2013.

Conflict of Interests

The authors have not declared any conflict of interests.

REFERENCES

- Authier-Revuz J (1982). Hétérogénéité montrée et hétérogénéité constitutive: éléments pour une approche de l'autre dans le discours, *DRLAV* 26: 91–151.
- Bakhtin M (1984). *Problems of Dostoevsky's poetics*. Minneapolis: University of Minnesota Press.
- Caldas MG (2004). "Comunicação pública e ciência cidadã", in *Comunicação pública*, org. Oliveira M J C. São Paulo: Editora Alínea, pp.29-47.
- Castelfranchi Y (2008). "Para além da tradução: o jornalismo científico crítico na teoria e na Prática", in *Los desafios y la evaluación del periodismo científico en Iberoamerica*, org. Massarani L; Polino C. Santa Cruz de la Sierra, Bolívia: AECl, RICYT, CYTED, SciDevNet, OEA, pp.10-20.
- Coracini M (2003). "As representações do saber científico na constituição da identidade do sujeito-professor e do discurso de sala de aula", in *Identidade e Discurso*, org. Coracini M, Campinas, EdUnicamp, pp.139-159.
- Ducrot O (1984). *El decir y lo dicho*. Buenos Aires, Hachette.
- Fairclough N (1995). *Media discourse*. London, Redbooks.
- Fiorin JL (2008). *Introdução ao pensamento de Bakhtin*. São Paulo, Ática.
- França M (2005) "Divulgação ou Jornalismo?", in *Formação e informação científica. Jornalismo para iniciados e leigos*, org. Boas V S, São Paulo: Summus pp.31-48.
- Foucault M (1966). *L'Archéologie du Savoir*. Paris, Gallimard.
- Giddens A (1990). *The consequences of modernity*. London, Polity Press.
- Gomes I, Holzbach A, Taveira M (2003). "Mídia impressa e construção da identidade de Ciência", in *Divulgação científica e TICs*, org. Silveira A. Santa Maria: FACOSUFISM, pp.216-237.

- Gomes I (2000). *A divulgação científica em Ciência Hoje: características discursivo-textuais*. Recife: UFPE, Tese (Doutorado em Linguística), Universidade Federal de Pernambuco.
- Hall S (1996). "Who needs identity?", in *Questions of cultural identity*, ed. Hall S and Du Gay P, London: Sage.
- Harvey D (1992). *The condition of postmodernity*. Oxford, Blackwell Publishers.
- Hilgartner S (1990) *The Dominant view of Popularization: Conceptual Problems, Political Uses*. *Social Studies of Science*, 20(3):519-539.
- Japiassú H (1982). *Nascimento e morte das ciências humanas*. Rio de Janeiro, Livraria Francisco Alves.
- Lyotard J (1984). *The Postmodern Condition: A Report on Knowledge*. Minneapolis, University of Minnesota Press.
- Maingueneau D (1987). *Nouvelles Tendances en Analyse du Discours*. Paris, Hachette.
- Maingueneau D (1991). *L'Énonciation en linguistique française: embrayeurs, 'temps', discours rapporté*. Paris, Hachette.
- Melo J M (1982). *Impasses do jornalismo científico*. *Comunicação e Sociedade*, São Paulo 7(3):19-24.
- Motta-Roth D, Lovato C (2011). *O poder hegemônico da ciência no discurso de popularização científica*. *Calidoscópio (Unisinos)*, 9:215-268.
- Moura M (2006). *O encontro anunciado. A mídia na construção das imagens da tecnociência brasileira*. Thesis (pHD in Communication) – UFRJ, Rio de Janeiro.
- Orlandi E (1998). "Identidade lingüística escolar", in *Lingua(gem) e identidade*, org. Signorini I, Campinas, SP: Mercado de Letras, São Paulo: FAPESP, pp.203-212.
- Pêcheux M, Fuchs C (1975). *Mises au point et perspectives à propos de l'analyse du discours*. *Langages* 37:7-80.
- Pechula M R (2007). *A ciência nos meios de comunicação de massa: divulgação de conhecimento ou reforço do imaginário social?* *Revista Ciência & Educação*, Bauru, São Paulo 13(2):221-222.
- Teixeira M (2002). "Pressupostos do jornalismo de ciência no Brasil", in *Ciência e público: caminhos da divulgação científica no Brasil*, org. Massarani L; Moreira I; Brito F, Rio de Janeiro: Casa da Ciência – Centro Cultural de Ciência e Tecnologia da UFRJ. Fórum de Ciência e Cultura, pp.133-142.
- Tucherman I (2006). "Mídia, ciência e tecnologia: representações, discursos e tensões", in *Construções do tempo e do outro*, org. Freire Filho J, Vaz P. Rio de Janeiro: Mauad X, pp.133-135.
- Tucherman I, Oiticica L, Cavalcanti C (2010). "Revistas científicas, mediações e retóricas: encontros e desencontros entre a mídia e o biopoder", in *Pesquisa Empírica em Comunicação*, orgs. Braga J, Lopes M and Martino L, São Paulo: Coedição Paulus/Compos, pp.271-292.
- Santos B (2006). *Um discurso sobre as ciências*. São Paulo: Cortez.
- Zamboni L (2001). *Cientistas, jornalistas e a divulgação científica*. Campinas, SP: Autores Associados.

Internet sources

- Bueno W. "Jornalismo Científico". Retrieved from: <http://www.jornalismocientifico.com.br/jornalismocientifico/conceitos/jornalismocientifico.php>.