

SCIENCE IN THE PRESS IN NINE LATIN AMERICAN COUNTRIES

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ABSTRACT The objective of this article is to present a panorama of the journalistic coverage of science and technology themes in Latin America, taking as a case study 12 newspapers of significant impact in the region, involving nine countries. We collected the stories published in the science section from January to April 2006, and analyzed them based on the constructed week methodology and using quantitative tools. In total, our sample amounted to 681 stories. Among our findings, we observed an important presence of medicine and health issues as main topics of the stories. National science has space in the newspapers, although less than scientific results from developed countries. Benefits are stressed in the stories, while a low level of controversies is observed. Scientists are the main source for the journalists, with a low representation of the former in stereotyped images in most of the newspapers.

KEY-WORDS science journalism, qualitative research, scientific information.

1. Introduction

Interest in science journalism has been growing in the international scenario, as expressed by the creation in 1992 of an international forum for discussing the area, the World Conference of Science Journalists. Ten years later, during the third world conference, the World Federation of Science Journalists (WFSJ), a non-profit, non-governmental international organization representing science, technology, health, medical and environmental journalists' organizations in all parts of the world was created.¹ In this context, research in science journalism has been growing, and several groups have been devoting their studies to these

areas. Non-limiting examples of studies are: Pellechia (1997), and Clark and Illman (2006) in the U.S.; Peters (1995), in Germany; Hijmans, Plejter and Weste (2003) in the Netherlands; Hansen and Dickinson (1992), and Bartlett, Sterne and Egger (2002) in the United Kingdom; Bucchi and Mazzolini (2003) in Italy; Metcalfe and Gascoigne (1995) in Australia; Einsiedel (1992), and Saari, Gibson, and Osler (1998) in Canada. Some researchers also have been focusing on specific themes of science and technology coverage, mainly in the case of controversial issues or emerging technologies [see, for example, Priest (1994), Gaskell, Bauer and Durant (1998); Gunter, Kinderlerer, and Beyleveld (1999), Nisbet and Lewenstein (2002), Bubela and Caulfield (2004), Eyck (2005) and Stephens (2005)].

However, despite the significant efforts in this area, a remaining remarkable challenge is to develop methodologies suitable for supporting comparative studies considering different contexts, including those outside the so-called developed countries. In Latin America, there is a significant gap in knowledge in cross-country studies. To help address this gap, we developed a project for analyzing science and technology coverage in the region. In a previous study, we focused on a case study involving seven newspapers of significant impact in five countries in the region (MASSARANI *et al*, 2005). Among the results of this previous study, we observed that biology sciences and medicine issues have a strong presence in the newspapers analyzed. Another result is that scientists have an important role in the consolidation of the news stories, as interviewed key actors and as sources of suggestions for stories. The journalists also stressed that the relation between scientists and journalists has improved and although there are still some tensions, there is a joint effort at the moment of consolidating the stories. We also observed a reduced number of stories representing stereotyped images of scientists.

Following the steps of the previous study, we widened the scope of our research to 12 newspapers of significant impact in the region, involving nine countries, as it will be more detailed in the following item "Methodology".

The specific questions addressed in our study were the following:

Research question 1: Which academic fields and topics are contained within the broad heading "science" in the view of the Latin American newspapers?

Research question 2: To which degree is national science present in the newspapers in comparison to developed countries' science?

Research question 3: To which degree do the stories express concern or promises of science?

Research question 4: To which degree do the stories emphasize the benefits of science?

Research question 5: Do the stories represent stereotyped images of scientists?

2. Methodology

We analyzed 12 newspapers from nine countries in Latin America, as follows: Clarín (www.clarin.com) and La Nación (www.lanacion.com.ar), Argentina; Folha de São Paulo (www1.folha.uol.com.br/fsp) and O Globo (oglobo.globo.com/jornal), Brazil; El Mercurio (diario.elmercurio.com), Chile; El Tiempo (<http://eltiempo.terra.com.co/>), Colombia; La Nación (www.nacion.com), Costa Rica; El Comercio (www.elcomercio.com), Ecuador; Reforma (www.reforma.com) and La Jornada (www.jornada.unam.mx), Mexico; El Nuevo Día (www.endi.com), Puerto Rico; El Nacional (www.el-nacional.com), Venezuela. We also collected information on Granma (www.granma.cubaweb.cu), from Cuba, but we did not take it into consideration in this analysis since only one story was recorded during the period analyzed.

The criteria for the selection of the above-mentioned newspapers were the fact that, besides having an important impact in their countries, they have a specific section for publishing science stories, with a staff devoted to covering such issues.² We are aware that science and technology stories are eventually present in other sections of the newspapers, including comics and sections devoted to sport, family, women and comics (MASSARANI *et al*, 2003). But as checking the whole newspaper is very time consuming, we decided to focus on the science sections as a starting point. The newspapers were selected through Latindex (www.latindex.com), a comprehensive website that lists the newspapers in every Latin American country; all the newspapers included here are classified by Latindex as having “***”, a symbol for indicating the most important newspapers.³

We collected all the stories published by the science section from January to April 2006, available at the website of the newspapers.⁴ Our sample was based on the constructed week methodology. We selected four weeks, one for each month, as follows: we randomly selected one Monday, one Tuesday, one Wednesday, etc., for January 2006, then used the same strategy for February 2006, and so on. We excluded the

stories with less than 500 characters, arriving at a final sample of 681 stories in total, with which we built a database.

We used qualitative methodology for content analysis of the stories, having as a starting point an instrument developed by Bauer, Ragnarsdóttir and Rúdólfsdóttir (1933), which has approximately 60 variables. We focused on the variables that were in line with our analytical interests, and included some changes aimed at adjusting this instrument to the objective of our analysis.

Our analysis embraces two parts, one including primary coding frame and the other, secondary coding frame. The primary coding frame includes general information on the article, such as: information on the coder; identification of the article; name of the newspaper; day, month and year in which the article was published; and size of the story. Then we read each story and coded it according to the secondary coding frame, including the following: academic field mentioned in the story; location of the event/main action; evaluation of the tone of the article; kind of authorship; presence (or not) of the mention of controversies; presence (or not) of benefits; presence (or not) of stereotypes of the scientists. In the following section, when presenting the results, we will provide more details on these categories.

3. Results

Table 1 shows the number of stories of our sample, considering each of the newspapers. The first result that calls our attention is the fact that the two newspapers that had the biggest number of stories published during the period are *El Nuevo Día*, from Puerto Rico, and *La Nación/ Costa Rica*. We also observed an important difference in the number of stories published during the period by the specific newspapers, from 88 stories (*El Nuevo Día*) to 20 stories (*El Tiempo*). However, the lower number found in *El Tiempo* can be biased by our methodology, which included only the stories published in the science section, although it has other three related sections: ecology, technology and health.

3.1 Academic fields

The newspapers analyzed clearly take a broad view of science and a remarkable variation in the academic fields is observed when we compare the different newspapers (Table 2). However, clearly there is a dominance of medical stories, reaching about half of the stories in *El*

Table 1. Number of stories in each newspaper (real number)

Newspaper	Number of stories
<i>El Nuevo Dia</i> /Puerto Rico	88
<i>La Nación</i> /Costa Rica	82
<i>Folha de São Paulo</i> /Brazil	75
<i>La Nación</i> /Argentina	71
<i>Reforma</i> /Mexico	69
<i>El Clarin</i> /Argentina	59
<i>O Globo</i> /Brazil	56
<i>La Jornada</i> /Mexico	55
<i>El Comercio</i> /Ecuador	43
<i>El Mercurio</i> /Chile	39
<i>El Nacional</i> /Venezuela	24
<i>El Tiempo</i> /Colombia	20
Total	681

Table 2. Distribution of the stories by academic fields

	Exact sciences	Earth sciences	Biology sciences	Environment sciences	Medical sciences	Social sciences	S&T
<i>Clarín</i>	15.3	0.0	20.3	8.5	45.8	5.1	5.1
<i>El Comercio</i>	30.2	0.0	16.3	7.0	20.9	7.0	11.6
<i>El Nacional</i>	8.4	0.0	20.8	0.0	50.0	12.5	0.0
<i>El Nuevo Dia</i>	43.2	3.4	22.7	12.5	9.1	6.8	2.3
<i>Folha de São Paulo</i>	34.6	1.3	28.0	12.0	9.3	13.3	1.3
<i>O Globo</i>	25.0	1.8	21.4	10.7	32.1	7.1	1.8
<i>La Jornada</i>	18.2	1.8	18.2	16.4	38.2	3.6	3.6
<i>La Nación/ Argentina</i>	12.3	2.8	16.9	2.8	53.5	11.3	1.4
<i>El Mercurio</i>	28.2	5.1	17.9	15.4	15.4	12.8	5.1
<i>La Nación/ Costa Rica</i>	14.6	1.2	15.9	9.8	43.9	14.6	0.0
<i>Reforma</i>	31.8	1.4	20.3	8.7	18.8	5.8	10.1
<i>El Tiempo</i>	45.0	0.0	10.0	10.0	10.0	20.0	0.0

Note 1: Exact sciences include physics, astronomy, space sciences, chemistry, and mathematics

Note 2: We excluded "Others", which had 8.3 percent in *El Nacional*, 5.0 percent in *El Tiempo* and 2.9 percent in *Reforma*.

Nacional, *La Nación*/Argentina and *Clarín*. In fact, the section is called “Ciencia y bienestar” (“Science and Wellbeing”) in *El Nacional* and “Ciencia y Salud” (“Science and Health”) in *La Nación*/Argentina. Three newspapers, however, have a lower presence of medical themes in their stories, with figures equal to or less than 10 percent: *El Tiempo* (10 percent), *Folha de São Paulo* (9.3 percent) and *El Nuevo Día* (9.1 percent). Biological sciences are also present in the newspapers, being from about 30 per cent to 20 per cent in six of the nine publications analyzed.

Exact sciences showed a great difference of values among the newspapers, going from 45.0 percent (*El Nuevo Día*) to 8.4 percent (*El Nacional*), but kept an important presence in seven newspapers, with at least about one fourth of the stories related to the field. A variation among the newspapers is also observed on the presence of social sciences [20.0 percent (*El Tiempo*) and 3.6 percent (*La Jornada*)] and of environmental sciences [16.4 percent (*La Jornada*) to 2.8 percent (*La Nación*/Argentina). The stories on science and technology in general (including for example stories on science policy) reached a maximum of around 10 percent, in *El Comercio* and *Reforma*; in the latter, this is explained by the fact that it usually covers science policy issues. The presence of earth sciences was low in all the newspapers, reaching at the maximum 5.1 percent in *El Mercurio*.

The variation in the academic fields in some cases is due to the editorial guidance of the specific science section, which could express what the editors understand as science stories or what they think is more attractive for their audience. In other cases, however, it is a reflection of the general editorial guidance of the newspapers. Besides the above-mentioned editorial decision of joining health and science in *El Nacional* and *La Nación*/Argentina, we also observed that *El Mercurio* and *El Comercio* opted to call the section as “Science and technology” section. This explains the high figures found in both newspapers for exact sciences (about 30 percent), although other publications did have higher values for this academic field even without putting explicitly “technology” in the title of the section. As mentioned before, in *El Tiempo* there is the general editorial guidance of splitting science into four sections: ecology, science, health and technology, which can imply some impact on our analysis, although these academic fields are also present in the science section, as shown by Table 2.

Two major events happened during the period of analysis, which could lead to some bias in the distribution of academic fields in our results: the

bird flu and the space trip by the first Brazilian astronaut Marcos Pontes (an event also covered by other Latin American newspapers). In total, 53 stories were published on the Brazilian astronaut and 73 on bird flu during the whole period of 4 months (January to April). However, considering the constructed week methodology, only 13 articles (1.9 percent of the total number of stories) on the astronaut and 20 articles (2.9 percent of the total) on bird flu were published on the days analyzed.

3.2 Location of the events

We observed the location of the event or main action mentioned by the story, having as our focus to evaluate whether it was linked to a national context (country of origin of the newspaper); Latin America (another country in this region but not the country of origin of the newspaper); other developing countries; developed countries; worldwide. We also included the variable unspecified and not applicable.

Table 3. Location of the events (percent)

	National	Latin America	Other developing countries	Developed countries	Worldwide	Not applicable
<i>Clarín</i>	40.7	3.4	3.4	44.1	5.1	3.4
<i>El Comercio</i>	27.9	4.7	2.3	58.1	4.7	2.3
<i>El Nacional</i>	33.3	8.3	4.2	45.8	4.2	4.2
<i>El Nuevo Dia</i>	19.3	2.3	3.4	68.2	5.7	1.1
<i>Folha de São Paulo</i>	40.0	4.0	4.0	42.7	5.3	4.0
<i>O Globo</i>	26.8	3.6	5.4	53.6	10.7	0.0
<i>La Jornada</i>	30.9	1.8	1.8	49.1	14.5	1.8
<i>La Nación/ Argentina</i>	38.0	7.0	1.4	42.3	8.5	2.8
<i>El Mercurio</i>	38.5	0.0	2.6	53.8	5.1	0.0
<i>La Nación/ Costa Rica</i>	29.3	4.9	9.8	42.7	8.5	4.9
<i>Reforma</i>	29.0	5.8	5.8	52.2	5.8	1.4
<i>El Tiempo</i>	10.0	5.0	5.0	65.0	10.0	5.0

Table 3 shows a considerable difference among the newspapers with relation to the presence of national science, going from 10 percent (*El Tiempo*) to 40.7 percent (*Clarín*). But, in general, space was available for national science and technology. The figures are about 40 percent in four out of the twelve newspapers analyzed (*Clarín*, *Folha de São Paulo*, *La Nación/Argentina* and *El Mercurio/Chile*) and of about 30 percent in five publications (*El Comercio*, *El Nacional*, *La Jornada*, *La Nación/Costa Rica* and *Reforma*). Both newspapers in Argentina are included among the newspapers with higher coverage of national science and technology, expressing greater importance given to local production. *Folha de São Paulo* also has one of the highest figures related to national science, but usually most of the national stories are related to research in São Paulo.

Despite the important presence of local science in some of the newspapers, most of the coverage is related to developed countries, being the highest figure related to *El Nuevo Día* (68.2 percent, which is understandable due to the fact that Puerto Rico is a self-governing commonwealth in association with the United States) and *El Tiempo* (65 percent). The figures related to other Latin American countries are low – from zero (*El Mercurio*) to 8.3 per cent (*El Nacional*). The figures are also low for the presence of the science of other developing countries: from 1.4 percent (*La Nación/Argentina*) to 9.8 percent (*La Nación/Costa Rica*).

3.3 Concern or promise?

We evaluated the tone of the article, on a rating scale, in the following categories:

1) neutral; (2) affirmative (overwhelming discourse of great promise); (3) dominant discourse of promise and/or progress; (4) mixed, ambiguous; (5) dominant discourse of concern; (6) critical (overwhelming discourse of great concern).

Table 4 shows that in almost all the newspapers an important number of stories have a neutral tone, with some variation among the different newspapers. The figures are between 35.0 percent (*El Tiempo*) to 53.5 percent of the stories (*El Comercio*). The values for articles expressing great expectations and promises regarding science are smaller than those expressing great concern: from 0 percent (in four newspapers) to 5.8 percent for great promise (*Reforma*) in comparison to 0 percent (*El Tiempo*) to 13.2 percent (*El Mercurio*) for great concern..

Table 4a. Tone of article (percent)

	neutral	great promise	promise	mixed/ ambiguous	concern	great concern
<i>Clarín</i>	45.8	1.7	18.6	8.5	15.3	10.2
<i>El Comercio</i>	53.5	2.3	14.0	7.0	18.6	4.7
<i>El Nacional</i>	41.7	0.0	25.0	16.7	12.5	4.2
<i>El Nuevo Día</i>	48.9	0.0	27.3	4.5	17.0	2.3
<i>Folha de SP</i>	42.7	4.0	22.7	9.3	12.0	9.3
<i>O Globo</i>	50.0	3.6	21.4	1.8	12.5	10.7
<i>La Jornada</i>	43.6	0.0	16.4	5.5	27.3	7.3
<i>La Nación/ Argentina</i>	40.8	4.2	28.2	12.7	9.9	4.2
<i>El Mercurio</i>	36.8	2.6	28.9	13.2	7.9	13.2
<i>La Nación/ Costa Rica</i>	35.4	2.4	20.7	7.3	30.5	3.7
<i>Reforma</i>	49.3	5.8	29.0	2.9	10.1	2.9
<i>El Tiempo</i>	35.0	0.0	45.0	10.0	10.0	0.0

Tabela 4b. Tone of article (percent)

	Great promise + promise	Concern + great concern
<i>Clarín</i>	20.3	25.4
<i>El Comercio</i>	16.3	23.3
<i>El Nacional</i>	25.0	16.7
<i>El Nuevo Día</i>	27.3	19.3
<i>Folha de São Paulo</i>	26.7	21.3
<i>O Globo</i>	25.0	23.2
<i>La Jornada</i>	16.4	34.5
<i>La Nación/Argentina</i>	32.4	14.1
<i>El Mercurio</i>	30.8	20.5
<i>La Nación/Costa Rica</i>	23.2	34.1
<i>Reforma</i>	34.8	13.0
<i>El Tiempo</i>	45.0	10.0

But the values related to promises are higher than concern: from 14 percent (*El Comercio*) to 45 percent (*El Tiempo*) for promise and from 7.9 percent (*El Mercurio*) to 30.5 percent (*Reforma*) for concern.

The balance in the tone of the stories can be also observed when we add “great promise” to “promise” and “great concern” to “concern”. In nine out of the twelve newspapers, the difference between the columns is at maximum about 10 per cent (with the exception of *Reforma*, *La Jornada* and *El Tiempo*):

The variation for an ambiguous or mixed tone is from 2.9 percent of the stories of *Reforma* to 16.7 percent (*El Nacional*).

3.4 Science benefits

Although some balance in the tone is observed in the stories, as shown above, the explicit reference to the benefits of science is also clear in all the newspapers analyzed (Table 5). The most distinguished case is *El Nacional*, in which 79.2 percent of its stories stress the benefits of science. The lowest figure is found in *O Globo* (35.7 percent), and the variation in the value among most of the newspapers is not very large..

Table 5. Presence of benefits of science (percent)

	Benefits
<i>Clarín</i>	42.4
<i>El Comercio</i>	37.2
<i>El Nacional</i>	79.2
<i>El Nuevo Día</i>	42.0
<i>Folha de São Paulo</i>	42.7
<i>O Globo</i>	35.7
<i>La Jornada</i>	36.4
<i>La Nación/Argentina</i>	56.3
<i>El Mercurio</i>	51.3
<i>La Nación/Costa Rica</i>	40.2
<i>Reforma</i>	50.7
<i>El Tiempo</i>	50.0

3.5 Information source

We observed whether the story is signed by some organization or person, classified in the following groups: news wire service; journalist; expert (scientist, professor, etc.); newsroom; lay person; other; unsigned.

Table 6. Type of authorship (percent)

	News Wire Service	Unsigned	Journalist	Expert	Newsroom	Others
<i>Clarín</i>	30.5	25.4	33.9	1.7	1.7	6.8
<i>El Comercio</i>	74.4	16.3	0.0	0.0	7.0	2.3
<i>El Nacional</i>	4.2	29.2	33.3	12.5	0.0	20.8
<i>El Nuevo Día</i>	71.6	12.5	13.6	0.0	2.3	0.0
<i>Folha de São Paulo</i>	4.0	4.0	66.7	12.0	6.7	6.7
<i>O Globo</i>	5.4	44.6	26.8	0.0	10.7	12.5
<i>La Jornada</i>	58.2	18.2	21.8	1.8	0.0	0.0
<i>La Nación/ Argentina</i>	25.4	22.5	45.1	1.4	0.0	5.6
<i>El Mercurio</i>	20.5	15.4	56.4	0.0	0.0	7.7
<i>La Nación/ Costa Rica</i>	41.5	14.6	41.5	0.0	0.0	2.4
<i>Reforma</i>	27.5	21.7	36.2	1.4	10.1	2.9
<i>El Tiempo</i>	65.0	25.0	10.0	0.0	0.0	0.0

Excluded 'lay person' (result = 0)

Table 6 shows a huge difference among the newspapers about the presence of the wire services as direct explicit source of the news: from 4.0 (*Folha de São Paulo*) to 74.4 percent (*El Comercio*). In four newspapers, this is the main source of authorship (*El Comercio*, *El Nuevo Día*, *La Jornada* and *El Tiempo*). In *La Nación/Costa Rica* wires services have the same importance as journalists in the authorship. In *O Globo* we observed some presence of stories bought from other newspapers, such as *The New York Times* (see "Others" in Table 6).

Folha de São Paulo is the newspaper that includes the highest figure for articles signed by journalists (66.7 percent), followed by *El Mercurio* (56.4 percent). In fact, both newspapers have a well structured staff in the science section (MASSARANI *et al*, 2005). However, the lack of signature of journalists can express internal procedures, instead of the absence or low presence of this professional. This is the case, for example, of *O Globo*, in which only 26.8 percent of the articles analyzed are signed by journalists and 10.7 percent are signed as “newsroom”. Another 44.6 percent are not signed, reflecting the decision that only exclusive stories are signed by the journalists (AMORIM, 2006). In *El Comercio* we found no articles signed by journalists; this is due to the fact that the electronic version is different from the printed version of the publication, with the former being mostly provided by external sources, including stories sent by Fundacyt, the foundation for science and technology.

We also observed in ten out of the twelve newspapers analyzed the presence of scientists as authors was very small, in some cases with no articles signed by experts. The maximum figure reached was approximately 12 percent (*Folha de São Paulo* and *El Nacional*). *Folha* includes a weekly fixed section signed by the Brazilian physicist Marcelo Gleiser. The absence of articles signed by scientists does not necessarily mean that scientists do not send articles to the science section (they might send them and be refused, for example).

Table 7. Stories including interview with scientists (percent)

<i>Clarín</i>	71.2
<i>El Comercio</i>	48.8
<i>El Nacional</i>	54.2
<i>El Nuevo Día</i>	63.6
<i>Folha de São Paulo</i>	77.3
<i>O Globo</i>	55.4
<i>La Jornada</i>	69.1
<i>La Nación/Argentina</i>	64.8
<i>El Mercurio</i>	68.4
<i>La Nación/Costa Rica</i>	59.8
<i>Reforma</i>	72.5
<i>El Tiempo</i>	45.0

However, reading the texts we observed that scientists do have an important role as the source of information through the interviews they provide for the journalists. In fact, all the newspapers present high figures for scientists interviewed (Table 7); in *Folha de São Paulo*, more than two thirds of the stories during the period include interviews with scientists.

No article was signed by a lay person; this is understandable considering the profile of the science section. Although we are not familiar with studies on this, we do believe that even in the letters to the editor section, the presence of published letters written by lay people on science issues is low.

3.6 Presence of controversies and stereotypes

We also observed a low presence of controversies, reaching at maximum 10 percent of the stories. *El Comercio* presented the lowest figure, with only 4.6 percent of the stories mentioning controversies (Table 8).

Table 8. Presence of controversies (percent)

<i>Clarín</i>	8.5
<i>El Comercio</i>	4.6
<i>El Nacional</i>	8.3
<i>El Nuevo Día</i>	5.7
<i>Folha de São Paulo</i>	9.3
<i>O Globo</i>	7.1
<i>La Jornada</i>	9.0
<i>La Nación/Argentina</i>	8.4
<i>El Mercurio</i>	7.7
<i>La Nación/Costa Rica</i>	7.3
<i>Reforma</i>	7.2
<i>El Tiempo</i>	10.0

We also analyzed the stories to identify to which degree the scientists are presented as stereotyped images. We considered the following stereotypes: magician and wizard; genius; impartial expert, judge; creator, destroyer, healer, curer (religious metaphors); heroes,

front, frontier, pioneer (military metaphors); financially interested, greedy, selfish; eccentric, mad scientist; removed, out of touch; mixed stereotypes (heartless, cheater, charlatan). We also included the variables 'none' and 'not applicable'. As the number of stories expressing each of the stereotypes was low, we present below the results placing all of them in the same column (see Table 9).

Table 9. Stories carrying any stereotype (percent)

<i>Clarín</i>	13.6
<i>El Comercio</i>	14.0
<i>El Nacional</i>	4.2
<i>El Nuevo Día</i>	9.1
<i>Folha de São Paulo</i>	16.0
<i>O Globo</i>	17.9
<i>La Jornada</i>	3.6
<i>La Nación/Argentina</i>	9.9
<i>El Mercurio</i>	5.1
<i>La Nación/Costa Rica</i>	7.3
<i>Reforma</i>	8.7
<i>El Tiempo</i>	10.0

As shown in Table 9, the presence of the stereotype images of the scientist is low in most of the newspapers analyzed, and the figures in eight out of the twelve newspapers analyzed are below 10 percent. The two main Brazilian newspapers *O Globo* and *Folha de São Paulo* are the ones that most presented stereotype images (respectively, 17.9 percent and 16.0 percent). The main stereotypes presented by both newspapers are included in the military metaphors, such as heroes, front, frontier and pioneer (*O Globo*, 8.9 percent, and *Folha de São Paulo*, 9.3 percent). However, these figures which are higher than those of the other newspapers might be caused by the above-mentioned bias caused by the period of time in which we collected our sample, due to the space trip of the Brazilian astronaut, presented as a hero by the newspapers.

Conclusions

A first conclusion that merits our attention is the high number of stories on science and technology issues published during the period by some of the most important Latin American newspapers. The figures support the findings of our previous study made in 2004 (MASSARANI *et al*, 2005), indicating that there is stability in the science coverage at least in five out of the twelve newspapers involved in the present study since 2004 up to the present.⁵ It was also surprising to observe the remarkable number of stories in Costa Rica and Puerto Rico, which have less consolidated science systems and science journalism than other countries in the region, for example Mexico, Brazil and Argentina. Costa Rica has been the stage for a burgeoning movement promoting science journalism, including the creation last year of a national association.

According to our results, there is an important variation among the Latin American newspapers regarding the academic fields covered by their stories. However, following the tendency observed by other studies (see for example Pellechia (1997); Bucchi and Mazzolini (2003); Clark and Illman (2006)), medical and health issues were the main topics in most of the newspapers analyzed, although the figures can vary considerably among the publications.

Our results also show a considerable difference among the newspapers with relation to the presence of national science and technology, although clearly they have space in the newspapers. In this sense, it is clear that Argentine science journalism – at least as expressed by the two main newspapers in the country – gives importance to local science (see also MASSARANI *et al*, 2005, and AMORIM, 2006, for similar conclusions). However, the figures relating to the coverage of scientific results in other Latin American countries are low, showing that we know more about what happens in developed countries than in countries in our own neighborhood with which some partnerships could be set up, due to similar interests and similar contexts. The figures are also low for the presence of science in other developing countries.

Although the figures change among publications, in all the newspapers analyzed most of the coverage is related to developed countries or worldwide. In debates on science journalism, it is usually argued that most of the coverage should be on developed countries ´

science, due to the fact that those countries are responsible for most of the scientific production in the world. Indeed, this is a fair argument. Brazil, for example, which is one of the most productive in science in the region, is responsible for only 2 percent of the scientific production in the world.

However, we should not ignore the high figures relating to stories that are simply reproduced by developed countries' news agencies without a critical approach by the journalists, as expressed for example by the number of articles that are taken from news wire agencies. Obviously, this is not a general rule: some journalists do care about checking the information provided by international agencies or sources and seek to have additional information on the issue, as well as in some cases to place the result in the context of the national reality.⁶ Furthermore, in some of the newspapers an important number of stories were in fact written by journalists, some of whom have been working in science journalism for a long time and have been seriously thinking about strategies for improving science coverage.

Our results show that scientists are one of the main sources for journalists, although they themselves do not write the stories. This supports previous findings by our group, using both quantitative and qualitative methodologies, in which science section editors of five out of the twelve newspapers analyzed here explicitly pointed out that scientists were the main source of information and tips for their stories.

Despite some balance in the tone considering the promises and concerns with regard to scientific results, we observed an important number of articles stressing the benefits of science in all the newspapers analyzed. This also includes a utilitarian use of science. Although additional qualitative analysis should be done, mainly in the stories that do not stress the benefits of science, our results suggest that the science sections of the main Latin American newspapers, at least during the period of our study, exhibited a positive image of science. In the next step of our study, we will be focusing on how much and in which way scientific risks are being covered by the newspapers, although we have some clues to believe that this is not a main concern (MASSARANI *et al*, 2005, AMORIM, 2006). From our point of view, the benefits of science are indeed important and should be covered by the media. However, it is also part of the role of science journalists to place in debate risks related to science and technology issues that have important impacts on society.

We also observed a low presence of controversies, reaching at the maximum 10 percent of the stories. These figures also support previous findings showing the low presence of controversies in Latin American newspapers (MASSARANI *et al*, 2005). Interviews with the editors of five out of the twelve newspapers analyzed here showed that, in fact, controversies were not the main concern for science section editors (AMORIM, 2006). From our point of view, however, controversies are intrinsic to the scientific process itself and thus should have more presence in the newspapers.

Our study also allowed us to analyze how much a stereotyped image of scientists is represented by the newspapers – a recurrent criticism made by scientists in meetings for discussion of science and media. At least in some of the newspapers analyzed here, the number of stories expressing a stereotyped image of scientists was low, supporting the similar findings of our previous study (MASSARANI *et al*, 2005).

In this study, we undertook an initial mapping of science coverage in Latin America, considering some of the most important newspapers in the region. An interesting aspect that is not possible to identify at this stage of the research is how much the national context of each of the countries has been framing the stories differently. This is not an easy question to answer considering the different aspects that influence agenda building, including the editorial guidance of each of the newspapers and the guidance of the science editor, but we hope that in the future we can find clues for elucidating this aspect of science journalism.

NOTES

- 1 The Declaration of the Third World Conference of Science Journalists at São José dos Campos, Brazil, available at <http://www.esf.org/newsrelease/57/declarationbrazil.pdf> [access on May 29, 2006].
- 2 *El Clarín* and *La Nación* don't have a section targeted exclusively for science, but they do have a section in which science is systematically covered. Due to the significance of these newspapers and that in fact there is a permanent space for science in them, we decided to include them.

- 3 *La Jornada* is the only newspaper that was not included in the “**” category, but we included it here due the consistent coverage on science undertaken by the newspaper.
- 4 We are aware that some newspapers might have differences between the printed and the electronic versions. This is the case, for example, of *El Comercio* – in which the most dramatic difference is observed since in fact the print and electronic versions have different editorial guidance. However, we opted for the electronic version due to the fact that it was available for people from other countries and was also more feasible, in terms of costs (most of the newspapers do not charge for electronic access) and practical aspects (it is time consuming to receive the issues by regular post and they are likely to be lost on the way). Thus, the results presented here should be seen as related to the electronic version.
- 5 The five newspapers are: *El Mercurio*, *El Comercio*, *La Nación/Argentina*, *Reforma*, *Folha de São Paulo* and *O Globo*.
- 6 Additional qualitative studies have also been made by our team to analyze how the scientific information provided by developed countries has been made available to journalists in Latin American newspapers (see for example VENEU, MASSARANI, AMORIM, 2006).

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