Newsworthiness in Science
A Content Analysis of Science News in Swedish Prime Time Television 2009-2011

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Abstract

Background: Science journalism is essential for keeping citizens of democracies informed and educated, this is part of the public service concept. However, some authors assume much arbitrariness of selectivity mark science news as a peculiar journalistic genre. This study investigates how science news are valued alongside general news in swedish public service programme Rapport. Method: The science features from two years of prime time broadcasts of Rapport was analyzed quantitatively by means of content analysis. Results: Studies with some connection to Sweden, a "human angle", emphasizing health risk, seems most likely to be covered. Conclusions: Put into context, the results was interpreted as invalid in some respects that support the conjecture of the peculiar nature of science news. The findings therefore suggest that news value theory needs special revision to account for newsworthiness in science.

Keywords: science journalism; news value; public service; television; Sweden
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1. Introduction

1.1 The problem of science news

Journalism is in general to a large extent about making complex information intelligible. In science journalism, this aspect of the craft is taken to its extreme. In terms of news values, general news may have higher overall value and market competition is seldom, if ever, in favour of science reporting. Interesting scientific findings are published on a regular basis but, as we shall see, the coverage of science is not regular. This somewhat peculiar nature of science journalism raises the question whether it has its own special criteria or value of newsworthiness. Where then, lies the newsworthiness in science? This question can get quite philosophical. How one answers it is probably largely dependent on what kind of worldview one harbours.

Among reporters covering science, there are allegedly two principal attitudes towards science journalism. Reporters of the first attitude finds scientific findings interesting on their own. Basic research with no obvious applications or relevance to daily life is considered newsworthy by virtue of the audiences curiosity about the world. This attitude is sometimes criticized for its uncritical coverage and relation to its academic sources. Reporters of the second attitude are striving to put science issues into social contexts and emphasize the importance of using academic experts critically. If the first attitude is that of traditional science journalism, the second could be labeled critical science journalism. These attitudes are of course extreme examples, or perhaps archetypal, but it is within this scope science journalism is generally discussed. (Carlsson & Ekström 2004; Bauer & Bucchi 2007; Hornmoen 1999) A science newsroom can of course accomodate both attitudes and its output can be, and probably most often is, a blend of the two.

Little has hitherto been said about the state of affairs of science news in swedish news media (VA 2005b). To make a satisfactory comparison in this respect of Sweden and other countries, this knowledge gap needs to be filled. This study takes its point of departure in conclusions from previous research on what makes science newsworthy. Hopefully, with this study some brief outline could be given of the basic characteristics of the scientific events considered newsworthy by Swedish news media.
1.2 Aims

Bad or unethical science could, at least in principle, become splendid news. Likewise, important scientific breakthroughs could be close to impossible to present to a wider audience without being unintelligible or boring. Broad coverage and publicity of science is of great benefit to scholars and their institutions. The public relation offices of universities and journals is often an important link between the researchers and the media. Their work is to highlight the newsworthiness of new published findings in order for media to cover them. To fully understand this mechanism, there is a need to investigate how different media actually cover scientific events.

Science news may be especially well suited for a study of news values since the events of science do not happen by chance and is less marked by political bias than other news. By journalistic measures, the time between a scientific discovery and its publication is very long. Scientific institutions provides newsrooms with a steady current of events to make news about, but the coverage of science is all but regular and the dynamics of selectivity is therefore expected to be particularly evident in this genre. The focal point here is on the science news that compete with general news for space. Therefore, specialized science programmes is of no interest here. In a specialized science programme there is of course certain dynamics of selectivity at play, which is interesting on its own, but that would not tell us anything about how science is valued alongside general news. The aim of this study is to provide a descriptive account of how science news are valued and selected in the Swedish television news programme Rapport. By studying the science features from two years it might become clearer what the typical science feature looks like and what scientific events the Rapport newsroom considers newsworthy. The results of this study will hopefully bring about some new perspectives on news value theory, especially how well science news in particular can be studied in terms of news values.

1.3 Research questions

The main question this study seeks to answer is: "When is science considered most newsworthy by Rapport?" In order to answer this, the question was subdivided into research questions based on the aspects of news that is expected to determine whether an event is covered or not.

* What kind of scientific events become news?
* Do "closeness" matter for a scientific event to become news?
What difference does risk or benefit make for a scientific event to become news?
What topics are dominant among the scientific events that become news?
What role does availability of imagery play for a scientific event to become news?
What is presented about the source?

1.4 Delimitations
The Swedish word that corresponds to the English word ”science” is ”vetenskap”. The social sciences and humanities, are often understood as belonging within the category of ”vetenskap” and ”Natural science” is demarcated from ”cultural sciences”. In this study however, the word ”science” is used and understood as the word is used and understood in English. News on ”cultural science” is therefore not taken into account. Further, the focus on this study is on scientific events that become news. Therefore news on funding of a university or news with commentary by academic experts is not included.

1.5 Disposition
In the next chapter it is summarized what has been done in the field and what of those results this study can be fruitfully compared to. Then the theory of news value and the critique directed towards it is discussed. Chapter three describes the methodology of content analysis and motivates its use in this study, there is also a discussion on what is meant by ”science news” and how to demarcate the field for this study. The results are presented and contextualized in chapter four. In the last chapter the results are interpreted into some conclusions. Before summing things up and comparing the new results to the ones of previous research, some suggestions will be made on how to improve science reporting according to the results of this study.
2. Science news and the dynamics of selectivity

2.1 News values
Whatever purpose the concept of “news value” serves, it cannot do it with any exact measures. With it, the media scholar could not pinpoint exactly what makes an event into news, but on a larger scale it can be used to understand some basic dynamics of news production. ”News value” is a way to conceptualize the potential of an event or phenomena to be covered by media. If a decision was to be made between two features to be included in a broadcast, the one actually included is to be considered as having higher news value that day. Therefore, to analyze what is actually covered by a news organization is to analyze what features of an event that makes it likely to become news. If the journalist works on ”gut feeling”, the scholar of news studies tries to map this gut feeling into a theoretic framework, of news value. Quantitative measures of trends and patterns of the work of many journalists may provide insights into how the gut feeling of reporters and news editors really works. The concept of news value can be at least one way to understand how selectivity works in the newsrooms.

2.2 Review of literature
Analysis of the values and processes involved in the selection of news is one of the most important areas of journalism studies as it goes to the heart of what is included, what is excluded, and why. […] by shedding light on the values inherent in news selection we can help illuminate arguments about the wider role(s) and meaning(s) of journalism within contemporary society. (Harcup & O'Neill 2009:162)

News values are criteria for selectivity in news. Even though selectivity in news has been discussed since Lippman (1922) and others, ”news value” as a standardized concept has been around since Galtung & Ruge’s (1965) seminal study. Galtung & Ruge aimed at studying how foreign news was covered in the Norwegian press. Their basic assumption was that even if journalists report events faithfully and as unbiased as possible, the selection of events to become news will ultimately reflect some bias depending on the worldview of the selector. Their outlook showed great conceptual potential for further studies of other media and genres.

The incentives for publishing a story differs between media organizations. While some organizations have "good" journalism as their main selling point, others have their market strategies based on sensational stories where selling single copies seem more important than
the professional ethics of journalism. The organization’s respective ways of valuing news is expected to differ accordingly. Allern (2002) argues that coverage should be analyzed in both terms of market objectives and journalistic practice instead of in terms of journalistic practice alone. Rolland (2006) compared two theories on the impact of commercialization on investigative journalism, one theory stating that commercial news criteria restrain investigative journalism, the other stating that commercial news criteria stimulates investigative journalism. His empirical test supported the latter. Ihlen et al (2010) compared how two norwegian television channels cover foreign news. One license-financed channel; NRK and one channel funded by advertising; TV2, both having public service obligations. They found that apart from that NRK televised more foreign news, the characteristics of the news were ”strikingly similar” due to three things in common; availability of images, the norwegian news culture and their public service obligations.

Shoemaker & Cohen (2006) has presented a large comparative study of news in ten countries. Showing that different countries, cultures and media harbour the same basic ideas of what news and newsworthiness really is in spite of the several differences in their coverage.

The study of news values has been subject to highly relevant critique. First, the tension between academic notion of news value viz. the practicing journalists notion is important to take into account. Second, traditional research into news value may be claimed to investigate how news are presented rather than why they are selected. Third, news values are not the same across time and space. Fourth, other factors than news value may indicate the newsworthiness of events and what differs between stories may vary. For a more detailed review on news value research, see Harcup & O’Neill (2009).

2.3 News values in science

Science becomes newsworthy when it becomes part of wider social and political problems, or when it is linked to major accidents and disasters.

(Hansen 1994:116)

News values in science news in general have been studied by Gregory & Miller (1998). Hughes (2007) has studied news values for science particularly in the mail correspondence between news editors of the Manchester Guardian and the science reporter James Gerald Crowther. A study shedding some light on how news editors thought about the expectations and scientific literacy of the British interwar newspaper audience.
Hansen (1994) notes that science journalists from the British press routinely choose to cover science which is of “relevance to daily life”, “with a human angle” or perhaps, simply “weird and wacky”. The dominance of medicine and health related issues in science news is probably due to this “human angle” criterion of selectivity. Hansen makes two important conclusions: First, science journalists see themselves primarily as journalists and being specialists as subordinate. Second, science journalists seem to agree upon that criteria of news selectivity differ in very important aspects in science journalism. Furthermore, the journalists “see their job as one of providing interesting, informative and entertaining coverage of science, not as one of educating the public or proselytizing on behalf of science”. (1994:130)

2.4 Science news and its role in society

By studying questions submitted to the interactive website Scienzaonline, Falchetti et al (2007) could draw some conclusions about what the public expects from scientists when given the opportunity to anonymously ask experts about what puzzled them. They found that the public sought for knowledge in the “information” category rather than in the categories of “explanation” or “validation”. Further, the nature of the expected knowledge was to a larger extent “practical” rather than “theoretical”. According to the authors, their study supports hypotheses made elsewhere stressing that the public expects aid in their personal intellectual strife to find answers to the ”great unanswered questions” in contrast to requesting brute scientific facts.

Cultivation theorists expects television viewers to adopt a worldview consistent with what is shown on television correlated with the amount of time they spend in front of their TV. Gerbner et al (1985) investigated how cultivation theory held for the public view on science. The study confirmed the cultivation theory by concluding that people held a less favourable view on science the more TV they watched. Since science, according to this theory, was represented as unfavourable on overall television. The cultivation theory remains confirmed as the phenomenon was studied anew in the media landscape of the early 21st century (Dudo et al 2010).

The importance and impact of scientific results is commonly held to be indicated by how much its authors are cited in subsequent research articles. (King 1987) Transmission of scientific results in the lay press generates a significant increase in citations in academic journals. (Phillips 1991) Industry funded research and industry-favoring results in medicine
have also been shown to be associated with significant increase in citation rates. (Kulkarni 2007) Bhandari (2004) has shown that medical trials funded by the industry is liklier to yield industry favoring results. Results not favoring the industry often remain unpublished. A comparison between internal company documents from industry sponsored clinical trials was shown to deviate from what was later publicly reported (Vedula 2013).

There has been concerns about print media presenting an unbalanced and exaggeratedly positive image of genetic research, commonly refered to as "genohype". (For instance, Petersen 2001) This view was challenged by Bubela & Caulfield (2004). By comparing newspaper articles about genetics with its academic sources the authors found that the newspapers reflect the peer-reviewed findings accurately. However, risks were consequently neglected to a similar extent in both academic and lay press on behalf of the highlighting of benefits. Singer (1990) studied inaccuracies in science reporting from 15 different media during four months in 1984. Two fifths of the news stories deviated substantially from its peer-reviewed source. Discrepancies were mainly about qualifying statements, details of method, significant results, shifting of emphasis, less precise wordings and more colloquial terms. A study made on how media reports on preventive medicines have shown that the representation have been "inadequate or incomplete” in terms of benefits, risk and the financial ties between researchers and the industry. (Moynihan et al 2000) It’s uncontroverisal to emphasize that commercialization of the media have some negative implications for the democratic society. (Rolland 2006) Especially, when it comes to medical news. This is important to have in mind since most of the experts are funded by, and thus dependent on, the pharmaceutical industry. Even if science have a reputation of producing objective and neutral knowledge, it does require heavy finance. And with heavy finance comes heavy commercial concerns, a suspicion confirmed to some extent, as noted above. (Bhandari 2004; Vedula 2013)

In Shoemaker and Cohen’s study, the country that covers most science in TV, radio and press, is China (3.2%). Israel covers the least (0.2%), in the U.S the figure is 1.0% and in Germany 0.9%. (2006:38-39)

Vetenskap & Allmänhet (VA) has published two reports on science journalism in Sweden. The first report is a study of how science is covered in the press with a special focus on a younger audience. It investigates how much science is covered, what sources are cited, how science is
presented and what topics are covered. (2005a) In the other report, journalists attitudes to science is investigated. (2005b).

The literature seems to suggest that news media do for the most part transmit peer-reviewed findings accurately, but fail to compensate for what goes without saying within the scientific community i.e. questions about risks and benefits. This may call for a more active and extensive source criticism from science reporters. For instance, paying more attention to the acknowledgement sections in scientific papers and presenting risks or benefit with some extra caution.
3. Data and methods

In this study, what is presented in the news is measured and analyzed. Thus, a conclusion can presumably be drawn about what events have passed the threshold of the editors gatekeeping function. The analysis was carried out guided by Krippendorff (1980) and Neuendorf (1999).

3.1 Choice of study object

To investigate news values in science, a programme or paper was needed without a regular science section, the possibility for science to be ignored when bigger news is covered was essential, as were an audience as broad as possible. The 1930 broadcast of Rapport is prime time and on a channel accessible for everyone with a television receiver in Sweden. Also, the coverage of the program is aimed at the general population and what is covered can be expected to count as having highest possible news value. Thus, the 1930 broadcast of Rapport is a good candidate for being the most comprehensive news package for a person who only chooses one source of news per day. The science news in Rapport should therefore be a good indicator of how science news are valued alongside general news.

The time scope of this study is exactly two years. With a quantitative approach such as this, it may be possible to generalize the results and use it for comparison.

3.2 Research design

Aiming at understanding the dynamics of news values of scientific events in swedish public service, this study takes its point of departure in previous studies on news values in science. A content analysis was designed to answer the research questions quantitatively. The method of content analysis was chosen due to its relative empirical robustness and repeatability, hence high in reliability. A list of variables was created to provide answers to the research questions. The possible answers to these questions were set as values of the variables. The variables were designed to enquire to what extent the news values of earlier research was present in the material of this study. The data was then analyzed by running all variables pairwise. (See the full code book in Appendix 1 and result tables in Appendix 2.)

A similar study to this is VA (2005a), which is based on similar research questions and uses a content analysis. However, it investigates printed material, mostly magazines with a younger audience. Rather than studying what makes science newsworthy, the report is focused on how science is presented and how and whether it is distinguished from pseudo-science.
3.3 Defining science news

News based on original and novel research in the natural sciences presented on the 1930 broadcast of Rapport is the subject here. The demarcation line between science news and general news is not always clear. Therefore the following two criteria were chosen:

**Novelty:** The newsworthy event should be new scientific knowledge. Therefore news concerning funding of science, political issues on universities or research are discriminated. Also, coverage of awards like the Nobel Prize is not taken into account since the awarded findings are not new.

**Science proper:** A lot of news has a scientific flavour without actually being about science. Polls, market research or plain statistics are not taken into account. News concerning natural disaster or animal population change etc. commented by academic experts are also excluded from this study.

News items on research in the social sciences and humanities were not included.

3.4 Message unit: The science feature

In content analysis, the term for what is being analyzed is ”message”. This is the unit whose content is being analyzed. In this analysis, the messages are science news items. Headlines and introductory announcements are counted as part of the item. The televised news on Rapport is also published on the web, often with additional information. These are not counted as part of the item.

3.5 Source

The source material was acquired digitally through the Swedish Media Database at the National Library in Stockholm, Sweden. All programs were scanned manually. For every relevant unit, i.e. a science feature on the programme, the variables were entered into the IBM SPSS software, which was also used to analyze the data.

3.6 Variables and operational definitions

The values of the variables reflect what is presented in the program. ”Mention” means that it is either mentioned with voice, byline or image. What was not included or mentioned in the feature was not taken into account. The first four variables deal with the *source* of the news.
The next two concerns *implications* of the events. The following two variables state what *kind* of science the items are about. The last variable is about the imagery of the feature.

**Event**

Most science news are about published studies. Sometimes however, the application and utility of science make it to the news and some items simply cover ongoing research. Conferences were coded as "ongoing research". In news value theory, "news" is the coverage of *events*. Science news according to the criteria of this study is events of three distinct kinds. Hence the values "published study", "applied science" and "ongoing research" of the first variable.

**Closeness**

By "connection to Sweden" it is meant that a co-author of a paper might be Swedish, a conference taking place in Sweden or the whole research group has done its research in Sweden. This variable has two values: "yes" and "no".

**Implication**

Whether risk or benefit is dominant is of interest since most research into news values seem to conclude that bad news are favoured. This variable will hopefully tell us whether risk or benefit is favoured by Rapport. The three values of this variable are "risk", "benefit" and "neutral". The value "risk" means that the event is a stating of hazard. And "benefit" means that the event implies the solution to a problem or simply have positive effects. When neither "risk" or "benefit" is meaningful or if the event is presented as having no immediate implications, the item is valued as having "neutral" implications.

**Interpretation**

This variable concerns the kind of implications the event has. The values are "health", "commercial" and "purely scientific". "Health" is here to be understood in a wider sense, such as health of humans, the planet/environment or animal populations. "Commercial" means that the event is presented as having foremost commercial implications. The risk or benefit is then concerning economy. When the event is presented as having no implications outside the scientific community it is valued as having "purely scientific" implications. This could mean that an event that has to do with human health, but having no practical applications other than extended knowledge about the human body, is valued as "purely scientific".
**Level of description**

At what level of description are the studies made? In simpler words: what size have the study objects? The purpose of this variable is for enquiring to what extent the "human angle” criterion is fulfilled. This variable is also supposed to indicate what perspective is predominant. If an event is about quantum physics it is valued "subatomic”. If it is about anything bigger than a cell but smaller than a population it gets the value "organism/object” i.e. things at arms-length, visible to the naked eye. Units concerning organs are also valued at the "organism/object” level. For findings about a cell's reaction to a molecule it is valued "cell”. Environmental issues are most often about how the planet as a whole is affected by pollution and are in such cases valued "planetary”. The difference between "organism/object” and "population” can be quite problematic. Findings about how statistical cohorts (with obvious internal variance) behave or is affected are valued with "population”. Choosing between values 5 and 6 may be tricky but they are both taken to represent the "human angle” and can be counted together, for instance, relative to the "topic”-variable. The values are: "subatomic”, "atomic”, "molecular”, "particles”, "cell”, "organism/object”, "population”, "planet”, "solar”, and "cosmic”.

**Topic**

Since very few modern scientific findings would fit into a schema of pure disciplines, "topic” was considered more appropriate. The values of this variable are not exhaustive, but any unit will fit well into some value. This will not show what discipline is predominant, but it will point at what topics may be preferred by the newsroom. The values are: "pharmaceuticals”, "alcohol”, "food”, "technology”, "environment”, "genetics”, "animals”, "plants”, "human health”, "basic Research” and "space”.

**Publication**

Where a study is published can, if mentioned, indicate the dignity of the event. Since not all newsworthy science events are published results, there is one value for this. The values for this variable are: "journal, name mentioned”, "place of publication not mentioned”, "unpublished” and "doctoral dissertation”.

**Facility**

The place or facility where a study is made, could also increase the credibility of a finding. This variable has two values: "yes” and "no".
Visualization

This variable is supposed to show to what extent the availability of imagery is a selectivity concern. Relevant diagram on screen counts as graphics. Items with both graphics and animation were valued with "animation". The values are: "animation", "graphics" and "no such images".

3.7 Frequency and sample size

Rapport is aired seven days a week all year round. The time scope of this study is 24 months. The amount of broadcasts scanned is thus 730 and the amount of recorded units is 144, which makes a science news item every 5.07 days or 6 items per month. The distribution of science items per month varies between 0 (February 2010) and 12 (May 2011).

3.8 Testing reliability and validity

The conclusions were inferred from a sample size of 144 units. The reliability of the data was tested with a split-half technique. The sample was divided into two subsamples with equal amount of items. The two halves were statistically equivalent, proving internal consistency at sample size 144. To test the consistency further, the half-samples were divided into quarters, showing a sample size of 72 was not large enough to infer valid conclusions.

<table>
<thead>
<tr>
<th>Event</th>
<th>Frequency</th>
<th>Percent</th>
<th>First half (%)</th>
<th>Second half (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>94</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Applied Science</td>
<td>23</td>
<td>16</td>
<td>11 (-5)</td>
<td>21 (+5)</td>
</tr>
<tr>
<td>Ongoing Research</td>
<td>27</td>
<td>19</td>
<td>24 (+5)</td>
<td>14 (-5)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>144</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Event</th>
<th>First quarter</th>
<th>Second quarter</th>
<th>Third quarter</th>
<th>Fourth quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>56 (-9)</td>
<td>75 (+10)</td>
<td>69 (+4)</td>
<td>61 (-4)</td>
</tr>
<tr>
<td>Applied Science</td>
<td>17 (+1)</td>
<td>6 (-10)</td>
<td>17 (+1)</td>
<td>25 (+9)</td>
</tr>
<tr>
<td>Ongoing Research</td>
<td>28 (+9)</td>
<td>19</td>
<td>13 (-6)</td>
<td>13 (-6)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>101</td>
<td>100</td>
<td>99</td>
<td>99</td>
</tr>
</tbody>
</table>

Fig 3.1 Frequency and split-half in the "Event"-variable
Values constant in both subsamples at sample size 144:
Event = ”study” (65%)
Publication = ”not mentioned” = (54%), doctoral dissertation (3%)
Implication = ”benefit” (49%)
Level = ”cell” (3%)
Topic = ”genetics” (3%), ”animals” (6%), ”space” (3%)

Values with higher variation than (+/- 5%) at sample size 144:
Connection to sweden = ”yes”/”no” (+6%/-7%)
Implication = ”risk”/”neutral” (+/-6%)
Level = ”organism/object” (+/-7%)
Topic = ”technology”/ ”enivronment” (+/-7%)

<table>
<thead>
<tr>
<th>Implication</th>
<th>Frequency</th>
<th>Percent</th>
<th>First half (%)</th>
<th>Second half (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>52</td>
<td>36</td>
<td>42 (+6)</td>
<td>31 (-5)</td>
</tr>
<tr>
<td>Benefit</td>
<td>70</td>
<td>49</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>Neutral</td>
<td>22</td>
<td>15</td>
<td>10 (-5)</td>
<td>21 (+6)</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>100</td>
<td>101</td>
<td>101</td>
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<tr>
<th>Implication</th>
<th>First quarter</th>
<th>Second quarter</th>
<th>Third quarter</th>
<th>Fourth quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>31 (+5)</td>
<td>53 (+17)</td>
<td>42 (+6)</td>
<td>19 (-17)</td>
</tr>
<tr>
<td>Benefit</td>
<td>56 (+7)</td>
<td>42 (-7)</td>
<td>42 (-7)</td>
<td>56 (+7)</td>
</tr>
<tr>
<td>Neutral</td>
<td>14 (-1)</td>
<td>6 (-9)</td>
<td>17 (+2)</td>
<td>25 (+10)</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>101</td>
<td>101</td>
<td>100</td>
</tr>
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</table>

Fig 3.2 Frequency and split-half in the "Implications"-variable

<table>
<thead>
<tr>
<th>Connection to Sweden</th>
<th>Frequency</th>
<th>Percent</th>
<th>First half (%)</th>
<th>Second half (%)</th>
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<tbody>
<tr>
<td>Yes</td>
<td>103</td>
<td>72</td>
<td>78 (+6)</td>
<td>65 (-7)</td>
</tr>
<tr>
<td>No</td>
<td>41</td>
<td>29</td>
<td>22 (-7)</td>
<td>35 (+6)</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>101</td>
<td>100</td>
<td>100</td>
</tr>
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<table>
<thead>
<tr>
<th>Connection to Sweden</th>
<th>1st quarter</th>
<th>2nd quarter</th>
<th>3rd quarter</th>
<th>4th quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>81 (+9)</td>
<td>75</td>
<td>61</td>
<td>69 (+3)</td>
</tr>
<tr>
<td>No</td>
<td>19 (+10)</td>
<td>25 (+4)</td>
<td>39 (+10)</td>
<td>31 (+2)</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Fig. 3.3 Frequency and split-half in the "Connection to Sweden"-variable
3.9 Classification problems

Difficulties were encountered in choosing values for variables in the following cases:

*Place of publication*

When the event variable was valued applied science, uncertainty occurred on the place of publication variable. Findings in applied science can be published in journals well. When this information was not presented, the place of publication was valued as "unpublished".

*Visualization*

When diagrams on computer screen was filmed, this was valued as having "graphics" instead of "no such images". If the item was visualized with both graphics and animations, it was valued as if having only animations.

*Interpretation*

When the interpretation of a finding was presented as having both "health" and "commercial" implications, the item was valued according to the implication that was emphasized most in its description.
4. Results

In this chapter, the results will be presented in three sections. The first section deals with the kinds of events the items are based on. The second section deals with how the items were presented. In the third section, answers to the research questions are given in the light of the results.

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<th>2009</th>
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<td>Mar</td>
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<td>12</td>
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<td>Jun</td>
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<td>8</td>
</tr>
<tr>
<td>Tot</td>
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<td>40</td>
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</tbody>
</table>

*Fig. 4.1 Distribution of items per month.*

4.1 Events

65% of the items were based on studies. 19% on ongoing research and 16% on applied science. 72% of the items had some connection to Sweden. 49% of the items had benefit as main implication compared to 36% that was about risks. 15% had neutral implications. As noted in the split-half test, there was a significant decrease in "risk” in favour of ”neutral”.

<table>
<thead>
<tr>
<th>Implication</th>
<th>Frequency</th>
<th>Percent</th>
<th>First half (%)</th>
<th>Second half (%)</th>
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</thead>
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<td>Risk</td>
<td>52</td>
<td>36</td>
<td>42 (+6)</td>
<td>31 (-5)</td>
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<td>Benefit</td>
<td>70</td>
<td>49</td>
<td>49</td>
<td>49</td>
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<tr>
<td>Neutral</td>
<td>22</td>
<td>15</td>
<td>10 (-5)</td>
<td>21 (+6)</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>100</td>
<td>101</td>
<td>101</td>
</tr>
</tbody>
</table>

*Fig. 4.2 Differences in subsamples of the "Implications"-variable.*
The risk or benefit was concerning health in 72% of the cases, compared to commercial implications in 5%. The results were in 23% valued as purely scientific.

The findings at the organism/object level accounted for 49% of the features. 29% at the population level and 8% on a planetary level. 7% was molecular, 3% had to do with cells. The remaining levels had 1% each.

The topic was "human health" in 51% and "environment" in 11% of the cases. As noted earlier in the reliability test, a significant decrease over time in items on environment. As seen in figure 4.3 the decrease was in favour of items on technology. The number of items on genetics, animals and space was constant throughout.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Frequency</th>
<th>Percent</th>
<th>First half (%)</th>
<th>Second half (%)</th>
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</thead>
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<td>Pharmaceuticals</td>
<td>6</td>
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<td>6 (+2)</td>
<td>3 (-1)</td>
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<td>Alcohol</td>
<td>3</td>
<td>2</td>
<td>3 (+1)</td>
<td>1 (-1)</td>
</tr>
<tr>
<td>Food</td>
<td>4</td>
<td>3</td>
<td>0 (-3)</td>
<td>6 (+3)</td>
</tr>
<tr>
<td>Technology</td>
<td>15</td>
<td>10</td>
<td>4 (-6)</td>
<td>17 (+7)</td>
</tr>
<tr>
<td>Environment</td>
<td>16</td>
<td>11</td>
<td>18 (+7)</td>
<td>4 (-7)</td>
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<tr>
<td>Genetics</td>
<td>4</td>
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<td>3</td>
<td>3</td>
</tr>
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<td>Animals</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Plants</td>
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<td>2</td>
<td>4 (+2)</td>
<td>0 (-2)</td>
</tr>
<tr>
<td>Human health</td>
<td>74</td>
<td>51</td>
<td>49 (-2)</td>
<td>54 (+3)</td>
</tr>
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<td>Basic research</td>
<td>7</td>
<td>5</td>
<td>6 (+1)</td>
<td>4 (-1)</td>
</tr>
<tr>
<td>Space</td>
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<td>3</td>
<td>3</td>
<td>3</td>
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</tbody>
</table>

Total 144 100 100 100

Fig. 4.3 Differences in subsamples of the "Topic"-variable.

4.2 Presentation

In 54% of the cases, the place of publication of the studies were not mentioned. In 13% of the features the journals name were mentioned. All the journals mentioned were well-known prestigious peer-reviewed journals. (Lancet, Nature, Science, Nature Genetics, PNAS, PLoS One, Journal of Geophysical Research, Cell, New England Journal of Medicine and Journal of Current Biology.)

<table>
<thead>
<tr>
<th>Publication</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal, name mentioned</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>Publication not mentioned</td>
<td>78</td>
<td>54</td>
</tr>
<tr>
<td>Not published</td>
<td>44</td>
<td>31</td>
</tr>
<tr>
<td>Doctoral dissertation</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Total 144 101

Fig 4.4 Frequency of the "Place of publication"-variable.
The research facility was mentioned in 72% of the items. Pre-constructed imagery was used in 29% of the items. 19% were animations and 10% were graphics. The images in the 71% of the “no such images” value were mostly semirelevant magery of laboratories, scientific paraphernalia or “talking heads”. A lot of the items contained patients or other people whose lives were somehow affected by the covered findings.

4.3 Answers to research questions and contextualization

What kind of scientific event is most likely to become news?
The most frequent scientific event to become news among the studied items are published studies. If the studies are published in peer reviewed journals, the reporters and editors can be more sure of the relevance and accuracy of the findings than when covering ongoing research. This suggests that published studies are more likely than other events to become news.

Do “closeness” matter for a scientific event to become news?
Items with connection to Sweden was the most frequent. Geographic and cultural closeness is perhaps the least questionable news criteria and the science news in Rapport is evidently not an exception. The dominance of items with connection to Sweden is distributed on three topics, “human health”, “environment” and “Technology”. The items with no connection to Sweden also had the highest prevalence in “human health”, but no corresponding high prevalence in “environment” and “technology”. The explanation for the high prevalence of “human health” items with connection to Sweden is that the studies often are made on swedish subjects, thus relevant to the Swedish audience. The same explanation is however not applicable to “environment” and “technology” were the implications are generally not limited to Swedish conditions. However it is safe to conclude that “Closeness” do matter for a scientific event to become news.
What topics are dominant among the scientific events that become news?

"Human health" is unarguably the dominant topic. 51% of the items was on "Human health".

"Technology" and "environment" also stand out above the rest of the items. See fig. 4.5.
What difference does risk or benefit make for a scientific event to become news?

The most frequent kind of implication is "benefit". This however, might not be indicating newsworthiness of the events. In relation to the event-variable it is evident that most events with "benefit" as implication is "applied science" and "ongoing research". Among the studies "risk" is more prevalent and among the "ongoing research"-items "benefit" is dominant.

As the distribution of "benefit" is even in relation to the amount of items in the three kinds of events, "risk" is limited to "study" and relatively low in "ongoing research". In "human health", "risk" is as prevalent as "benefit". As with "applied science", benefit in the "technology" topic is naturally dominant. This is the case even with "food". In the other topics "risk" is dominant or equally prevalent as "benefit".

The conclusion is that risk and benefit determines newsworthiness dependent on topic and kind of event. "Risk" is thus interpreted as being valued equal to "benefit".
What role does availability of imagery play for a scientific event to become news?

Since only 19% of the features contained animations there is reason to conclude that availability of images does not affect the valuing of news. This contradicts earlier research that strongly hold that availability of images increases news value. However, despite the figures in this study, availability of images is thought to increase news value in television. The explanation to this anomaly is that frequency analysis on its own might not be a valid method to investigate news value.

Among the news on findings were the journals name is mentioned 8 features are visualized with animations, 4 with graphics and 6 with ”no such images”. This suggests that when a journals name is mentioned, the item is likely to be visualized with animations. Animations are also more frequent when the event implies ”benefit” than when it implies ”risk”. Animations are mostly used in health benefits on the ”organism/object” level and in news on ”environment”.

Contrary to the low frequency of items with animated imagery, it is concluded that availability of special imagery increases the likelihood for an event to become news.
What is presented about the source?

The facility where the research was made, was mentioned in 72% of the items but the place where the findings are published are seldom mentioned, only in 13%.
5. Discussion

5.1 Explanation of the findings

Rapport presents mostly good news, 49% of the recorded cases were about benefits rather than risk or neutral. The majority of ”good” news however is due to the coverage of applied science. Applied science is by nature beneficial (except for weapons of mass destruction).

What is most striking, is the abundance of items about health risks made in Sweden where the place of publication is not mentioned. The most events considered newsworthy seems to be studies with some connection to Sweden about health issues, explained at the organism level of description. Availability of animated image material is assumed to increase the news value even if the study show that most items had no such imagery.

These findings can be explained in terms of:

_Closeness_: Most news on social medicine is about research from Karolinska Institutet which means that an interview is easy to do since the Rapport newsroom is less than an hour away from the interviewees. The research made in Sweden is also made on swedish test subjects, hence more relevant to the audience itself. This is also thought explain the high amount of items where the place of publication is not mentioned since place of publication seems to be mentioned only when the journal is internationally well-known and highly respected.

_Human angle_: Social medicine is brute figures about human populations. They are easy to understand and their relevance to daily life is obvious. According to Hansen (1994) science journalists from the British press routinely choose to cover science which is of ”relevance to daily life” and ”with a human angle”. This applies also to Swedish television.

_Cost effectiveness_: Research on Social Medicine is non-expensive and therefore more studies are made on subject matters with relevance to daily life, thus having high news value. To some extent, this confirms Allern’s (2002) conclusions, where it is argued that coverage should be analyzed in both terms of market objectives and journalistic practice instead of in terms of journalistic practice alone.
5.2 News values as a measure for studying newsworthiness in science

The size of data used in this study was too small for more conclusions on newsworthiness to be inferred. What did become clear however, is the complexity of news values and that frequency alone say very little about newsworthiness in science news. Alongside general news, discovery of life on mars must be considered more newsworthy than social medicine. In this study such item would be considered among the least likely events to be covered. Therefore it seems that the most common news are not necessarily coverage of most newsworthy events. Even if some interesting conclusion was drawn from the study, the main question, ”When is science considered most newsworthy?” remains unanswered.

News values, as a conceptual tool for determining a newsrooms image of what is newsworthy can be valuable when studying in general news. Especially when the study object is a newsroom, rather than a country or media type. Frequency analysis of coverage showing how news are routinely valued in terms of a relevant news value taxonomy will most probably yield valid results. Science news however, seem to be an exception and quite peculiar in this respect. In the light of the results of this study, a story on life on Mars is predicted to be dismissed in favor of a swedish study on social medicine where the source is unmentioned and no special imagery is available, when common sense intuition says life on Mars would break headlines. The corresponding case in foreign news would be, say, murder of an elite person, which would be consistent with news value theory as well as newsworthy according to common sense intuition.

The main conclusion is therefore that news value theory needs special revision in the case of science news.

5.3 Normative remarks

Overall, Rapport does not always present the origin of their statsitics or studies satisfactory. There is no consensus of what information there ought to be in a science feature. But the following is suggested:

*A clear account of what kind of study it is question about.* As was evident in this study, peer-reviewed studies can be presented in the same way as authority-initiated surveys or even commercial market analysis surveys. Plain statistics may also be referred to simply as ”a study” or ”fresh figures” which can be hard to distinguish from science proper. Initiative and financing are crucial in this respect. For peer-reviewed studies the name of the journal is
helpful to understand how important and well performed the study is considered by mainstream academia. Even if the journal is not one of the most prestigious.

* Better presentation of interviewees. It was not always clear if the persons interviewed were academic experts commenting on a study or the researchers themselves.

Also interesting from an ethical point of view, is the scientific applications with commercial potential that is covered by Rapport. As noted above, it is not always clear what kind of institution is responsible for the research. Commercial actors and academic institutions should perhaps not be covered alike, this is very much a public service issue.

5.4 Further research

This study could be viewed as a pilot study for a bigger research project on the subject of newsworthiness in science. Based on the data of this study it is possible to construct a predictive hypothesis on how science is covered by Rapport under a period not included in this study. How science coverage changes over larger time scopes could provide further interesting insights into what factors having impact on the selectivity process.

A study could be made on the characteristics of the original articles to be reported in the prime time news. Supposedly, certain words in the titles of academic articles may attract science reporters more than others.

What differs between science news in Public Service media and other media also needs further research.

How and why risk and benefit is communicated are important psychological and journalistic concerns. There is a need for knowledge about the psychology of science news, particularly in terms of new theories on evolutionary psychology.
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Stockholm

Appendix 1: Codebook

Variable 1: Event

Values:
1,00 = Study
2,00 = Applied science
3,00 = Ongoing research

Variable 2: Connection to Sweden

Values:
1,00 = Yes
2,00 = No

Variable 3: Publication

Values:
1,00 = Journal, name mentioned
2,00 = Place of publication not mentioned
3,00 = Not published
4,00 = Doctoral dissertation

Variable 4: Research facility mentioned

Values:
1,00 = Yes
2,00 = No

Variable 5: Implication

Values:
1,00 = Risk
2,00 = Benefit
3,00 = Neutral

Variable 6: Interpretation

Values:
1,00 = Health
2,00 = Commercial
3,00 = Purely scientific

Variable 7: Level of Description

Values:
1,00 = Subatomic
2,00 = Atomic
3,00 = Molecular
4,00 = Cell
5,00 = Organism/Object
6,00 = Population
7,00 = Planet
8,00 = Solar
9,00 = Cosmic
10,00 = Particles

**Variable 8: Topic**

Values:
1,00 = Pharmaceuticals
2,00 = Alcohol
3,00 = Food
4,00 = Technology
5,00 = Environment
6,00 = Genetics
7,00 = Animals
8,00 = Plants
9,00 = Human health
10,00 = Basic research
11,00 = Space

**Variable 9: Visualization**

Values:
1,00 = Animation
2,00 = Graphics
3,00 = No such images
## Appendix 2: Frequency and split-half reliability test

<table>
<thead>
<tr>
<th>Event</th>
<th>Frequency</th>
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<th>Second half (%)</th>
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<td>Risk</td>
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<td>36</td>
<td>42 (+6)</td>
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<td>Benefit</td>
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<td>49</td>
<td>49</td>
<td>49</td>
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<td>Neutral</td>
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<td>15</td>
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</tr>
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<td><strong>Interpretation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<th>Percent</th>
<th>First half (%)</th>
<th>Second half (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animation</td>
<td>27</td>
<td>19</td>
<td>24 (+5)</td>
<td>14 (-5)</td>
</tr>
<tr>
<td>Graphics</td>
<td>15</td>
<td>10</td>
<td>11 (+1)</td>
<td>10</td>
</tr>
<tr>
<td>No such images</td>
<td>102</td>
<td>71</td>
<td>65 (-6)</td>
<td>76 (+5)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>144</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
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