

MEDIATING SCIENCE IN NORWAY: PRACTICES AND TRANSFORMATIONS IN MAJOR NEWSPAPERS

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ABSTRACT: What characterizes journalistic representations of researchers and research in Norway? This article presents a quantitative analysis and a discourse analysis of how journalism that covers and uses scientific research has been practiced in major Norwegian newspapers in 1966, 1986 and 2006. The quantitative analysis suggests that this coverage in some respects has not changed significantly (e.g. the amount of sources used, the genres used for presentation). On the other hand, a comparative discourse analysis of articles covering emergent science in the three periods indicates how representations of scientific research are changing from resembling science's own discourses to a more distinct adaption of the research, adjusting it to journalistic requirements of angles and storylines. However, the study presented here does not suggest that science journalism in Norway has developed an independent position from which it can throw a light upon scientific developments in a critical manner.

KEYWORDS: science and the media, Norway, content analysis, discourse analysis, press history

INTRODUCTION

Scientific research plays a crucial role in society. It establishes a basis for political decisions and technological development, and gives us new insights into nature, culture and society. A survey of Norwegians' relationship to science and technology (Ramberg, 2004) points out that daily newspapers, television and radio are people's most important sources of information about scientific research and knowledge, apart from the Internet. In this perspective, it is surprising how little research has been done on journalism in Norway that covers science or uses scientific researchers as key sources.

This article presents an analysis of how such journalism has been practiced in major Norwegian newspapers in 1966, 1986 and 2006. The main research questions are: What characterizes Norwegian newspapers' use and representations of scientific researchers and research in 1966, 1986 and 2006? In what ways have the uses and representations possibly changed over this period of time?

We attempt to answer the questions by applying different methodological approaches. A quantitative content analysis is conducted by Andersen, who looks particularly at how often and in what way research and researchers are used in major Norwegian papers. A critical discourse analysis of a more limited sample of articles is done by Hornmoen, who looks more closely at how these articles represent emergent science in the different periods¹. "Emergent science", as we understand it, refers to research that develops at the research frontier.

EARLIER RESEARCH

A few studies of science journalism have been carried out in Norway. Most extensive are the contributions from Ottosen and Eide from the end of the 1980's and the beginning of the 1990's (Ottosen, 1988, Eide & Ottosen, 1994). According to them, scientific sources initiate media coverage of science to a much larger degree than what is implied by popular images of researchers in ivory towers. Furthermore, journalists covering science tend to rely on a few oral sources. Eide and Ottosen assert that the Norwegian media's coverage of scientific research is extensive in scope, but uncritical. They see the relationship between scientist sources and journalists as marked by mutual understanding and a cooperative spirit in the service of public enlightenment.

Hornmoen (1999, 2003) also traces a rather harmonious relationship between scientists and journalists, and a dominant view of science communication existing among both parties. They tend to understand science communication and journalism as a one-way dissemination of scientific knowledge to an audience

¹ Hornmoen's complete study (2010) is published in Norwegian in the online journal Sakprosa, available at: http://sakprosa.files.wordpress.com/2008/06/hornmono_layout_5.pdf.

conceptualized as people who lack and (therefore) need this knowledge in order to make rational choices that serve democracy. This model of communication is also known as the deficit model (Gregory & Miller, 1998).

However, a deficit-model of the public understanding of science is gradually changing among journalists, and new conceptions of their duties in covering and using science are emerging. There are some signs that Norwegian journalists are opting for more critical coverage and increasingly talking about their work as science journalism and not science communication. One indication is that a certain willingness to use the term “forskningsjournalistikk” (science journalism) and not “forskningsformidling” (science or research dissemination) about journalistic coverage of scientific research becomes more discernible from the beginning of the 2000’s. This is indicated when searching by the aforementioned terms in the Norwegian newspaper database *Retriever*.

But we do not have studies that suggest to what extent the conception of this new and more critical role may be reflected in the actual coverage of science in recent times. Moreover, we lack knowledge about possible transformations in newspaper coverage of science over a certain time period. So there is reason for embarking on a diachronic study of the science coverage in newspapers, attempting to trace possible changes and developments in this coverage over a time span of forty years.

A QUANTITATIVE APPROACH: CONTENT ANALYSIS

The first part of our study presented here uses quantitative methods to investigate how the press covers science and uses scientists as sources in this coverage. It traces the science coverage from 1966 to 2006 in five daily newspapers: *Nordlys*, *Adresseavisen*, *Bergens Tidende*, *Aftenposten* and *VG*. Articles chosen for closer scrutiny were written in the month of February in 1966, 1986 and 2006. Selected articles were either about research or they used researchers as sources. They were analyzed and categorized according to several parameters such as genre, number of sources, and the kind of research reported on. Some of the major findings are presented below.

SAMPLE AND NUMBER OF ARTICLES

The sample consisted of a total of 1428 articles either using researchers as sources or being about researchers and research. The articles were distributed in the following way in the month of February (*Figure 1*). There is a certain increase in the number of published science related articles from 1986 to 2006. The average number of articles in the earlier periods is in accordance with results from earlier studies by Eide and Ottosen (1994). They found that three or four

articles were published on a daily basis in six major Norwegian newspapers. The increase is in accordance with a similar study of the use of scientific experts in the Danish press (Albæk, 2002).

	1996	1998	2000
Number of articles	429	442	557
Average number of articles per day	2,7	2,7	4,2

Figure 1.
Number of
articles.

GENRE

Roksvold's topology of journalistic genres orders them according to three major types of journalism: News journalism, commentary journalism and feature journalism (Roksvold, 1997: 10). In our study, the first includes such genres as the news report and the news brief. The second embraces editorials, reviews and commentaries, whereas the third encompasses genres such as the profile and the feature story or reportage. The following figure displays the percentage of articles presented as news, commentaries or feature stories. More striking than the increase in science related articles (*Figure 1*), is the similarity in the choice of genres (*Figure 2*). The news genre clearly dominates in the representation of research and researchers in all three periods. Commentaries and features are not used nearly as frequently to write about research and researchers for newspaper readers.

	1996	1998	2000
News	93,2	91,4	89,0
Commentaries	4,0	4,0	5,6
Features	2,8	4,5	5,0

Figure 2.
Genres used.

FRAMING THE RESEARCH/RESEARCHER

In what way is the material framed in the articles? As mentioned above, the articles selected were either about research or they used researchers as sources. This division is reflected in the major framing categories detected. Not all of these categories in the study are presented here (therefore the percentages do not add up). However, *Figure 3* displays the major categories.

Figure 3.
Ways of framing.

	1966	1986	2006
The researcher as expert	22%	29%	34%
Research results	19%	21%	39%
Planned or ongoing research	26%	10%	7%

The first category in the figure refers to articles in which researchers make statements as experts and comment upon other researchers' work or current events (research based knowledge). The second category refers to articles that present research results, as in the many stories that include variants of the phrase: "new research shows that". The third category refers to articles presenting planned or ongoing research projects that accordingly have not come up with any results yet.

We can observe an increase in the use of researchers as expert commentators (although not to the extent that some other studies have indicated, e. g. Albæk, 2002). More pronounced is an increasing tendency to represent research results at the expense of presenting ongoing projects without finished results. Comparatively, one notes how articles in 1966 to a large extent were about what researchers wished to uncover through their participation in research projects.

THE TYPES OF RESEARCH COVERED

In earlier quantitative studies of the research coverage in Norwegian newspapers, material is grouped according to the general type of research that the reported activity or the scientist as source normally represents (see for instance Nilsson et al., 1996, Andersen, 2003). These general types correspond to conventional divisi-

ons in academia, and the categories thus are the social sciences (labeled “Samf.vit” in the *Figure 4* below), the humanities (“Humaniora” below), the natural sciences (“Nat.vit”) and medical research (“Medisin”). We have also added a category called “Vitenskap”, which may be translated as “science”. This category encompasses articles representing scientific research in general and not a specific field or discipline within one of the aforementioned general types of research. In particular, the category applies to articles presenting or discussing science policy.

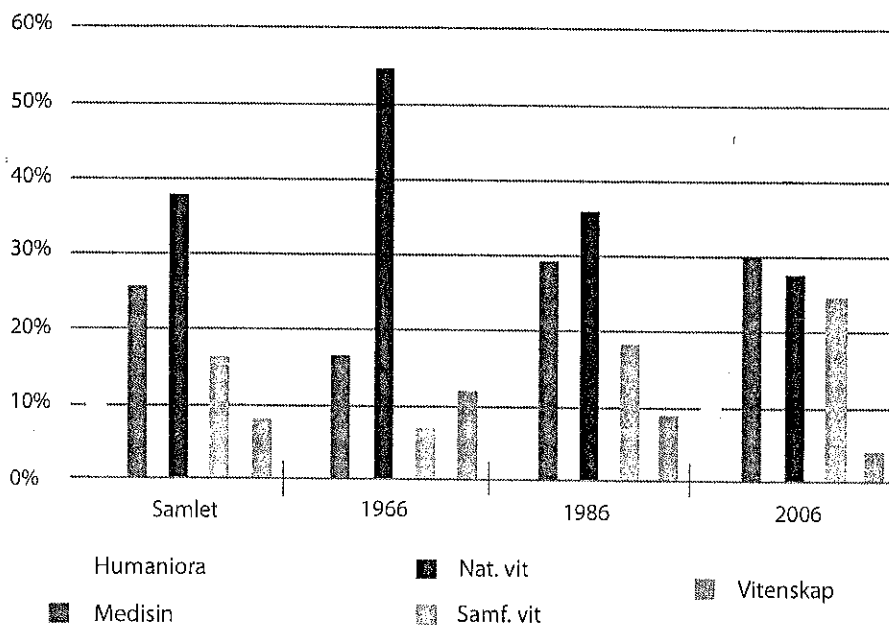


Figure 4.
Types of research represented.

The first cluster of bars to the left (“Samlet”) depicts the total distribution in the three periods according to the types of research that are written about. In sum, most articles refer to the natural sciences in their source use and depiction of research activities (38,4%). Medical research follows up by being referred to in 25,8% of the articles, while the social sciences are referred to in 17,3% and the humanities in 10,1%. Tracing the development over the three periods, one notes some major changes, from a distinct focus on disciplines and researchers within the natural sciences in 1966 to a more equal distribution in 2006, albeit with the strongest emphasis on medical research. It should be noted that in some respects this distribution differs from findings in similar studies. Although our study indicates a strengthening of focus on social science/scientists, other studies tend to point to a marked increase in the use of experts from the social sciences. For

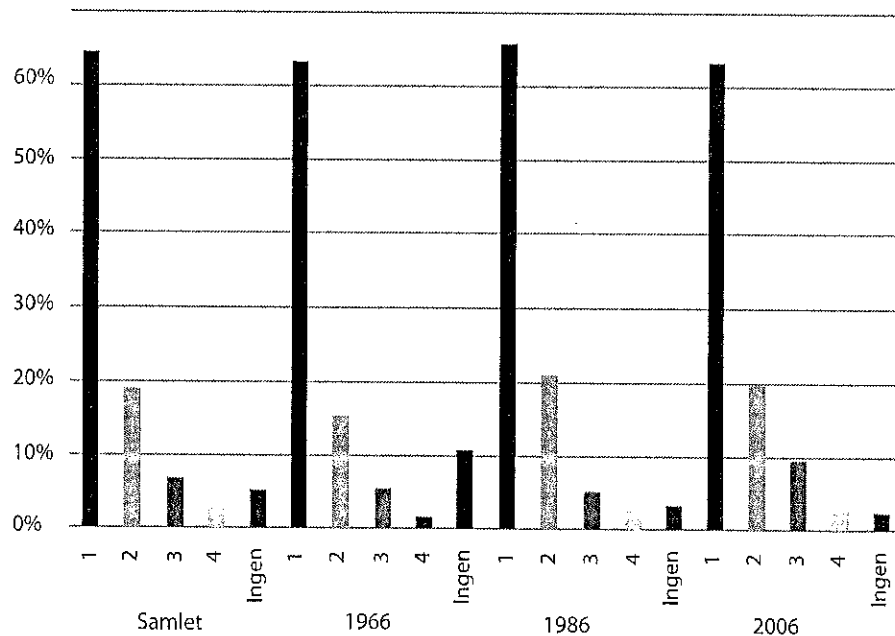
instance, a study by Albæk et al. (2002) on the use of such experts in the Danish press displays how social scientists dominated in 2001, whereas experts from the natural sciences dominated in 1961.

Although an increase in the use of social scientists may be more striking in some studies than in others, they do point to a rise in this respect. A possible explanation for this tendency is the following: Since the 1960's there has been a considerable increase in researchers within the social sciences, coinciding with an increasing demand in the media for expert commentators in the coverage of politics as well as everyday life (see also Eide & Ottosen, 1994).

NUMBER OF SOURCES

Here we detect the total number of sources appearing in a research related article, and not only researchers as sources. Sources that are registered are the ones that are cited or referred to in the articles, e.g. a news agency, a politician, a "man in the street" and/or a researcher. Other possible sources than the ones that are visible in the articles have been registered as "not mentioned" ("Ingen" in the Figure 5).

Figure 5.
Total number of sources in the articles. ("Ingen" = No visible sources).



The figure clearly shows how a journalism based a single source dominates (the percentages for single-source articles are: 1966: 65,3%; 1986: 65,8%; 2006: 63,7%). It indicates that little has changed with respect to the number of sources used when journalists write science-related articles. However, we emphasize that our material includes quite a number of news briefs.

RESEARCHER SOURCES AND GENDER

All the researcher sources that were referred to or interviewed in the articles were registered. This was done because the gender of the researcher sources presented in articles contributes to shaping the image of the research community for newspaper readers.

The *Figure 6* displays a use of research sources that is far from gender-balanced. In 1966 there were hardly any female sources. In 1986 the female sources still only constituted 8, 8% of the researcher sources. There is a more marked increase in female sources from 1986 to 2006, when they amount to 20,9% of the sources. Nevertheless, this percentage suggests that in four of five articles with a visible source the reader is introduced to a male researcher. For the newspaper reader, the scientific community will possibly appear as a male bastion. However, this does to some extent reflect employment realities within Norwegian higher education.

Although there is a good gender balance within higher education and research as a whole, the proportion of women employed becomes lower the higher the occupational category in scientific areas becomes (Løseth, 2010).

	Number of / percentage	Number of / percentage	Number of /per- centage
Male	325 / 98,5%	361 / 91,2%	398 / 79,1%
Female	5 / 1,5%	35 / 8,8 %	105 / 20,9%
Not mentioned in the article	178	127	151

Figure 6.
Researcher
sources and
gender.

SUMMARIZING THE QUANTITATIVE STUDY

Our study suggests that there are some striking similarities in the newspapers' science coverage in 2006, 1986 and 1966. This becomes clear when one quantifies the articles according to parameters such as genre, sources, kind of research and number of articles. A typical science related article is a news story, using one oral source, preferably a man, who either presents research results or is used as an expert.

A QUALITATIVE APPROACH: DISCOURSE ANALYSIS

The second part of our study uses a qualitative approach to investigate a more limited sample of articles. Critical discourse analysis, particularly inspired by Fairclough (1995a, 1995b, 2003), is applied in a comparative examination of articles about research within medicine and the natural sciences in 1966, 1986 and 2006. The analyzed articles are from *Verdens Gang* (VG), a major daily tabloid, and *A-magasinet*, a weekend magazine supplement to Norway's largest subscription newspaper, *Aftenposten*. Samples are chosen after reading through all articles appearing in the relevant periods in a search for the words "forskning", "forskere", "forskere" and "professor" ("research", "researchers", "the researchers" and "professor") in the Norwegian newspaper database Retriever. In this way we have ended up with a few articles we judge as exemplary of science reportages in each period, that is, reportages about science that apply some devices typical of the feature genre in their presentation of research.

The articles cover so-called new or emergent science. This is "science in the making", normally referring to research that develops over a period of time, not primarily to research marked by unexpected and sudden breakthroughs (Dunwoody et al., 1999). Such emergent research is uncertain. Contemporary frontiers of research in any given field are, as Priest (2001: 9) asserts, characterized by the existence of competing explanations.

The overarching questions for analysis are:

- (1) *What image of science is created in the articles?* Is it essentially an image of science as a process where theories are developed and modified in light of new evidence? Or is it a picture of science as an accumulation of facts that scientists discover?
- (2) *How certain/uncertain does the knowledge appear in the portrayed research?* This implies detecting such matters as whether or not alternative or opposing explanations or viewpoints are represented.
- (3) *Which images are constructed of the relationship between different actors: scien-*

tists as sources, other sources, the journalist and the implied audience? Here we look at the construction of process and participant types, and attempt to answer questions such as: Which text participants are portrayed as agents initiating activity? Who are so-called patients? What kinds of processes are initiated?

In order to answer the questions, we apply relevant analytical categories from critical discourse analysis, looking at modality, presuppositions, the use of metaphors and the representation of discourse or speech. In a multimodal analysis both visual and verbal elements are examined.

UNCOVERED TENDENCIES

In the following we present some of the main tendencies exposed by the analysis.

1966

In 1966, fidelity towards preferred discourses in the scientific community is typical of the analyzed articles in both *VG* and *A-magasinet*.

The scientist's own research questions may constitute the introduction to the articles. These can be structured according to a model characteristic of article structures in empirical natural science and medicine, the so-called IMRAD-structure (Introduction, Methods, Results And Discussion). A case in point is an article in *VG* (Sørhus, 1966) about basic cancer research, with a headline resembling a research question: "Researchers hunting for the "regulating guardian" of the skin: the key chemical substance – is it called Chalone?" (*Our translation*). It is an inconceivable head in today's papers. The period's preference for covering ongoing research projects rather than achieved results is reflected in a text abounding with hedges, questions and expressions of uncertainty. The cancer article closely follows an IMRAD-narrative, and not the inverted pyramid-structure typical of most news journalism. After posing the headline's introductory question, the article focuses on the methods and process of the research, before concluding by reflecting on tentative results. In this manner, a picture is created of science as a process of developing hypotheses and theories as well as modifying or rejecting them in the light of evidence brought about by new experiments.

In other words, an academic "cautiousness discourse" dominates in articles about science. An individual researcher's own exposition of his research – with specialized terms in abundance – characterizes utterances in direct and indirect speech. There is quite a lot of space provided for researchers' careful assessments of their research. The function of their utterances is apparently not only to inform about what one knows on the grounds of research. It seems to be equally important to exhibit the complexities of the objects of research, e. g. what one does not know and the uncertainties involved in applied methods and achieved results.

To a larger degree than in the later periods studied, scientific knowledge is represented as contingent, as dependent on such contextual conditions as whether and to what degree control experiments have been carried out and which methods have been applied. In sum, the articles analyzed in this period are marked by a tuition discourse positioning the implicit reader in a role as someone who has something to learn from the presentations. The structure and language of the articles signal that independent journalistic ways of popularizing and representing scientific research are not yet well developed in the press coverage.

1986

More discernible in the articles from 1986 is a celebratory discourse, a discourse praising scientific research and what it is able to achieve. The emphasis is now stronger on results than the process of research, and the preferred article structure is the inverted pyramid. Research may be presented as possessing enormous methodological power and the ability to disclose causal connections.

The discourse of praise is evident in the article “The professor who makes new animals” (Diesen, 1986, our translation) in *A-magasinet*. It establishes a frame emphasizing animal husbandry research as a Norwegian success story. The researcher is depicted as an active agent and unequalled innovator:

“He loves testing out creative propositions, and his line of thought is full of unexpected leaps. Nothing is impossible before it is proven. Yes, the impossible may in reality offer fantastic possibilities. (...) It is he who is responsible for most of what has happened within animal reproduction in this country. Yes, not only in Norway...” (Diesen, 1986, our translation).

His research is represented as a field with enormous potential as a rational problem-solver. Metaphors and adjectives depict gene technology as a potential mystery solver in a discourse celebrating the insights it may give us.

“Every cell in your body offers an endless journey. The DNA-molecule, a giant molecule containing unbelievable amounts of information. A little piece of the DNA-molecule reveals who you are” (Diesen, 1986, our translation).

Traces of a conflict frame suggest discrepancies between on the one hand scientists who strive for progress and act rationally on behalf of society, and on the other hand “most people”, who are hostile towards progress and to a larger extent driven by emotion. The researcher is portrayed as an educator through his “willingness to disseminate knowledge”. However, the presentation of him and his research field also constructs an insurmountable knowledge gap between “ordinary people” and researchers such as him.

In *VG*, tabloid effects are clearly more visible than in the first period. One no longer finds academic article structures. Shorter articles frequently address the reader intimately in direct requests as “you”. An advisory discourse is now pronounced in a newspaper that increasingly markets itself as “the reader’s newspaper” with the slogan “*VG* helps you”. Research stories in the paper are largely included in this service assignment on behalf of the readers. Scientific research is apparently perceived to provide a knowledge basis and authoritativeness to an advisory journalism, thus assisting the portrayal of the newspaper as a helper for “the common woman and man”.

A rather characteristic *VG*-story with the headline: “Drink wine, live longer!” (Aasbø, 1986) reports about apparent health benefits from drinking red wine. The message is delivered in the form of assertions and slogans, such as: “Wine is healthy. The body needs the nutrients from wine”; and, “Wine cures stress, stomach problems and many other things”. The headline and the lead adopt the utterances of the source in a direct address to the readers, who are presumed to be wine lovers. Characteristically, this article was published when the Norwegian summer holidays were about to begin, a season with an above average level of alcohol consumption in the population. Thus, it testifies to how choices and presentations of research results in *VG*’s emergent advisory journalism are influenced by seasonal variations.

2006

Compared to the preceding periods, the most striking feature of the science coverage in 2006 is the more carefully designed and impressive layout of the stories, with a greater emphasis on photographs and graphical presentations in order to present and explain abstract and complex connections and relations that research allegedly has shown or will uncover. In other words, multimodality is more noticeable than in the earlier periods.

In *VG*, formulas such as “research shows” and “according to the researchers” are now more strongly established in salient parts of the layout. Such phrasings contribute to an impression that there is wide agreement among scientists that certain findings or connections have been established. There is a widely spread optimistic and enthusiastic rhetoric on behalf of science, with stock phrases such as “sensational” and “breakthrough”. Thus, the language use tends to position the reader in a role as an admiring spectator of findings and discoveries in science.

The role as an advisor for the reader is no less perceptible in *VG* in 2006 than in 1986. To a larger extent, research in the tabloid is now included in a campaign journalism that provides the newspaper with an opportunity to draw attention

to its own efforts to induce changes to the benefit of “the common man”. For instance, *VG* in 2006 has extensive coverage of stem cell research. An apparently balanced or multi-perspective article about this research (Gjerding & Hansson, 2006) suggests – when closely inspected – how the newspaper may now emerge as an active agent and advocator, in this case pushing for a change in biotechnology legislation so that research on fertilized eggs will be permitted in Norway. Close reading illustrates a pattern reoccurring in other articles: the more salient the position in the layout, the more a potential power to heal is ascribed to the stem cells and the research on them.

In both *VG* and *A-magasinet*, the science coverage in 2006 is often characterized by a mixture of discourses. A categorically ascertaining discourse frequently marks salient elements and spots of articles (e.g. headlines, captions, highlighted quotes), as in the headline “The genes are to blame” (Torp, 2006), from a story about research into the causes of alcohol abuse (the head may also be translated as “the genes are the cause”). In the same articles, the less salient body texts are typically marked by a more cautious discourse that modifies the assertions appearing in the salient parts. In this manner, the total presentation of the story conveys somewhat contradictory messages about the status of the findings and knowledge presented. Such ambiguity is created in the intersection between a journalistic rhetoric designed to attract reader attention and the reservations with respect to drawing clear or definite conclusions that characterize scientific discourse. In a contradictory manner, this illustrates on the one hand a more independent journalistic reworking and presentation of scientific research than in the earlier periods – in the sense that the research material is adjusted to a journalistic norm system connected to news criteria, presentation effects and dramaturgy. On the other hand, it suggests how journalists can try to approach caution in their representations, in accordance with norms in science encouraging researchers to reflect upon the limitations of one’s research.

SUMMARIZING THE QUALITATIVE STUDY

The representation of scientific research changes from largely attempting to resemble scientific discourse in 1966 towards a much more distinct adaption of the research in the later periods, when it is adjusted to journalistic requirements of angles and storylines and an ability to attract readers. Accordingly, there is a change of focus from processes and questions in the research towards a greater attention to the results and applications of the research. There is a similar movement from representing research as basic science and a process of modifying theories towards portraying science as an activity in the “application context”, which discloses connections and develops innovations, applications and “useful

knowledge". This is part of a development where research increasingly appears in advisory journalism and campaign journalism, particularly in the tabloid *VG*. We have noted, however, how journalists in the latest period may attempt hold with greater fidelity to a scientific "cautiousness discourse" in less salient parts of an article.

CONCLUSIONS

Our study illustrates some diverging tendencies in the science coverage and the use of scientists as sources in major Norwegian newspapers over a period of forty years. The quantitative study of five major newspapers displayed some striking similarities in the science coverage, whereas the discourse analysis pointed to some clear changes in the ways research and researchers were represented over this period of time.

The quantitative analysis does indicate a development towards more articles about scientific research in the press. However, throughout all periods studied, research has primarily been presented in the news genre. There are, in other words, comparatively few commentaries and features (although news stories about science often include some feature elements). In light of the frequent calls for more critical science journalism in the Norwegian press (Hornmoen, 1999), we consider this unvaried use of genres unfortunate. In all likelihood, commentaries and features give larger possibilities than straight news to discuss science, provide perspective, depth and context, and to create engaging narratives around research.

As to the types of research, there has been a development from a clear dominance by the natural sciences in 1966 towards a more equal distribution between different academic disciplines in 2006. But one may also trace a change towards a clearer homogenization of the research material in the press. In 1966, newspaper readers were offered quite a lot of information about ongoing projects and about science policy, whereas in 2006, 70 percent of the science-related material is conveyed as research results or in the form of expert statements from researchers. Add to this a continuing strong reliance on one (visible) source in the articles, and the overall picture drawn by the quantitative analysis barely resembles the kind of deliberative and multi-perspective journalism envisioned in science journalism handbooks (Blum & Knudson, 1998, Hornmoen, 1999).

The discourse analysis more distinctively pointed out changes over time in the ways research and researchers are represented, as described in detail above. But do such changes towards a more distinct journalistic adaption of research signal a more independent journalism about emergent science? Seemingly, the changes reflect a break with a traditionally strong trust in scientific authority. To a larger

the extent, scientific research and knowledge is selected and adjusted according to a journalistic system of norms, thus indicating a stronger professionalization of the science coverage. Fewer specialized terms and monological expositions in direct speech creates the impression of representing researchers' utterances in a less servile manner than before.

However, the discourse analysis does not suggest that science in recent times is represented in a particularly critical or reflective way, inviting and engaging readers in a dialogue about science and its role in society. A hindrance for involving readers is how journalism's preferred modes of representation tends to glorify science. The formulaic language, applying "wonder appeals" such as "sensational breakthroughs" and phrases such as "new research shows", is increasingly present over time in the material, and this language use positions the readers at a respectful distance from the research portrayed.

One should also mention how the development of a symbiotic relationship between journalism and research may be an obstacle to advancing a critical public debate on science. Journalism is not only dependent upon scientists as sources in order to gain access to relevant material. Journalism needs researcher sources in order to give its stories credibility as truthful and objective accounts of reality (whereas science is dependent upon journalism to acquire legitimacy in society). In the journalistic institution, truthfulness is commonly conceived of within an objectivity ethic, emphasizing impartiality and neutrality, values that are conventionally attributed to science. So it is a question as to what extent the press sees its own interests as served by exposing the values, political dimensions, interests, conflicts and shortcomings in science.

But there is a potential for dialogical and critical coverage of science in the Norwegian media. Journalists themselves have a major responsibility⁴ for developing such journalism. Much can be done within the organizational constraints of their institution. So-called media logic does not necessarily inhibit journalistic rationality to such a degree that journalists are left unable to pose critical questions to researchers who claim that they have generated new knowledge or come up with the solution to a puzzle. The challenge is ultimately to develop a journalism that will stimulate broad reflection around questions that concern all of us.

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