Chapter 6
Medialization and Credibility: Paradoxical Effect or (Re)-Stabilization of Boundaries? Epidemiology and Stem Cell Research in the Press

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6.1 Introduction

It is a commonly held position in science communication studies that the relationship between science and its social environment is undergoing a fundamental change. As expressed in the characterization as a "knowledge society," it is assumed that scientific knowledge increasingly permeates all areas of social activity (Gibbons et al. 1994; Stehr 1994; Willke 1998; Nowotny et al. 2001; Weingart 2001, 2005). One feature of this "tighter coupling" between science and its social environment is the medialization of science (Weingart 2001, 2005). In this paper I focus on one aspect of medialization: How does the increasing presence of science in the news affect the credibility of science? With the increasing importance of science in society, reporting on science has intensified both quantitatively and qualitatively. Not only is science given more space, coverage also increasingly goes beyond merely reporting on the results of scientific research (Bauer et al. 1995; Nelkin 1995; Elmer et al. 2008). The scientific process itself as well as the relationship between science and its social environment is subjected to observation by the mass media. As a result, much of what previously took place in the seclusion of the ivory tower comes into the field of public vision. Thus, more science in the news also means more scientific dissent, uncertainty, fraud, misconduct and more instrumentalization of science in the news (Nelkin 1995).

This quantitative and qualitative rise in reporting on science is in part due to a greater interest in science. The increasing importance of science raises both public interest and the democratically legitimated expectation of accountability. Mediated by mass media, science becomes subjected to the continual observation by the public and this on all levels of the scientific process. The attention given to the precarious

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nature of scientific findings, shady characters and ethically disputable uses of science has to do with the nature of mass media and their weakness for the dramatic and the negative (Galtung and Ruge 1965; Schulz 1976; Nelkin 1995). Why restrict coverage to scientific findings when dissent, fraud and the instrumentalization of science for political and economic goals provide ample opportunities for reporting on conflicts and scandals? The mass media and the public are, however, not the only parties involved in changing how science is covered. The mechanisms endorsing the attention media give to uncertainty and dissent also have to do with the changing relationship between science, politics and economics.

Mass media is not only an impartial observer or platform for spreading information of public interest. It is also the stage on which power struggles are enacted, won and lost. And as the importance of science in society increases, science becomes intimately involved in these power struggles. It is not only increasingly relevant as a basis of political decisions and economic production processes, but also as a means of legitimating and selling decisions and products. Thus, whether in competition for the better argument or in an attempt to solve policy problems or make money, politicians as well as actors from the economic field increasingly turn to the forefront of scientific developments and thus to areas where scientific knowledge is unstable and contested. As different parties resort to scientific knowledge as a source of legitimacy, expertise is countered with counter-expertise, exposing the uncertainty of scientific knowledge to the public eye (Jasanoff 1987, 1990: 197ff; Peters 1994; Nelkin 1995; Weingart 2001; Kinchy and Kleinman 2003). Furthermore, policymakers often deliberately set the stage so that science appears as unable to provide clear answers, thereby justifying the right of politicians to interpret science and base their decisions on their "personal" interpretations of scientific findings (Jasanoff 1987: 199). Politicians are, however, not the only ones to have discovered the media as an instrument in battles for monetary, political and legal resources and for legitimacy (Gieryn 1983, 1999; Nelkin 1995; Bucchi 1996; Simon 2001; Weingart 2001; Peters et al. 2008; Chapter 11; Haran and Kitzinger 2009). Scientists, too, "enlist journalists as vital allies" (Gieryn 1999: 200).

As shown, we can piece together a relatively coherent narrative about the mechanisms changing the quality and quantity of science coverage in the media. When it comes to the *effects* of these changes, we are, however, confronted with what at first seem to be rather strong contradictions. Here, too, we encounter a coherent narrative: The theoretically well founded assumption that more dissent, misconduct and instrumentalization of science in the news leads to a loss in credibility. At the same time, we are, however, faced with numerous empirical studies showing the stability of the credibility of science. Thus, in an attempt to explain and resolve these contradictions, we are well advised to begin by distinguishing between areas of consent and dissent. Uncontested is that the credibility of science rests on the special epistemological status of science as a source of knowledge impartial to particular interests, be they political, economic or of any other nature. Uncontested is also that autonomy functions as a prerequisite for impartiality and objectivity. Thus, both the mobilization of legal and economic support for scientific undertakings and the acceptance of the autonomy of science depend on the credibility of science as a

source of objective and certain truth (Gieryn 1983; Jasanoff 1987, 1990; Luhmann 1990; Weingart 2001, 2005; Kinchy and Kleinman 2003). In this regard, the concept of credibility is surprisingly indifferent to differences in theoretical perspective.

How then do compatible definitions of medialization and of credibility allow for such different understandings of the effects of medialization? Let us begin with what Peter Weingart calls the paradoxical effect of proximity (Weingart 2001, 2005). As a result of the increasing importance of science in its social environment, the presence of science in the news increases. And, as shown, more science in the news means more dissent, fraud and instrumentalization of science in the news. Thus, on the one hand, science loses its credibility as being politically neutral and impartial to particular interests (Daniels 1967; Jasanoff 1987, 1990; Habermas 1992: 426; Weingart 2001, 2005: 52ff). Or as Kinchy and Kleinman (2003) put it: The ideals of "value neutrality" and "utility" come into conflict. On the other hand, increasing dissent and uncertainty in the news erodes the image of science as a source of certain and objective truth. Fuelling this process, scientists, in an attempt to fulfil the expectations society places on them, end up making knowledge claims that cannot be upheld and thereby further inflate the value of scientific truths (Luhmann 1990: 623ff). Following this line of thought, the effect of medialization on credibility seems obvious: The increasing presence of science in the news leads to a loss in credibility.

From a difference theoretical perspective, (1) distance between science and its social environment appears as a condition for legitimacy and hence for autonomy and (2) medialization is equated with a loss in distance. Tearing down the ivory towers, the media ends up making the incompatibility of social expectations towards science (such as utility and certainty) with the logic of the scientific process apparent. In this perspective, transparency means a loss in autonomy. Although the loss in distance caused by medialization is seen as posing a threat to the autonomy of science, distance is, however, not equated with difference. The special epistemological status of science has its roots in the differentiation of science from other forms of communication and knowledge attainment. The development of a logic *specific* to the scientific subsystem is what allows science to produce *comparatively* objective and certain knowledge. With medialization, science is, however, increasingly confronted with concrete expectations of objectivity and certainty it is not able to meet. As a result, the incompatibility of the logic of the scientific knowledge production process with the logics and expectations of other social systems becomes apparent. Or in other words: Science inevitably appears as continually disappointing the expectations of society. Thus, the increasing importance of science in its social environment paradoxically erodes the very foundations on which the special authority and status of science is based.

It is when we confront this conceptually sound reasoning with the results of empirical research that we begin to lose our footing. No one disputes the fact that the increasing presence of science in the news goes hand in hand with more "negative" science in the news. What is called into question is the assumption that this leads to a loss in credibility. Numerous studies show how science immunizes itself against the negative connotations of fraud and misconduct by publicly expelling the "black

sheep" from the scientific community (Gieryn 1983, 1999; Nelkin 1995; Haran 2007; Franzen et al. 2007; Haran and Kitzinger 2009). In addition, Collins shows how uncertainty is framed not as failure but as part of normal science, justifying more science (Collins 1987). "We are shown only a small 'window of uncertainty' set within walls of certainty that extend into the past and the future" (Collins 1987: 692).

As the term "boundary work" implies, this can be attributed to the effectiveness of scientists as gatekeepers (Gieryn 1983, 1999; Schäfer 2008; Gerhards and Schäfer 2009; Haran and Kitzinger 2009). Scientists are not passive observers but rather actively influence how science is perceived. Another explanation is "that the repeated drawing of boundaries along similar lines [. . .] reflects the historically resonant, and consequently, taken-for-granted character of the discourses on which actors draw" (Kinchy and Kleinman 2003). In a similar vein, Gieryn observes: "So secure is the epistemic authority of science these days, that even those who would dispute another's scientific understanding of nature must ordinarily rely on science to muster a persuasive challenge" (Peters 1994: 181; Gieryn 1999: 3).

While neither the "paradoxical effect" explanation, nor the "boundary work" and "cultural patterns" explanations are wrong, each is in its own way insufficient for understanding the effect of medialization on credibility. The assumption that more "negative" science in the news *necessarily* leads to a loss in credibility underestimates the influence of framing. Only then can dissent, misconduct and instrumentalization be equated with negative science. And only then can distance be seen as a condition for legitimacy and thus for autonomy. The "boundary work" and "cultural pattern" explanations, on the other hand, do not provide a plausible explanation for *why* scientists have such easy play defending their boundaries. Why is it that the epistemic authority of science is so secure that – in spite of so much dissent, misconduct and instrumentalization – there seems to be no valid alternative to countering scientific expertise with counter-expertise (Peters 2008: 141)?

In order to better understand the effects of medialization on the credibility of science, it is, I argue, necessary to differentiate between normative and cognitive expectations. While cognitive expectations are based on *observations* about how things function, normative expectations are based on *judgements* about how things *should* function (Luhmann 1987: 436). Thus, while cognitive expectations change with contradictory empirical evidence, normative expectations are rooted in cultural patterns and moral values. As a result, the *experience* that my good friend Charlie always comes too late will change my cognitive expectation, while it is unlikely that my normative expectation that he *should* be punctual will be affected. Thus, normative expectations tend to be more stable than cognitive expectations.

Distinguishing between normative and cognitive expectations allows us to identify three possible effects of medialization: (1) a *loss* in credibility, (2) a *tension* between normative and cognitive explanations, and (3) a *re-stabilization* of cognitive and normative expectations. A *loss* in credibility means that science is no longer given credit for what it once was. Here, the public may, for example, "learn" that science is not to be understood as a source of objective and certain truth, but rather

as one of many different ways of constructing reality, and that scientists are always "blinded" by their particular perspective on the world. In this case, we would be facing both a cognitive and a normative change in expectations. Science would neither cognitively nor normatively be expected to function as a source of certain and objective truth. When the credibility of science is discussed in science communication studies, what scientists are usually talking about is whether a loss in credibility can be observed. Thinking in categories that permit only two alternatives – a loss or the reproduction of credibility – has made science communication studies blind to two further possibilities: that the "negative" coverage of science does not lead to a *tension* between normative and cognitive expectations or to a re-stabilization of the relationship between the two. In the first case, the *normative expectations* placed on science remain stable. One may, for example, agree that scientists *should* act as impartial observers, while at the same time being aware of the fact that career interests often play a decisive role in influencing the judgement of scientists. In this case, one would *cognitively expect* scientists to continually disappoint the *normative expectations* placed on them. In the second case, medialization leads neither to a tension nor to a loss in credibility, but rather to a *re-stabilization* of the expectations placed on science. In this case, science would maintain its special epistemic status, while the expectations of *how* science attains knowledge may change. Uncertainty may, for example, come to be viewed not as failure but as a normal part of science. What we would then be observing is an adjustment of cognitive expectations while normative expectations remain untouched.

Although a tension between normative and cognitive expectations refers to a credibility problem in the present, both a loss of credibility and a re-stabilization of credibility refer to a change over time. A re-stabilization of credibility can, however, be operationalized as the production of an image of science in which the "negative" aspects of science covered in the media are accounted for, without creating a tension between cognitive and normative expectations. A loss in credibility can, in turn, be operationalized as an image of science in which the validity and objectivity of scientific knowledge is not seen as being superior to other knowledge forms.

Using this analytical distinction, I interpret the implications of the image of science produced in the coverage of epidemiology and stem cell research in the German Press on the credibility of science. Here, I show that what at first sight may be interpreted as successful boundary work is rather a re-stabilization of credibility or even the stabilization of a tension between normative and cognitive expectations. In the conclusion, I then argue that these effects must be seen in context of the nature of mass media as a communication form. I argue that although mass media can and do allow for learning in the sense of a re-stabilization of expectations, they would not be able to produce such a fundamental cultural change as the loss of the special epistemic authority of science. However displeasing it may be to scientists, the continual reproduction of a tension between normative expectations and cognitive observations is, on the other hand, precisely the democratic function the press should be fulfilling.

6.2 Epidemiology and Stem Cell Research – Between Routine Coverage of Science for Policy and Science Policy for Breakthrough Science

In the following, I present the results of an analysis of the coverage of epidemiology and stem cell research in the German national press (*Das Handelsblatt*, *Der Spiegel*, *Die Tageszeitung*, *Die Welt*, *Die Zeit*, *Frankfurter Allgemeine Zeitung* and *Süddeutsche Zeitung*) between 2000 and 2006. The goal of this analysis was to reconstruct the images of science produced in the media.[1] Epidemiology and stem cell research were chosen as two areas that represent "visible science," both enjoying a high degree of media attention while, at the same time, differing in ways that are likely to influence the effect of proximity on credibility. Health is an "area in which science, politics and the media interface [. . .] and in which regulatory measures are connected to the actual state of knowledge and are changed in accordance with its progress" (Weingart 1997: 605). Thus, in the case of epidemiology, "the process of decision-making places unusual strains on science" (Jasanoff 1987: 195). Epidemiology is, however, at the same time, an area in which reporting is to a large extent a routine matter because it has to do with an issue of universal concern (health!). In contrast, stem cell research is breakthrough science both in the sense of being seen as being at the outer most frontiers of scientific development (Nelkin 1995) and in the sense of "violating" cultural categories of the natural, thus disturbing the existing social/moral order (Bloomfield 1995). In addition, while epidemiology is almost only covered as *science for policy,* stem cell research is largely reported on in terms of *science policy*. Thus, on the one hand, reporting on *science for policy* is compared with reporting on *science policy* while, on the other hand, *routine reporting* on science is compared with *reporting on breakthrough science*.

6.2.1 Epidemiology

6.2.1.1 Method and Material

The articles were analyzed with the qualitative interpretation method developed by Ulrich Oevermann: objective hermeneutics (Oevermann et al. 1979; Oevermann 1991, 2000; Reichertz 2004). This is a method that takes the contextuality of meaning seriously. Two principles serve to ensure that this constructivist understanding of meaning is respected in the interpretation processes. Instead of focusing on parts of a text that might seem particularly interesting, the researcher goes through the text step by step, analyzing each sequence in its particular context. Each sequence is analyzed in terms of all possible meaning contexts in which the selection of precisely

[1] This study was part of the project "Integration of scientific expertise into media-based public discourses (INWEDIS)" (see Peters et al. 2008) which was supported by a grant from the German Federal Ministry of Education and Research (BMBF) in the research programme "Knowledge for Decision-making Processes – Research on the Relationship between Science, Politics and Society."

this form of constructing reality would make sense. As one progresses in the analysis, more and more of the many possible contexts can be eliminated so that in the end one has only one coherent "reality" – in our case one coherent image of science. This meticulous approach usually greatly restricts the amount of material that can be analyzed. Since the image of science produced in the coverage of epidemiology proved to be very stable, it was possible to analyze a comparatively large number of articles (120).

Based on a keyword search in the Database Lexisnexis, a stratified random sample of 40 articles was taken from each of the following three areas of epidemiology: BSE, cancer and epidemiology excluding BSE and cancer. Restricting the analysis to cancer and BSE served to neutralize possible context variables. In the case of cancer, the purpose was to assure that reporting was on an area of epidemiology that enjoys continual and high media presence. BSE is an area of epidemiology in which media coverage was not a matter of routine reporting. Rather, it took place in a situation that can safely be described as a crisis both in terms of policy and in terms of the relationship between science and politics. No variation of the image of science was found in the coverage of cancer, BSE and other areas of epidemiology.

6.2.1.2 Empirical Results[2]

A very consistent image of science is created in the media coverage of epidemiology. Politicians are expected to be informed on the latest research results and to base their decisions on this knowledge. Policy that does not take the latest scientific discoveries into account is framed as not well founded and irrational, thereby reaffirming the epistemic status of scientific knowledge.

> Those who demand cannabis for everyone are not familiar with current research results and with the dramatic epidemiological data of the last two to three years (*Spiegel*, "Kick from the bong," 33/2002).

> With the slogan 'the fattening television' the eager Minister Künast wants to drive kids away from the TV screen. At the same time, a recent study [. . .] couldn't affirm the often claimed relationship between television consumption and overweight (*Zeit*, "Round and healthy," September 30, 2004).

The objectivity of scientific knowledge as the legitimate basis of policy decisions is contrasted with the influence of interest groups.

> The scientific findings on the dangers of passive smoking should have long ago been translated [. . .] by a responsible politics into effective laws and regulations. [. . .] The dependence on and the fear of lobby groups has [. . .] played an overwhelming role in tobacco prevention or rather non-prevention [. . .] (*Süddeutsche Zeitung*, "More protection for non-smokers," March 11, 2003).

[2] Since the interpretation method objective hermeneutics produces very long texts, the quotes used serve to illustrate the results of the analysis.

The image of science as the legitimate basis of policy decisions and as a source of objective truth is reinforced by the expert role of scientists as educators and policy advisors.

> 'In this regard we are politically not on the right path,' says epidemiologist Niklaus Becker from the German Cancer Research Centre Heidelberg. Although both the educational campaigns of the government and its Mammography project [. . .] are positive, 'the behaviour of Germany in the fight against tobacco is a disgrace' (*Süddeutsche Zeitung*, "The lifestyle that makes you sick," April 4, 2003).

> Andreas Krause from the rheumatism clinic in Berlin-Wannsee summarizes the prejudices of the nation as follows: 'It is seen as an old people's alignment against which one cannot do anything.' But lay people are mistaken (*Zeit*, "Smouldering fire in the body," July 29, 2004).

As expected, dissent, uncertainty and the instrumentalization of science were recurring themes in the media coverage of epidemiology. How did this affect the credibility of science? In the empirical material analyzed, two contexts were found in which the credibility of science becomes an issue: (1) the inadequacy of science for solving concrete problems (utility) and (2) the instrumentalization of science. In the following, I will analyze each of these contexts separately.

Science and Utility

The coverage of science in contexts in which the lack of scientific knowledge that is needed for solving concrete problems is an issue, the credibility of science is at least implicitly called into question. One common means of solving this credibility problem is by re-defining the problem. Knowledge gaps are attributed to the complexity of the subject matter rather than to deficiencies in science. As can be seen in the article cited below, more science thus appears as the only means of solving the problem.

> Nothing can conceal the fact that the knowledge gaps concerning cancer promoting or cancer inhibiting effects of the natural and synthetic ingredients of our nutrition are immense. Well founded knowledge on these complex relationships could help countless people to attain a healthier life. Detailed research into carcinogenic and anti-carcinogenic effects of food should therefore be more intensely driven forward than they have been till now (*Frankfurter Allgemeine Zeitung*, "Cancer and nutrition – A never ending story," February 28, 2001).

This article begins by calling the utility of science into question. The title "Cancer and nutrition – a never ending story" evokes an impression of futility. As we quickly learn, the "story" referred to is scientific research on the relationships between cancer and nutrition. We are shown that science is unable to find clear answers to questions concerning cancer inhibiting and cancer promoting effects of nutrition. Describing these scientific uncertainties as "a never ending story," of course, implies that science, at least in this field, cannot be given credit for attaining certain and objective truth. The utility for preventing cancer is called into question. Ongoing research thereby appears as futile and hence as a waste of time and resources. This image is, however, quickly contradicted in the running text. The text begins by

distinguishing between areas of scientific consent and dissent: The fact that nutrition has both positive and negative effects on cancer development is undisputed. What is difficult to understand, we are told, is what effects which substances have. These difficulties are not attributed to scientific deficiencies but rather to the complexity of the subject matter. The only means of attaining "well founded knowledge on these complex relationships" is more "detailed research." The implication is that scientific research is the only means of attaining "well founded knowledge" and that the uncertainties of current scientific findings can be resolved by more "detailed research." At the same time, research is defined solely in terms of utility ("help countless people attain a healthier life").

In short: While the article begins by addressing a credibility problem in its title, the text serves to (1) re-define the problem as a problem that is caused by the complexity of the subject matter and not by deficiencies in science and (2) thereby stabilize the credibility of science as the only means for solving the problem: "Detailed research into carcinogenic and anti-carcinogenic effects of food should therefore be more intensely driven forward than they have been till now." Thus, as in Collins' "window of uncertainty," scientific uncertainty is framed as being a temporary state set within "walls of certainty." The credibility problem addressed in the title can be defined as a tension between normative and cognitive expectations. The purpose of science appears as attaining knowledge concerning the relationship between nutrition and cancer. The impression is, however, evoked that this is a futile mission. In the text of the article, this impression is implicitly repudiated and thus framed as being a false impression. In this sense, what we observe in this article can be defined as a re-stabilization of credibility. It addresses and corrects an "existing" credibility problem. The credibility of science as a source of objective truth and the legitimacy of science in terms of utility is upheld (1) in that uncertainty and dissent are framed as a normal part of science and (2) in that science alone appears as able to resolve the conflict, close the gaps and thereby replace uncertainty with certainty.

Another means by which the tension between the normative expectation placed on science to solve concrete problems and its inability to meet these utility demands is resolved is by: (1) addressing the *incompatibility* of science process and knowledge acquirement and with the demands of utility, in terms of solving concrete problems as they arise –while at the same time – (2) annihilating the difference between the scientists as researchers and policy advisors and policymakers as the ones making collectively binding decisions.

> It is as if we were sailing a boat which we are still building. We are still missing unbelievable much knowledge. But we still have to continuously make decisions that can be a question of life and death – and at the same time about a lot of money (*Spiegel*, "International alliance of virus hunters," 19/2003).

Instead of scientists as policy advisors, we encounter a collective engaged in a common endeavour of both building (attaining knowledge) and steering (making decisions). In this context, an understanding of science in terms of its utility is pushed to its extreme. Although the process of knowledge acquisition (building) is distinguished from its application (steering), no distinction is made between those

responsible for building and those responsible for steering. In this context, scientists are characterized as people mobilizing all possible resources and energy to find the knowledge needed. The inadequacy of knowledge is explained by the complexity of the issue at hand and by the nature of the scientific process, or more precisely, the incompatibility of the nature of science and the nature of policy. While decisions must be made as problems arise, science must adhere to scientific methods of knowledge acquisition. Thus, policymakers are faced with the dilemma of having to steer a boat that is still being built. In terms of credibility, here, too, we see a re-stabilization of the image of science in the sense that science is neither normatively nor cognitively expected to be able to provide the knowledge needed for decisions *in the time frame* set by the necessity of action. The consequence that science is inadequate in terms of what is needed to solve concrete problems is avoided by annealing the difference between science and policy in terms of relevance structures. The distinction between scientists and policymakers disappears and scientists are portrayed as part of an international collective working for the common good.

In contexts of concrete utility expectations, scientific uncertainties are not only addressed in terms of knowledge gaps, but also in terms of contradicting information. Here, the credibility of science as a source of certain and objective truth is called into question. The tension between the expectation of objectivity and the observed uncertainty is resolved by framing existing contradictions as a result of knowledge gaps. Scientific dissent, we are told, can, must and will be resolved by further research. Thus, the credibility problem that scientific dissent implies is re-defined as a problem of missing knowledge. The lack of scientific certainty is then, as shown in the above examples, not attributed to deficiencies in science, but rather to the complexity of the subject matter. Thus, here, too, one can see a very consistent pattern of re-stabilizing the credibility of science. The following example shows how the coverage of dissent and uncertainty can create an image of science that at first may appear as a form of successful boundary work. The credibility of science as a source of objective and certain truth is re-stabilized. Upon closer examination one can see, however, that, at the same time, a tension between the normative and cognitive expectations placed on science is stabilized on another level.

> *Spiegel*: Professor Michaelis, the findings of your discipline are causing an epidemic of fear. The basis are epidemiological studies which make the consumption of coffee responsible for pancreas cancer, fatty foods for heart disease and anti-baby pills for thrombosis. Often enough a little later studies claim the exact opposite.
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> Michaelis: Contradictions are often caused by epidemiological studies collecting extensive data. [. . .] Then, in the analysis of all kinds of things, one has the statistical problem that relationships can always be seen which are merely coincidental results of the numbers. [. . .] The perhaps coincidentally observed results have to be – and this is the point – researched methodologically in a further study. [. . .] That is where the epidemiologists often make the mistake that they want to increase the value of their study and sell still uncertain coincidental findings as definite results (*Spiegel*, "Fishing for data is widely spread," 15/2001).

In his "question," the journalist of the magazine *Spiegel* prompts his interview partner, an epidemiologist, to justify the behaviour of "his field." Both the expectation of utility and of science as a source of certain and objective truth is called

into question with the metaphor "an epidemic of fear." Instead of helping to prevent and heal diseases, science is portrayed as being a source of illness and suffering. Framing science as the cause of an "epidemic of fear" not only reverses the role of science from helper to ill-doer. The term "epidemic" also refers to a highly contagious, rapidly spreading disease and therefore to a threat or danger, implying a loss of control. Thus, instead of functioning as a source of certainty allowing for rational decisions, science is portrayed not only as causing "fear" as an irrational emotion, but as causing this emotion to be passed from one member of the community to the next like an uncontrollable disease. The credibility problem addressed, thus, concerns both the epistemological status of science as a source of certain and objective truth and the utility of science. By beginning this description of epidemiology with the phrase "the findings of your discipline" a collective is defined. The journalist does not speak of the finding of individual epidemiologists but rather of "your discipline." Hence, the implication is that the discipline as a whole, as a collective, is responsible for "causing an epidemic of fear." By calling it "your discipline" the interview partner is identified as a member of this collective and thereby given responsibility for "the epidemic of fear." Without formulating a question the journalist clearly calls on his interview partner to justify the behaviour of *his* discipline.

The interview partner begins by locating the cause of contradiction in what seems like sound scientific practice: "epidemiological studies collecting extensive data." This sound practice is then shown to bear a problem: "Relationships can always be seen which are merely coincidental results of number." Then, a norm of good scientific practice is formulated: "The perhaps coincidentally observed results have to be researched in a further study." It is only in a next step that we are told what the true source of contradictions is. It is not the extensive data that cause the contradictions or the problem of distinguishing between coincidental and real relationships. With the formulation of the norm of good scientific practice we have already been told what the scientific solution to this problem is: more research. The cause is the "selling of still uncertain coincidental findings as definite results." The implication of "*still* uncertain findings" is that these momentary contradictions will eventually be resolved – the means of resolving the contradictions being further research. The deviation from good science is attributed to personal career interests: "Epidemiologists want to increase the value of [the] study and sell uncertain finding as definite results." So here, too, we see familiar mechanisms of re-stabilizing the credibility of science at work: (1) the distinction between good science and bad science and (2) the setting of uncertainties within walls of certainties.

While the "setting of uncertainties within walls of certainties" re-stabilized the epistemic status of science, the distinction between good and bad scientific practice functions somewhat differently here than in the contexts considered so far. It both re-stabilizes the credibility of science and stabilizes a tension between normative and cognitive expectations. In order to understand this double effect, let us compare Michaelis' epidemiologists with the "black sheep" we meet in Gieryn's studies (Gieryn 1983, 1999). The "culprits" we encounter in this example differ from Gieryn's "black sheep" in three regards. (1) The deviation from the norm of

good science is not described as fraud or misconduct but rather as a "mistake." There is a great difference in the moral implications of the term "mistake" and the terms "fraud" or "misconduct." Accusing somebody of "fraud" or "misconduct" bears a clear moral judgement expressing both a breach of deeply-rooted values and contempt for the person or at least his behaviour. Classifying behaviour as a mistake, in contrast, places it safely beyond the reach of moral judgement. Not only does everybody make mistakes. Mistakes are not a result of ill intentions or moral indifference but rather of bad judgement or lack of knowledge. Therefore, even if the "mistakes" are interpreted as mistakes in moral judgement, it would be inappropriate to sanction them with disdain let alone such drastic measures as the expulsion from the scientific community. (2) The deviation from the norm is not framed as an exception. Both the title ("Fishing for data is *widely spread*") and the text ("epidemiologists *often* make the mistake") emphasize that what is being described is common practice. The implication is that this form of behaviour is not only common, but also that it does not breach deeply-rooted norms in the scientific community but is rather tolerated as an understandable mistake – and this in a context, where the detrimental effects of this behaviour on society are described in dramatic terms: "causing an epidemic of fear." (3) The mistake in judgement is made possible by a characteristic of the scientific research process itself: "One has the statistical problem that relationships can always be seen which are merely coincidental results of the numbers." By framing this as an objective "problem" that exists for all researchers ("*one* has the problem." "*always* can be seen"), we are given the impression that the sale of "*perhaps* coincidental relationships" as clear research results is a "mistake" caused not only by the career interests of individual scientists, but also by the nature of this kind of research. Instead of despicable personality traits being responsible for the crossing of the boundary from good science to bad science, we are shown a kind of slippery slope. Combined with the nature of epidemiological research and the normal, morally acceptable motivation to further one's career interests, the mistake of "fishing for data" becomes common practice.

The image of "black sheep" both serves to immunize science by making misconduct and fraud appear as an exception to the norm and by re-affirming the compatibility of social and scientific norms. Here, far from being described as "black sheep," the culprits are described as scientists making a by no means uncommon "mistake." The possibility for wrong interpretations, though of temporary nature, appears as something inherent to the scientific process and selling research results over value as an impulse that is both common and tolerated within the scientific community. At the same time, the detrimental effects of the resulting bad scientific practice for society – the "epidemic of fear" – are not called into question. As a result, scientific norms appear as being in conflict with basic social interest on a very fundamental level. Thus, although the repertory used to address the credibility problem is not extended, the implications for the credibility of science are very different. The immunizing effect is restricted to the epistemological status of science and as a means of attaining certain and objective truth in the *long run.* Science, we are told, is in principle able to function as a source of reliable information with practical implications. One can, however, expect that "in reality" any particular statement might very well be based on "bad" science.

Instrumentalization of Science

In articles in which the instrumentalization of science is an issue, the credibility of science is stabilized in two regards: (1) The instrumentalization of science is framed as a breach of the norm of scientific autonomy. (2) Scientists appear as key actors fighting for the autonomy of science. In both cases, the credibility of the autonomy of science is reinforced. The credibility problem we encounter here does not pertain to the validity of science as a knowledge form or to its autonomy, but rather to the relationship between science and its social environment. Decisive for whether credibility is re-stabilized or a tension between cognitive and normative expectations is stabilized is whether the breach in norms appears as common practice or as a scandal in the true sense of the word. The following example shows how the coverage of the instrumentalization of science can re-stabilize the credibility both of science and of the relationship between science and its social environment.

> One is otherwise only used to this kind of influence in totalitarian states: Researchers weren't allowed to freely participate in conferences, their findings were censored. British clerics and politicians picked out those statements from their findings that served to calm down the population. Warnings were kept concealed. Instead, British agricultural minister John Gummer went in front of the camera with his daughter and asserted, eating a hamburger: Beef is safe (*Süddeutsche Zeitung*, "Living with the risk," November 28, 2000).

By framing the instrumentalization of science as something "one is otherwise *only* used to in totalitarian states," the incident is marked as a scandal in the true sense of the word. It is not only something which should never have happened; it is also something lying beyond normal experience. The comparison with totalitarian states, at the same time, legitimates the autonomy of science in two different ways: The autonomy of science appears as a condition for utility. Scientific knowledge is framed as something the public both has a right to and needs for making rational judgements. Autonomy from politics appears as the condition for open communication about scientific research. The autonomy of science is, however, not only justified in terms of utility, but also – as the comparison with totalitarian states implies – in terms of freedom and thereby as something of inherent value. Thus, the instrumentalization of science is constructed both as a breach of democratic norms (freedom of science, the right of citizens to information on matters of public concern) and as a threat to the social function of science. Eating beef on camera is framed as being a form of propaganda based on emotional manipulation and is implicitly contrasted with the legitimate means of evaluating risk: objective, scientific knowledge. The instrumentalization of science described here is framed not only as a breach of the norms of a legitimate relationship between science and politics, but also as something breaking with previous experience – at least in democratic states: "One is otherwise *only used to* this kind of influence by totalitarian states." Thus, what we see here is a re-stabilization of the credibility of the autonomy of science both as the legitimate and the normal form of the relationship between science and its social environment.

> Because the study didn't find anything new it wasn't published, the company defends itself. In addition, it was faulty anyways. Frits Rosendaal of the University of Leiden does not accept this excuse: 'Whether the study is worth it, is decided before one starts,' he says.

> 'Even if nothing new comes of it, the result is of interest. [. . .] This is selective publication.' The case thus shows what scientists often criticize. Studies that fit the concept are published, others kept back (*Süddeutsche Zeitung*, "New debate on the third generation pill," March 20, 2001).

As in the previous examples, here, too, we can observe how a breach in norms is defined, by distinguishing between good and bad practice ("selective publication"). What is wrong with bad practice becomes clear through the more or less implicit comparison with good practice. And once again, we see that how responsibility for crossing the boundary between good and bad practice is decisive for the implications of this distinction for the credibility of science. The "defence" of the company is framed as being an "excuse." Unlike an "explanation," an "excuse" always bears the negative connotation of trying to explain unacceptable behaviour on false grounds. With the phrase "does not accept this excuse" the scientist cited is framed as being an expert for judging the validity of the "defence" and thus for distinguishing between what is good and what is bad science communication. At the same time, his judgement is implicitly marked as being correct. It would obviously be wrong to accept an excuse. Why the "excuse" is unacceptable is shown by comparing good science-communication with the communication practice of the company. Good science-communication is described as an objective, existing norm with the phrase "*is* decided before *one* starts." The existing norm of communicating research results appears as the legitimate basis for assuring objectivity and impartiality. The bad communication practice described here is attributed to the economic interests of the company and thus to motives ulterior to the scientific process itself. Scientists and science, thus, appear as impartial and objective and scientists both as defenders of impartiality and victims to the power and influence of political and economic parties.

In contrast to the previous example, the bad practice described here is, however, framed as being common. We are told about an ongoing "censorship" of which the current incident is but one example ("*often* criticize," "Studies that don't fit the concept *are* published, others kept back"). Thus, while stabilizing the epistemological stability of science and the credibility of scientists as impartial and objective observers, a tension between the normative and cognitive expectations placed on the relationship between science and economics is stabilized.

6.2.2 Stem Cell Research

6.2.2.1 Method and Material

The articles on stem cell research were selected based on two criteria: (1) the phase within the stem cell debate and (2) the method of maximal case contrast. The stem cell debate was divided into three phases: the coverage prior to the decision of the lower house of the German parliament on the import and use of human embryonic stem cells (January 2001–August 2001), the debate in the immediate context of this decision (August 2001–March 2002), and a third phase that I understand as a

re-warming of the debate (May 2005–May 2006). Forty articles were selected from each of these three phases based on a keyword search in the Database Lexisnexis. Within these three phases, the articles were chosen using the method of maximal case contrast. The purpose of this method is to allow for a maximal representation of a field in studies where relatively few cases can be analyzed. Here, too, the image of science was reconstructed based on the interpretation method of objective hermeneutics. After analyzing the image of science in an article, I formulated hypotheses as to what context factors might be responsible for the production of precisely this image – such as the political orientation of the paper, the column in which the article was published or the particular issue at hand. The articles were selected with contrasting context factors – for example, articles dealing with a different topic or with a different political orientation. Once again, relatively little variation was found in the images of science, allowing for the analysis of a comparatively large number of articles (120).

6.2.2.2 Empirical Results

With the analysis of the coverage of stem cell research in the news, we come to an area of science in which one would expect the credibility of science to become an issue in a very different sense. Aside from being a prominent example of visible science, stem cell research shows interesting parallels to epidemiology. Here, too, science is reported on in a context where utility appears as the criterion legitimating scientific endeavours. And as in the coverage of epidemiology, sound policy is seen as being based on sound science. Thus, here too, we see politicians as being faced with an insoluble dilemma. They must make decisions based on judgements about the potential uses of science in areas where the knowledge needed for these judgements is not available. In the case of stem cell research, there are, however, three additional layers to the dilemma. On the one hand, politicians must make science policy decisions that will affect the ability of scientists to gain the knowledge needed for judging the utility of stem cell research. The research needed for closing the knowledge gaps is in this case precisely the ethically contested stem cell research about which policy decisions must be made. On the other hand, politicians must rely in their science policy on the knowledge of scientists who have a vested interest in the topic. Thus, scientists appear as political actors. In addition, stem cell research is an area of breakthrough science. Not only is science seen as posing an at least potential threat to the social/normative order of society (Bloomfield 1995). It also produces "monsters" and is thus compatible with the discourse of fear used both in science fiction and politics to discredit science (Haynes 1994, 2003). Thus, stem cell research is an area of visible science in which one would expect the credibility of science to be at risk.

As in the reporting on epidemiology, science consistently appears as a source of certain and objective truth and scientific research as a process by which knowledge gaps are gradually closed and uncertainties reduced. Thus, the epistemological authority of science remains intact. In the reporting on stem cell research, there is, however, an additional layer of "reality." Here we find three different images

of science: (1) science as a "sport", (2) science as a "guild" and (3) science as "hubris." In the "hubris" image, and in part in the "guild" image, the credibility of the autonomy of science becomes problematic.

In the following section, I describe the key features of these images in terms of credibility. While the quotations used here serve to illustrate these features, the full objective hermeneutical analysis of all three images is available in "Mediale Konstrukte von Wissenschaft in den Bereichen Stammzellforschung und Epidemiologie" (Jung 2009).

6.2.2.3 Science as "Sport"

A frequent pattern of portraying science is as a "sport." In this context, the goal of science is framed as winning in a competition between nations. Thus, the success of German scientists is a German success, and the success of scientists from other countries is a national set back.

> The success of Asiatic clone laboratories shows scientists that they not only have lost the chance of competing in the champions league of biotechnology but are in danger of being handed down to the regional league. [. . .] South Korea is on the move [. . .] As a result, Germany is in danger of irrevocably falling behind (*Zeit*, "Stem cell researchers are pessimistic," May 25, 2005).

Consequently, the importance of a victory or defeat is neither measured in terms of the epistemological value of scientific findings, nor their medical relevance. Rather, it is qualified in terms of the region in which the finding was made for the first time and the medial attention the finding aroused.

> Before it became publicly known yesterday that South Korean researchers have for the first time succeeded in the therapeutic cloning of cells of patients, scientists of the University of Newcastle reported on Thursday evening that they have cloned human embryos for the first time in Europe (*Welt*, "Clone successes cause new ethics debate," May 21, 2005)

Doing something "for the first time in Europe" appears as a success, doing something for the first time in the world as an even greater success. Mirroring the shifting possibilities of regional identification, the English success is framed as a European victory and the Asian success as a setback for Germany.

The flip side of the construction of science in the context of a competition between nations and world regions implies the normative expectation of internal co-operation.

> In a (for Germany unimaginable) closing of ranks politicians of the two biggest [South Korean] parties have founded a committee. Their goal: the Noble Prize for Hwang Woo Suk (*Zeit*, "Stem cell researchers are pessimistic," May 25, 2005).

Society, and in particular national politics, is framed as being responsible for assuring that science is given the support it needs to attain a high ranking and play in the champions league.

What are the implications of this form of constructing science in terms of credibility? The expectation of internal cooperation is stabilized, while the implied criticism of the "reality" of the relationship between science and politics can be seen

as a form of successful boundary talk. Here, too, however, the legitimacy of science is upheld at the cost of the creation of a tension between normative and cognitive expectations. The credibility of German scientists is upheld in the face of what is constructed as a national defeat by criticizing the relationship between science and politics: The failure of German scientists is not a result of any inherent inferiority. Rather, it is a result of unfair competition conditions. While South Korean scientists can rely on the support of politicians and the nation, German scientists are faced with a political landscape deeply split in their standing on stem cell research and the even drier prospect of ending up with a political party in power, which is categorically against stem cell research. As the phrase "in a for Germany unimaginable closing of ranks" shows, the expectation that the normative expectation concerning the relationship between science and politics/society be fulfilled is framed as being "unrealistic."

6.2.2.4 Science as a "Guild"

Another frequent image is that of science as a "guild." In contrast to the image of science as a "sport," the success or failure of German scientists is not equated with the success or failure of Germany. Rather, individual scientific successes or failures are seen as the successes or failures of an internationally, or rather globally, organized community. Science appears as a self-governing community, sharing common interests and norms and capable of strategic action. The implications for the credibility of science are somewhat more complex than the implications of the "sport" image. Two different forms of this image can be distinguished. In the first image, the goals of science appear as being at least potentially in conflict with the interests and values of society, and the values and interests of society are only insofar of relevance to scientists as they hinder or promote the realization of their goals.

> While society, at least in its political sphere, is dedicatedly debating the acceptability of research on stem cells [. . .] science is– though for now elsewhere – unflinchingly going its way (*Frankfurter Allgemeine Zeitung*, "Stem cells – the next step," March 3, 2001).

> Stem cell researchers are thus eagerly looking for new ways, because they see their work hindered in many countries by ethical hurdles [. . .] (*Süddeutsche Zeitung*, "Politically correct stem cells," October 18, 2005).

Scientists appear as being unscrupulous, bound neither by the moral values nor by the legal norms of nation-states and oriented solely to the interests of their own scientific community. Although the credibility of science as a knowledge form remains intact, the credibility of science as an institution is called into question, the implication being that science should be subjected to the control of society or the political system.

In the second form of this image, science is portrayed as a self-governing international community adhering to a moral code which is compatible with fundamental social norms and values.

> Those who let themselves be caught in massive deceit don't get a second chance in the scientific community. No one cooperates with them, no one supports their research proposals,

> no one appraises their work. The rigorous exclusion for caught deceivers is the only protection against charlatans in one's own herd. [. . .] But because researchers are humans, cases of fraud occur time and time again. It is the exaggerated ambition, the pressure to publish and the concern for one's own position and occasionally hubris and thoughtlessness that drive some to dishonesty (*Zeit*, "Hero or charlatan," December 21, 2005).

The stringency with which the scientific community enforces its moral code appears as evidence of the morality of science and the functionality of scientific self-control. That fraud is possible is attributed to factors ulterior to science per se.

> The wonderful thing about science is that the moment, in which trust is lost, its true strength comes to light. Religious leaders can make unfounded statements and cause millions of trusting people to bash up each other's heads without any possibility of proving that they are lying. For the man, however, who used the hopes of the seriously sick part of humanity for his own fame colleagues and instruments are now available to verify or disprove his work. The less wonderful aspect of current science is that Hwang could rise to such heights with his statements. The South Korean state has made a star of Hwang in order to bring itself onto the world stage. [. . .] The success addict Hwang didn't leave any room for the possibility of failure. No scientists should work in that kind of pressure chamber. Some undesirable developments should now be ended thanks to the self-control of science. [. . .] If Hwang turns out to be a forger science will spit him out like a cold fish (*Frankfurter Allgemeine Zeitung*, "Trust gambled away," December 17, 2005).

Here, too, neither the legitimacy of scientific norms nor the autonomy of science as an institution is called into question. The comparison with religion implies that although science, like religion, is an area with a great deal of power, science is capable of self-control. The sentence "If Hwang turns out to be a forger, science will spit him out like a cold fish" not only illustrates how science governs itself, but also, as in the example above, how important this moral code is in the scientific community. Thus, the reaction implies that forgery is not a common and by no means an accepted practice. And here, too, the occurrence of forgery is explained by factors external to science per se such as the role of the state or Hwangs personal character traits. Once again we find the credibility of science is maintained at the cost of the stabilization of a tension between normative and cognitive expectations. An image of science is produced in which society creates an atmosphere in which scientists are subjected to undue pressure. So here the tension is between the normative expectations placed on the relationship between science and society and the reality of this relationship. In the case of the Hwang scandal, this tension is largely restricted to the relationship between the South Korean state and its science (see also Haran and Kitzinger 2009).

6.2.2.5 Science as "Hubris"

Another recurring image found in the coverage of stem cell research is that of science as "hubris." Here, the goal of scientific endeavours appears as the realization of megalomaniac fantasies.

> Worldwide, so at least the prophets of the new era announce, new human ES cells will be ripening to liver, heart and nerve tissues. Alzheimer, Parkinson, heart attacks and cancer – Brüstle and his co-fighters hardly leave out any of the great captivators of humanity when

> they list the sicknesses that one day will supposedly be healed with the help of ES cells (*Spiegel*, "We are better than God," May 14, 2001).

Although science is portrayed as *claiming* to have a noble purpose, what is promised appears as being so ambitious – freeing humanity of almost all its great captivators – that it seems utterly unrealistic. In addition, scientists are depicted as being prophets and visionaries, not only comparing themselves with God but even appearing in their self-evaluation as the winners in that comparison. The implication of this characterization is that their predictions and promises are not based on professional expertise and a rational evaluation of the potential utility of research.

Scientists are not only portrayed as being irrational, but amoral and down right manipulative.

> It is an amazing fact of contemporary history that scientists always remember the sick and the weak of the world precisely at those moments when acceptance is needed for future technologies (*Spiegel*, "Cell workshop," January 1, 2001).

The delusions of grandeur possessing scientists appear as posing an at least potential threat to the moral and social order of society.

> If human nature is technologically changed, this affects the very idea of man on which constitutional law is founded. It is part of human dignity that the imprinting given to man by nature remains unchanged. [. . .] If and for how long the scientific community allows itself to be tamed by these consideration remains unclear (*Handelsblatt*, "Science won't let itself be permanently tamed," August 6, 2001).

In this context, we encounter the allusions to "monsters" ("human nature technologically changed") threatening the existing social and moral order typical of the coverage of breakthrough science (Bloomfield 1995). And scientists seem indifferent to these consequences. Thus, the "hubris" image of science picks up on the "Frankenstein discourse" of science fiction (Haynes 1994, 2003).

Scientific cooperation with politicians and entrepreneurs is consequently framed as a "devilish alliance" in which the allies are at best victims, if not succumbed to megalomaniac fantasies of their own, themselves knowing and willing partners in the manipulation of the public.

> With his unfailing sense for symbols Schröder understood: A new type of researcher had entered the scene. Their message was epic, their promise a revolution. [. . .] Schröder wanted to partake in the glamour (*Spiegel*, "We are better than God," May 14, 2001).

What we find here is a tension both between the normative and cognitive expectations placed on science and on the relationship between science and the rest of society. Central to the credibility problem science faces here is that the values and goals of science are framed as being in conflict with fundamental values and norms around which society is organized. The implication is that both scientists and science as an institution must be subject to political and social control. Thus, here, the legitimacy of the autonomy of science is called into question. It is, however, important to note that even in the construction of science as "hubris", both the credibility of the *normative* expectation that science function as a source of objective and certain truth and the epistemological status of science are not called into question.

6.3 Conclusion

Medialization means not only more science in the news, but also more "negative" science in the news. What, however, are the effects on the credibility of science? Both common sense and theoretical consideration give us a rather clear cut answer: More "negative" science in the news leads to a loss in credibility. With the increasing importance of science in society, science becomes subject to continual observation by the media – and this on all levels of the scientific process. The result is what Peter Weingart calls the paradoxical effect of medialization: What previously took place in the seclusion of ivory towers or backstage is now a matter for public viewing (Weingart 2001). Dissent, uncertainty, fraud, misconduct and the instrumentalization of science for political and economic interests are not only topics the media size upon due to their affinity for the dramatic. They are also matters the public has a right to be informed about. Thus, with the increasing importance of science in society, its special authority as a source of certain and objective knowledge – the bases of the increasing importance of science in society – is, paradoxically, undermined. We are, however, also confronted with ample empirical evidence, showing how the epistemic status of science is stabilized. Culprits are identified and expelled from the scientific community as black sheep; scientific uncertainties are set within walls of certainty, etc. Here, the media appear as a stage on which the credibility of science is successfully defended. How can these seemingly incompatible findings be explained?

The distinction between normative and cognitive expectations allows us to identify three possible effects of medialization: (1) a *loss* in credibility, (2) a *tension* between normative and cognitive expectations and (3) a *re-stabilization* of the relationship between normative and cognitive expectations. Exemplified with the results of an analysis of the coverage of epidemiology and stem cell research in the German press, it was shown that in the coverage of fraud, uncertainties or the instrumentalization of science one of two things happen: Either a tension between normative and cognitive expectations is constructed or the relationship between the two expectations is re-stabilized. A loss in credibility could not be observed. Thus, some of the tension between the conceptually convincing expectation of a loss in credibility and the empirical observation of the stability of the epistemic status of science was resolved. It was shown that, although the epistemic status of science is not called into question, what at first may be mistaken for "successful" boundary work in fact often (re)produces a tension between normative and cognitive expectations.

In order to fully understand the effects of medialization on the credibility of science, we must, however, also take the logic of mass media into account. The function of mass media can be described as an integration function. In highly differentiated societies, mass media fulfils an integration function by co-ordinating the mutual expectations and expectations-expectations of different social spheres. Mass media function as a mirror, both reflecting the worlds of different social spheres to the public and to each other and reflecting these reflections back to the respective social spheres. Thus, they make a continual adjustment of mutual expectations and expectations-expectations possible (Marcinkowski 1993, 2002; Blöbaum 1994;

Esposito 1995; Kohring 1997, 2005; Sutter 2002, 2005). And this is exactly what happens when the coverage of science leads to a re-stabilization of the expectations placed on science. Social learning takes place.

As Shirley Ramsey has shown, reporting on science intensifies when the credibility of science is on the line (Ramsey 1994). Only then can science slide from the science pages to political and cultural columns. Only then is a more differentiated reporting on science possible, allowing for a "more realistic" understanding of science. Only when reporting on science takes place in a more extensive debate, in which science itself becomes an issue, can the real and necessary tensions between the logics of application – be they economic, political or of an everyday nature – and the logic of research be addressed. Thus, more science in the news does not only mean more dissent, uncertainty and misconduct in the news. It also means that the conditions for a "more realistic" re-alignment of cognitive and normative expectations are created. By intensifying the relationship between science and the media, the respective expectations can be better co-ordinated. Or put more succinctly: Distance is not necessary for maintaining credibility. Once the ivory towers have been torn down, the medialization of science is the functional and necessary counterpart to the politicization and economization of science as well as to the increasing permeation of scientific knowledge into all areas of human activity.

The resulting re-stabilization of the relationship between cognitive and normative expectations is but one dimension of the integration function of mass media. The mass media also fulfil a co-ordination function by continually confronting the "reality" of different social spheres with the normative expectations placed on these spheres. The mass media thus forces politics, the economy and, as in our case, science to adjust to the normative expectations of their social environment. Although the adjustment often seems to be restricted to rhetorical strategies and symbolic acts, such as the expelling of black sheep, the orientation to the normative expectations of a generalized public has a long-term integrating effect. In order to maintain their credibility, the respective social spheres are continually forced to make their actions at least *seem* compatible with the normative expectations of their social environment. Thus, both the re-stabilization of expectations and the continual (re)production of a tension between normative and cognitive expectations serve to fulfil the integration function of mass media – a function that can also be described in normative terms as a democratic function of transparency and accountability.

A loss in credibility is in contrast an effect that is not compatible with the function of mass media. Addressing a large and heterogeneous public, journalism is not a communication form, in which fundamental cultural patterns, such as the epistemological status of science, can be radically undermined. In order to serve as a mirror for and to different publics and diverse social spheres, mass media has to appeal to the lowest common denominator, or more precisely: to shared meaning structures. Thus, it is not a communication form, in which a fundamental transformation of deeply-rooted cultural patterns is to be expected. Rather, long held assumptions and norms tend to be reproduced. Insofar as medialization does indeed have the paradoxical effect of causing a credibility problem, it does so by (re)producing a tension between normative and cognitive expectations. Criticizing the way our institutions

function in light of existing norms is not only an important part of the democratic function of journalism. It is also a means of breaking with routine reporting while at the same time reinforcing existing social norms. Just as political and economic scandals do not undermine the normative legitimacy of democracy and capitalism, uncertainty, misconduct and the instrumentalization of science do not undermine the normative expectation that science function as a source of certain and objective truth.

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