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Lost in Translation: How Science Communicators are Depriving Modern Society of Science

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ABSTRACT: The transfer of insights from the exact sciences to society at large is disturbed. This article is a plea to replace science communication by science transfer, which is based on Gadamerian hermeneutics, changing the focus from the news value of science knowledge, to its application.

KEYWORDS: fusion-of-horizons, Gadamerian-hermeneutics, poion, poson, science communication, science journalism, science transfer, understanding

1. INTRODUCTION

Developed societies on this planet have a problematic relationship with exact sciences. Although we have used science to create, for example, our production technologies, our medical knowledge, our means of transport, and our communication technology, there are signs that the role of the exact sciences is becoming less prominent.

In all of the Western countries—for example, in the US (Otellini, 2011), the UK (Richardson, 2012), and the Netherlands (ANP, 2012)—there is a growing shortage of technologists in both academia and industry. One of the important factors contributing to this seems to be the disinterest with which young people regard the exact sciences. Industrial leaders from such prominent companies as Intel, Google, Shell, and Unilever have voiced their concern about lost opportunities and the threat to technological progress. According to the calculations of Jonathan Huebner (2005), a physicist at the Pentagon, we have in fact already gone beyond that phase. If Huebner is correct, the tempo of technological innovation reached its climax toward the end of the 19th century. Up to the 1960s, the number of important technological advances per head of the population decreased slowly, but there has been a rapid decline since then. In fact, Huebner feels that the lack of innovation could lead to a repeat of the Middle Ages.

Despite the large increase in the number of scientific researchers at universities and scientific institutes since the 19th century, there has not been more technological innovation. It is a question of “strong science, weak commercialization,” according to researchers at Cambridge University in a report on the “technology-based innovation gap” commissioned by the British government (Livesey, 2006, p.1). There is no lack of scientific knowledge, but evidently this knowledge fails to reach companies or researchers who can transform scientific knowledge into innovations. Moreover, this scientific knowledge is unable to stimulate enough young people to follow a scientific or technological course of studies.

A third factor that should be mentioned here is the persistence (or, according to some trend watchers, the growth) of modern irrationalism. For example, a small but increasing number of parents are worried about vaccination programs since they believe they could lead to autism (Offit, 2008), some important policy makers allow their decisions to be influenced by astrologists (Regan, 1988), and large groups of consumers in all of the developed countries are concerned about a minuscule amount of food additives even though they continue to feed themselves and their children products rich in fast carbs, bad fats and salt.

2. TWO CASES: DIET CHOCOLATE AND MILK TO STRENGTHEN YOUR HEART

The theory underlying this article is that, in every case, part of these worrisome developments results from insufficient scientific communication. Too many communication professionals at universities, institutes and companies as well as scientific journalists fail to communicate scientific insights to society at large.

Exemplary of the way in which scientific communication fails to fulfill its goal was the publicity surrounding the research letter that Beatrice Golomb of the University of California, San Diego published in the *Archives of Internal Medicine* in 2012. In an epidemiological study of one thousand adults, Golomb (2012) had discovered a relationship between the consumption of chocolate and BMI. The more chocolate the study participants ate, they less they weighed. The communications department at Golomb’s university publicized these results under the headline “Regular Chocolate Eaters are Thinner” (Kain, 2012). “Beatrice Golomb, MD, PhD, associate professor in the Department of Medicine at the University of California, San Diego, and colleagues present new findings that may overturn the major objection to regular chocolate consumption: that it makes people fat” was one of the first sentences of the press report. Thousands of websites, newspapers, magazines and TV shows spread the news using headlines such as “Choclate may help keep people slim” (Roberts, 2012) and “Can Chocolate Aid Weight Control?” (O’Conner, 2012). Millions of people believed that they could now eat chocolate without becoming fat.

Food scientists took offense at these publications because chocolate is a high-calorie product rich in saturated fats and sugar. Golomb attributed the slimming effect of chocolate to phenols such as epicatechin in chocolate, but most chocolate products contain too few phenols to have any physiological effects whatsoever (Pogson, 2007). In trials in which researchers succeeded in showing the effects of the phenols in chocolate, participants were given some tens of grams of pure chocolate daily (Engler, 2004). Such amounts contained some hundreds of milligrams of phenols—and some hundreds of calories. Although bioactive substances like those in cocoa or tea might slightly increase metabolism (Hursel, 2011), this increase would never be enough to metabolize some hundreds of calories a day. In fact, no plausible mechanism is known in which eating chocolate could help you to stay thin.

In the Netherlands, Sander Kersten, a professor of Nutrigenomics at Wageningen University, stated that the publicity surrounding the Golomb study was an example of how the information communicated by the media undermines the work done by food scientists (Ramaker, 2012). Although the results of Golomb’s study were interesting and challenging, Kersten would have preferred them to remain unpublished until a larger study had confirmed them and a plausible mechanism had been discovered.

More recently, some of Kersten’s colleagues at Wageningen University also became involved in a similar affair. Because food scientists from Harvard were also involved, the
respected scientific journal *Science* published information about the study on its website (Enserink, 2011). The study concerned a meta-analysis by food scientists from Wageningen and American researchers such as Frank Hu and Walter Willett that was published in the *American Journal of Clinical Nutrition*. The researchers claimed that there was a protective relationship between milk consumption and the risk of coronary diseases (Soadamah-Muthu, 2011) (but this relationship is so weak that drinking more milk does not benefit the individual consumer). Despite the weak relationship, the communication department at Wageningen University published the news suggesting that people who drink a lot of milk could protect themselves against coronary diseases (Wolkers, 2010). “Drink a lot of milk,” the press report stated. All of the important Dutch media picked up on the story. The Dutch NGO Wakker Dier, an organization that champions animal rights and campaigns against the bio-industry, then accused Wageningen University of misusing scientific research to promote the sale of milk (Wakker Dier, 2010). The researchers decided to distance themselves from the news coverage. In the autumn of 2011 they published a press report in which they stated that coronary diseases “were not significantly associated with milk consumption” (Wageningen University, 2011).

3. THE MEDIA AND COMMUNICATIONS DEPARTMENTS

These are not isolated events. Scientists throughout the world are increasingly concerned about the effects of unbalanced media coverage, and journalists are often the target of their accusations. In the cases cited above, however, journalists were not at fault; rather, the communications department of the universities themselves spread the press reports that cast a tendentious light on the research results. That is evident, for example, in the way in which press reports issued by universities describe studies of genes and cancer. In seventy percent of those press reports, the universities inaccurately suggest that cancer is genetically determined (Brechman, 2009). Other press reports give too optimistic an account of trials in which doctors attempt to treat patients with experimental methods (Yavchitz, 2012).

In most of the developed countries, traditional journalistic media are quickly losing ground to the new digital media. This process has been accurately illustrated in the American documentary *Black & White and Dead All Over*. Newspapers and magazines are losing readers and income, are forced to make budget cuts, merge, fire employees, continue in digital form or stop altogether. A visit to the website newspaperlayoffs.com shows how quickly that medium is disappearing in the US alone. In the wake of the demise of newspapers and magazines, the number of scientific journalists is also on the decline. Consequently, for their scientific articles the media increasingly rely on press reports written by communications departments at knowledge centers. This also holds true for press reports of academic hospitals (Woloshin, 2009). If they are tendentious, unbalanced or incorrect, so are the related journalistic reports, as shown by the two analyses mentioned above (Brechman, 2009; Yavchitz, 2012).

The main culprit of the distortion of scientific results should perhaps first be sought among communication specialists and, in the second place, among journalists who unquestioningly rely on the reports of these same specialists. It is tempting to attribute this process to the commercialization of science and to claim that, on the instruction of their employers, communication professionals make scientific studies more positive and more important than they actually are. Such a strategy makes it easier to find funding for further research. In this article, however, I am going to explain this phenomenon from another perspective based on a number of arguments. Manuals for communication professionals
emphasize that information officials must present the truth. As stated in a frequently used Dutch manual,

An information official must do justice to the truth. What is told by an information official must agree with the facts as they are known, and the official must be reliable: as a receiver, you must be able to rely on the fact that he is not deceiving you. (Meiden, 1984, p. 138)

There are similar codes for journalists. According to the first Article of the Code of Bordeaux, the code of behavior drawn up by the International Federation of Journalists in the 1950s, journalists must respect the truth (IFJ, 1954/1986). “Respect for truth and for the right of the public to truth is the first duty of the journalist,” the Article states.

The imperative to be truthful is one of the basic values shared by both journalists and communication professionals. The basic values are undoubtedly ignored in some situations, but the number of cases in which scientific press reports and media coverage are erroneous is so large that there must be other underlying motives. Moreover, it is also clear that science, scientists and the organizations they work for are damaged by the growing number of erroneous media reports. Finally, a new and related point of concern in this area has nothing to do with journalists or communication professionals but rather with “citizen journalists” on the internet. The concern about misinformation on the web is nothing new (Mintz, 2002), but it has expanded to include scientific reporting on the web as well (Brossard, 2013). Increasingly more people use the internet to search for scientific information, which they find on websites, blogs and postings that consider the use of sweeteners a form of genocide, that warn against vaccines, that praise vague food supplements as a cure for illnesses such as cancer, diabetes and coronary diseases, or that encourage extreme and, according to doctors, potentially risky diets. “Citizen journalists” also have difficulty in interpreting science.

We suspect that the causes of the poor communication surrounding scientific studies lie primarily in how we understand science. To be more precise: in how we understand—or fail to understand—scientific studies described in scientific texts. In this connection, the following paragraphs will discuss the hermeneutic philosophy of Hans-Georg Gadamer (1900–2002), who focused on understanding texts.

4. VERSTEHEN

Up to the late 19th century, hermeneutics was a philosophical discipline that concentrated on the way in which humanity had been able to understand the Bible, a centuries-old book that was written in a completely different context than that of modern society. Hermeneutics refers to understanding concrete phenomena in the context of their meaning. Gadamer, a student of Martin Heidegger, based his studies on that tradition, but he expanded the subject of hermeneutic philosophy to include understanding texts in general that were written in a context other than the reader’s context. In his most important work, Truth and Method (hereafter Wahrheit un Methode) (1960), Gadamer focused on texts that had been written in previous centuries, but his theory can also be applied to other areas (Gadamer, 1960/2004; Gremmen, 1997; Jacobs, 2001).

According to Gadamer, understanding a text involves more than simply absorbing information. “Schon das Wort ‘Information’ sagt es ja,” said Gadamer in 2000 in an interview with Der Spiegel; “Das ist etwas, worüber man nicht weiter nachzudenken braucht” (Sturm, 2000). One can speak of understanding only when the reader can apply that which he or she
has learned (Gadamer, 2004, p. 335): “Applikation ist keine nachträgliche Anwendung von etwas gegebenem Allgemeinen, das zunächst in sich verstanden würde, auf einem konkreten Fall, sondern ist erst das wirkliche Verständnis des Allgemeinen selbst, das der gegebene Text für uns ist” (Gadamer, 1960/2004, p. 323)

According to the Dutch philosopher Veronica Vasterling, the first step toward understanding a text in Gadamerian hermeneutics is when an experience while reading a text conflicts with an assumption or an expectation (Vasterling, 2003). This then results in a new understanding. This first step is what Gadamer referred to as Vorverständnis or foreunderstanding. We understand everything on the basis of images, ideas and assumptions that we already have, but then we encounter in a text something that conflicts with our expectations and whose meaning we do not comprehend. This phenomenon is not completely strange since something that is completely foreign to us cannot conflict with our expectations: “Hermeneutic work is based on a polarity of familiarity and strangeness. . . . The true locus of hermeneutics is this in-between” (Gadamer, 2004, p. 295).

We discover something that “addresses” (Gadamer, 2004, p. 299) or “alerts us” (Gadamer, 2004, p. 268); something remarkable makes us take notice of it. We then try to explicitly interpret the anomaly we have discovered, this being the second step that Vasterling has defined in Gadamer’s hermeneutics. We try to clarify the meaning of the anomaly using the authoritative interpretation related to the object that we wish to understand. If we read the Bible, we consult theology. We study the tradition in which the text we wish to understand was created and make ourselves familiar with it. We simultaneously consult ourselves in order to answer the question of what the text means to us at our present time and place.

While we familiarize ourselves with the history of the authoritative interpretation of the object that we wish to understand, we also define our current perspective. These processes occur simultaneously, and one is not possible without the other. I can be aware of my current perspective only if I encounter something that forces me to define this perspective. A text “says” something to me only if it answers a question that I also pose. If this is not the case, that text will not “say” anything to me. “The text must be understood as a response to a real question,” wrote Gadamer in Wahrheit und Methode (1960/2004).

If we interpret a text explicitly, we separate—to use Gadamer’s terminology—two interpretational horizons: the horizon that explains the tradition in which a text was created and the horizon of ourselves at this moment in time. In the third and final step of the process of Verstehen, these two horizons merge together. We have acquired a piece of tradition and we use this to interpret what up to then had been an anomaly. As Gadamer (2004) states, “There is no more an isolated horizon of the present in itself than there are historical horizons which are to be acquired. Rather, understanding is always the fusion of these horizons supposedly existing by themselves” (p. 306).

5. POSON AND POION

Gadamerian hermeneutics describes how, in their daily lives, people understand and learn—from one another, from books and from scientific texts. “Hermeneutics is not a doctrine of methods for the humanities and social sciences but rather a basic insight into what thinking and knowing mean for human beings in their practical life, even if one makes use of scientific methods,” said Gadamer in a speech given in 1994 (Gadamer, 1995/2002, p. 5).
It is clear that Gadamer did not think that knowledge and truth belonged only to the domain of science. Both in science and in our daily lives, we interpret reality in the way in which we search for meaning in a text. However, there is a difference between scientific and everyday interpretations and, consequently, between scientific and everyday knowledge: Scientists use a different language than do people in their everyday lives. Scientists observe, measure and describe reality differently from non-scientists (and perhaps also differently from scientists in their daily lives). Gadamer (1995/2002) describes this difference between the scientific and the everyday form of measuring, describing and knowing by referring to Plato’s and Aristotle’s concepts of Poson and Poion.

For the ancient Greeks as well as for Gadamer, Poson stands for quantity and objectivity and Poion for quality and subjectivity. However, in Gadamerian hermeneutics these two terms also have another layer of meaning. In the case of Poson, a text approaches its subject with a criterion that makes it objectively measurable, available and manageable. In the case of Poion, the individual reader determines his or her own criterion (Gadamer, 1995/2002).

A scientist who wants to know how warm it is outside checks the thermometer hanging in his garden and reads the number of degrees it shows. “Sixty degrees,” he concludes, which is objectively true. Anyone else who walks outside and checks the thermometer will reach exactly the same conclusion. What you do with this objective knowledge is a different matter. That is Poson.

A non-scientist walks outside, stands still, and then walks inside again. “It’s a bit chilly,” he says. “The sun’s shining, but you need a jacket.” That is Poion. Not everyone will agree with him. Someone with a lot of body fat or someone used to low temperatures might think that a jacket is unnecessary. Nevertheless, the non-scientist clearly knows how to use his knowledge of the temperature.

6. FROM POSON TO POION

Armed with these insights taken from Gadamer, I can return to the topic of this article: the ambiguous transfer of insights from the exact sciences to society at large.

The internet encyclopedia Wikipedia describes the purpose of scientific journalism as follows: “to render the very detailed, specific, and often jargon-laden information produced by scientists into a form that non-scientists can understand and appreciate, while still communicating the information accurately” (“Science Journalism,” 2013). However, the article continues, scientific journalists are often not trained in the disciplines that they write about: “However, good preparation for interviews and even deceptively simple questions such as ‘What does this mean to the people on the street?’ can often help a science journalist develop material that is useful for the intended audience” (“Science Journalism,” 2013). In general, this also applies to the communication professionals trained in science who work for universities and other knowledge institutes, although they are primarily concerned with the interests of their employers.

When analyzing the tension between journalism and science, communication studies researchers emphasize the differences between journalistic and scientific practice (Bucchi, 2008). Journalism wants to be concise, science wants to be thorough. Journalism reports on a news item, which is sharply defined in space and time. In science, on the other hand, the focus is on the process: researchers work in the wake of other researchers who have preceded them.
and traditionally end their publications with suggestions for further study. In science, knowledge and insights are subject to progressive insight.

If the media makes mistakes in its reporting, scientists say that they are often the results of the differences between scientific and journalistic practice. Drawing attention to what scientists feel to be fragmentary events, journalists speak of “scientific breakthroughs” when they describe a humble step forward. Or they refer to a scientist who is pitifully regarded by the scientific community as an eccentric as “a dissident who has placed a bomb under the foundations of science.” Or they exaggerate an unimportant discovery by claiming it will drastically affect the daily life of the man in the street who should protect himself against heart attacks by drinking milk and who should eat a lot of chocolate to lose weight.

A philosopher familiar with Gadamer’s work sees the relationship between exact science on the one hand and scientific journalists and communication specialists on the other in the light of Poson and Poion. The first group expresses itself in Poson and the second in Poion. Scientific journalists and the communication personnel specialized in science translate the Poson of science into the everyday Poion. More often than not, this translation is disappointing for scientists, no matter how trained the communication specialist is in the material, how honestly he or she works, or how much expertise he or she has. The Poson knowledge of scientists is tied to their instruments and their agreements on how these instruments should be used. Whether scientific findings also apply outside of their context is questionable. A temperature of 60 degrees Fahrenheit (Poson) can mean that it’s quite agreeable to be outdoors—which certainly isn’t the case if it’s raining cats and dogs. This is an absurd example; no meteorologist would ever make such a mistake. Nevertheless, the example shows how different Poson and Poion sorts of knowledge are and how risky it is to translate Poson knowledge into Poion knowledge.

7. GADAMERIAN NEW MEDIA

Gadamer defines the concept of “understanding” with the term fusion of horizons. A reader understands a text when his or her interpretational horizon merges with the text. That can happen only when the reader is sufficiently familiar with the tradition in which the text was created. That point of departure can be useful for scientific reporters and scientific spokespersons who wish to produce better texts and reduce the tension between their field of work and science. They could try to inform their readers of the tradition in which the facts they report on were created so that, to use Gadamer’s words, the readers could Verstehen. In doing so, they also more accurately illustrate the fact that scientific discoveries are comprised of a series of processes.

Seen from this perspective, the core task for scientific communication should not be to translate Poson into Poion, but rather to translate Poson into Easy Poson. Science communicators should no longer have to search in science for material that they can translate into stories for non-scientists, but they should instead focus on transferring that science itself. No translation, no communication, but a transfer of science to society could be the aim of journalism and information services. Reports should not be restricted to an event bound by time and space—for example, a discovery, a breakthrough, etc.—but they should cover the process leading to an insight, including the context and the extent to which the findings are relevant beyond that context.
It is, of course, impossible to transfer the entire scientific tradition. Nor is that necessary. Scientific transfer could limit itself to that which the public can apply in their daily lives. *Verstehen* is synonymous with *Applikation*. Currently, editors and communication managers use the “news value” of an item to determine if it is worthy of a press release or news report. This “news value” is decisive when choosing whether or not to make a report public.

In a science transfer based on Gadamerian principles, the criterion of “news value” could be replaced by “application value.” In such a world, a report about milk reducing the chance of strokes and heart attacks or about following a chocolate diet to lose weight would never have been made public so quickly simply because the application of this “knowledge” is unsuccessful. Scientific transfer is not about what something means for the man in the street, but rather whether or not the man in the street can use the information.

I am aware that my plea for scientific transfer rather than scientific communication may appear Utopian. People who work in or with the media will undoubtedly think that this is asking too much of a scientific spokesperson, that such an approach will require too many investments, that consumers of scientific news may not want to become mini-scientists. But there are already media sorts based on Gadamerian hermeneutics. On the internet, in on-line communities like those created around an extreme sport such as bodybuilding, citizen journalists are actively searching in scientific publications for information about training, nutrition, food supplements and often prohibited pharmacological substances that interest their target group. Some of these journalists have a scientific background, others are self-taught, but they are specialists who make their reports with a scientific depth and thoroughness that is seldom found in the mainstream media. For examples of what I am referring to, have a look at a blog such as SuppVersity or a website like Meso-Rx.

It does not take much effort to find similar blogs, sites, fora and other sorts of media that serve other communities. These communities are still eccentric and relatively small and have been created around such extreme activities as bodybuilding. However, I suspect and hope that this new form of scientific reporting—thorough, detailed and obsessed—will find its way into the large media: first, perhaps, among groups of patients who are trying to survive an illness, later among media focusing on specific demographic groups like mothers with young children or 50-plussers, and finally in the classic forms of large media.

Sooner or later, we the public will understand how much science has to offer us and that we can use scientific knowledge to become healthier, to create more satisfying relationships, and to work more productively. We will ask the media for science that we can actually use in our daily lives, and the media will provide us with this, for economic reasons and for ethical reasons. After all, we are entitled to this information.

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