Credibility of science communication: An exploratory study of astronomy press releases

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Abstract

Current developments in the media marketplace and an increased need for visibility to secure funding are leading inevitably to faster, simpler and more aggressive science communication. This article presents the results of an exploratory study of potential credibility problems in astronomy press releases, their causes, consequences and possible remedies. The study consisted of eleven open-ended interviews with journalists, scientists and public information officers. Results suggest that credibility issues are central to communication, deeply integrated into the workflow and can have severe consequences for the actors (especially the scientist), but are an unavoidable part of the communication process. In general a major credibility problem was not found to exist for astronomical press releases.

Introduction

Science communication operates in the modern media marketplace and competes for headlines with politics, business, sports, crime and large commercial communicators such as the entertainment industry. Science communication is partly a political tool and the pressure on the communicator to deliver is greater than ever. Due to the very nature of public communication, the temptation to overstate the importance of scientific results or to take credit for more than is deserved is great. Two of the better known examples of credibility problems within astronomy and physics are the “NASA Mars meteorite” case (Kiernan 2000) and the “Cold fusion” case (Gregory and Miller 1998, p. 61). A more recent and less problematic example from September 2007 is given in the next section.

The extent of the damage done to the public perception of science and scientists by examples like these is very difficult to measure. A public opinion survey (European Commission, 2005) has shown that Europeans generally see scientists as being credible and having a positive impact on society.

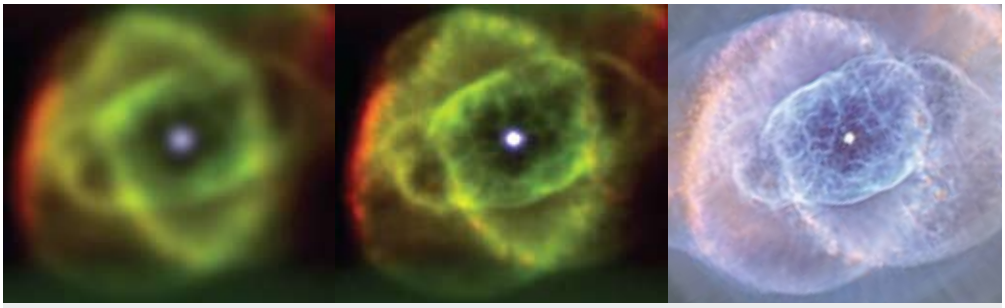
Many scientists have the impression that science reporting is inaccurate and that science news is often overstated (Shortland and Gregory 1991, p. 8; Dunwoody 1986, p. 11). This perception has, in the case of astronomy, been shown to be false by Shaefer et al. (1999), who found that none of 403 evaluated newspaper articles on astronomy misled the reader significantly. Furthermore, most errors in the evaluated articles could be contributed to the fact that they were reporting on front-line science, where no reliable conclusion had yet been reached. Scientists and journalists can have very different perceptions of the term accuracy, and thus what is accurate to journalists usually does not have the required level of detail for scientists (Peters 1995).

Credibility in science communication is one of the most actively discussed issues in science communication today: *How far can we, in the name of science communication, keep pushing, or promoting, our respective results or projects without damaging our individual, and thus also our collective credibility?* (Robson 2005, p. 162). However, serious studies about this important, but rather elusive, topic are difficult to find in the literature.

Case Study

One of the main conclusions of the study is that there are no major credibility problems for astronomy press releases. There are nevertheless certainly examples of credibility problems in press releases. However, before going into more detail with the most recent example, it is important to mention that the examples have not been chosen to point fingers at anyone in particular, but only to illustrate how little it takes to generate credibility problems when fighting for visibility in the media.

On 3 September 2007 the University of Cambridge issued a press release with the headline "*Lucky camera" takes sharpest ever images of stars (and it's 50,000 times cheaper than Hubble)* (University of Cambridge, 2007). Just below the headline were two images of the Cat's Eye Nebula obtained from a ground-based telescope. The images were showing the before and after effect of using the new "Lucky Imaging" technique, which significantly reduces the blurring of the images by the Earth's atmosphere. The first paragraph in the press release elaborates further: *[…]sharper than anything produced by the Hubble telescope […]*.



University of Cambridge (left, middle), ESA, NASA, and The Hubble Heritage Team STScI/AURA (right))

Figure 1 – Cat's Eye Nebula imaged with ground-based telescope without Lucky Camera (left), ground-based telescope with Lucky Camera (middle) and Hubble (right).

Comparing the Cat's Eye Nebula image obtained using the "Lucky Imaging" technique with one taken with Hubble reveals that the Hubble image is clearly sharper[1] – contrary to the impression given by the press release. Four days later the lead scientist is quoted in an online NatureNews article, saying: *Well, perhaps their press release got a little out of hand. The team wanted the world to know about their camera, and this seemed like a simple, provocative way to make the point. But, he admits, the press release "did kind of hype it up"*. (Brumfiel, 2007).

[1] Said with tongue in cheek, please note that two authors work for ESA/Hubble (meaning they are Hubble-fans) and thereby of course are incapable of giving any neutral judgment in this case study.

The “Lucky Imaging” technique is indeed scientifically very exciting and the technique can in fact produce sharper images than Hubble in certain cases. However, the claims are nothing like as clear-cut as the press release claims. Taking a step back from the case study, we might ask how do the communication actors actually define credibility and exaggeration? In which situations do they experience credibility problems? What factors may cause the problems, what are the their consequences and how can they be reduced? It is the purpose of this exploratory study to answer these questions.

Study design & method

This paper only examines the credibility of the communication of scientific results, and not the credibility of the actual scientific results themselves. We thus assume that the peer-review process produces credible scientific results, though some scholars question this claim (Russell 1986, p. 93; Nelkin 1995, p. 150; Gregory and Miller 1998, p. 168). The communicated scientific results may of course later be proved wrong, but this is how the scientific process works.

We chose to examine the problem of credibility in astronomical press releases from the perspective of the actors in the science communication process: scientists, journalists and public information officers at large governmental and intergovernmental scientific organisations. According to Madsen (2003) and sources quoted therein, nearly 50% of all reported science news in the media result directly from press releases, making this particular way of communicating science news very important. Eleven open-ended interviews were conducted with science communication actors.

Results

Finding 1: Credibility is primarily defined as being honest and doing your homework.

Eleven out of twelve of the interviewees largely defined credibility in science communication as being honest and doing your homework well. Interestingly, Heck defined credibility as, *credibility occurs if the message that you conveyed has been perceived as credible by the receiver*, which implies that the communicator is responsible for tailoring the message so that it is well received.

All interviewees generally defined hype and exaggeration as taking credit for more than you deserve by overstating the importance of science results e.g. by overly increasing visibility. The interviewees had different perceptions of when over-exaggeration affects the credibility negatively.

Finding 2: Credibility issues are ubiquitous and integrated into the public information officer (PIO)–Journalist interaction.

There is a general view that a certain amount of exaggeration of scientific findings is necessary in press releases is necessary to reach the general public (Schilling; Villard; Tyson). The media are used to and even expect a certain amount of overstatement, as stated by Schilling: *There is hype everywhere and everybody is doing it ... every serious science journalist knows that press releases are made by public information officers who emphasise their own organisation*.

Public information officers are juggling daily to find a sensitive balance between correctness and overstatement, and they constantly need to walk a tightrope to get news out to the media. If press releases are accurate but uninteresting, they will not receive media attention, but if PIOs sacrifice accuracy while injecting colour the press releases lose credibility with journalists and are not used (Watzke). Great effort is however put into producing science communication that is as accurate and as credible as possible (Watzke; Livio; Madsen; Hurt).

Finding 3: Credibility problems are most often caused by an intense need for visibility driven by personal or organisational desires for recognition or financial gain.
As stated by Heck: *Behind hype is the problem of visibility and recognition—the fight of organisations, laboratories or people for money*. This development inevitably leads to science communication with more spin, more push and a shorter elapsed time from scientific results to publicly communicated results.

The pressure is applied from different sides: from the organisation itself — often from management, from PIOs and also from scientists. While many scientists try to be modest when they publish their results, the increased competition in the scientific community may push them to overstate their results to become more visible (Leibundgut).

Finding 4: At least five separate factors may contribute towards credibility problems in press releases.
When trying to "dissect" the cause of credibility problems, we found that it is possible to list (at least) five different distinct, but related, causes with underlying motivations that generally fall into one of two categories: factors that contribute to making the organisation look better than it deserves and factors that make other organisations look worse than they merit. The causes are:

- **The level of communication effort**
  Using too high a level of communication effort for the level of scientific importance — that is the efforts to emphasise the finding and convince the media to run the story, by e.g. having a high-ranking political figure to endorse the release.
- **The wording of a press release**
  Using wording that does not correspond to the level of scientific importance, by e.g. omitting a question mark from the headline – *Alien life found* vs *Alien life found?*
- **Dictating the timing of a press release**
  Letting unscientific factors dictate the timing of the publication of a press release. A press release might be:
  - Politically motivated e.g. to secure funding.
  - Forced out before a peer-reviewed paper, and thus bypass the scientific process.
  - Timed to interfere with a press release or an event from a competing scientific organisation.
- **Omission of references to other scientists' work.**
- **Unjust comparisons with other facilities.**

All of the above factors may cause credibility problems in a press release, and raise concern about the real motives behind the press release.

Finding 5: Loss of credibility mostly affects the scientist
We find that individual scientists stand to lose more credibility than an entire institution, a reporter or a PIO (Schilling). So it is natural to find that scientists are more concerned about this topic than other actors. Scientists know that negative reactions from their peers can have devastating consequences for their career, as it might get harder to publish articles, find collaborators or get better positions (Livio; Tyson).

Finding 6: Refereeing either by the main scientist, an internal refereeing board or an external refereeing board can reduce the risk of credibility problems.
If a press release is run past an internal refereeing board before its public release, some factors that are known to increase inaccuracy can be eliminated. This means that there is less risk of oversimplified results, incorrect analogies, problems of a political nature and other factors that can harm credibility. Internal refereeing also helps scientists maintain credibility with their peers and thereby increase their willingness to communicate (Edmonds; Hurt; Madsen; Watzke).

Finding 7: The lack of a peer-reviewed scientific paper makes a press release more vulnerable to loss of credibility.
To all interviewees it is important that the result has been peer-reviewed prior to public dissemination, as this is vital to increase the scientific accuracy of the communication. The need for a refereed scientific paper backing a press release however also increases as the claims become more significant. If no paper is available to support significant scientific claims, it makes a press release more vulnerable to loss of credibility.

Conclusions

The main conclusion of the study is that major credibility problems for astronomy press release do not exist, though examples certainly exist. Credibility issues are found everywhere in scientist–PIO–journalist interactions and are deeply integrated into their workflow. Overstatements are, to some degree, accepted and recognised as a necessity for the communication process. All actors also recognise the sensitivity of the issue and know that the issue can have severe consequences for the actors. The real reason behind credibility problems is an intense need for visibility that is driven primarily by the desire for recognition or funding.

Credibility problems in press releases can be caused by using too high a level of communication effort, by overstating scientific claims, omitting qualifiers, by dictating the timing of a release for political motives, by announcing the finding to the public before the peer-reviewing process has had a chance to work or to time the issuing of a release in order to interfere with other press releases, by omitting references to other important work in the same field, or by making unjust comparisons with other projects.

Credibility problems often have the greatest negative implications for the scientists. However, internal refereeing and the peer-reviewing system can reduce the risk of credibility problems for all actors.

Please refer to Nielsen et al. (2007) for further details about this exploratory study.

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