



Science

14 January 2011 | \$10



Retraction of scientific papers

The *Science* experience:
(the good, the bad and the ugly)

Andrew Sugden

Deputy Editor, *Science* magazine
(Cambridge UK and Washington DC)

(with thanks to Monica Bradford)



Outline

Survey of retractions at Science

Types of retraction

Lessons and precautions

Handling the process

We've seen it all:

Good: the original authors initiate and/or agree to retract the paper

Bad: one or more authors refuse to sign retraction, or fail to agree among themselves

Ugly: authors refuse to retract despite institutional findings and/or try to inappropriately characterize the status of the work

Retractions at *Science*

1960s	1
1970s	0
1980s	6
1990s	8
2000s	50 (incl. 10 Schoen papers in 2002)
2010-	7

Mean time to retraction 2.8 years, max 8 years
~15 misconduct

Some 'good' retractions...

'I have described (1) unmineralized fossil bacteria from two sources, widely separated in time and space

[...]. When two friends to whom I had sent parts of my sample of the Newark Canyon limestone failed to find the coccoid bacteria, I reexamined the sample and **made the embarrassing discovery** that the minute spheres were fluorite **artifacts** produced during the preparation of the material for microscopic examination.'

[...]

W. H. BRADLEY
U.S. Geological Survey,
Washington, D.C. 20242

1. W. H. Bradley, Science 141, 919 (1963).

Retraction

George Gaskell, *et al.*

Science 16 July 1999: 384-387.

The Review article by G. Gaskell *et al.*, “Worlds apart? The reception of genetically modified foods in Europe and the U.S.” (16 Jul. 1999, p. [384](#)) is hereby retracted because, unknown to the authors, at the time of publication some of the data on which the article was based were not in the public domain. All the data sets in question are now in the public domain, or will be shortly, and may be obtained through the appropriate national data archives ([1](#)).

Some good/bad retractions...

'I have decided to retract the paper "Virus specific splicing inhibitor in extracts from cells infected with HIV-1"- by D. Gutman and myself published in the 16 September 1988 issue of Science (volume 241, p. 1492). The data in that paper should no longer be considered reliable.'

CARLOS J. GOLDENBERG
10745 SW 74th Court,
Miami, FL 33156

Retraction of Zou and Buck, Science 311 (5766)
1477-1481. (2006)



In the Report “Combinatorial Effects of Odorant Mixes in Olfactory Cortex” (1), we described subcellular patterns of *Arc* (*arg3.1*) mRNA expression in anterior piriform cortex neurons after mice had been exposed to odorants. We reported that some cortical neurons express *Arc* in response to a mix of two odorants but not either odorant alone. My laboratory has been unable to reproduce this finding. I am therefore retracting the Report. I sincerely apologize for any confusion that its publication may have caused. Zhihua Zou declined to sign this Retraction.

Linda B. Buck

In the course of carrying out experiments that were a direct extension of our recent *Science* paper “Stable RNA/DNA hybrids in the mammalian genome: inducible intermediates in immunoglobulin class switch recombination” ([1](#)), we discovered differences from those in the paper. The first author (R. B. Tracy) has admitted to data alteration such that the primary conclusions of the paper are in question. Because of this, the authors are retracting the entire paper on class switch recombination ([1](#)). We are deeply regretful for any scientific misconceptions that have resulted from these studies.

[Robert B. Tracy¹](#) [Chih-Lin Hsieh^{2,3}](#) [Michael R. Lieber^{1,2,4,5}](#)

Retraction of Stapel and Lindenberg, *Science* 332 (6026)
251-253.[2010]

Science 2 December 2011: Vol. 334 p. 1202

Our Report “Coping with chaos: How disordered contexts promote stereotyping and discrimination” (1) reported the effects of the physical environment on human stereotyping and discriminatory behavior. On 31 October 2011, Tilburg University held a press conference to announce findings of its investigation into possible data fraud on the part of author Stapel. These findings of the university's interim report (2) included fabrication of data in this *Science* paper. Therefore, we are retracting the paper, with apologies from author Stapel. Coauthor Lindenberg was in no way involved in the generation of the data and agrees to the retraction of the paper.

D. A. Stapel,

S. Lindenberg¹

Expressions of Concern (8 since 2000)

Editorial notice, usually indicating that an investigation has been initiated

...

Editorial Expression of Concern



‘In the issue of 23 October 2009, Science published the Report “Detection of an infectious retrovirus, XMRV, in blood cells of patients with chronic fatigue syndrome,” a study by Lombardi et al. purporting to show that a retrovirus called XMRV (xenotropic murine leukemia virus–related virus) was present in the blood of 67% of patients with chronic fatigue syndrome (CFS) compared with 3.7% of healthy controls (1). Since then, at least 10 studies conducted by other investigators and published elsewhere have reported a failure to detect XMRV in independent populations of CFS patients. [...]

The study by Lombardi et al. (1) attracted considerable attention, and its publication in Science has had a far-reaching impact on the community of CFS patients and beyond. Because the validity of the study by Lombardi et al. is now seriously in question, we are publishing this Expression of Concern and attaching it to Science's 23 October 2009 publication by Lombardi et al.

The U.S. National Institutes of Health is sponsoring additional carefully designed studies to ascertain whether the association between XMRV and CFS can be confirmed. Science eagerly awaits the outcome of these further studies and will take appropriate action when their results are known. ‘

Bruce Alberts, Editor-in-Chief

Partial retractions (rare)

Retractions of interpretations

Preludes to complete retractions

Partial Retraction

In our 23 October 2009 Report, “Detection of an Infectious Retrovirus, XMRV, in blood cells of patients with chronic fatigue syndrome” ([1](#)), two of the coauthors, Silverman and Das Gupta, analyzed DNA samples from chronic fatigue syndrome (CFS) patients and healthy controls. A reexamination by Silverman and Das Gupta of the samples they used shows that some of the CFS peripheral blood mononuclear cell (PBMC) DNA preparations are contaminated with XMRV plasmid DNA ([2](#)). The following figures and table were based on the contaminated data: Figure 1, [...] table S1, [...] and figure S2 [...]. Therefore, we are retracting those figures and table.

[Robert H. Silverman](#)^{1,*} [+ 11 more]

Science 14 October 2011

Editorial retractions (5 since 2003)

**Editorial decision to retract paper, ahead
of or instead of author retraction**

Retraction (XMRV, again)

Science is fully retracting the report “detection of an infectious retrovirus, XMRV, in blood cells of patients with chronic fatigue syndrome” ([1](#)). Multiple laboratories, including those of the original authors ([2](#)), have failed to reliably detect xenotropic murine leukemia virus–related virus (XMRV) or other murine leukemia virus (MLV)–related viruses in chronic fatigue syndrome (CFS) patients. In addition, there is evidence of poor quality control in a number of specific experiments in the Report. [...]

Given all of these issues, *Science* has lost confidence in the Report and the validity of its conclusions. We note that the majority of the authors have agreed in principle to retract the Report but they have been unable to agree on the wording of their statement. It is *Science's* opinion that a retraction signed by all the authors is unlikely to be forthcoming. We are therefore editorially retracting the Report. [...]

[Bruce Alberts](#), Editor-in-Chief

Editorial Retraction

A Single Molecular Spin Valve **J. H. Schön, *et al.***

Science Published online 18 April 2002

Recently, as a result of the report of the Beasley Committee to Bell Laboratories, Lucent Technologies, several papers on which J. H. Schön was the lead author have been retracted. Another paper ([1](#)) that was published by *Science* was not formally analyzed by the Beasley Committee. Although we recognize that some parts of this paper may remain valid, we note that key parts depend on and cite results or methods derived from two of the already retracted papers ([2](#), [3](#)). We therefore advise the scientific community that the validity of all of the results in this paper cannot be established.

Donald Kennedy, Editor-in-Chief

1) Evidence of a Pluripotent Human Embryonic Stem Cell Line Derived from a Cloned Blastocyst

Woo Suk Hwang, Young June Ryu, Jong Hyuk Park, Eul Soon Park, Eu Gene Lee, Ja Min Koo, Hyun Yong Jeon, Byeong Chun Lee, Sung Keun Kang, Sun Jong Kim, Curie Ahn, Jung Hye Hwang, Ky Young Park, Jose B. Cibelli, and Shin Yong Moon

Science 12 March 2004: 1669-1674. Published online 12 February 2004

2) Patient-Specific Embryonic Stem Cells Derived from Human SCNT Blastocysts

Woo Suk Hwang, Sung Il Roh, Byeong Chun Lee, Sung Keun Kang, Dae Kee Kwon, Sue Kim, Sun Jong Kim, Sun Woo Park, Hee Sun Kwon, Chang Kyu Lee, Jung Bok Lee, Jin Mee Kim, Curie Ahn, Sun Ha Paek, Sang Sik Chang, Jung Jin Koo, Hyun Soo Yoon, Jung Hye Hwang, Youn Young Hwang, Ye Soo Park, Sun Kyung Oh, Hee Sun Kim, Jong Hyuk Park, Shin Yong Moon, and Gerald Schatten

Science 17 June 2005: 1777-1783. Published online 19 May 2005

About Our Sites

[About Science](#)[About ScienceNOW](#)[About Science Signaling](#)[About Science Careers](#)[About Multimedia](#)[About Collections](#)

Feeds & Alerts

[Email Alerts](#)[RSS Feeds](#)

Recent Highlights

[Science](#)[Low-Power Memory Switch](#)[Science Podcast](#)[More from Science](#)[ScienceNOW Daily News](#)[Stem Cell Ruling Brings Relief for Low, But Legal Battle Continues](#)[Tropical Peat Forests in Trouble](#)[Ready to Leave Key Agriculture Research](#)

Special Online Collection: Hwang et al. Controversy -- Committee Report, Response, and Background

On December 1, 2006, *Science* published, on this Web site, the report of a committee commissioned by the journal to review its practices in the period leading up to the publication of the 2004 and 2005 stem cell papers by Hwang et al., which were subsequently retracted. On this page, we are making available direct links to the report, *Science's* response, and an accompanying editorial.

To provide additional context on the history of the controversy, we also provide on this page links to *Science's* editorial retraction of the papers and other official statements on the situation, the original *Science* papers, associated news coverage on the controversy, letters and a Policy Forum on the controversy, and another Policy Forum on stem cell ethics published earlier in 2005.

Jump to features in special collection:

- ▼ [Committee Report](#)
- ▼ [Science Statements](#)
- ▼ [The Papers](#)
- ▼ [News Coverage](#)
- ▼ [Letters/Policy Forum](#)

COMMITTEE REPORT AND SCIENCE RESPONSE

In its 1 December issue, *Science* published an editorial, authored by Editor-in-Chief Don Kennedy, discussing the journal's internal review process in the wake of the Hwang scandal, as well as the review conducted by a committee including members of the journal's Senior Editorial Board, the U.S. executive editor of another major scientific journal, and two distinguished members of the stem cell research community. Links to the editorial and associated report appear below.

Editorial: Responding to Fraud

Donald Kennedy

Science 1 December 2006 314: 1353 [DOI: 10.1126/science.1137840]

[Full Text »PDF »](#)

Supporting Online Material: Committee Report and Science Response

Committee Report: John Brauman, John Gearhart, Douglas Melton, Linda Miller, Linda Partridge, George Whitesides

Response: Donald Kennedy

[PDF »](#)

ADVERTISEMENT

Science
Poster
SERIES

Browse and
download posters.

Access Now!

ADVERTISEMENT

Introducing:



The new journal
from AAAS
& *Science*.

At the expanding
intersection of basic science
and clinical medicine.

Impact of Hwang on our Policies

- All co-authors notified upon manuscript submission, to check authorship.
- Detailed authorship and conflict-of-interest disclosure before acceptance by all authors.
- All figures checked at revision for inappropriate adjustments
- Restrictions on data/materials access minimized.
- No unpublished data allowed. All references/data must be available at the time of publication.

Each author must complete authorship form before acceptance of the paper:

Authorship: The authorship policies of *Science* follow those recommended by the report "On Being a Scientist", 3rd Edition, published by the US National Academy of Sciences (<http://www.nap.edu/catalog/12192.html>).

In order to meet our requirements for authorship of a paper, you must have participated significantly in the reported research or writing of the paper. Please affirm that you meet these criteria by indicating your contribution to all of the following descriptions (circle from 0% responsible to 100% responsible): I...

Science /AAAS Authorship Form and Statement of Conflicts of Interest



Authorship Activity	Level of participation
Participated in the design and/or interpretation of the reported experiments or results.	0 20 40 60 80 100%
Participated in the acquisition and/or analysis of data. State Which data: _____	0 20 40 60 80 100%
Participated in drafting and/or revising the manuscript.	0 20 40 60 80 100%
Was primarily responsible for a particular, specialized role in the research, e.g. statistical analysis, crystallography, preparation of cell lines; please briefly state which: _____ _____	0 20 40 60 80 100%
Provided administrative, technical or supervisory support.	0 20 40 60 80 100%

Data must be checked by senior author:

The senior author from each lab or group must answer this question: I have personally checked all the original data that was generated by my lab or group:

____ Yes ____ Not applicable; I am not the senior author or lab head.

If yes, these data are presented in these figures and tables (including the Supporting Online Material):

_____.

***Science* policy: data must be available—in SM or archived.**

“Data and materials availability: All data necessary to understand, assess, and extend the conclusions of the manuscript must be available to any reader of Science. After publication, all reasonable requests for materials must be fulfilled. Any restrictions on the availability of data or materials, including fees and original data obtained from other sources (Materials Transfer Agreements), must be disclosed to the editors upon submission. “

“... a lamentable element of the culture [in social psychology and psychology research] is for everyone to keep their own data and not make them available to a public archive. This is a problem on a much larger scale...

Archiving and public access to research data not only makes ... data fabrication more visible, it is also a condition for worthwhile replication and meta-analysis....”

(Tilburg report on the Stapel case, Oct 2011)

“risk factors” that can help identify papers that should receive an even higher level of scrutiny

Multi-disciplinary

Result that was “hoped for” or too good to be believed

Multiple labs and multiple countries

Fast turn around on additional experiments/data

More referees?

Yes, increasingly 3 or more, because:

- **More interdisciplinary papers**
- **More Supplemental Material**
- **Referee disagreement**
- **Incomplete review**

Has this helped...?

Retractions at *Science*

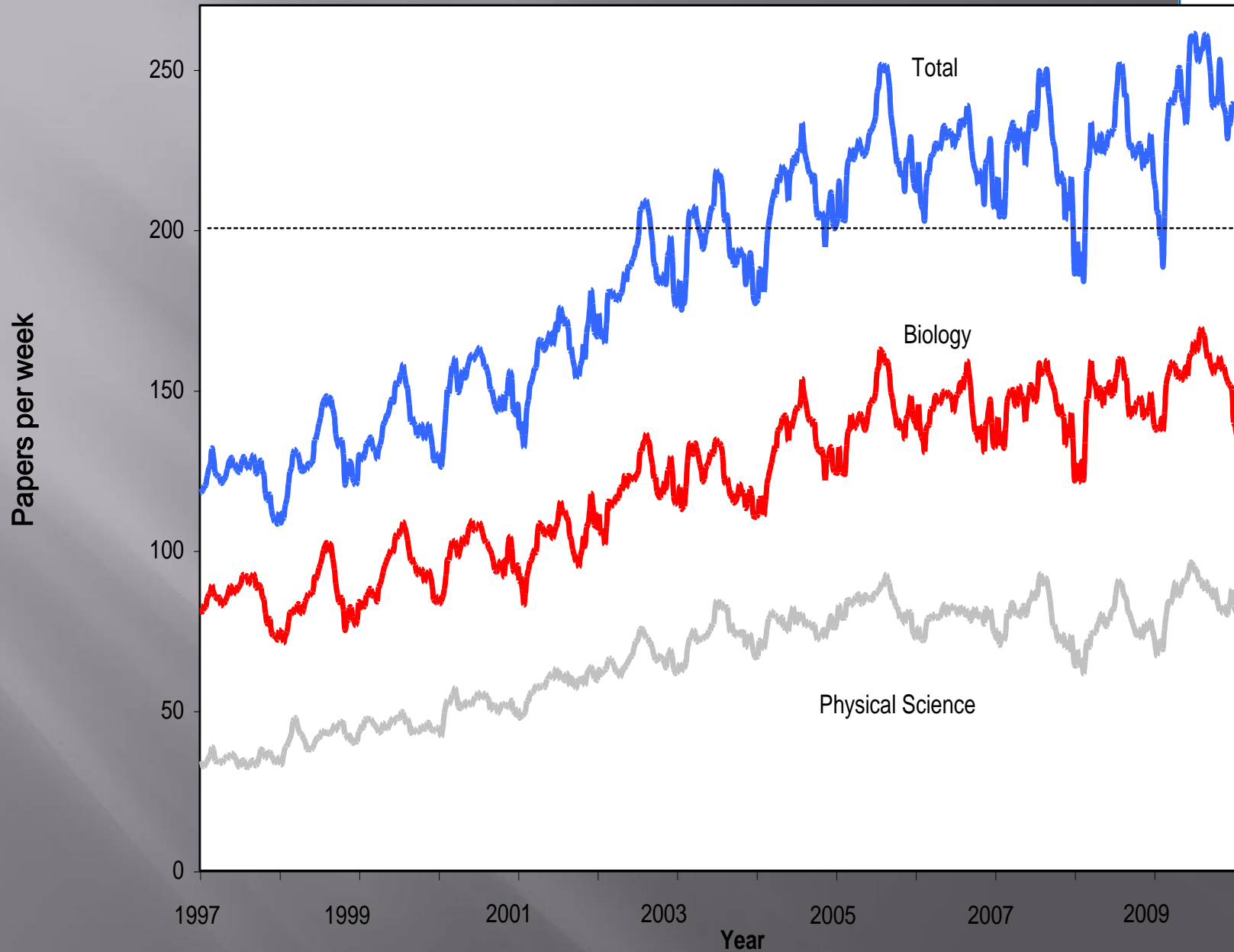
2000	3	*
2001	1	
2002	5 (13)	*
2003	5	*
2004	3	
2005	5	*
2006	4	*
2007	4	*
2008	4	
2009	2	
2010	2	
2011	5	

Original research submissions 1997 - 2010

smoothed w/ an 8 week running avg

Science

AAAS



Supplementary material (SM)

SM: additional online material accompanying (print) papers

Main elements :

- Methods, tables, diagrams, images
- Video clips and sound files

SM should be subject to the same editorial standards and peer-review procedures as the print publication.

SM must be essential to the scientific integrity and quality of the paper.

needs thorough scrutiny – but does it always get it?.

Handling retractions - some issues:

Multiple institutions from multiple countries

Language barriers

Intense media scrutiny

Human elements: hospitalizations, suicide attempts,
cultural norm

Anonymous whistle-blowers

Whistleblowers

Corresponding author

Coauthors

Identified correspondent

Anonymous correspondent

Institution

(Referees)

To retract or not to retract?

	Correction	Expression of Concern	Retraction	No action / Self-correcting scientific process	Letter or Technical Comment exchange
Results unrepeatable	x	x	x	x	x
Data not available	x	x	x		
Fabrication/ plagiarism		x -> -> ->	X		
Interpretation/ conclusions questioned			x	x	x
(lack of) citation	(x)			x	

Lessons learned

Balance notice to readers with a fair process.

Editorial Expressions of Concern help with this

Not always clear who are the “good guys”

Rapid online reactions can help and hinder

The retraction process can be long and complex.

Don't give in to demands for instant reaction

Every case is different.

Just when we think we've seen it all, there's a new twist

‘Although [journals] cannot create deception-proof peer review, they can treat retractions honestly and forthrightly. They can express the community's interest in the trustworthiness of results and close their pages to transgressors. They should also praise responsible actions, especially when those carry personal costs.’

Donald Kennedy

Closing thoughts

Still need to look closely at the pressures contributing to the transformation of behaviour from good to ugly.

Scientists are humans and this means we will always be confronted with new challenges to integrity, some intentional.

But don't forget that most retractions are 'good' (and most papers are good, too!)

SATURDAY, JULY 3, 1880.

To Correspondents.

All communications should be addressed to the Editor—Box 3838, P. O., New York—with name and address of writer, not necessarily for publication without consent.

Scientific papers and correspondence intended for publication, should be written *legibly* on one side only of the paper. Articles thus received will be returned when found unsuitable for the Journal.

Those engaged in Scientific Research are invited to make this Journal the medium of recording their work, and facilities will be extended to those desirous of publishing original communications possessing merit.

Proceedings of Scientific Societies will be recorded, but the abstracts furnished must be signed by the Secretaries.

Both questions and answers in "Notes and Queries" should be made as brief as possible; an answer appearing to demand an elaborate reply, may be written in the form of an article.
