Spot the Manipulation: Detecting and Addressing Problem Images Before Publication

The Evaluation Process

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Overview

My background with Blood

Why should a publisher implement preventative evaluation?

What sort of preventative measures does Blood implement?

How do you tell if an image might be a problem?

What are some resources to help someone looking to start or develop an evaluation program?

My Background

• Joined Blood in 2008
• Preexisting image evaluation program
  • Began with 2 staff
  • Grew to 4 staff
• Development of data integrity program
  • Expansion of image evaluation
  • Plagiarism testing
  • Defined resolution process
Purpose of Evaluation

Purpose

- Maintaining public faith in science
  - Correction is necessary
  - Viewed negatively, but actually healthy
- Protecting your publication
  - Reduce errata and retractions

Purpose

- Assist editors
  - Experts in subject area, not image forensics
  - Investigation difficult and awkward
- Help authors
  - Cosmetic errors can be corrected
  - Prevents future questions
  - Severe errors result in withdrawal rather than retraction
”When we seek a textbook case for the proper operation of science, the rotation of certain error offers far more promise than the establishment of probable truth.”

Stephen Jay Gould

“An Essay on a Pig Roast”

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**Process of Evaluation**

**Acceptance**
- Authors upload final, production-ready files

**Evaluation**

- Inquiry
- Withdraw or proceed with publication

**Evaluation**

- Automated triage
  - Blots or micrographs: yes/no
  - Yes: Direct to evaluation
  - No: Skip evaluation
  - Staff can return papers to evaluation

- Staff check figures
  - Assigned set of handling editors
  - Image editing software (Photoshop or GIMP)
  - Modify brightness and contrast, use gradient maps, etc.
Training

- Training was difficult
  - Staff don’t have scientific training
  - Open collaborations and referrals
- Experience vital in recognizing irregularities
  - Two primary evaluation staff
  - Two secondary staff
  - Secondary staff have reduced ongoing duties
  - Retains training

Examples of Evaluation

“If you start wielding a hammer, then all your problems look like nails. And maybe they’re not. Maybe it’s more subtle than that. And so your toolkit has to be able to morph into what is necessary for what it is that you confront at that moment.”
Neil deGrasse Tyson

Examples

- Errors easier to spot than true manipulations
- Blots
  - Most common source of issues
  - Usually least severe
- Micrographs
  - Less common
  - More severe
- Cross-publication duplication
Cross-publication duplication

• May be across issues or even journals
• Difficult to detect
  • Probably no error in the image itself
• Typically discovered by readers later on

Resources

“There is a large stock on hand, but somehow or other, nobody’s experience ever suits us but our own.”
Letitia Elizabeth Landon
Romance and Reality

Resources

• U.S. HHS’s Office of Research Integrity (ORI)
  • https://ori.hhs.gov/
• COPE
  • https://publicationethics.org/
• 2004 JCB Editorial
  • http://jcb.rupress.org/content/166/1/11
Resources

- PubPeer
  - https://pubpeer.com/
- GIMP
  - https://www.gimp.org/
- Me! (Dax Rodulfa Blemberg)
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