



Writing in the Sciences

Module 8: Communicating with the Media
and Lay Public



Writing in the Sciences

Module 8.1: Talking with the Media



Being Interviewed by a Journalist:

**What the journalist is waiting to hear, and will use in his/her article:

- take-home message
- how your research affects people (i.e., their readers)
- what's different or new about your results (the "news hook")
- colorful prose
- interesting stories (anecdotes)
- paradox/irony/surprise
- people-focused stories
- historical facts/the development of the idea
- sweeping comments about the significance of the work (makes a good first quote)
- controversy/criticism or laudatory praise, if you are being asked to comment on a peer's research



Being Interviewed by a Journalist:

**Your job as the interviewee:

- Be prepared.
- Avoid jargon. Pretend that you are talking to your aunt/uncle/grandmother/grandfather.
- Give the journalist clear take-home messages.
- Anticipate confusions/misinterpretations; and explain them away.
- Give a clear statement of the key limitations of the work.
- Think carefully about how to present data/numbers in a way that is understandable to a general audience.
 - Make units understandable.
 - Present risks in an easy-to-understand, transparent way.



Explaining risk to a journalist/lay public

- Whole numbers are easier to understand than fractions and percents.
- Relative risk can be high even if absolute risk is low.



Case Study: Women's Health Initiative

- Women's Health Initiative: large randomized, double-blind study of postmenopausal hormones versus placebo
- Halted in 2002 because hormones were found to significantly increase the risks of breast cancer and heart disease
- 14 million women were on hormones at the time the study was halted



Results: Relative Risks

- Relative risk for invasive breast cancer = 1.26
- Relative risk for coronary heart disease = 1.29
- Best translation for the public?
- “Women who take hormones have a 26% increased risk of breast cancer and a 29% increased risk of heart disease”?



Results: Absolute Risks

Risk of invasive breast cancer:

- On hormones: .38% per year
- On placebo: .30% per year
- \therefore Risk increase due to hormones: .08% per year

Risk of heart disease:

- On hormones: .37% per year
- On placebo: .30% per year
- \therefore Risk increase due to hormones: .07% per year



Results: Absolute Risks and Whole Numbers

Risk of invasive breast cancer:

- On hormones: 38 per 10,000 women per year
- On placebo: 30 per 10,000 women per year
- \therefore Risk increase due to hormones: 8 additional cases per 10,000 women

Risk of heart disease:

- On hormones: 37 per 10,000 women per year
- On placebo: 30 per 10,000 women per year
- \therefore Risk increase due to hormones: 7 additional cases per 10,000 women



Best Translation for the Public?

- 26% increased risk of breast cancer and 29% increased risk of heart disease sounds impressive and scary.
- Better to report:
 - 8 more invasive breast cancers per 10,000 women/year
 - 7 more heart attacks per 10,000 women/year



Writing in the Sciences

Module 8.3: Writing for General Audiences



Scientific Writing vs. Writing for the Lay Public: Differences

Lay Audience	Scientific audience
Need fewer “bottom level” scientific details.	Need precise scientific details.
Need more basic explanations.	Can assume a basal level of scientific knowledge.
May incorporate more story-telling techniques.	Can be more direct.



1. Fewer nitty-gritty details

Lay Audience	Scientific audience
Need fewer “bottom level” scientific details.	Need precise scientific details.



1. Fewer nitty-gritty details

Lay Audience	Scientific audience
Need fewer “bottom level” scientific details.	Need precise scientific details.

Scientific version: Smokers had a 25 percent higher risk of dying than non-smokers (RR 1.25; 95% CI: 1.03, 1.56).

Lay version: Smokers had a higher risk of dying than non-smokers.



2. More basic explanations

Lay Audience	Scientific audience
Need more basic explanations.	Can assume a basal level of scientific knowledge.

Scientific version: AXL is a receptor that binds the ligand GAS6. We created a decoy receptor to reduce GAS6-AXL binding.

Lay version: AXL is a receptor. Embedded in the cell membrane, it acts like a lock. We designed a molecule that looks enough like AXL to fool the protein “key,” that normally activates it.



3. More story-telling techniques

Lay Audience	Scientific audience
May incorporate more story-telling techniques.	Can be more direct.

Scientific version: They tested the participants in the pain lab.

Lay version: One might expect a pain lab to resemble a medieval torture chamber, but the lab where Dr. Johnson is demonstrating TMS is quite civilized. There are snacks on the table, a comfortable chair for volunteers to sit in and a smattering of innocuous-looking electronic equipment.



Writing in the Sciences

Module 8.4: The Science News Story



News Writing

Crucial Information

Recall: The Five "W"s and the "H"

- **Who? What? Where? When? Why?
How?**

Any good news story provides answers to each of these questions.



Writing a science news story

News stories follows a basic formula (just as scientific journal articles do)...

- **Lead**
- **Nut Graf**
- **First quote (3-6 paragraphs down)—brings in the human element**
- **Body of the story**
 - What was done before
 - What was done in this study—key experiments/key findings
 - Implications/caveats
- **Kicker**



The Lead

The lead (also spelled "lede");

- The first paragraph
- Grabs the reader's attention
- Imparts the heart of the matter (simple and focused)

Guidelines...

- 1-2 sentences
- Aim for <35 words
- Use the main verb to carry the main news, and use action verbs
- Give complementary, but different information than the headline.
- Provide some, but not necessarily all, of the 5 W's and 1 H



Example Lead

Stone Age Gene Swap

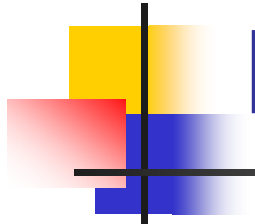
When the Neanderthals and other prehistoric human cousins went extinct around 30,000 years ago, they didn't disappear completely. A little part of them lives on in many of us.



Nut Graf

Shortly after the lead paragraph, the so-called 'nut graf' flushes out the story: the 5 W's (who/what/where/why/when) and the H (How).

Occasionally, the nut graf is hidden—contained within the lead or strewn throughout several paragraphs. But usually, it's identifiable.



Example “Nut Graf”

Paragraph 2: In 2010, scientists revealed that sporadic couplings between our ancestors and the Neanderthals (as well as a related group, the Denisovans) left many of us with traces of their DNA in our genomes. But the evolutionary impact was unclear. Now a team of scientists —led by Peter Parham, professor of structural biology and of microbiology and immunology—has shown that these genetic exchanges significantly strengthened modern human immune systems.



Quotes

The fun part of news writing! The interview doesn't involve any 'writing' on your part—just eliciting good quotes and strategic placement.

Quotes→

- Give a human dimension to the story
- Provide evidence
- Provide opinion
- Provide color and flavor
- Flush out the main idea
- Move the story along
- Make the story more readable



Example First Quote

First quote—often gives “big picture” overview of why the research is important.

Paragraph 3: “This is really the first evidence that there was something functional that was contributed from this admixture that was useful for modern humans,” says Laurent Abi-Rached, a research associate in Parham's lab and first author on the report in *Science*.



Attribution

“Blah, blah, blah, blah,” Professor Smith said (or says).

NOT: “Blah, blah, blah, blah,” said Professor Smith.

Noun-Verb

Unless: “Blah, blah, blah, blah,” said Professor Smith, the really boring professor that we all had to take English from (long attribution—sounds awkward to say Prof. Smith, the really boring professor that we all had to take English from, said!).



Attribution

Prefer “said” (or “says”) to most other possibilities, such as “noted” and “remarked,” which have particular connotations...

e.g., Noted implies that whatever the person’s statement was fact.



Body of the story

- Flushes out the story—walk the reader through the important parts of the research
 - What was done before
 - Research question
 - Key experiments
 - Key findings
 - Caveats (if room)
 - Outside commentary (if room)
 - Implications (if room)

Filter out less important details!

Use quotes to add flavor and break up the story!



What was done before

- In 1993, while sequencing HLA genes, Parham came across a mysterious variant: HLA-B*73. “It stood out like a sore thumb,” he says. Unlike other HLA alleles, HLA-B*73 resembled genes found in chimpanzees and gorillas, suggesting that it was at least 16 million years old (predating the split between humans and chimpanzees)...
- Then, last year, technological advances allowed scientists to sequence the genomes of three Neanderthal females who lived in Croatia more than 40,000 years ago...
- On the heels of this discovery, scientists unveiled the genome of a Denisovan....



The study (research question, key experiments, key findings)

- Parham's group immediately seized the opportunity to mine the genome data for HLA sequences. They reanalyzed sequence data for HLA-A, HLA-B and HLA-C. Stunningly, the Denisovan genome yielded an answer to the long-standing mystery of HLA-B*73. Though it did not contain HLA-B*73, it contained two HLA-C alleles that HLA-B*73 is almost invariably paired with in modern humans...(key experiments/key finding)
- Even more astounding, most of the Neanderthal and Denisovan alleles were identical to alleles found in humans today. "When I first started looking, it was quite clear that we were finding alleles that are found in modern humans. And that's when we realized that it was more than just B*73"...(key finding)
- The frequency in modern populations was particularly surprising, Abi-Rached says...(key finding)



Caveats/outside commentary/implications

- “This demonstrates that genes that were most likely inherited from archaic humans have been advantageous and have spread throughout the human population,” Trowsdale concludes. “Direct proof of cause is extremely difficult, because you’re just looking at four [archaic] individuals. But I think these are interesting, attractive hypotheses at the moment, and they fit with the information we have.” (outside commentator)
- The alleles may have conferred several survival advantages... (implications)
- Many of the archaic HLA proteins also have unique properties that may have conferred evolutionary benefits...(implications)



The kicker

- The ending.
- Leaves the reader feeling satisfied.
- Often circles back to the lead.
- A quote can be effective.



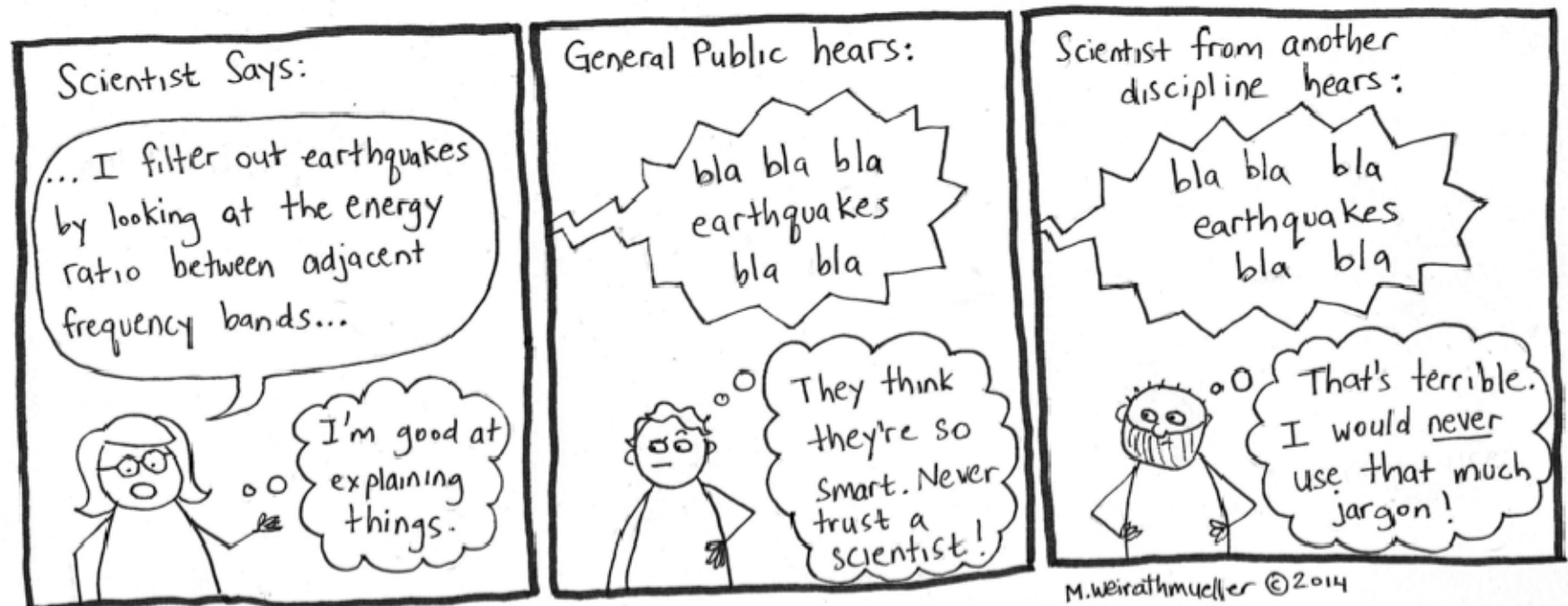
Example “Kicker”

Neanderthal (or Denisovan) proteins continue to live on and function inside us, and this also may have a downside, Parham notes. Neanderthals evolved separately from us for a few hundred thousand years, so their proteins may be somewhat mismatched to our immune systems and could play a role in autoimmune disease. Autoimmunity is poorly understood but known to be related to HLA types. “This is all just speculation. But we have been apart for all this time, so it would be very surprising if there weren't differences,” Parham says. “It would solve a long-standing puzzle.”

Conducting an Interview

HOW TO EXTRACT LAY LANGUAGE FROM SCIENTISTS

Guest Speaker: Amy Adams, Director of Science Communications at Stanford University



Why can't scientists let go of jargon?

- It's how they talk
- Don't want to be imprecise
- Don't really understand what people do and don't know
- Don't care if people understand their work





Why do you need the scientist to speak well?

You can translate their science better than they can in some cases, so who needs them?



Why do you need the scientist to speak well?

- You want to quote them



Why do you need the scientist to speak well?

- You want to quote them
- You need their analogies/descriptions



Why do you need the scientist to speak well?

- You want to quote them
- You need their analogies/descriptions
- You want the scientists to seem like real people

Scientists don't use lay language with other scientists
so...

You can't appear to be a scientist





Exercise: What is the role of the quote?

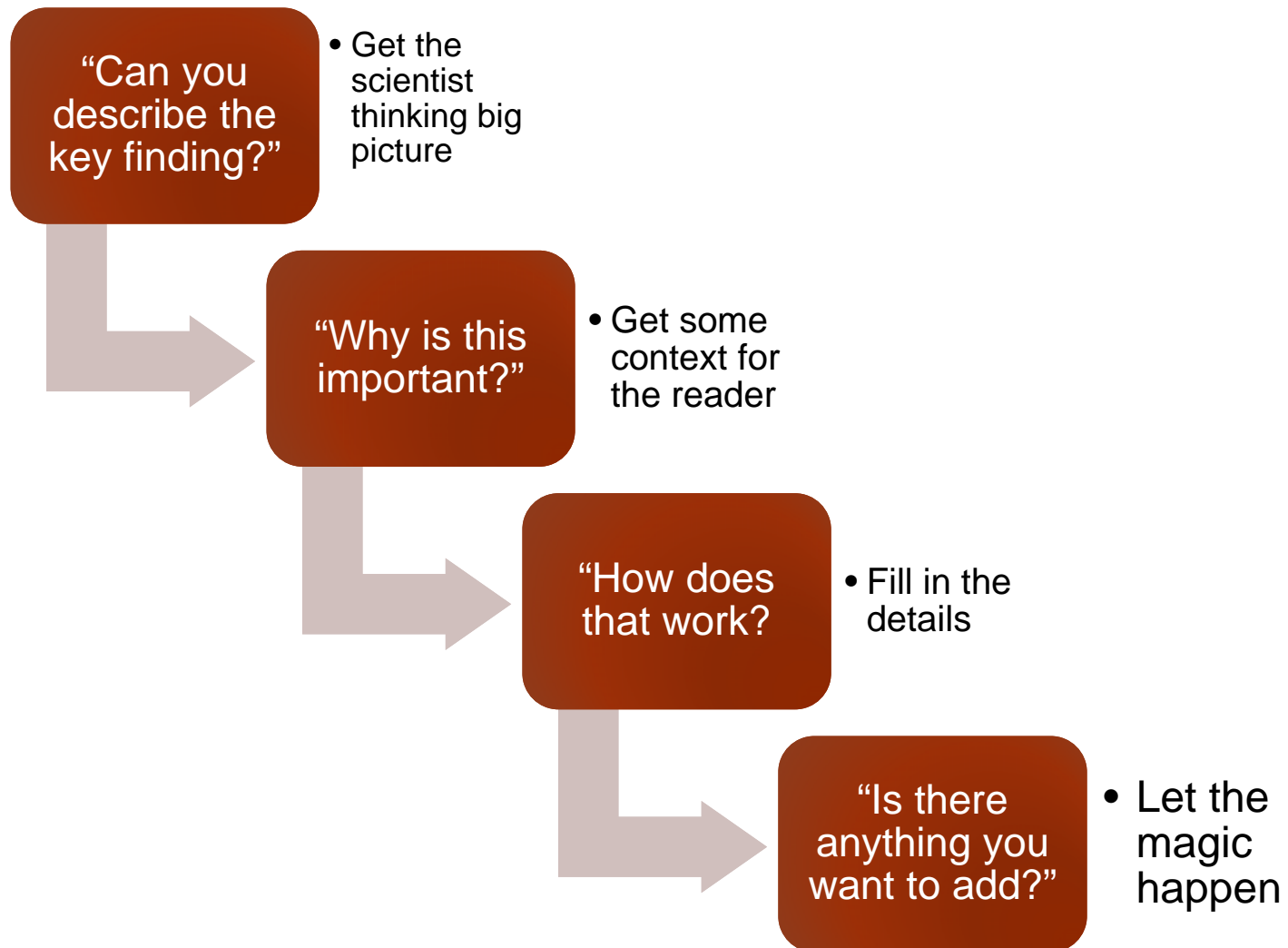
Take a look at the stories and discuss what role the quotes play

What questions elicited those quotes?



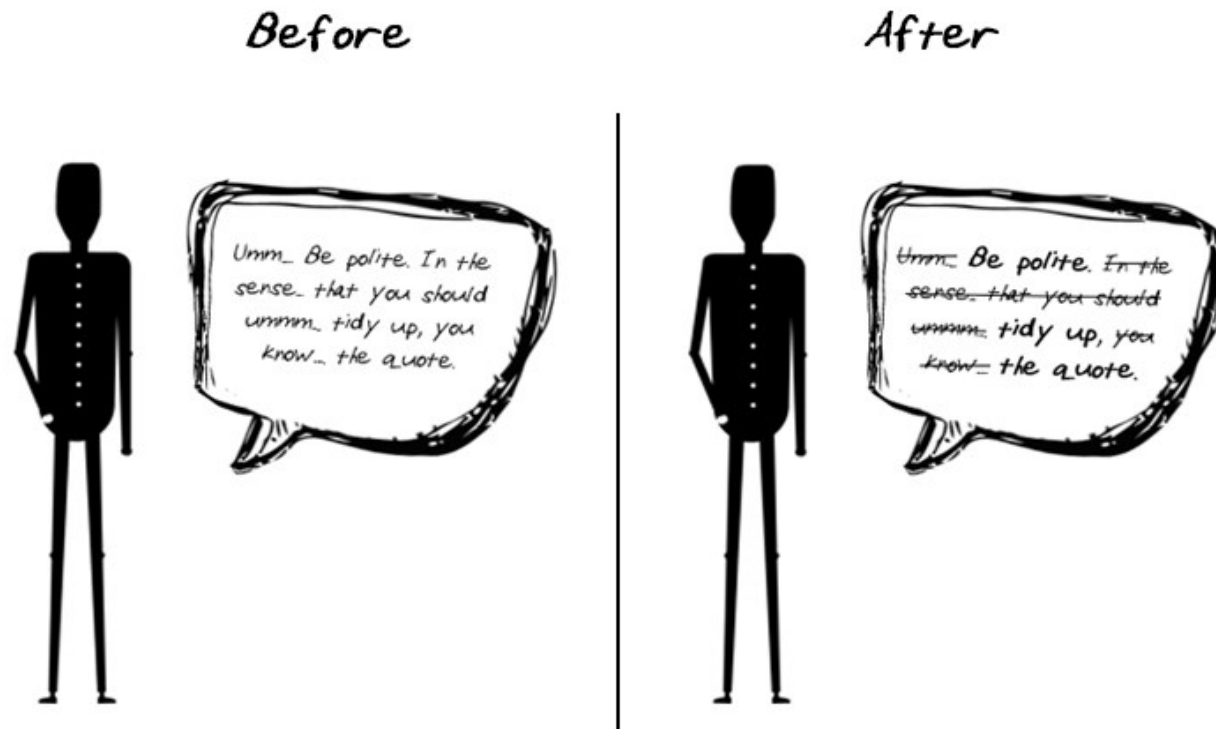
- What is the significance of this work?
- Who will benefit from this work?
- What did you think when you got the result?
- What made you look into this question?

Anatomy of an interview



Using the quote

The general rule of thumb is to use a quote exactly as it was said, but...



Poynter.

Icon by matthijs de block via The Noun Project

Stanford University



Using the quote

From the Poynter Institute (Roy Peter Clark):

1. Be truthful.

Quotes should be faithful to the words and intended meaning of the speaker. My goal is not to trap a source into making a mistake. It is to make public a meaningful statement.

Using the quote

From the Poynter Institute (Roy Peter Clark):

2. Adding language to quotes is more dangerous than taking stuff out, although both can distort meaning.

Distortion by subtraction is necessary in the very selection of quotes.
Distortion by addition can get you fired.

Using the quote

From the Poynter Institute (Roy Peter Clark):

3. Because of language prejudice on race and class, be careful with slang and dialect.

In "The Elements of Style," E.B. White advises "Do not use dialect unless your ear is good...and you are a devoted student of the tongue you hope to reproduce."

Using the quote

From the Poynter Institute (Roy Peter Clark):

4. That said, the American language is a great treasure.

If everyone you quote sounds like you, your readers are in trouble. Listen to NPR to get a feel for how skilled reporters and editors reveal the diversity of American speech.

Using the quote

From the Poynter Institute (Roy Peter Clark):

5. Be polite.

Tidy up the quote rather than make someone sound stupid. Too many journalists have a double standard: they may clean up the mayor, but not the cranky old lady complaining to City Council.



Exercise: interview each other

Take 10 minutes to interview another student. Write down a quote that would help explain the research or add color to a story

Topic: “Tell me about your research.”

Q&A: Not exactly one long quote

A Q&A is a good option when:

- you have a scientist who speaks really well
- the person is the story
- the point of the story is to get that person's opinion
- you don't have a lot of time (Q&A eliminates the need to write a lede, nut graph, clever analogies, etc)
- you want to help your readers understand a new process or decision

What a Q&A is NOT

A literal transcript of the answers

(Because people aren't actually that interesting)



What a Q&A IS

A more succinct, more engaging version of what the person actually said.





Interviewing for a Q&A

Like any other interview except:

- Know in advance what you want the story arc to be
- Have more questions prepared than what you will eventually use
- Be open to detours, but be thinking about how they fit in to your arc
- Be listening to make sure the person answers the full question. You won't be able to write in context or fill in details.



Example

So that problem was waiting to be solved and was solved because there were two people in different fields who decided to work together. And they got money in the form of a seed grant and actually the students also had fellowships to really launch the project.



Example

~~So that problem was waiting to be solved~~
~~and was solved because there were two~~
~~people in different fields who decided to~~
~~work together. And they got money in~~
~~the form of a seed grant and actually the~~
~~students also had fellowships to really~~
[Seed funding to] launch the project.

Exercise: Edit the transcript

Use the transcript to create an answer to the question “Why are people suddenly taking an interest in how to propagate the Bio-X concept?”

Tips:

- Combine parts of sentences where helpful
- Try to use the interviewees sentence structure and language
- Clean up meandering thoughts, partial sentences
- Condense significantly



Exercise: Compare to final



Assignment

Conduct a ~15 minute interview with a friend, lab member, or classmate on a single question. For example:

- What interests you about this field?
- What was the key finding in a recent paper/poster?

Write a short answer to the question based on the transcript.

Tomorrow

Science journalists:

<https://twitter.com/nytscience/lists/nyt-science-section>

@NeilTyson

@SciFri

@NPRScience

Scientists:

@Pknoepfler

Blog: www.ipscell.com

@RosieRedfield

<http://rrresearch.fieldofscience.com/>

Social media for science communication

PUT YOURSELF WHERE THE PEOPLE ARE

Guest Speaker: Amy Adams, Director of Science Communications at Stanford University

Social media by the numbers

Monthly active users (2015)

- Twitter: 320 million
- Facebook: 1.59 billion
- Blog readers: 150 million (2014)





Why engage?

Great question! Ask it before diving in.

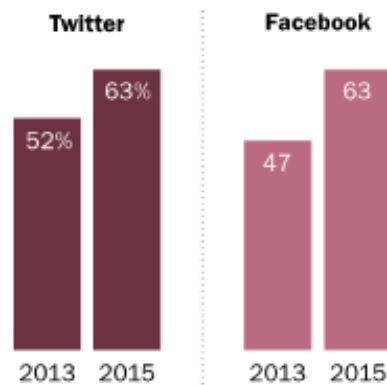
Why engage?

- Reputation of a school or institute
- Promote your cause
- Show thought leadership
- Engage people in a topic
- Drive traffic
- Promote a personal brand
- Connect with like minded people

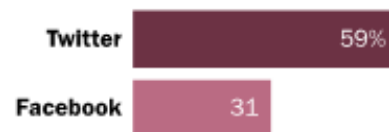
Know what you want to achieve before starting to engage
THEN figure out how you are going to measure success

Facebook and Twitter News Use is on the Rise

% of ___ users who get news there



Of those who get news from ___ in 2015, percent who have kept up with a news event as it was happening

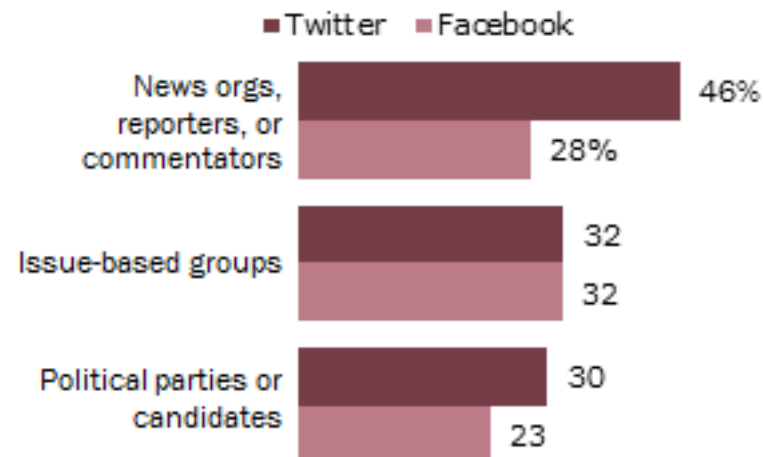


Social Media and News Survey, March 13-15 & 20-22, 2015. Q2, Q4, Q7, Q11.

PEW RESEARCH CENTER

Twitter Users More Likely to Follow News Outlets

% of ____ users who follow...



American Trends Panel (wave 1). Survey conducted March 19-April 29, 2014. Q33d, Q34d.

PEW RESEARCH CENTER

Anatomy of a tweet



Anatomy of a tweet



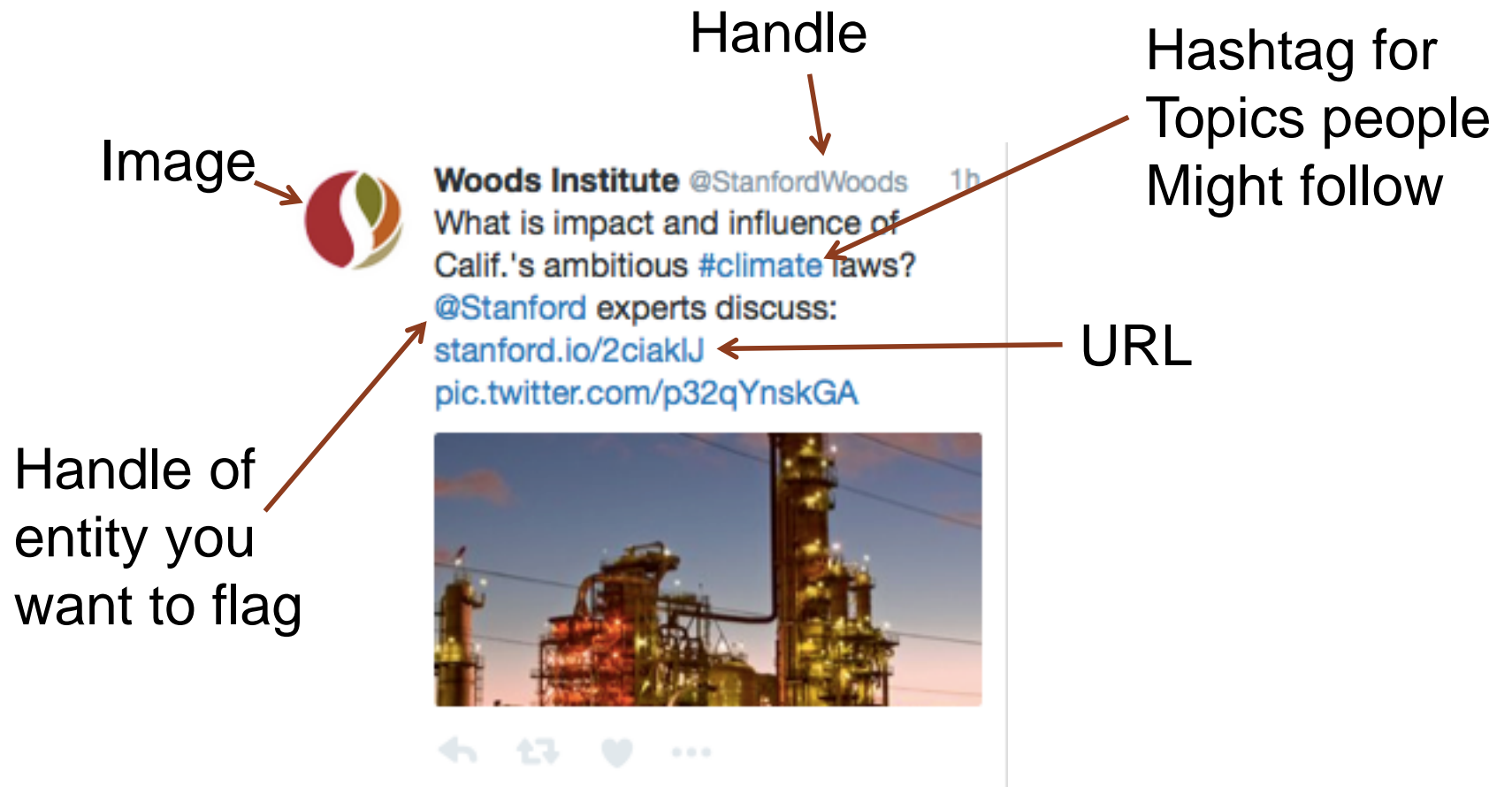
Anatomy of a tweet



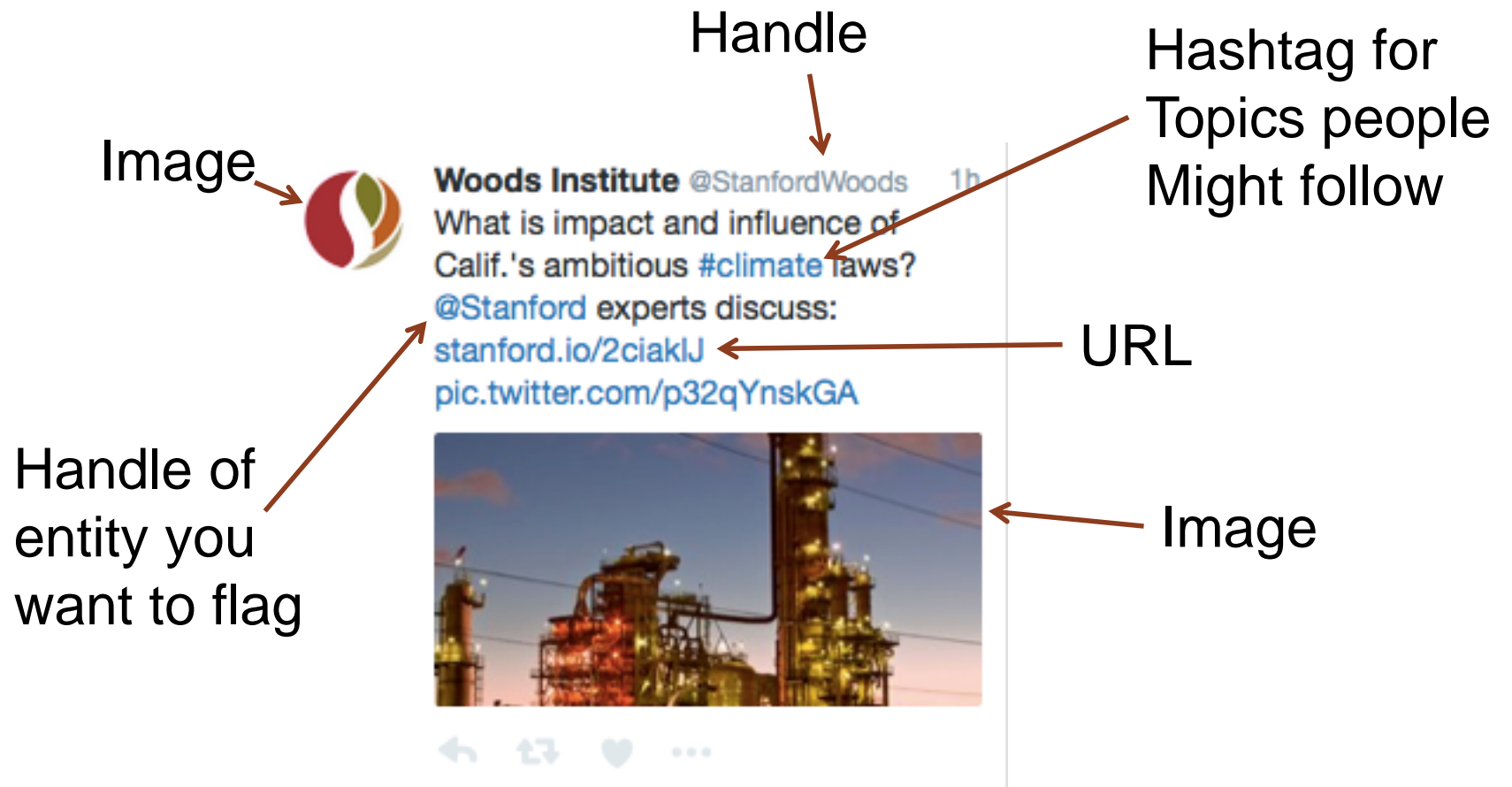
Anatomy of a tweet



Anatomy of a tweet



Anatomy of a tweet



Feed styles



Lists of people who I follow

- Journalists
- Scientists
- Science organizations

Feed styles

Tweets by a
single user








Stanford Bio-X retweeted









Stanford University


Feed styles


Tweets and retweets of an individual





**Amy Adams** @runnr 1d
I've had my head under a rock, which is why I'm just now learning about Alice Ting's cool work: scopeblog.stanford.edu/2016/08/29/che...
   

 Amy Adams retweeted

**Jill Filipovic** @JillFilipovic 2d
I don't follow football, but quietly noting that I've read more about a dude not standing than I have about the dudes who beat & rape women.
   

**Amy Adams** @runnr 2d
The situation is so sad. What I just can't fathom is that the US won't get it together to fund research.

Liz Szabo @LizSzabo
Just keeps getting worse: Zika virus now linked to hearing loss in babise. usat.ly/2c5BbxP
pic.twitter.com/n3FYInarse


Stanford University

Tweetdeck

Keep your friends close and your enemies in a
Tweetdeck column

Stanford Bio-X @StanfordBioX 1d
Looking for a good book?
@NIHDirector got these
recommendations from
@KarlDeisseroth:
pic.twitter.com/IX4t5XwAlj

Stanford Bio-X @StanfordBioX 2d
The balance of gut bacteria and
inflammation influences the risk of
colorectal cancer: stan.md/2bzbNIU
pic.twitter.com/OrMFp1iVcu

Stanford Bio-X @StanfordBioX 2d
Alice Ting developed a chemical
spray paint to identify all the
molecules in the synapse:
stan.md/2bWeVcz

Stanford Bio-X retweeted

Stanford Medicine @StanfordMed 3d
Quality versus quantity:
@StanMedMag on what we need —
and what's rewarded —in research:
stan.md/2aZ5nek

National Academy of Medicine @theNAM 1m
Learn more about clinical
management and #publichealth
interventions for the #ZikaVirus:
ow.ly/OuCw303OipD #ZikaResearch
#Zika

STAT @statnews 1m
From the @BostonGlobe: Could this
be the end of surgical caps for
surgeons? bit.ly/2bW9aNb
pic.twitter.com/8UTLLvt8up

Jill Filpovic retweeted

Eric Michael Garcia @EricMGa... 11m
@JillFilpovic Right here.
theatlantic.com/politics/archi...

Pia Christensen @AHCJ_Pia 10m
Is Texas too easy on troubled Dallas
psychiatric hospital? by
@milesmoft bit.ly/2bYwxTO via
@dallasnews

Rebecca Traister retweeted

Aminatou Sow @aminatou 21h
The Cut @TheCut
Whoopi Goldberg's thoughts on
marriage: "I don't want somebody

abpro @abprolabs 10m
#Immunotherapy and future
directions in #oncology
ow.ly/SMGh303f8fD @PMLivecom

AAI @ImmunologyAAI 25m
Combining #immunotherapy with
chemotherapy reduces #cancer
reoccurrence in dormant breast
cancer cells.
eurekalert.org/pub_releases/2...
#Immunology

Cancer MoonShot 2020 @Mo... 31m
#Oncologists – Join the mission & the
@Moonshot2020 Clinical
Community. bit.ly/2bWLVCM
#immunotherapy
pic.twitter.com/V1w0NnOoLI

J Clinical Oncology @JCO_ASCO 1h
IL-10 - an immune activating
cytokine in cancer #immunotherapy
bit.ly/2cftGI4

Precision Med US @PrecisionM... 1h
#Immunotherapy: hype or hope? -
goo.gl/alerts/gWjT8
#PrecisionMedUS
#PrecisionMedicine



A case story

Stanford chemists develop a new method of cancer immunotherapy

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Stanford chemists develop a new method of cancer immunotherapy



Stanford University @Stanford 9d

A team led by @CarolynBertozzi has developed a new approach to cancer immunotherapy:

stanford.io/2bxeCpH

pic.twitter.com/FJahdPt9HI



A case story

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pic.twitter.com/FJahdPt9HI



 **Stanford Bio-X** @StanfordBioX 9d
.@CarolynBertozzi created a chemical lawn mower as a novel method for #cancer #immunotherapy:
stanford.io/2bAQDEF




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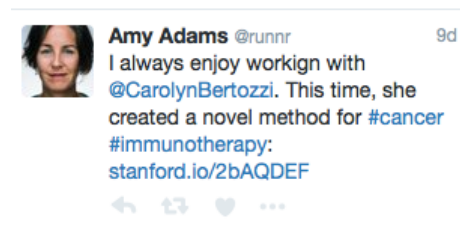
 **Amy Adams** @runnr 9d
I always enjoy workign with @CarolynBertozzi. This time, she created a novel method for #cancer #immunotherapy:
stanford.io/2bAQDEF

 **Stanford Bio-X** @StanfordBioX 9d
.@CarolynBertozzi created a chemical lawn mower as a novel method for #cancer #immunotherapy:
stanford.io/2bAQDEF



A case story

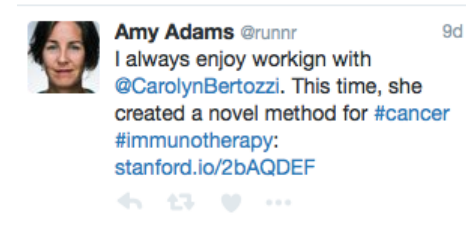
Stanford chemists develop a new method of cancer immunotherapy



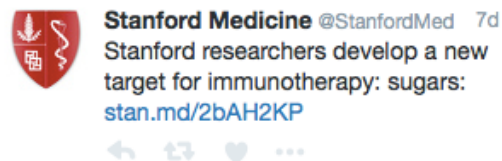
Stanford researchers develop a new target for immunotherapy: sugars

A case story

Stanford chemists develop a new method of cancer immunotherapy



Stanford researchers develop a new target for immunotherapy: sugars



Exercise

Write 2 tweets based on the news story link in your packet.

- A personal tweet
- A tweet as Stanford

URL is 22 characters

Image is 26 characters



Facebook

- Organizations use it to retain and engage existing friends



Facebook

- Organizations use it to retain and engage existing friends
- Very image/video driven

Facebook

- Organizations use it to retain and engage existing friends
- Very image/video driven
- Hard to use as a way of spreading content, unless:
 - You are Science Friday
 - Cal Academy
 - IFLS
 - Neil deGrasse Tyson

Facebook

- Organizations use it to retain and engage existing friends
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 - You are Science Friday
 - Cal Academy
 - IFLS
 - Neil deGrasse Tyson
- Can educate existing friends on a personal page

Who blogs about science?

- Individual scientists blogging about their work or their field
- Scientific organization blog about the the science they fund
- News outlets run blog to fill in background on longer stories, or to cover other topics (Nature Jobs)
- Groups of scientists might start a blog on a field of research (NeuWrite West)

Case study of a blog post

Cancer has proven to be a wily foe, in part because the cells are so effective at hypnotizing the immune system that should act to destroy them.

In recent years, cancer therapies that activate the body's own immune system to destroy tumors have improved the odds against some cancers, including formerly incurable skin cancers like that afflicting former President Jimmy Carter. But the immunotherapies currently available only activate one arm of the multi-pronged immune system – the adaptive immune system – and aren't always effective.

Carolyn Bertozzi, a Stanford professor of chemistry, has now shown that removing certain sugars surrounding breast cancer cells can recruit a second arm of the immune system – the innate immune system. The approach, described in a study published Aug. 22 in Proceedings of the National Academy of Sciences, greatly improved the effectiveness of a breast cancer drug in a lab dish, opening up a new avenue in the fight against cancer.

“This is a whole new dimension to immune therapy,” Bertozzi said, adding that she thinks it could be the first of many therapeutic approaches involving the sugars that surround cells, called the glycocalyx.

Case study of a blog post

Cancer immunotherapies have been big news in the past few years, particularly after former President Jimmy Carter's melanoma was **successfully treated** with one such immune-stimulating therapy.

What I hadn't known before working on a recent story is that all immunotherapies currently available activate the immune system in the same way (they aim for a **pair of proteins** found on cancer cells and some immune cells.)

Chemist **Carolyn Bertozzi**, PhD, told me that many more pathways exist that cancer cells exploit for evading the immune system. Any of those could also make a potential target for immunotherapies.

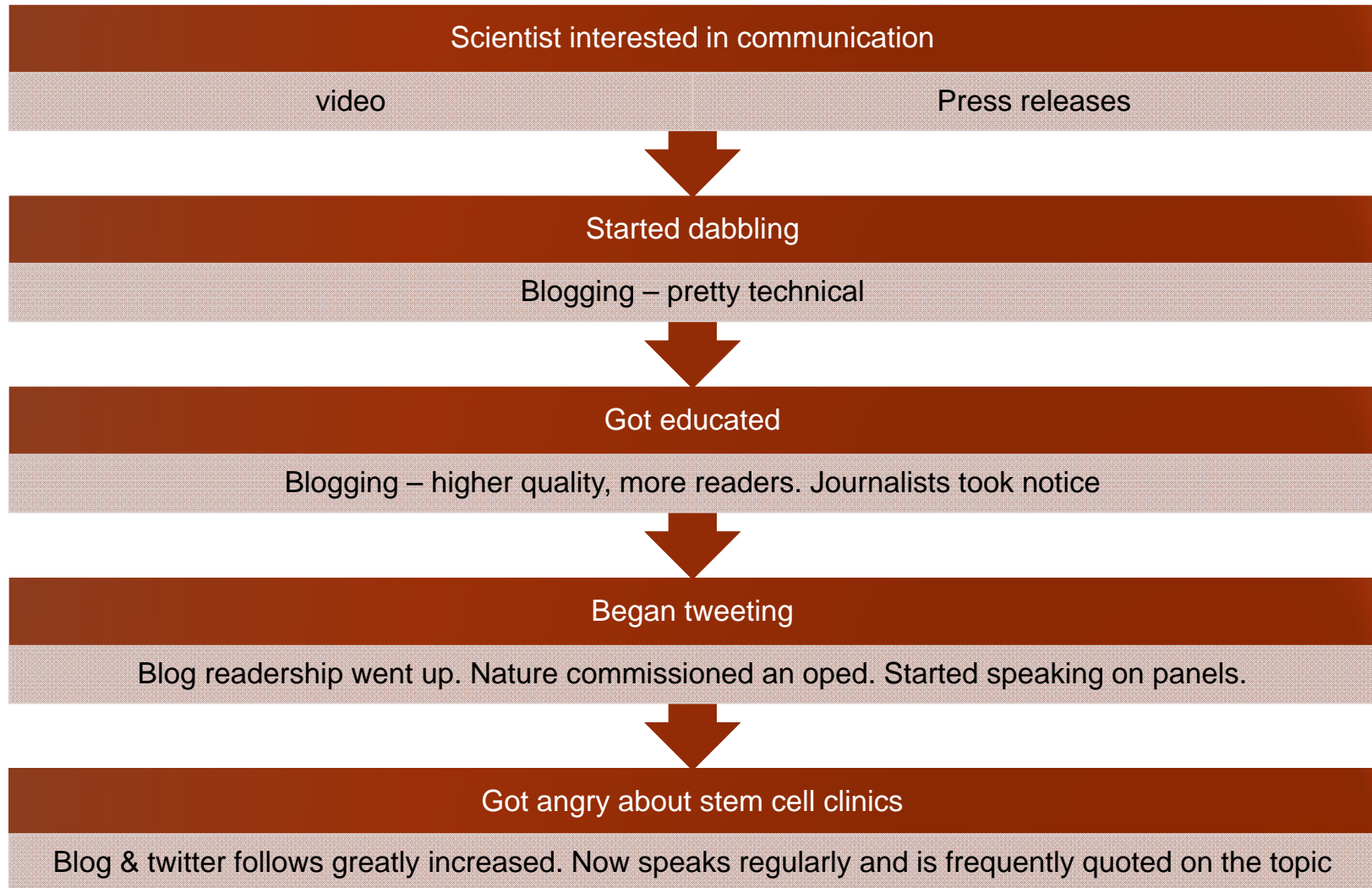




Exercise

Using the same news story, write a blog post

Case study: Paul Knoepfler





Social media roundup

- Be real (because if you are trying to hard it shows)



Social media roundup

- Be real (because if you are trying to hard it shows)
- To pull that off, know who you are talking to



Social media roundup

- Be real (because if you are trying to hard it shows)
- To pull that off, know who you are talking to
- And know why those people would follow you



Social media roundup

- Be real (because if you are trying to hard it shows)
- To pull that off, know who you are talking to
- And know why those people would follow you

And the biggie:

- Engage, don't teach



Additional reading/listening

Arne will send some links