REASONING WITH SOURCES

Evaluating, managing, integrating, and citing the work of others
Why Do We Use Sources?

• To gain access to information—facts, statistics, narratives, etc.

• To see what other people think about the topic

• To respond to other statements; to put ourselves in conversation with other scholars

• To build our work on the methods and theories that others have developed, so we don’t have to reinvent them
Why Do We Cite Sources?

• To credit other scholars’ work
• To show the sources of our information
• To show how our own ideas developed from thinking about the work of other scholars
• To identify which scholarly conversations we’re entering
• To allow other scholars to find and use our sources
• To allow other scholars to judge the relevance, expertise, reliability, and accuracy of our sources
• To allow other scholars to trace our methods and lines of reasoning as a way of testing our ideas
• To allow the discipline as whole to trace the collective development of knowledge (and thus to know what needs correcting if theories are disproven, etc.)
How do we make use of sources?

Examine the following examples—

• How do the ideas and information from a source enter this text?
• How do we know what is from a source and what is from this author?
• How does the source material function? What is its purpose?
• How does the citation function? Why does it take the form it does?
From Marine Biology

Right whales produce sounds ("up calls" or "contact calls") that may function as a means of individual identification. These are the only calls known to be made by newborn calves, their acoustic properties are well-suited for long-range communication, and they appear to be under selection to minimize overlap with ambient noise (Clark, 1982; Parks et al., 2007). Thus, these contact calls represent the most likely means of mother-offspring recognition in right whales.

Frasier, Timothy R., Philip K. Hamilton, Moira W. Brown, et al. "Reciprocal Exchange and Subsequent Adoption of Calves by Two North Atlantic Right Whales (Eubalaena glacialis)." Aquatic Mammals 36, no. 2 (2010): 115–20. © MinuteMan Press. All rights reserved. This content is excluded from our Creative Commons license. For more information, see https://ocw.mit.edu/help/faq-fair-use/.
Definite evidence for whale hunting, including the presence of ethnographically documented whaling tools (reviewed below) and strike marks on whale remains in sites, appears as early as 3000 B.P. and has been entirely limited to the Nuu-chah-nulth and Makah area (Monks et al. 2001). Arguments also have been made for precontact whale hunting on the Queen Charlotte Islands based on ethnohistoric data and the relative abundance of whale bone in sites (Acheson and Wigen 2002). However, most researchers working beyond the region where whaling is ethnographically documented have been reluctant to use such information as evidence for precontact whale hunting.

Losey, Robert J., and Dongya Y. Lang. "Opportunistic Whale Hunting on the Southern Northwest Coast: Ancient DNA, Artifact, and Ethnographic Evidence." *American Antiquity* 72, no. 4 (2007): 659–76. © Cambridge University Press. All rights reserved. This content is excluded from our Creative Commons license. For more information, see [https://ocw.mit.edu/help/faq-fair-use/](https://ocw.mit.edu/help/faq-fair-use/).
OH-PCBs have been detected in the blood and tissues of humans (17-20) and several wildlife species (21-28), and those levels and patterns were shown to vary with species, possibly due to species-specific metabolic capacity by phase I CYP and/or phase II conjugation enzymes and binding affinity to TTR (29, 30). Such interesting observations suggest the need for studies on OH-PCB residue levels in biota. However, little is known on the patterns and levels of OH-PCBs in cetaceans, which accumulate some of the highest concentrations of PCBs (26, 28, 31-36).
From Literary Studies

To understand modernity, and in particular its insistent compartmentalization of knowledge, [Bruno] Latour invites analysis of what he calls “translation”: the continuous process of exchange between nonhuman and human domains, recognition of which is foreclosed by the “modern constitution” (32). Melville's whales, I will argue, evince precisely this kind of transgressive translation. At certain moments they act as screens for the projection of models for human society; at others they are called upon to shape that society, or are shaped by it.
Citation styles differ

BECAUSE different fields care about:

- specific wording and its location in a text (author-page number styles)
- currency (author-date styles)
- using unpublished sources (footnotes)
- data from many sources more than authorship (citation-sequence styles)
Citation Styles Differ, BUT:

All styles share two main features:

--an in-text marker

--a complete bibliographic reference
Evaluating arguments

How do we know what to use from a source?
How do we indicate our stance / assessment?
Stasis Theory is a useful frame for evaluating and connecting arguments

**Fact**—does a thing exist? how much? what happened?
Examples: is the ivory-billed woodpecker extinct? What nutrients do carrots provide? What is the intermediary in this chemical reaction?

**Definition**—what kind of thing is this? (links the concrete to the conceptual, or places a thing in a classification system)
Examples: what exactly is entropy? Does this defendant’s action fit the definition of murder? Should this area be classified as a wetlands?

**Causation**—What are the causes, effects, or consequences of this?
Examples: what caused this outbreak of bird flu? What is the influence of environment on psychology? How will the intensity of cyclones change with increases in sea surface temperature?

**Value**—How should we evaluate or judge it?
Examples: Would person X make a good advisor? How significant? What’s the best process for refining uranium?

**Policy or Action**—what should we do because of this?
Examples: Should we? Should we approve the Keystone XL pipeline project??
Claims in lower stases can form warrants for claims in higher stases

Data
1 million animals are killed each year in cosmetics testing

Qualifier
So, except for treatments of diseases,

Rebuttal: human lives matter more than animal lives

Claim
Animals should not be used to test skin treatments

Warrant
Animal lives should matter more than profits

Backing
Studies have shown that companies use animals to reduce the cost of tests

Claims in different stages create chains of reasoning
Arguments of fact: Is or is not?

Claims of fact can be true or false if they can be measured absolutely and verified.

If they are measured by proxy or estimated, they are in the realm of the probable, and thus we can argue about the existence or amount.
The stasis of definition lets us navigate the ladder of abstraction, and reason by analogy.
And categorize, include and exclude, reason by example, and generalize

**Categories**: Class, kind, family, type, group, cluster, camp, genre, genus

**Inclusion**: Is, counts as, meets the qualifications, can be considered, belongs in, typifies, is defined as

**Exclusion**: is not, is distinct from, unlike, differs from, is a separate case

**Cases**: Instance, case, member, item, candidate, representative

**Typicality**: classic, (un)common, (a)typical, central, (un)representative, borderline

Adapted from Davida Charney and Chris Neuwirth, *Having Your Say: Reading and Writing Public Arguments*, 2005.
Elements of causation need to work together

Correlation (correlation implies but is not sufficient for causation)

Sequence (sequence helps us understand directionality in causation, but it is also not sufficient, and alone results in a post hoc ergo propter hoc fallacy)

Agent and mechanism
Types of values claims

Comparisons

Ratings on a scale; hierarchies

Trade offs between values
Hedging, (phrases of probability) indicate whether the stasis is “open” or “closed”
As you read, ask and record:

- What assumptions does the source make?
- What claims does it make?
- How does it use evidence?
- How is the source structured?
- How does the source use its own sources?

- Do you share those assumptions?
- Are the claims convincing? To what extent does the source close any open stases?
- Is the evidence relevant and sufficient?
- What does the structure tell you about the logic of the argument?
- Will you agree with, counter, complicate, extend, or qualify the ideas of the source?
Managing Information from Sources

• How do you manage information as a researcher?

• Can you describe your process of capturing useful facts, theories, methods, mechanisms, results, etc. from your sources?

• Are there particular tools or procedures you use?
Highlighting and margin notes

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Somebody asked me to explain the achievements of the great biologists, the ones who could recognize patterns in nature and classify objects. So I began to think about whether the capacity to classify nature might be a separate intelligence. The naturalists’ ability passed with flying colors.” Howard Gardner (9/37)

“There are certain parts of the brain particularly dedicated to the recognition and the naming of what are called ‘natural’ things.” Howard Gardner

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Linguistic Intelligence — Reading in Broca’s and Wernicke’s areas of the brain. Linguistic intelligence is exemplified in poets and other authors, but it is a strength of many people who are not recognized in the universe of words, reading, or writing. These individuals are often articulate, having a sense of humor. Deaf children who invent their own signs are likely showing this intelligence at work. A linguistically-strong child with average math skills may do fairly well on an IQ test. Math teaching can draw heavily on linguistic intelligence by encouraging children to put into words what they see as patterns and procedures. A careful choice of a few accurate key words (instead of a stream of technical tracheals) can explain an idea capitalizing on the verbal capacity for clarifying concepts, and it can prevent the predictable misunderstandings that later arise. Also, the origins and definitions of math terms can enrich a presentation for students who possess a strong linguistic intelligence.

Naturalist Intelligence — This intelligence has to do with observing, understanding, and organizing patterns in the natural environment (plants, animals, rocks, and natural features) — an essential key to survival. Tom Frenzen, known as “The Tracker” can distinguish minute indicators to any footprint that indicate even the emotional state of the walker, whether animal or human! Even identifying sounds and models of cars, analyzing fingerprints variations, or spotting patterns in x-rays uses the naturalist parts of the brain. In the math “environment,” attributes of fractals, unique features of graphs, and visual patterns created by numbers and geometrical designs all tap this brain capacity. The Fibonacci Number patterns even give us deep insights into natural forms.

A major premise shared by Gardner, and the book, is that a teacher should not only attempt to get students that are strong and natural in the brain then thoroughly assess producing from a weaker intelligence while. Without understanding this fundamental dilemma, schools and educators find themselves in classic win-lose situations, as evidenced by the child who’s constantly sitting out of his chair and throwing spitballs, using his strong kinesthetic intelligence for trivial ends, while the teacher is trying to verbally hang things into his weaker logical-mathematical intelligence, to no avail.

The times tables, for example, can be taught more effectively through several intelligences rather than relying on the traditional math drills, printed square (V/F) and timed tests that appeal to some linguistically- and spatially-intelligent students. For a variety of Multiple-Intelligence options that rapidly teach the math facts, see Chapter 10, “Sharpening the Math Facts.”

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Galaxy interactions and collisions occurred not only in the early universe but also in the ‘recent past,’ at lower redshifts and with objects appearing at larger angular size” (p. 77).

Source Card:
1898 Urban planning conference’s 1st PROBLEM: Horse manure. No solution
Horse manure=pollution=transportation byproduct → public health, sanitation problems

Factors affecting the problem: Urban density ↑ → transportation↑

Causal relationships: living standards↑ → trade↑ → transportation ↑ → byproducts↑

New technology amplifies the problem: Railroad ↑ → horse ↑ → manure ↑

Innovation extends use: omnibus → personal transportation ↑ → horse ↑ → manure ↑

General principle: as efficiency ↑ → prices ↓ → usage ↑ → byproducts ↑

Potential uses for byproducts: manure=fertilizer, BUT manure ↑(glut) → fertilizer price ↓

Byproducts have byproducts (2nd order problems): manure ↑ → flies ↑ → disease ↑

More direct byproducts: noise, accidents, traffic congestion, horse disease and death

Final claims: Cars are the solution! The example of the horse pollution problem can be generalized as an indicator of how technology and ingenuity will solve our problems.

These notes are based on the article “From Horse Power to Horsepower” by Eric Morris in Access Magazine, 2007.
<table>
<thead>
<tr>
<th>Study (Year) Ref No</th>
<th>No of cases, country, time period</th>
<th>% Smokers, Quantified smoking based groups</th>
<th>NSCLC stage profile, Group differences^ in NSCLC stage</th>
<th>Other baseline group differences^ (Gender, Age, Histology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holli K, et al. (1999) (15)</td>
<td>290; Finland 1983-87</td>
<td>100%; Lifetime Cig: L (&lt;500), M (500-800), H (&gt;800)</td>
<td>Stages I-IV: No diff in T or N or M status</td>
<td>Males max (99%) in H, min (72%) in L. No diff in mean age. SqCC (63%) &amp; SCLC (26%) max in H, ADC (17%) max in L.</td>
</tr>
<tr>
<td>Guo NL, et al. (2009) (17)</td>
<td>327; USA N.A.</td>
<td>100%; Sm &lt;61 PY1, Sm &gt;61 PY1</td>
<td>Stages I-III: TNM status N.A.</td>
<td>Age ≥60 years more in Sm &gt;61 PY1 (77.9% vs. 64.4%). Males more in Sm &gt;61 PY1 (68.4% vs. 42.9%). SqCC (61.0%) more in Sm &gt;61 PY1, ADC (83.2%) more in Sm &lt;61 PY1.</td>
</tr>
<tr>
<td>Janjigian YY, et al. (2010) (18)</td>
<td>2010; USA 2003-06</td>
<td>83.5%; NS, Sm &lt;15 PY, Sm &gt;15 PY</td>
<td>Stages IIIB-IV: TNM status N.A.</td>
<td>Males max (55.6%) in Sm &gt;15 PY, min (34.4%) in NS. Median age max (65 yrs) in Sm &gt;15 PY, min (59 yrs) in NS. SqCC (12%) max in Sm &gt;15 PY, ADC (69%) max in NS.</td>
</tr>
<tr>
<td>Current study</td>
<td>520; India 2008-11</td>
<td>74.0%, NS, L/M (SI 1-300), H (SI&gt;300)</td>
<td>Stages I-IV: No diff in T or N status</td>
<td>Males max 97.9% in H, min (48.1%) in NS. Mean age max (61.0 yrs) in H, min (54.5 yrs) in NS. SqCC (57.9%) max in H, ADC (59.3%) max in NS.</td>
</tr>
</tbody>
</table>

ETD=Extrathoracic disease, BI=Brinkman index, SI=Smoking index, NSCLC=Non-small cell lung cancer, Cig=Cigarettes, Sm=Current/Ex-Smoker, NS=Never-Smokers, PY=Pack Years, PYI=Pack Years Index, H=Heavy, M=Medium, L=Light, max=maximum, min=minimum, resp=respectively, N.A.=Data Not Available, SqCC=Squamous cell carcinoma, SCLC=Small cell lung cancer, ADC=Adenocarcinoma; ^ Statistically significant.
Useful note-taking systems must:

• Track the texts’ main claims, purpose, and logical structure
• Record your own responses to the ideas
• Differentiate between your words and ideas and those of the sources
• Make information and ideas malleable, so they can be restructured and used to construct new ideas
How do we incorporate others’ ideas?

• Direct Quotation
• Paraphrase
• Summary
• Images

All paraphrases, quotations, summaries, images, ideas, and facts from a source must be cited.
Write a 2-sentence summary of Emanuel 2005
A Paraphrase Must:

• Accurately reflect the meaning of the source

BUT

• Substantially change the source’s wording and structure

What cognitive and textual operations do we employ when we paraphrase?
How to Paraphrase

First, identify the central concepts and their logical relationship. Then, keeping that logical relationship intact, invert the structure of the central concepts.

Next, look for ways to change syntax and diction:
- e.g. changing from first to third person;
- reordering phrases and clauses and using different subordinating conjunctions to keep the logical relationship intact;
- “translating” phrases into more formal or less formal diction;
- breaking long sentences into smaller parts, or linking similar smaller parts into one unit;
- “translating” concepts from more concrete to more abstract, or vice versa.

Check for accuracy and completeness—has the language sufficiently changed? Has the sentence structure sufficiently changed? Has the meaning not changed?
“Normal science does and must continually strive to bring theory and fact into closer agreement, and that activity can easily be seen as testing or as a search for confirmation or falsification. But science students accept theories on the authority of teacher and text, not because of evidence." (80)

Kuhn, Thomas. S. The Structure of Scientific Revolutions. University of Chicago Press, 2012. © University of Chicago Press. All rights reserved. This content is excluded from our Creative Commons license. For more information, see https://ocw.mit.edu/help/faq-fair-use/.
Is this an acceptable paraphrase?

“Normal science always tries to make theory and fact agree; for example, scientists test theories and try to confirm or deny them. Students of science, though, don’t test the evidence but just take the theories as true based on the authority of their teachers (80).”
Is this an acceptable paraphrase?

“Because he’s interested in how scientific revolutions occur, Kuhn compares how normal scientists and students learn. Normal scientists, he claims, constantly work to make their theories fit the evidence, testing, confirming, and falsifying their ideas, but students don’t work like normal scientists; instead, they ignore the evidence due to their concern for their teachers’ authority (80).”
“Thomas Kuhn identifies an incongruity between how “normal science” works and how students learn to become scientists. Students learn scientific theories by listening to their professors and reading their textbooks, he points out, rather than by actively questioning and assessing the fit between theory and reality themselves (80).”
Questions?