

Research Methods (HDFS 3390),
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Conducting a Research Study

Initiation	Three Crucial Issues	Later Stages
Ideas	Measurement	Statistical Analyses
Prior Literature	Sampling	Write-up of Results
Conceptual Basis	Causal Inference	Publication
<ul style="list-style-type: none">• Theories• Hypothesis Generation		
Ethical Issues/IRB Approval		

Video: "[A Survey in 10 Steps](#)" (Elon University)

"[Writing a Research Proposal](#)" (University of Southern California)

Aim of Scientific Research: To Generate New Discoveries, Advance the Field Step-by-Step

As the work of [Newton](#) and [Einstein](#) exemplifies, scientific breakthroughs are sometimes born of a single scientist's staggering genius, pure and simple. But that's rare. Much more frequently, great breakthroughs represent the collective effort of many scientists, each building on the insights of others to accomplish what no individual could have achieved in isolation...

Broad knowledge, technical facility, flexibility of thought, openness to unanticipated connections, immersion in the free flow of ideas worldwide, hard work, and significant luck are all critical parts of scientific discovery.



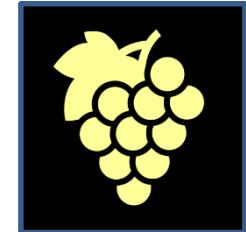
From: [Brian Greene](#) (2004). *The fabric of the cosmos: Space, time, and the texture of reality*. New York: Knopf.

Examples of Incremental (Step-by-Step) Advances in Our Knowledge

Going back to 1980s, it has been thought that red wine (in moderation) improves heart health, although idea has also been challenged. ([link](#))

Could it be the alcohol or the grapes? ([link](#))

What about white wine? ([link](#))



Research on Self-Consciousness/Body Image



Fredrickson, B. L., Roberts, T.-A., Noll, S. M., Quinn, D. M., & Twenge, J. M. (1998). That swimsuit becomes you: Sex differences in self-objectification, restrained eating, and math performance. *Journal of Personality and Social Psychology, 75*, 269–284.

- Women were randomly assigned to wear either one-piece swimsuit or sweatshirt; men were assigned to wear either swim trunks or a sweatshirt, before completing questionnaires, eating task, and math problems (to measure cognitive distraction due to body awareness).

Hebl, M. R., King, E. B., & Lin, J. (2004). The swimsuit becomes us all: Ethnicity, gender, and vulnerability to self-objectification. *Personality and Social Psychology Bulletin, 30*, 1322-1331.

- These authors thought trunks did not maximize men's self-consciousness, so used ____.

Social Network Depiction of Watson & Crick's Discovery of DNA Structure

By Alan Reifman (Based on my reading of Watson's 1968 book *The Double Helix*)

Complementary:

A-T, T-A, C-G, G-C

Like-with-like:

A-A, T-T, C-C, G-G

Gulland & Jordan – Paper also appeared to suggest complementarity (p. 183)

John Griffith – Discussed with FC, argued for complementarity; provided some important calculations (pp. 126-128)

Quote on p. 145 notes: "the agreement between Griffith's calculations and Chargaff's data"

JN Davidson – His book had formula for bases (p. 182)

Erwin Chargaff – Research showed number of A molecules very similar to no. of T, and no. of G very similar to C (p. 125)

Quote on p. 209 notes: "The unforeseen dividend of having Jerry share an office with [us]... If he had not been with us in Cambridge, I might still have been pumping for a like-with-like structure."

Jerry Donahue – Argued to JW that there were technical flaws in Davidson's book (p. 190)

James Watson & Francis Crick

Bill Cochran – Developed helical diffraction theory with Crick; only a few DNA solutions appeared to be compatible with both Cochran-Crick theory and with Franklin's data (pp. 62, 66, 75, 77, but also see p. 94)

Linus Pauling – His book *The Nature of the Chemical Bond* provided info for JW & FC's calculations (pp. 80-81)

Rosalind Franklin & Maurice Wilkins – Colleagues at nearby lab, their X-ray crystallography played major role, as did RF's argument that backbone was on outside of molecule (pp. 169, 212) and her photo of "B" form (pp. 167, 225)

Charles (FC) Frank – His theory of "cozy corners" in growth of crystals encouraged JW's helical ideas (pp. 113-114)

Hugh Hurley – Taught JW X-ray techniques, helping him progress on corners idea (p. 114)

Unnamed biochemists who helped Wilkins by giving him highly purified DNA to analyze (p. 72)

Direct personal communications of individuals with Watson and Crick are depicted in RED text within the ovals. Scholarly communications (i.e., Watson and Crick reading something in a journal article or book) are depicted in BLACK

Where Do People Get Research Ideas From?

Ideas for a Thesis Topic

Undergraduates Can Conduct Projects, Too

Resolving Contradictory Findings

Another thing that can stimulate new research is when two studies seem to **contradict each other**. Researchers can try to conduct new studies that **reconcile** the findings.

Is there a link between children's TV viewing and ADHD/attentional problems?

- 2007 study from New Zealand (found many years ago via the media assignment)
- 2006 study, by Dr. Miriam Mulsow in our HDFS department and her Texas Tech colleague Tara Stevens in the College of Education.
- Article in which Dr. Stevens comments on the New Zealand study.

