

Today's Topics

- Literature Reviews
- Theoretical Strategies
- Empirical Strategies
- Reporting Information

Reviewing Literature

“A month in the laboratory can often save an hour in the library.”

— Frank Westheimer



Google
scholar

“If I have seen further it is by standing on the shoulders of Giants.”

— Isaac Newton

Literature Review

- How to start?
 - Google Scholar
 - Chrome/Firefox add-on to add Scholar to search bar
 - Works hard to give you a PDF
 - Has an “Import into BibTeX” option
 - www.wpi.edu/+library
- And then?
 - Act like a Web crawler
 - Take promising documents, look at who it cites and who it is cited by to find other relevant documents
 - As you learn relevant jargon/key words, search for those as well and iterate

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Abstract The rapid evolution of large-scale worms, viruses and bot-nets have made Internet malware a pressing concern. Such infections are at the root of modern scourges including DDoS extortion, on-line identity theft, SPAM, phishing, and piracy. However, the most ...
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... These **scalable** decision points remain logically and physically separate from the system's gateway ... specific prototype of a worm **honeyfarm** that explored the **scalability** constraints present ... of operational **fidelity** and, in the process, necessarily sacrifice the **fidelity** that precisely ...
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Literature Review – Continued

- Use **related work section**, abstracts, tables, figures, intros, and conclusions to find related work
- Identify and check up on the key players
 - Typically professors, research scientists
- When do I stop?
 - When you seem to have exhausted the most closely related work
 - No new relevant citations (or cited by) from any of the papers you have found
 - No new useful keywords to search
 - When it seems like you have a full mesh

Literature Review – FAQ

- What if nothing is related?
 - You need to be more liberal in your view of “related”
 - If you squint, maybe X or Y is somewhat close
 - Eventually, it all comes back to seminal works in networking in the end
 - People hopefully have not done exactly what you’re doing, but your ideas were inspired from somewhere

Keeping Organized

- Use a spreadsheet or similar tabular organizational structure
- Keep track of authors, titles, PDF links, citation counts, publication venue, BibTeX entry (optional), and summary (where appropriate)
- Determine the influential folks who are highly cited and whose ideas are spreading

Reading Research Papers

- Work smarter, not harder
- Multiple pass approach
 - Quick screen/gist read:
 - Read title and abstract
 - Skim intro and conclusion
 - Look at shiny things (headings, figures, tables)
 - Deep-dive on the important ones:
 - After skim, actually read document and make notes on what is important
 - Focus on contributions, novelty, key details of experiments/proofs
 - Identify flaws/opportunities for improvement
 - Are you convinced? Why or why not?

Reading Research Papers

- Further reading:
 - P. Fong, "Reading a computer science research paper," Inroads, the SIGCSE Bulletin, 2009.
 - S. Keshav, "How to read a paper," ACM Computer Communication Review, 2007.

Theoretical Strategies

- Algorithms
- Foundations of CS
- Logic in CS

True or False?

- Theory is Mathematical Foundations, and doesn't care about actual machines
- Theory is an specialist's area just like networks, AI, graphics, compilers ...

Why & How

- Why study theory:

per previous remarks, lots of applications
in design, implementation, verification
of systems

not for today....

... come see me for propaganda

Why & How

- How to make theory work for you:
 - techniques more important than famous theorems
 - learn to do proofs: same skill set as programming
 - learn to ask annoying questions

Empirical Strategies

- Simulation (and Emulation)
- Measurement and Experiments
- Constructing Metrics
- Trials (without tribulation)

Reporting Information

- Explain your setup and methodology clearly
 - Details matter
 - Some readers/viewers annoyed by sudden presentation of results without background
- Charts
 - Determine most useful information to display
 - Use labels/axes very carefully

A Bad Chart

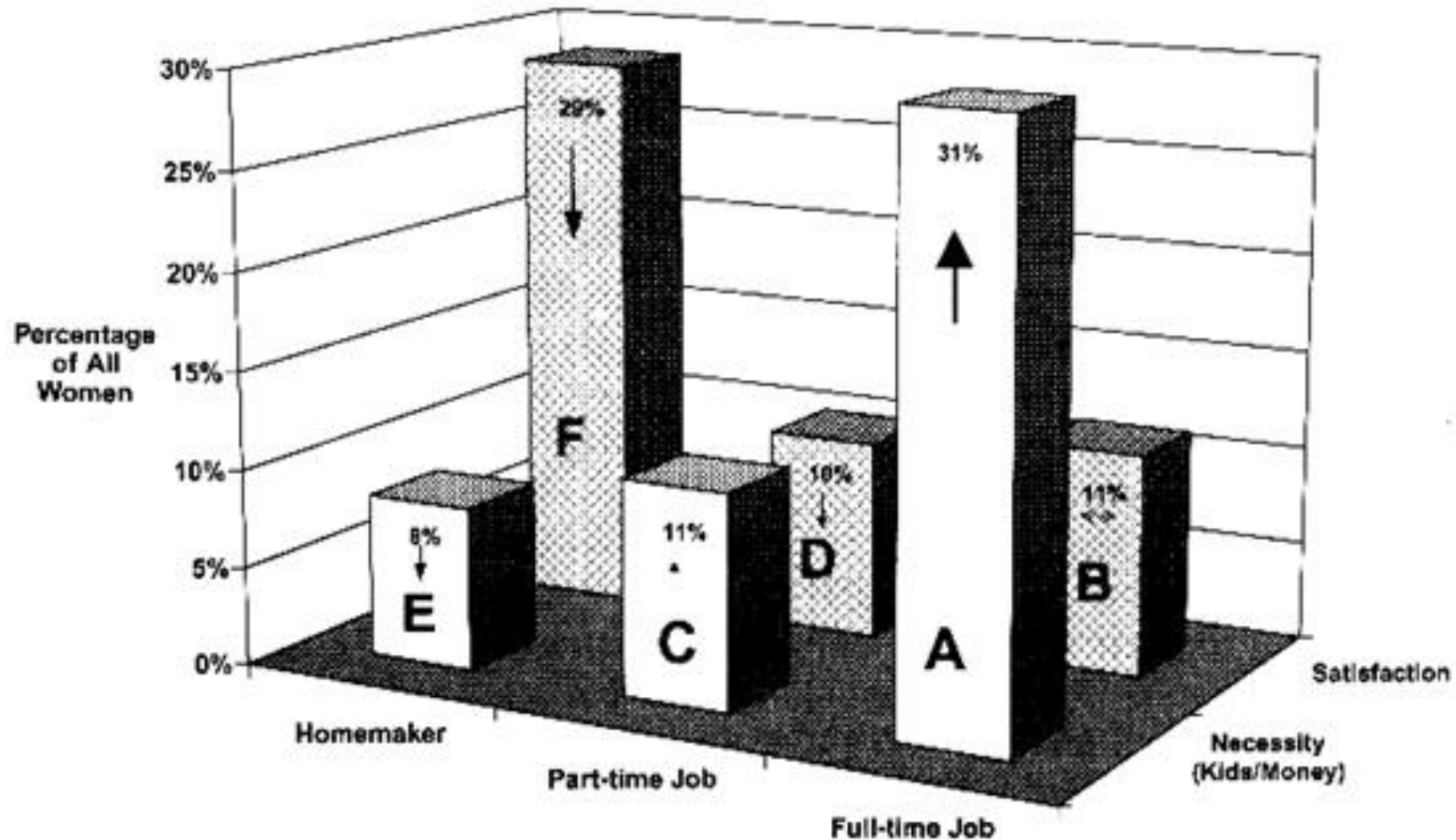


Figure 47: Working by Choice and by Necessity Among American Women, 1978-1999

Illustration courtesy of Gary Klass, Illinois State University

Better (but still bad) Chart

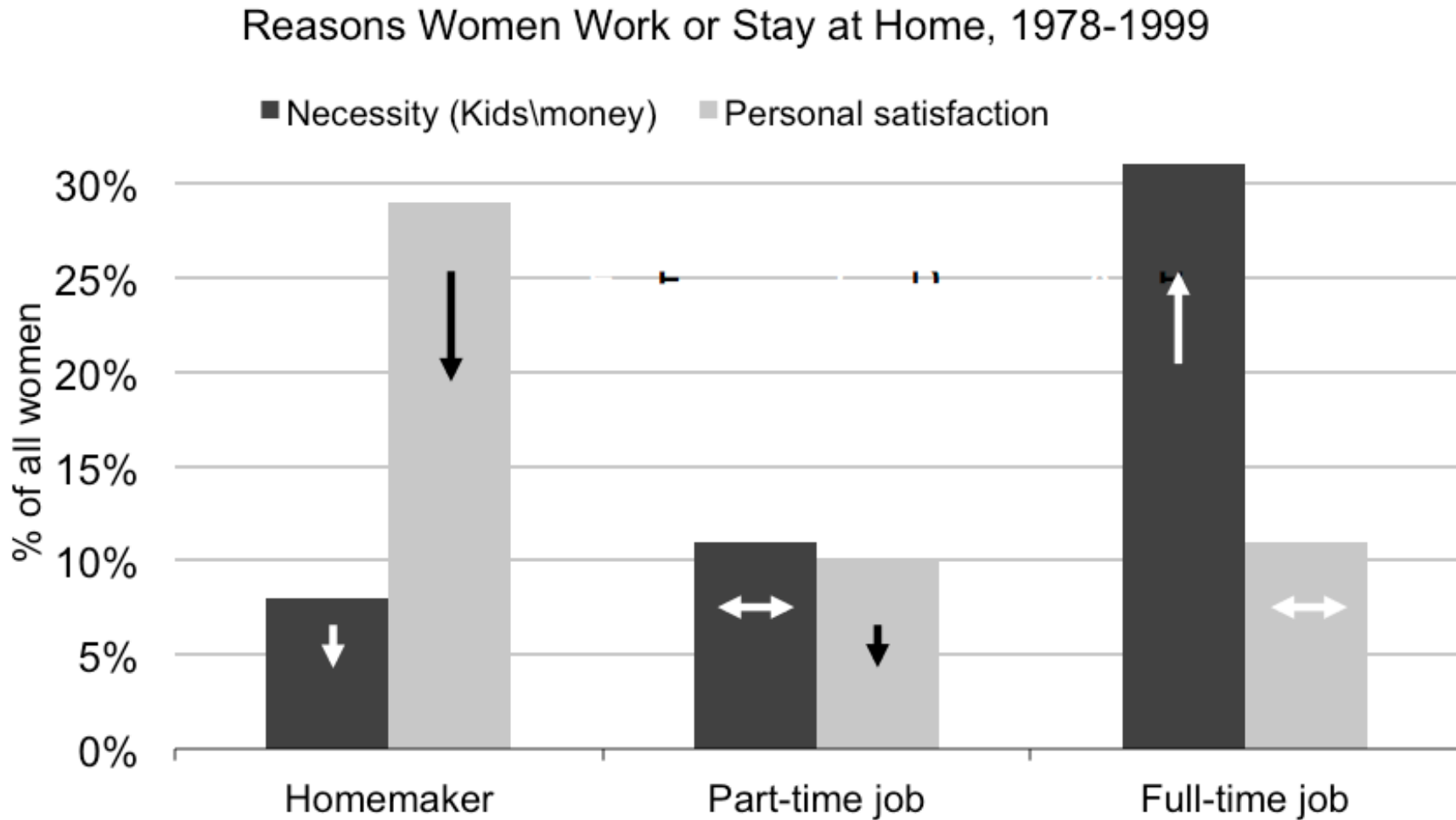


Illustration courtesy of Gary Klass, Illinois State University

Avoid Pie Charts

- Extremely low value per square pixel
 - Distribution across a single variable
- Multivariate comparisons are generally more meaningful
- Three dimensional pie charts?
 - Are you serious?

Making Good Charts/Tables

- Chart Examples and Guidance:
[http://lilt.ilstu.edu/gmklass/pos138/
datadisplay/sections/goodcharts.htm](http://lilt.ilstu.edu/gmklass/pos138/datadisplay/sections/goodcharts.htm)
- Table Examples and Guidance:
[http://lilt.ilstu.edu/gmklass/pos138/
datadisplay/sections/goodtables.htm](http://lilt.ilstu.edu/gmklass/pos138/datadisplay/sections/goodtables.htm)

Question and Answer

Upcoming Sessions

- Sept. 15: Making an Impact
- Sept. 29: Creativity and Communicating with the Community
- Oct. 6: Tools of the Trade