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Aphorisms on Writing, Talking, and Listening.

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Aphorisms on Writing, Speaking, and Listening

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Eric Rasmusen

Abstract

This article collects aphorisms on the mechanics of doing research in economics, emphasizing writing, speaking, and seminar participation. They are intended for both students and for scholars and are useful beyond just economics.

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1. Introduction

Some fifteen years ago I wrote down some thoughts on how to write papers for the students in my Ph.D. game theory classes. I have taught that course almost every year, and each year I have updated and improved the notes, which itself is an example of how writing can always be improved. Now, finally, I will publish these notes. They are aphorisms– ideas expressed in sentences or paragraphs rather than pages, often expressed in striking ways, and only loosely linked. Because they run from one idea to another and use plentiful helpings of rhetoric, aphorisms make for rather a rich diet, so you might want to read a few at a time, as a break from drier consumption. You will find my tone to be informal but dogmatic. The most important idea is that the author should make things clear to the reader and save him unnecessary work. Bluntness aids clarity.

I will assume throughout that you already know the following.

1. Benefits are to be weighed against costs. It is optimal for writing to be somewhat unclear if the alternative is costly, just as toilet paper is the optimal writing medium if you are smuggling a journal article out of a prison. More usually, we face tradeoffs between improving tenth drafts and writing first drafts.

2. I am still learning how to write. I have never looked over any of my papers without finding ways to improve it, even though I am accounted a good writer and do many drafts. So do not be surprised when you read my published papers and find violations of my own rules.

3. It is okay to violate any rule, including rules of grammar and spelling, if you have a good reason. Just be sure you do it deliberately.[1] If you know you write poorly, do not even break the rules deliberately. Having drunk a fifth of whisky, an economist, being rational, refrains from driving rapidly home even though he may feel not only confident but exceptionally confident in his driving ability in such circumstances.

Care in writing is important, and writing up your results is not just

[1] This may strike you as similar to the idea that a gentleman is never unintentionally rude. It is.

a bit of fringe to decorate your great idea. Besides the obvious benefit of helping the reader, clear writing fosters clear thinking. If you have to write an abstract, to decide which results to call propositions, and to label all your tables and diagrams, you will be forced to think about what your paper is all about.

1. Introduction
2. Background
3 Writing, Generally
4 Words and Notation
5 A Paper From Start to End
6 Footnotes and Quotations
7 Tables, Figures, and Numbers
8 Miscellaneous
9 Speaking
10 Listening
11 References on Writing

2 Background

2.1 Motivation. Students generally do not take their papers seriously, which is defeatist, though realistic. MBA and PhD students, if not undergraduates, eventually will be trying to write important reports or articles, and they ought to start practicing.

In writing a paper, think about whether anyone else would want to read it. Other than recreation, here are the reasons people read a paper:

(1) They can cite it in arguing for a position because it pins down a certain fact or logical connection.

(2) It is better written than other papers on the same subject, even though it contains nothing new. As Pascal said, "Let no one say that I have said nothing new... the arrangement of the subject is new. When we play tennis, we both play with the same ball, but one of us places it better." [2]

[2] Blaise

(3) It contains an important idea that readers want to understand.

Most people should not count on reason (3), since it requires that the reader already believe the paper contains an important idea. People read George Stigler's papers because they believe that, but most of us do not have that reputation (nor did the young Stigler). Reason (1) is more important. Even a student can write something citable, and however trivial the cite, it is a useful contribution to the world. A badly written summary of someone else's work, on the other hand, or an original variant on an existing model, may be completely useless.

Especially, do not scorn the small fact. The small fact is the foundation of science, and since it is the kind of contribution anyone can make, experts are less likely to throw away a paper by an unknown which modestly purports to establish a small fact. Of scholars, "It suffices, if many of them be plain, diligent and laborious observers: such, who thought they bring not much knowledge, yet bring their hand, and their eyes incorrupted; such as have not their brains infected by false images, and can honestly assist in the examining and registering what the others represent to their view."[3]

2.2 Thinking. Most people are confused in their everyday conversation and thinking. If you had a transcript of your conversation and your thoughts you would be shocked by their incoherence. That is a big reason to write down your thoughts. Writing helps thinking. It is hard to hold an entire argument in your head at once and even harder to find which part has a flaw. This goes not only for the mathematics but for the explanations. Thus, start writing as soon as you think you have a worthwhile idea.

2.3 The Reader. The reader, like the customer, is always right. That is

Pascal, *Pensees*, translated by W.Trotter, Www.orst.edu/instruct/ph1302/tests/pascal, I-22, (1660/August 18, 1999).

[3]Thomas Sprat probably wrote this around 1700, but I can't find the source. For some purposes, if you cannot verify a citation or a fact you should leave it out. In these aphorisms, however, I am usually quoting because someone has said something well rather than because he is an authority, so the point of the citation is to give credit, not credibility. In view of that, I have decided to keep quotations for which I do not have adequate sources. Please let me know if you find the source of any of them. I'll have a link on my web page for any new citations I find.

not to be taken literally, but it is true in the sense that if the reader has trouble the writer should ask why and not immediately blame the reader's lack of intellect or effort.

Copyeditors are a different matter. Especially at law reviews and scholarly journals, they are often pedantic young college graduates who rely on rulesbut ignore clarity. (In my experience, book copyeditors are much better.) Don't trust them unthinkingly. But please don't shoot the reader; he's doing his best.

At some point in a paper's history, you should write up your results for your reader, not yourself. The first draft is for you and only you but unless the paper ends up in the "cylindrical outbox" it will reach a point where you want other people to read it. So write for them.

This means doing a lot of work that will take up very few lines in the paper– finding a statistic or a cite, or running a test that is mentioned only to say it found nothing interesting. It also means putting figures and tables in the text, not at the end of the paper, using English for variable names rather than Computerese, and cutting out all the propositions that are true and hard but boring.

2.4 Checking for mistakes. In looking for mistakes, spread your effort across all parts of your analysis. Suppose it has five steps. If you have done the first draft efficiently, you have put most of your effort into the hardest steps in such a way as to equate the marginal product of effort across steps. As a result, the likelihood of error in the easiest step, on which you spent very little effort, may be just as great as that of error in the hardest step.

2.5 A Football Metaphor. Don't go charging off at full speed immediately, or you'll confuse the sidelines with the goal lines.[4] Looking where you're running saves time in the end, and prevents head injuries. At the same time, if you don't start, you don't finish.

3 Writing, Generally

[4]Note my use of a contraction here. That is out of place in the formal writing of a journal article, but I use contractions here and there in these aphorisms for euphony and emphasis.

3.1 Effort. Professors and parents may or may not care about how much work you did to write your paper. In the wider world, absolutely nobody cares in the slightest. All they care about are results. Thus, do not include material just to show how hard you worked. A paper with 1 useful regression will be more highly regarded than a paper with the same 1 useful regression plus 10 useless regressions.

Students often think that if they write something down, it has to stay in the paper. If they cut a paragraph from the introduction, maybe they can put it in the conclusion, or the literature review, or an appendix, or, in desperation, as part of the caption of Figure 2. Be prepared to consign that paragraph to the dustbin, to complete annihilation. Any word that cannot justify its existence must die. This is not murder, but justifiable homicide– or perhaps self defense.

3.2 Role Models. When the mathematician Niels Abel was asked how he gained his expertise he said, "By studying the masters and not their pupils."[5] As a model for writing, take the best economists, not the average article you read, and certainly not the average article published: George Stigler, RichardPosner, Paul Milgrom, Jean Tirole, Franklin Fisher, Adam Smith.

To learn how to write good English, read it. George Orwell, Joseph Epstein, C.S. Lewis, David Hume, Thomas Macaulay, Isaac Asimov, Winston Churchill, Jack Vance, and Walter Durant would all be good influences, and one of these surely must have written on a subject that interests you. This is particularly important for those of you who are not native English speakers.

3.3 Reading Aloud. Reading your paper out loud is the best way to catch awkward phrasing and typos. Have someone else proofread the final version for you if you can.

3.4 Revision. Serious papers require many drafts, where 'many' means from five to twenty-five. Coursework does not, but students should be aware of the difference from professional academic standards. A major if seldom noted purpose of graduate training is to teach people

[5] I do not know the source for this quotation.

how to work hard. People don't know how to work hard naturally, and although students think they know what hard work means, most of them are in for a surprise. One of the tribulations of being a professor is that "What is written without effort is read without pleasure."[6] Do not be misled by the free and easy style of good writing. It rarely comes from pure ability without revision.

> "True ease in writing comes from art, not chance,
> As those move easiest who have learn'd to dance.
> 'Tis not enough no harshness gives offense;
> The sound must seem an echo to the sense."[7]

It is useful to set aside a paper for a week or a month before going back to revise it. Not only will you approach it more as a reader would, but also your subconscious will have been working away at it. An economics article, like a poem, is never finished– only abandoned.[8] At some point the author, or rather, some editor, decides it is ready to be set into print. You should, however, be circulating drafts for comment long before that point. If your paper is repeatedly rejected for publication, the bright side is that it will have fifty years of steady improvement before you die.

3.5 Clarity Versus Precision. Clarity and precision are not the same. Usually clarity is preferable. Consider the following opening for a monopoly model:

> "Let output be q"

versus

> "Assume that a firm can produce a nonstochastic, finite quantity of an infinitely divisible good that is uniform in quality. Denote quantity by q, where q is a non-negative real number bounded above by some sufficiently large number $\overline{q}$ and measured in units we need not specify here. "

[6] Quote from Samuel Johnson, but I don't know the source.
[7] Alexander Pope, "Essay on Criticism," Part II, line 162 (1711).
[8] Reportedly said by Auden, but I don't know the source.

The first version is clearer, though the second is more precise.

3.6 Redundancy. A common vice of theorists is this trick of phrasing: "The price is high (low) if the quantity is low (high)." How quickly can you understand that statement compared to, "The price is high if the quantity is low. The price is low, on the other hand, if the quantity is high." Writing for people is different from writing for computers. Redundancy helps real people read faster. That is why I didn't write "Rdnncy hlps pple rd fstr", even though the condensed sentence is precise, unambiguous, and short.

This goes for algebra too. "Suppose that there is a probability β that the plaintiff will go to trial. The defendant's expected cost from turning down the settlement offer is then $(1-\beta)*(0)+\beta(\alpha D+C_d)$. " This algebraic expression is different from and superior to "$\beta(\alpha D+C_d)$" because it explains to the reader that there are two possible outcomes, in one of which the defendant has zero cost and in the other of which he has a cost of $(\alpha D+C_d)$. Algebra is not easier when expressions are boiled down to their shortest versions.

Another example is $\frac{1}{1+\rho_{cb}}$ versus β_{cb} for discount factors. We have enough to think about in the world without having to remember the difference between a discount rate and a discount factor. Interest rates are foremost in our minds, so write $\frac{1}{1+\rho_{cb}}$ and do your comparative statics in terms of the discount rate.

This is a metaphor for writing generally. In these notes, I am saying both "Don't be verbose!" and "Don't be afraid of redundancy if it makes things clearer!" These are not contradictions. You must ask of each word: "Does it help the reader?" Some hurt, some help.[9]

3.7 Verbosity. Keep your signal to noise ratio high. To modify Eleazar ben Azariah,

> "He whose words are more abundant than his data, to what is he like? To a tree whose branches are abundant but whose roots are few, and the wind comes and overturns it, as it is written, *For*

[9] Here you have observed an example of a purposeful and correct violation of the rules of grammar. I thought carefully about inserting an "and" or a semicolon in that sentence.

he shall be like the tamarisk in the desert, and shall not see when good cometh; but shall inhabit the parched places in the wilderness, in a salt land and not inhabited. But he whose data is more abundant than his words, to what is he like? To a tree whose branches are few but whose roots are many, so that even if all the words in the world come and blow against it, it cannot be stirred from its place, as it is written, *He shall be as a tree planted by the waters, and that spreadeth out her roots by the river, and shall not see when heat cometh, but her leaf shall be green; and shall not be careful in the year of drought, neither shall cease from yielding fruit.*[10]

Do not say, "The price controls which were introduced by Nixon." Rather, say, "The price controls Nixon introduced" to avoid a passive and save 38 percent in words. In revising, cut out words that are not doing any work. They are barnacles sticking to the ship and slowing down its progress.[11]

3.8 Novel Formats. To good and brave writers, I offer the suggestion that they think about using unusual formats. Consider writing using dialogues,[12]

[10] *Mishna Perke Aboth* , 3.22. Eleazar is speaking of the evil of wisdom exceeding deeds, but as a Calvinist economist I'd reverse him. The two quotations I have italicized are Jeremiah 17:6 and 17:8. Verse 9 is also pertinent: *The heart is deceitful above all things, and desperately wicked: who can know it?* We must all be careful of bias.

[11] Cutting out useless words is a theme running through most discussions of good writing. Consider what two mathematicians have said. (1) "You know that I write slowly. This is chiefly because I am never satisfied until I have said as much as possible in a few words, and writing briefly takes far more time than writing at length." Gauss, as quoted in G. Simmons, *Calculus Gems*, p. 177, New York: McGraw Hill (1992). (2) "My Revererend Fathers, my letters haven't usually followed so closely or been so long. The small amount of time I've had caused both. I wouldn't have been so long except that I didn't have the leisure to be shorter." ("Mes Reverends Peres, mes Lettres n'avaient pas accoutume de se suivre de si pres, ni d'etre si entendues. Le peu de temps que j'ai eu a ete cause de l'un et de l'autre. Je n'ai fait celle-ci plus longue que parce que je n'ai pas eu le loisir de la faire plus courte.") Blaise Pascal, *Letters Ecrites a un Provincial,* Letter 16, p. 233, Paris: Flammarion, 1981 (first published in 1656).

[12] Kenneth Dau-Schmidt, Michael Alexeev, Robert Heidt, Eric Rasmusen & Jeffrey Stake, "Review Discussion: Game Theory and the Law,' ' *Law and Society Review*, 31: 613-629 (1997); pages 476 to 480 of Eric Rasmusen & Jeffrey Stake, "Lifting the Veil of Ignorance: Personalizing the Marriage Contract," *Indiana Law Journal*, 73: 454-502 (Spring 1998).

parables,[13] aphorisms,[14] hyperlinked web files, allegories, book reviews,[15] letters, Legal briefs, disputations,[16] or the Socratic method.[17] I wouldn't suggest blank verse or stream-of-consciousness, but there are lots of possibilities. For most papers, the straightforward pattern of Introduction-Model-Propositions-Evidence-Implications-Conclusion is best, but think about whether it is best for your particular paper.

4. Words and Notation

4.1 Word Choice.

- "And so forth" is better than "etcetera".
- "I present a theoretical model in which there are two players, each of whom..." is better than "I present a theoretical model where there are two players, each of whom..."
- Avoid "to assert" and "to state". In over 95 percent of the examples I've seen in student papers they are misused. The word "to say" is fine old Anglo-Saxon and closer to what is meant.

4.2 Groups of Related Connecting Words.

And Furthermore, besides, next, moreover, in addition, again, also, similarly, too, finally, second, last.

Therefore Thus, then, in conclusion, consequently, as a result, accordingly, finally, the bottom line is.

[13] See the story at the start of David Hirshleifer & Eric Rasmusen, "Cooperation in a Repeated Prisoner's Dilemma with Ostracism," 12 *Journal of Economic Behavior and Organization* 87-106 (August 1989).

[14] The article you are now reading.

[15] Thomas Macaulay, "Mill on Government," *Edinburgh Review*, (March 1829); Sam Peltzman, "The Handbook of Industrial Organization," *The Journal of Political Economy* (February 1991) 99: 201-217.

[16] Thomas Aquinas, *Summa Theologica*, Www.Newadvent.org/Summa (August 17, 1999).

[17] Plato's *Meno* is a dialog in which Socrates takes a slave boy step by step through a mathematical proof. Classics.mit.edu/Plato/meno.html (August 17, 1999).

But Or, nor, yet, still, however, nevertheless, to the contrary, on the contrary, on the other hand, conversely, although, though, nonetheless.[18]

4.3 Gender-neutered language. Political correctness has had an unfortunate impact on academic writing. In English, " he" and "his" have two uses. One use is when we want to refer to a male. The other is when we want to be bland and not specify gender. It has become common to throw in "she"and "her" erratically for the second use. In reading along, we are thinking, 'no special sex' until we hit "her," when a flag goes up and we think that gender must matter. After that first flag, a second flag goes up, "Ah, this is just an expression of the writer's political correctness," the reader thinking this with satisfaction or with irritation depending on his political views. In either case, the reader is distracted from what is being written, which is bad unless the writer considers working to destroy patriarchy more important than whatever he is writing about.

There are milder forms of political correctness. One is to use "he or she". This has the disadvantage that it is three times as long as "he" and rather distracting to the reader, who wonders why the author is being so verbose. Another, more insidious form is to resort to the third person, and use "they". This sounds more natural, because we often do that in daily conversation when we want to be purposely vague, not knowing what people are doing some particular thing. That vagueness is less desirable in writing,where the singular is generally more desirable because of its extra precision and punch.

4.3 Notation. Think about your notation. "By relieving the brain of all unnecessary work, a good notation sets it free to concentrate on more advanced problems, and, in effect, increases the mental power of the race."[19] Bad notation, on the other hand, irritates readers and provokes them to blunt criticism. "This paper gives wrong solutions to trivial problems. The basic error, however, is not new: if the reviewer has correctly understood the author's undefined notations and misprints, the

[18] This list is based on p. 62 of Mary Munter's 1992 book.

[19] Alfred Whitehead, as quoted in P. Davis and R. Hersh, *The Mathematical Experience*, Boston: Birkhauser (1981).

stress-strain relations used are those once proposed by St.-Venant..."[20]

1. Use conventional notation such as r for the interest rates and p for price.
2. To avoid trouble in seminars, avoid using the same letter in both upper and lower case (e.g. Y for output and y for the log of output).
3. Macroeconomists commonly use a symbol for the logarithm of a variable, but I find this irritating, since it weakens intuition considerably. I would rather see "$Y = M/P$, where Y is output, M is money, and P is price" than "$Y = M - P$, where Y is the logarithm of output, M is the logarithm of the money supply, and P is the logarithm of the price."
4. Be careful about using 1 and 2 as subscripts for anything but time. If you have a static model, though, 1 and 2 may do well for denoting countries or companies.
5. Just because you define your notation once does not mean that the reader is going to remember what μ_{ji2} meant ten pages later. If possible, define all your notation on one page so the reader knows where to flip back to, even if you don't use a particular variable till later. Also, try to use both words and symbols. Don't say "This shows that as μ_{2i} gets bigger, crime falls." Rather, say "This shows that crime falls as μ_{2i}, the second-period return to a particular crime, gets bigger."
6. Don't define notation you're not going to use. Someone might, for example, pretend that their model is more general than it is by saying that agent i has ability a_i and agent j has ability a_j while later assuming that $a_i = a_j = a$. It would be better just to say that all agents have ability a from the start.

4.4 Anecdotes. Data is the plural of anecdote. Anecdotes are highly useful if true. One data point is much better than none, an application of the principal of diminishing returns. More data may add less than you think. More often than we like to believe, our data points are not

[20] Clifford Truesdell, *Mathematical Reviews* 12:561 (1951).

independent, in which case eighty observations may be no better than one. Finding that eighty managers all predict a fall in demand next year has a different meaning sif they all based their opinion on the same article in a trade journal.

Try to find one concrete illustration to carry through the paper, using that illustration to explain the mathematical propositions. "The more abstract the truth is that you would teach, the more you have to seduce the senses to it."[21]

4.5 Jargon. Duangkamol Chartpraser found in experiments that college students rated an author higher in expertise if he wrote badly, and rated him higher the longer they had been in college, even though they also said they liked simpler writing better.[22] "Such labour'd nothings , in so strange a style, Amaze th' unlearn'd, and make the learned smile."[23] You must decide who you want to impress, the learned or the unlearned. On this rests whether you should use "impact" as a verb.

4.6 Acronyms. Do not say "The supra-national government authority (SNGA) will..." and then use SNGA throughout your paper. Say "The supra-national government authority ("the Authority") will..." The use of acronyms is a horrible vice akin to requiring the reader to learn a foreign language. The reader will not bother to learn foreign terms just to read a paper as insignificant as yours. If the term 's length makes using it throughout your paper awkward, the problem is the term, not the number of letters used to represent it. Let the author be warned: when he finds his writing is awkward, that is often a sign his thinking is muddy. Political scientists, take note!

5 A Paper From Start to End

[21]Friedrich Nietzsche, *Beyond Good and Evil*, 4-128, from *Basic Writings of Nietzsche*, translated by Walter Kaufmann, New York: Modern Library, (1968) (*Jenseits von Gut und Bose*, 1886). Just across the page, he writes, "It was subtle of God to learn Greek when he wished to become an author– and not to learn it better" (4-121), a nice observation on the advantage of using a plain style in a popular language rather than, say, the Greek of Sophocles.)

[22]Duangkamol Chartpraser "How Bureaucratic Writing Style Affects Source Credibility," *Journalism Quarterly*, 70: 150-159 (Spring 1993). The article itself is rather poorly written.

[23]Pope, "Essay on Criticism," Part II, line 126.

5.1 Starting. To overcome writer's block, put together an outline in any order of the points you want to make. Then order them. Start writing without worrying about style, and later revise heavily or start over. Starting twice today is better than waiting three months and starting once. It is better, *a fortiori*, than waiting forever.[24]

Pascal said, "The last thing one knows when writing a book is what to put first."[25] Don't write your introduction first. Write it last. Setting it into the context of the literature, motivating the idea, and so forth are for your reader, not for you. Do, however, at some early stage write up the part of your paper which intuitively explains your idea.

5.2 Numbering. Number each page of text so the reader can comment on particular pages. Number each equation in drafts on which you want comments. If you have appropriate software, label each line.

5.3 Title Pages. The title page should always have (1) the date, (2) your address, (3) your phone number, and (4) your e-mail address. You might as well put your fax number and web address down too, if you have them. The date should be the exact date, so that if someone offers you comments, you know what he mean when he says, "On page 5, line 4, you should say...". Save copies of your old drafts for this same reason.

5.4 Abstracts. A paper over five pages long should include a half-page summary of its main point. Depending on your audience, call this an abstract or an executive summary. In general, write your paper so that someone can decide within three minutes whether he wants to read it. Usually, you do not get the benefit of the doubt.

The plaintiff in a lawsuit writes up pleadings which state his complaint and suggested remedy. "John Doe, though driving carefully, hit me with his car and caused $5,000 in damages, which I should collect from him according to Section 103.2 of the Indiana Code." The judge may respond with a "summary judgement": "The Court dismisses the

[24] Depending, of course, on the substance of your paper.

[25] Blaise
Pascal, *Pensees*, translated by W.Trotter, Www.orst.edu/instruct/ph1302/tests/pascal, I-19, (1660/August 18, 1999).

suit because even if what you say about Doe is true, Section 103.2 does not allow damages when the driver was careful." But if the plaintiff does not submit clear pleadings, the judge rejects his suit anyway: "The Court dismisses the suit for lack of a clear legal basis." A paper's abstract and introduction are like the pleadings in a lawsuit. The abstract should present the claims you make to the reader, with the proof to come later. If the claims are too weak, or, worse, if it is unclear what they are, the reader will not bother to go to the second page of the paper.[26]

5.5 Sectioning. It is often useful to divide the paper into short sections using boldface headings, especially if you have trouble making the structure clear to the reader.

5.6 Assumptions and Definitions. On page 163 of his article on writing, William Thomson has an excellent discussion of using examples.

"*When introducing a novel definition, give illustrative examples.* If the definition is a property that an object may or may not have, exhibit:

1. Objects that satisfy the definition;
2. Objects that do not satisfy the definition;
3. Objects that satisfy the definition but almost do not;
4. Objects that do not satisfy the definition but almost do."

Figure 1 and Definition 1 are my versions of Thomson's example. Note the importance of Figure (1.4) in pointing out the part of Definition 1 most likely to be misunderstood.

Definition 1. A function $f : [0,1] \to [0,1]$ is **increasing** if for all x_1 and x_2, if $x_1 < x_2$ then $f(x_1) < f(x_2)$.

[26] In federal courts, if a plaintiff has only ridiculously weak evidence or facetious claims, the judge will fine him under Rule 11 for pleading in bad faith. Something similar, but working through reputation, happens to people who write bad papers.

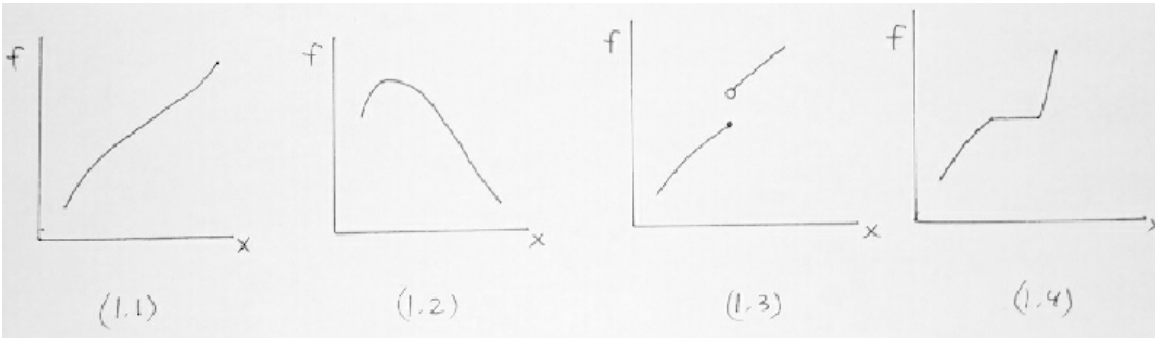

Figure 1: Examples to illustrate Definition 1. Functions (1.1) and (1.3) are increasing; Functions (1.2) and (1.4) are not.

Examples are useful to elucidate not only mathematical definitions but economic policies and laws. You might, for example, suggest a particular anti-merger policy and provide the reader with four examples of mergers that could come under scrutiny.

Thomson also suggest, "State your assumptions in order of decreasing plausibility or generality." Do it in this order for a payoff function: "A1: u_i is continuous; A2: u_i is bounded; A3: u_i is strictly concave."[27] The last assumption, equivalent to risk aversion, is the one with bite, so put it at the end and flag it somewhere for your readers.

5.7 Propositions Technical papers should present their results as *Propositions* (the interesting results, stated in words), *Corollaries* (subsidiary ideas or special cases which flow directly from the propositions), *Lemmas* (points which need to be proved to prove the propositions, but usually have no intrinsic interest), and *Proofs* (why something is true). Lemmas and proofs can be purely mathematical, but propositions and corollaries should be intelligible to someone who flips directly to them when he picks up the paper. That means they must be intelligible to someone who does not know the paper's notation. A reader must be able to decide whether the paper is worth reading just by reading the propositions.

[27] Thomson, p. xxx.

Be content if your paper has one contribution to make– that is one more than usual in economics journals. If you include too many points the reader won't be able to find the best one. Beware of listing numerous results as propositions. Three propositions to an article is plenty; someone who says that everything is interesting says that nothing is interesting.

5.8 The Model. It is best to present the model quickly before pausing to explain the assumptions. That way, the experienced reader can grasp what the model is all about, and all readers can flip back and find the notation in one place. It is reasonable, and even desirable, however, to separate the model from the analysis of equilibrium. Such separation is particularly important for beginners in game theory, who have a wonderously difficult time separating out the rules of the game from the description of the equilibrium– "What could happen" from "What does happen."

5.9 Proof by Example. Often a model's qualitative predictions depend on its parameters, preventing clean propositions. In such a case, consider dropping the general model and using two examples. A general proposition like "Free trade increases conflict if $\alpha > \frac{3\beta^2}{log(\gamma)}$ and reduces it otherwise," really just means "Free trade can either increase or reduce conflict, depending on the parameters." Such a proposition can be proven by laying out two numerical examples, one where free trade increases conflict and one where it reduces conflict. Such a proof is more enlightening than one with pseudo-generality in α, β, and γ.

5.10 Headings. Headings should have what Munter calls "stand-alone sense."[28] Make all headings skimmable. The reader should get some information from each of them. Instead of "Extensions", try "Extensions: Incomplete Information, Three Players, and Risk Aversion."

White space on the page is part of the writing too. This is obvious in tables and figures. Do you feel any temptation to fill up your figures with text in order to save space, as in Figure 2? If you don't, don't feel any compulsion to do so in the tables or text either.

[28] Munter, p.52)

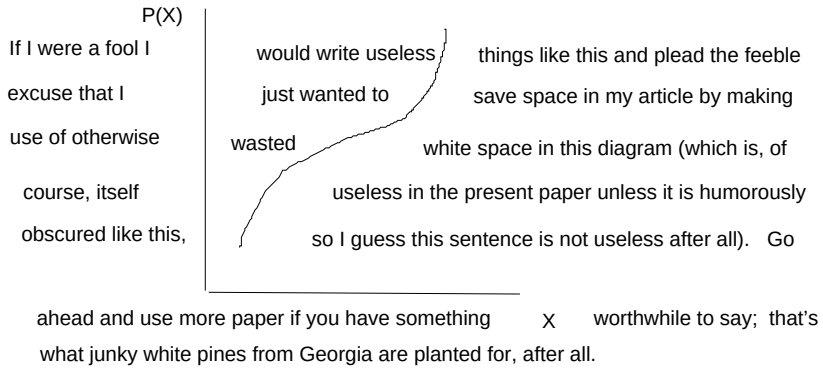

Figure 2: Misusing Your Budget Constraint, Paperwise

5.11 The Conclusion. Do not introduce new facts or ideas in your concluding section. Instead, summarize your findings or suggest future research.

5.12 Appendices. Appendices should be self-contained. If you put the proof of a proposition in an appendix, put a copy of the proposition too, and perhaps even a recap of the notation.

5.13 The Reference List. Even a working paper should have a list of references, and these should be at the very end, after the appendices and diagrams, so the reader can flip to them easily. Law reviews do not publish lists of references, but you should have one anyway for the working paper version, including separately a list of cases and statutes cited. Include a few words of explanation after every case if you want to be especially helpful. Example: *United States v. O'Brien*, 391 U.S. 367 (1968) (upholding the conviction of a draft card burner).

6 Footnotes and Quotations

6.1 Footnotes. Scholarly references to ideas can be in parenthetic form, like (Rasmusen [1988]), instead of in footnotes.[29] Footnotes are suitable for tangential comments, citation of specific facts (e.g., the ratio of inventories to final sales is 2.6), or explanations of technical terms (e.g., Dutch auction).[30] Notes should be footnotes, not endnotes.[31] Every statistic, fact, and quotation that is not common knowledge should be referenced somehow. In deciding whether something is common knowledge, ask, "Would any reader be skeptical of this, and would he know immediately where to look to check it?" Economists are sloppy in this respect, so do not take existing practice as a model.

Try not to have footnote numbers[32] in the middle of a sentence. If a sentence requires two footnotes, as when you say that the populations of Slobovia and Ruritania are 2 million and 24 million, just use one footnote for the two facts. You may even wait until the end of the paragraph if you think the reader will still know which facts are being footnoted.[33]

Footnotes have a quite different purpose in drafts, where they can be used for comments to oneself or to co-authors. I put comments to myself as footnotes starting with xxx, like this.[34] I am eccentric, but this helps me not to forget to add things later at the appropriate places.

6.2 Cites to Books. References to books should usually be specific about which part of the book is relevant. Give the chapter or page number.[35]

[29] Like this: Rasmusen, Eric (1988) "Stock Banks and Mutual Banks." *Journal of Law and Economics*. October 1988, 31: 395-422.

[30] Like this tangential comment. Inventory ratio: 2.62 for 1992-III, *Economic Report of the President, 1993*, Washington: USGPO, 1993. In a Dutch auction, the price begins at a high level and descends gradually until some buyer agrees to buy.

[31] If this were an endnote, I am sure you would not read it.

[32] Like this one. A distraction, wasn't it? Go back up the page again and continue reading.

[33] The Slobovia population figure is from the 1999 *Statistical Abstract of Slobovia*, Boston: Smith Publishing. The Ruritania figure is for 1994, and is from the 1998 *Fun Facts From Fiction*, Bloomington, Indiana: Jones and Sons. In this case, I probably ought to have put the footnote at the end of the sentence containing the populations rather than waiting till the end of the paragraph. I should not, however, have two footnotes interrupting that sentence.

[34] xxx This is just a footnote to myself. Thus, I don't bother to get the ypos out.

[35] Example: "Adam Smith suggests that sales taxes were preferred to income taxes for

Note that I give 1776 as the year of Smith's work, rather than 1952, as the back of the title page of my copy says. The year could tell the reader one of two things: 1. the year the idea was published, or 2. what edition you looked at when you wrote the paper. Usually (1) is much more interesting, but you should also have (2) in the references at the end of the paper so the page numbers are meaningful.

6.3 Citation Format. How to cite old books is a problem. I like the format of: Smith, Adam (1776/1976) *An Inquiry into The Nature and Causes of the Wealth of Nations.* Chicago: University of Chicago Press, 1976. This does not seem quite right for Aristotle, but for moderns like Smith it combines the two functions of saying when the idea originated and how the reader can get a copy with the cited page numbering.

There seems to be consensus in the journals that the reference list should cite Author, Year, Volume, Pages, Journal (or City and Publisher, for a book), and Title. Some journals like to have the month of publication, a good idea because it helps readers find the issue on their bookshelf. Legal style is to list only the first page, not the first and last pages, a bad idea because readers like to know how long the article is.[36]

If you have the author's first name, put it in the citation rather than just using his initial. If, however, he customarily uses a different name, use the name by which he is known. Thus, you should not write "J. Ramseyer," or "M. Ramseyer," or "John Ramseyer," but "J. Mark Ramseyer," for the Japan scholar who goes by the name "Mark".

5.4 Quotations. Long quotations should be indented and single-spaced. Any quotation should have a reference attached as a footnote, and this reference should include the page number, whether it is to an article or a book.

When should you use quotations? The main uses are (a) to show that someone said something, as an authority or an illustration; and (b)

administrative convenience (Smith [1776], p. 383)." Or, "(Smith [1776], 5-2-4)." If you really wish to cite the entire book, then that is okay too: "Smith (1776) combined many ideas from earlier economists in his classic book."

[36] One good style is: Davis, John (1940) "The Argument of an Appeal," *American Bar Association Journal* (December 1940) 26: 895-899.

because someone used especially nice phrasing. Do not use quotations unless the exact words are important If they are and you do quote, give, if you have it, the exact page or section.

7 Tables, Figures, and Numbers

7.1 Highlighting Numbers in Tables. Circle, box, boldface, or underline the important entries in tables. Often you will wish to present the reader with a table of 100 numbers and then focus on 2 of them. Help the reader find those two. Table 1 and 2 show ways to do this.

The title of Table 2 illustrates an exception to three rules of good writing: (1) Use short words instead of long words, (2) Use Anglo-Saxon roots instead of Greek or Latin, and (3) Use unambiguous words rather than words with more than one meaning. I had to decide whether to use "illegitimacy", a long Latinate word with many meanings, or "bastardy" a shorter Anglo-Saxon word with only one meaning. I avoided "bastardy" because it is somewhat archaic and the word "bastard" is most commonly used in slang, so that the reader would be distracted from my subject if I followed the three rules above. But I thought carefully before breaking the rules!

Table 1
Arrest Rates per 100,000 Population

	Under 18	18-20	21-24	25-29	30-34	35-39	40-44	45-49	50+	All ages
1961	1,586	8,183	8,167	6,859	6,473	6,321	5,921	5,384	2,594	3,877
1966	2,485	8,614	7,425	6,057	5,689	5,413	5,161	4,850	2,298	3,908
1971	3,609	11,979	9,664	6,980	6,016	5,759	5,271	4,546	2,011	4,717
1976	3,930	13,057	10,446	7,180	5,656	5,205	4,621	3,824	1,515	4,804
1981	3,631	15,069	11,949	8,663	6,163	5,006	4,176	3,380	1,253	5,033
1985	3,335	15,049	13,054	9,847	7,181	5,313	4,103	3,155	1,088	5,113

Note: Over 50% of arrests are for "public order" offenses (e.g. drunk driving, prostitution), especially for older people. The underlined entries are mentioned in the text.

Source: BJS (1988c), pp. 26-27.

State	Illegitimacy (%)	AFDC ($/month)	Income ($/year)	Urban-ization (%)	Black (%)	Dukakis vote (%)	Unexplained Illeg. (from (??)) (%)
Maine	19.8	125	12,955	36.1	0.3	44.7	2.8
New Hampshire	14.7	140	17,049	56.3	0.6	37.6	2.3
Vermont	18.0	159	12,941	23.2	0.4	48.9	-4.9
Massachusetts	20.9	187	17,456	90.6	4.8	53.2	-6.2
Rhode Island	21.8	156	14,636	92.6	3.8	55.6	-5.2
Connecticut	23.5	166	19,096	92.6	8.2	48.0	2.3
New York	29.7	166	16,036	91.2	16.1	51.6	-3.8
New Jersey	23.5	119	18,615	100	14.4	43.8	6.2
Pennsylvania	25.3	111	14,072	84.8	9.4	50.7	3.4
Ohio	24.9	102	13,326	78.9	11.0	45.0	2.6
Indiana	22.0	84	12,834	68.1	8.4	40.2	4.9
Illinois	28.1	101	15,150	82.5	16.1	49.3	6.7
Michigan	20.4	156	14,094	79.9	14.6	46.4	-14.0
Wisconsin	20.7	160	13,296	66.5	4.8	51.4	-8.5
Minnesota	17.1	171	14,037	66.6	1.6	52.9	-11.0
Iowa	16.2	124	12,475	43.4	1.9	54.7	-3.5
Missouri	23.7	87	13,340	66.0	10.8	48.2	5.9
North Dakota	13.9	125	11,388	38.4	0.5	44.0	-7.2
South Dakota	19.4	94	11,611	29.1	0.3	47.2	6.2
Nebraska	16.8	108	12,773	47.6	3.4	39.8	-0.2
Kansas	17.2	110	13,235	53.4	5.8	44.2	-1.2
Delaware	27.7	99	14,654	65.9	18.9	44.1	2.1
Maryland	31.5	115	16,397	92.9	26.1	48.9	-0.4
DC	59.7	124	17,464	100	68.6	82.6	0.5
Virginia	22.8	97	15,050	72.2	19.0	40.3	-2.1
West Virginia	21.1	80	10,306	36.5	2.9	52.2	2.1
North Carolina	24.9	92	12,259	55.4	22.1	42.0	-6.0
South Carolina	29.0	66	11,102	60.5	30.1	38.5	-5.0
Georgia	28.0	83	12,886	64.8	26.9	40.2	-3.5
Florida	27.5	84	14,338	90.8	14.2	39.1	5.0
Kentucky	20.7	72	11,081	46.1	7.5	44.5	1.4
Tennessee	26.3	54	12,212	67.1	16.3	42.1	5.7
Alabama	26.8	39	11,040	67.5	25.6	40.8	0.5
Mississippi	35.1	39	9612	30.5	35.6	40.1	2.4
Arkansas	24.6	63	10,670	39.7	15.9	43.6	1.3
Louisiana	31.9	55	10,890	69.2	30.6	45.7	-1.4
Oklahoma	20.7	96	10,875	58.8	6.8	42.1	-4.8
Texas	19.0	56	12,777	81.3	11.9	44.0	0.9
Montana	19.4	120	11,264	24.2	0.2	47.9	0.5
Idaho	13.0	95	11,190	20.0	0.4	37.9	-0.6
Wyoming	15.8	117	11,667	29.2	0.8	39.5	-2.3
Colorado	18.9	109	14,110	81.7	3.9	46.9	1.3
New Mexico	29.6	82	10,752	48.9	1.7	48.1	14.0
Arizona	27.2	92	13,017	76.4	2.7	40.0	12.0
Utah	11.1	116	10,564	77.4	0.7	33.8	-14.0
Nevada	16.4	86	14,799	82.6	6.9	41.1	3.2
Washington	20.8	157	14,508	81.6	2.4	50.0	-4.8
Oregon	22.4	123	12,776	67.7	1.6	51.3	1.5
California	27.2	191	16,035	95.7	8.2	48.9	-6.8
Alaska	22.0	226	16,357	41.7	3.4	40.4	-10.0
Hawaii	21.3	134	14,374	76.3	1.8	54.3	1.1
United States	24.5	124	14,107	77.1	12.4	46.6	0

Table 2: The Illegitimacy Data and the Regression Residuals
(Extreme values are boxed. States defined as Southern are boldfaced. Sources and definitions are in footnotes 23 and 25.)

7.2 Summary Statistics. If you do not have hundreds of observations, you should consider showing your reader all of your data, as I did in Table 2. Note that I gave the reader the regression residuals by observation, which reveals outliers that might be driving my results. It is not enough just to show which observations are outliers in the variables– D.C. is an outlier in both the dependent and explanatory variables, but it isn't one in the residual. Regardless of the number of observations, give the reader the summary statistics, as in Table 3.

Variable	Minimum	Mean Across States	Mean (U.S.)	Median	Maximum
Illegitimacy (%)	11.1	23.4	24.5	22	59.7
AFDC ($/month)	39	112	124	109	226
Income ($/year)	9,612	13,440	14,107	13,017	19,096
Urbanization (%)	20.0	64.5	77.1	67.1	100
Black (%)	0.2	10.8	12.4	6.9	68.6
Dukakis vote (%)	33.8	46.0	46.6	44.7	82.6

Table 3: A Summary Table of the Data on Illegitimacy by State

N = 51. The District of Columbia is included. The U.S. mean is the value for the U.S. as a whole, as opposed to the equal-weighted mean of the 51 observations. Sources and definitions are in footnotes 23 and 25.

I did not put the standard deviations in Table 3 even though we usually think of them as the most important feature of a variable after the mean. If a variable has a normal distribution, listing the mean and the variance (or, equivalently, the mean and the standard deviation) makes sense because they are sufficient statistics for the distribution– knowing them, you know the exact shape of it. If the variable does not have a normal distribution, though, it may not be very useful to know the standard deviation, and such is the case in the data above. If the data might be highly skewed, the median may be useful to know, and if the data is bounded, the minimum and maximum are useful. If the

data points are well known, such as states, countries, or years, it may be useful to give the reader that information too. I could have put the states in parentheses in the table above, like this:

Illegitimacy (%)	11.1 (Utah)	23.4	24.5	22	59.7 (D.C.)

7.3 Correlation Matrices. Correlation matrices should be used more often than they are. You will want to look at them yourself while doing your multiple regressions in order to see how the variables are interacting.

	Illegit -imacy	AFDC	Income	Urban- ization	Black	South	Dukakis vote
Illegitimacy	1.00						
AFDC	-.25	1.00					
Income	.18	-.36	1.00				
Urbanization	.24	64.5	-.09	1.00			
Black	.76	-.17	.00	.14	1.00		
South	.48	-.17	-.05	.66	1.00		
Dukakis vote	.18	-.06	.06	.17	.03	.07	1.00

Table 4: A Correlation Matrix of the Variables

(N = 51. The District of Columbia is included. Sources and definitions are in footnotes 23 and 25.)

7.4 Normalizing Data. In empirical work, normalize your variables so the coefficients are easy to read. A set of ratios (.89, .72, .12) can be converted to percentages, (89, 72, 12). Incomes can be converted from (12,000, 14,000, 78,100) to (12, 14, 78.1), making the units "thousands of dollars per year" instead of "dollars per year" and making the coefficient on that variable .54 instead of .0054. Z-scores, the variables minus their means divided by their standard deviations, may be appropriate for numbers without meaningful natural units, such as IQ scores or job satisfaction.

If you do decide to write a full number such as "12,345," it helps to put the comma in to separate out thousands. Leave out meaningless

decimal places. 15,260 is better than 15260.0. In fact, if you are talking about incomes, there is a case to be made for using 15 instead, and measuring in thousands of dollars. That discards information, to be sure, but the number is simpler to work with, and if the data measurement error has, say, a standard deviation of 3,000, the loss in information is small.

Note that I said "data measurement error," not "the size of the disturbances". We often forget that there is measurement error in the data even before we start doing regressions with it and adding disturbances to represent specification error, omitted variables, and so forth. Remember the story of the man who was asked how old a certain river was and said "That river is 3,000,021 years old." When asked how he knew that precise number, he said, "Well, I read in a book that it was 3 million years old, and the book is 21 years old."[37]

7.5 Variable Names. There is no need to use peculiar code names for variables. "Density" is a much better name than the unpronounceable and mysterious "POPSQMI."

Use words as well as numbers, or instead of them. Say "Because of the differentiability assumption (A2)...," not "Because of (A2)..." As William Thomson says on p. 161 of his article, "The argument that numbers and abbreviations save space is not very convincing given that they will not shorten a 20-page paper by more than five lines, and they certainly will not save time for your reader."

7.6 Table Location. Always refer to tables in the text. Otherwise, the table is like a paragraph that has no link to the paragraphs before and after it. Put tables and figures in the text, not at the end of the paper. Journals often ask authors to put tables and figures at the end for ease in processing manuscripts but don't do it till the paper is accepted. The common practice of putting them at the end in working papers is a good example of the author being lazy at the expense of his readers.

[37] The story is from Chapter 3, "Specious Accuracy," pp. 62-69 of Oskar Morgenstern, *On the Accuracy of Economic Observations*, 2nd edition, Princeton, Princeton University Press (1963) (1st edition, 1950.) Note the precedent of a theorist criticizing econometrics–and considering it important.

7.7 Table Titles. Give useful titles to every table and every diagram. Do not label a table as "Table 3." Say, "Table 3: Growth in Output Relative to Government Expenditure." (When you refer to the table in the text, though, you can just refer to "Table 3," since it will be apparent from the context what the table is about.) Also don't title a table "Regression Results" or "Summary Statistics." Those are useless names– anybody can look at a table and tell it is regression results or summary statistics. "Executive Pay Regressions" and "Executive Pay Summary Statistics" are better names.

7.8 Diagram Axes. In diagrams, use words to label the axes, not just symbols. Say: "X, the education level," not just "X".

7.9 Econometrics. It is good to present several specifications for a regression, but pick your favorite specification and use it as your base. Discuss it in detail, and only say what happens in other specifications for comparison with the base regression, because your reader will find one regression hard enough to understand. You might use $y = \beta x + \gamma z$ as your base, for example, because it represents your theory best, but then present (1) $y = \beta log(x) + \gamma log(z)$; (2) $y = \beta x + \gamma z$, but excluding 10 outlier observations; and (3) $y = \beta x$. That way you have done three robustness checks, which together span three dimensions of specification space.

If you report the F-statistic, the Aikake Information Criterion, or anything else, do it for a reason. Don't report it just because your fancy regression program spewed it out. A common example of a useless statistic is the F-statistic for the test that all the coefficients in a regression equal zero. The reader can deduce for himself that if you bothered to report the estimated coefficients in your paper, it must be that the results were not complete garbage.

Here is a sample of how you might report a regression result:

A simple regression of illegitimacy on AFDC and a constant yields the following relationship:

$$\begin{array}{lll} Illegitimacy & = 26.91 & -\mathbf{0.034} * \mathbf{AFDC}, \\ & (3.05) & (\mathbf{0.026}) \end{array} \tag{1}$$

(standard errors in parentheses) with $R^2 = .03$. Equation (1) implies that high AFDC payments reduce the illegitimacy rate, but this is, of course, misleading because the simple regression leaves out important variables. Regression (2) more appropriately controls for a variety of things which might affect the illegitimacy rate:

$$\begin{array}{llll} Illegitimacy & = 15.74 & \mathbf{+0.016 * AFDC} & -0.00011 * Income \quad +0.024 * Urbanization \\ & (3.65) & (\mathbf{0.021}) & (0.00042) \qquad\qquad (0.033) \\ & -1.60 * South & +0.56 * Black, & \\ & (1.71) & (0.06) & \end{array} \tag{2}$$

with $R^2 = 0.79$. Equation (2) would leave us with the conclusion that AFDC payments have almost no effect on the illegitimacy rate. Nor, surprisingly, do any of the other variables except race have large or significant coefficients. The coefficients are small enough, in fact, that one might doubt whether increasing the size of the dataset would change the conclusions: the variables are insignificant not because of large standard errors, but because of small coefficients.

8 Miscellaneous

8.1 Backups. Xerox your paper before you give it to anyone, or, better yet, retain two copies on disk, in separate locations for fear of fire.

8.2 Computers. For each paper, have a separate directory with a short name– fore example, STIGMA. Then have the following subdirectories:_Literature, _Comments, _Letters, _Old,_Figures, _Old.Drafts. Also creat a file called AaChronology.stigma that has the dates different things happen–you begin, you circulate a draft, you send to a journal, etc. Each time you present the paper or submit it, create a new subdirectory, e.g.,_JPE, _ALEA.97. The subdirectories should all start with "_" so that they are together, not mixed in with the various uncategorized or active files in the main directory.

8.3 The Net. Email and the Net are increasingly important. Plain-text ASCII— the letters you type in from the regular typewriter keys— is the only universally readable type of file. Don't expect people to tussle

with Wordperfect, Postscript, or other specialized formats. Just because everybody at Podunk University uses Wordperfect doesn't mean everyone in the world does. Most people should rather have something readable, even if it loses all the equations, tables, and figures, than something which would be beautiful if they could read it, but they can't. (Admittedly, foolish people and business students are exceptions, who are happier with nothing than with something messy. Those people must be denied anything but hardcopy of final drafts.) Transmitting non-ASCII files by email can be done, with various coding programs, but do not expect it to work. The same goes for posting on the Net. One approach is to post both an ASCII version and a Postscript or other special version, so that everybody can read something and some people can read everything in your paper. A packager such as Adobe Acrobat is also useful. Acrobat creates a pdf file which is easily transferred across the Net and can be read with a public-domain reader that people can download at the same time as they download the pdf file.

Instead of emailing papers as attachments, post them to the Web and email the websites. That way you do not clog up email inboxes.

Always include the web address and your email address on any web page you create, including pages for your papers.

8.4 Referees. In dealing with journals, remember that ordinarily the editor, and even the referee, is much smarter than you are. They often get things wrong, but that is because they are in a hurry or feel obligated to give objective reasons for rejecting a paper when the real reason is that it is trivial or boring. If a referee has given some thought to the paper, he is probably correct when he suggests changes. Suggesting changes is a sign that he has given some thought to his report. Referees who have just skimmed the paper usually do not suggest any changes. Whether he suggests changes is also a way to distinguish the Big Problem from the Fatal Flaw.

8.5 Copyright. Many journals have unscholarly policies of requiring authors to give away the copyright and all their rights. Unless an exception is written in, this means that the author cannot legally xerox his

own article![38] The journal then charges well above the monopoly price for use of the article in class packets. Scholars should resist this even though journals, while insisting on obtaining the authority to sue authors who disseminate their writings, seem unlikely to carry out their threats. All that a journal really needs is a non-exclusive license to publish the article.

It is hard to turn down an article acceptance, but I have pulled out from submitting articles to journals of this sort (e.g., *Management Science*, *JEMS*), and I am reluctant to referee for them without being paid. I encourage other people to refuse to referee for such journals. Most of us referee only from a sense of public duty, a duty we do not owe to journals that try to suppress dissemination of research.

9 Speaking

9.1 Empathy. Sympathize with your audience. Put yourself in their place.

9.2 Purpose. When I was a student at MIT, Peter Temin told us that presentations have three purposes: (1) to tell something to people, (2) to get comments, and (3) to impress the audience. Purpose (3) is perfectly appropriate to a job talk, but it tends to conflict with purposes (1) and (2).

Get your meaning across first. Only then should you defend your assumptions.

9.3 Starting. Write out the introduction word for word. This will help you get over the nervousness of starting to talk.

9.4 Notes. Munter (1992, p. 107) suggests the following if you use notes:

1. Use large print.

[38] It probably also means the journal has the legal right to publish or republish the article under someone else's name, or to cut out half the article and publish the rest. The only limitations would be that the publication cannot ruin the author's reputation, and, perhaps, that his consideration for signing away his rights was that he hoped to have his name on the publication. Copyright ownership is not a small thing.

2. Leave a margin of one-third of the page on the right for last-minute notes.
3. Do not break a paragraph between two pages.
4. Do not staple the notes; it is better to slide pages to one side.
5. For a talk in which exact phrases are important enough that you will actually read your notes verbatim, or if you have to read them because your command of the seminar language is poor, leave the bottom third of the page blank so your head does not go down as you read.
6. An addition I will make to Munter's points is that you should circle quotations or numbers that you will need to read exactly, so they are not lost in the middle of words that you do not need to read.

9.5 The Outline. Use the blackboard or a transparency to outline your talk before you start. Do not write this on the board before you start. Instead, write a short outline as you are concluding the introduction. For example, you might write

1. Intro
2. The bargaining problem.
3. Nash solution.
4. Many periods.
5. Incomplete info.

Then check off sections as you finish them.

9.6 Feedback. In the Preface to the *General Theory*, Keynes wrote, "It is astonishing what foolish things one can temporarily believe if one thinks too long alone, particularly in economics..." [39] Sometimes even the act of trying to explain an idea (your own or another's) can show you the folly of what you thought you knew. This can even be true when you are trying to explain the idea to yourself. At about the same

[39] John Maynard Keynes, *The General Theory of Employment, Interest, and Money*, Preface , p. vii, New York: Harcourt, Brace & World, 1964 (1936).

time and place as Keynes, Ludwig Wittgenstein was writing, "Wovon man nicht sprechen kann, daruber muss man schweigen."[40]

9.7 Questions. Answering questions is more important than reaching the end of your talk. If you rush the talk, few people will understand the last part anyway. Think of the talk as a gathering of people to discuss your work for 90 minutes, not as a gathering of people to hear you read 33 pages of an article.

Look out to the audience to see if anyone has a question, or, if you are too busy writing, pause and ask for questions occasionally. Mary Munter says that if you can remember what people looked like after your talk, you had good eye contact.[41]

Invite questions along the way. If the audience must wait until the end they will be reluctant to raise questions that were relevant earlier, and disagreements will take the form of long speeches instead of short questions. Asking for questions is also a good way to show you have reached the end of a section of your talk.

Don't be embarassed to defer a question, but make a note on the board (the questioner's name or the topic) to come back to it, and tell the questioner to remind you later if you forget.

A very very common problem is that a young economist presents a model in such a way that nobody understands even the slightest thing about it. If the audience does not grasp the notation, the theorems are irrelevant. If they do not convey the model, whether you can defend it or not is irrelevant.

Obfuscation does prevent embarassing criticism, of course, but it is no more effective than standing up and saying "goo-goo-goo" for

[40] "Whereof one cannot speak, one must be silent") Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, Section 7.000, London: Routledge and Kegan Paul, (1974) (*Logisch-Philosophische Abhandlung* in *Annalen der Naturalphilosophie*, 1921). Usually, I would quote the English translation and put the German in footnotes (if I included it at all). Here, the quotation was short and famous, and ended a sentence in a choppy format so that the reader's progress would not be inappropriately disrupted. I therefore reversed the order for dramatic effect.

[41] Munte, p. 147. Or, it might just be you were seriously traumatized.

ninety minutes. Joe Sixpack may think your babbling means you're saying something profound; scholars will just think you're feeble-minded. Someone who with clarity lays out an interesting idea that crumbles under repeated and varied attacks will leave a far more favorable impression. Partly this is for the same reason that lions like Christians in the arena, but partly it is because the audience has actually learned something. "It is more important that a proposition be interesting than that it be true. This statement is almost a tautology. For the energy of operation of a proposition in an occasion of experience is its interest and is its importance. But of course a true proposition is more apt to be interesting than a false one."[42]

9.8 Excuses. When someone asks you, "Why did you make Assumption X?" do not answer, "Because that's standard in the literature." The implication is that you are a numbskull who blindly follows other people's mistakes, that you are proud of having a lemming's IQ, and that you don't even know the standard lame excuses for Assumption X. It is, however, acceptable to say that X is standard after you give a substantive explanation, so that the questioner knows that you are not doing odd things just because of an artistic temperament.

9.9 Handouts. Handouts are useful for tables, figures, equations, notation, technical definitions, abstracts, and statements of propositions. The length should be one to three pages, no more. Unless your audience has the entire paper, you should distribute at least a one page handout. This is particularly important in a Chicago-style seminar, since you may not get to your main point, and it must be on the handout for the audience to learn it. Handouts are also useful as doodling paper. Don't just use pass out handouts identical to your overheads. Think first. Handouts should have a higher idea to paper ratio.

9.10 Notation. If your paper is technical, write up the notation on a handout or put it on the board and do not erase it. This is crucial, unless you have a handout with the notation. Put extra handouts near the door, so that latecomers can pick them up as they come in.

[42] Alfred Whitehead, as quoted in W.H. Auden and L. Kronenberger, *The Viking Book of Aphorisms*, New York: Viking Press (1966).

9.11 Proofs. If your paper is technical, you should keep in mind that your propositions are probably more important than your proofs. Usually, the audience is completely uninterested in the proofs. This is not always true– sometimes the whole point of an article is the new way that you prove an old theorem– but spending two-thirds of a theory seminar going through your proofs is like spending two-thirds of an empirical seminar going through how you collected and cleaned the data. In both cases, the speaker will actually get much benefit from being forced to think systematically about the least glamorous parts of his paper, but think twice before inflicting this on the audience unless you are paying them to listen. (This kind of exercise is better suited to a "solitary seminar" in which you prepare and give a talk to an empty seminar room late at night just to clarify your own thinking.)

9.12 Diagrams. Label all axes on diagrams you draw on the board.

9.13 Electrical equipment. If you are using electrical equipment such an overhead projector, test it before the talk starts. If you are talking as a guest of someone else, be sure and tell them well in advance if you need a room with a screen. Have a backup plan for if the equipment fails entirely. This goes double for computer equipment, unless you bring your own along.

9.14 Overhead slides. Use boldface on overheads, especially for numbers. Circle important numbers with a red marker. Use lots of color, for interest, putting boxes around propositions and underlining key terms. In preparing slides, it is fine to use either computer-printed slides (if the font is large enough) or to write them by hand. I most often print out the slides in black ink and then write on them in color with a water-soluble marker. I use a penny to scratch out typos in the printing, and I have an oil-base marker to correct the typos.

9.15 Equation Numbers on Overheads. Should equation numbers match between the paper and the overheads? Matching them might require some extra work, depending on the word processor. Here are some acceptable alternatives:

1. Let the numbers be inconsistent, but point this out to your audience.

2. Make all the numbers consistent.
3. Use a marker to cross out the typeset inconsistent numbers and put in the numbers in the paper.
4. Leave all the numbers off of the overheads. (But then the audience cannot ask about specific equations, unless you write some of them back in with a marker, or write in some marks like *, **, and ***.)

9.16 Visibility. Test visibility if you have time. Can people at the back of the room read your overheads and the blackboard? Remember to keep overheads high up if the heads of people in front will block the lower part of the screen, as often happens at conferences.

9.17 Redundancy. Remember that people blank out frequently when listening. This means the speaker ought to occasionally summarize what he has done, and structure his talk so that if a listener misses any single thirty-second block he can catch up again later.

9.18 Calculations. Write down all calculations in your notes. At the board it is hard to remember even that $7(19) = 133$. If you perform a series of, say, ten arithmetic operations, a mistake is likely, and finding it will take as long as the first try on all ten operations combined.

9.19 The length of a seminar. As an economist, keep budget constraints in mind and don't grumble about not having enough time. Any paper can be presented in any length of time, just as any idea can be written up in any number of pages. This does not mean that you should use up all the available time, though, just as it is counterproductive for a slaveowner to work his slaves for 18 hours a day even though he may be legally entitled to do so. (A reminder: the slave analog is not you, but the listener.)

Students generally are very bad at delivering papers. Even though seminars often run an hour and a half, students are well-advised to schedule them for an hour. More people will attend, and often the comments received in the first hour make the last third of the paper irrelevant anyway.

9.20 My audience for these notes. Much of my advice is directed to speakers with boring topics and poor delivery. That is because most seminars

are given by speakers with boring topics and poor delivery. Don't take it personally.

9.21 Suspense. Don't rely on suspense, or delay announcing your main results until the end. After an hour, people usually stop listening anyway, and if your idea is worth spending time on, it is complex enough that people will need to hear the idea at the beginning to understand it by the end. Also, experienced economists often can figure out the middle of your argument by themselves better than a novice can explain it, once they have heard the assumptions and the conclusions. Without the conclusions, though, it's harder to make sense of why particular assumptions were chosen.

9.22 The option value of time. The speaker who only looks at his watch after an hour and then speeds up to cram everything into his time slot is a fool. Look at your watch early, and you will be able to *choose* which parts to rush through. Do not think, "I have an hour left, so I have plenty of time." Many a seminar–especially many a student seminar–is severely behind after the first half hour.

9.23 Towards the end. Towards the end, say things like "My final result is..." to give hope to your fading audience and stimulate them to a final effort to stay awake. And do not disappoint them.

9.24 Closing remarks. If the host asks if you have any closing remarks, that usually means you should have finished five minutes ago. He does not really want closing remarks; he wants you to stop. Your reply should be either (1) "No, I do not have any closing remarks. Thank you," or (2) Three sentences summarizing the main results; or (3) a closing joke.

9.25 The punchline. The composer of a musical has failed unless the audience leaves humming a tune. The same goes for you. Make them leave with a conclusion that they can't get out of their heads for the whole rest of the day.

9.26 Finish on time. Martin Luther said, "There are three things, so to speak, which every good preacher should do: First, he takes his place; second, he opens his mouth and says something; third, he knows when

to stop."[43] The first rule of speaking is to finish on time! Perhaps I should rephrase that:

FINISH ON TIME!!!

In your notes, mark certain paragraphs or sections to be dropped if you run out of time. Do not run late unless you sense that your talk is extraordinarily interesting to the people who matter.

Put more pungently: "When you strike 'ile', stop boring; many a man has bored clean through and let the 'ile' run out through the bottom."[44]Running late stimulates much more hostility than saying stupid things. Ending early is quite acceptable. People do not really say, "The food here is inedible, and, besides, the portions are so small."

10 Listening

10.1 Notation. Write down the notation.

10.2 The first question. Do not be afraid to ask the first question. In fact, try to ask it, to break the ice. Ask even if it isn't such a good question. Hold back only if you are a guest at an unfamiliar workshop, where boring, questionless, presentations may be the social custom.

10.3 Discussion. Discussion is usually the point of a seminar. Without questions, reading the paper almost always dominates listening to an oral presentation. If questions are not asked along the way, then (a) the audience gets confused, (b) the speaker gets away with incorrect or controversial assertions, (c) it is hard to make small comments of the kind useful to the speaker, and (d) when questions are asked, at the end, they tend to be irrelevant, and turn into general, solipsistic, speeches. In the humanities, this is what usually happens.

[43]Martin Luther, *Luther's Works, Volume 21, The Sermon on the Mount*, p. 7, translated by Jaroslav Pelikan, St. Louis: Concordia Publishing House (1956).

[44]Josh Billings, As quoted on p. 80 of Francis Wellman, *The Art of Cross Examination*, 4th edition, New York: The Macmillan Company (1936, 1st edition1903).

10.4 Notes. Write notes on the seminar paper (literally) if you have a copy, so you will not lose them later, and to make filing easier.

10.5 Comments. During the seminar, write down comments to give the speaker afterwards. This is especially useful if (a) your question would be too distracting because it is off the current topic, (b) too many other questions are being asked for you to get a chance to ask your question, or (c) the custom is not to ask questions, and you are bursting with frustration. Speakers are very appreciative about written comments, and you have nothing better to do.

10.6 Doodling. In my opinion, doodling is perfectly appropriate, and a good use of your time, though Hahnlike drawings are acceptable only if Hahn does them.[45] Knitting, whittling, etc. will be seen as peculiar, but can be socially useful.

10.7 Leaving early. It is often customary to let the speaker know beforehand if you must leave early. This can be presumptuous. I've sometimes thought to myself, "Why should I care if this person leaves early? He's not important enough for me to feel insulted even if I knew his motive was boredom." If you think the speaker has special concern for your opinions, though, you should certainly let him know if you must leave early.

10.8 Board typos. Ignore spelling errors the speaker makes at the blackboard, but instantly point out mathematical typos. You need not raise your hand for this kind of comment.

10.9 Helpful questions. If you realize that other people are confused and do not understand something, ask their question for them.

10.10 Long questions. Keep your questions as short as you can. Sometimes people feel obligated to state their question three times, to show what an important question it is. ("Could inflation be the cause? It seems like inflation might be the cause. So do you think inflation might be the cause? Inflation does seem important.") Resist this.

[45] One person drawing naked women during seminars is interestingly eccentric. Thirty of them is a bore.

10.11 Questions about assumptions. Don't object to a model's assumption simply as being unrealistic or too simple. Those are not valid objections. What is a valid objection is that the assumption leads to a false conclusion about the way the world works. For example, suppose that someone is presenting a general equilibrium model with two goods to show that if a change in tastes increases production of one good, it must decrease production of other goods in the economy. It is a valid objection to question whether that conclusion would also be true in a three-good economy. It would be best to ask the question with some hint of why you think it might make a difference, saying, for example, "It seems to me that if you had three goods, then when demand for good 1 increased, production of good 2 would also increase, if it were a complement. Isn't your model oversimplified, since complements are impossible in a 2-good economy?" If, on the other hand, the speaker uses a 3-good economy to show that if demand for one good rises, output of the two other goods might or might not fall, then objecting to the model limiting itself to 3 goods is not valid. To be sure, three is an unrealistically small number, but that is unimportant. A model with 4 or N goods would be unnecessarily complicated for the point being made.

10.12 Answers. It is quite proper to point out that the speaker did not answer your question. In academic discussions, this is usually because the speaker did not understand your question. If he is being purposely evasive, fry him. This does not usually happen in academic seminars.

10.13 References. It is often helpful if someone brings a *Statistical Abstract* or an *Economic Report of the President* to a seminar, to look up the odd fact.

10.14 Laser pointers. If you have a laser pointer, bring it along. You can use it to ask questions, pointing to the overhead or blackboard tables and equations.

10.15 Pacing. Pace yourself. If you are too tired, you will get nothing out of sitting through a seminar. Don't bother to go unless politeness demands it. At conferences, the problem is usually not sleepiness, but burnout. Plan to skip some good sessions, and force yourself to rest.

10.16 Language. Listening does not consist in thinking that the other person is saying sweet nothings. That indeed is much of small talk, but not scholarly discourse. Statements are either true, false, or meaningless, with minor Godelian exceptions. This is true objectively (using a logical system) or to you personally (using your own limited brainpower). Figure out the category of each statement you hear. If the statement is false or meaningless, you may wish to ask a question.[46]

[46] Another function of language is to convey an impression, and for this, statements with no literal meaning can still have meaning. I say, "How are you?", and might mean, "You are a worthwhile human being and I care about your welfare," or "I see you standing there." This function is unimportant in scholarly writing, however.

11 References on Writing

Any scholar who uses econometrics has more than one econometrics text in his office, even though all econometrics texts cover essentially the same material. Should the same be true for scholars who use writing?[47] Here are some suggestions for further reading.

Basil Blackwell, *Guide for Authors.* Oxford: Basil Blackwell (1985). A fine style guide by the publishers of the present article.

Bower et al., "Protocol, Etiquette, and Responsibilities of Reviewers in Finance," *Financial Practice and Education* (Fall/Winter 1994) pp. 18-24. How to write referee reports.

Davis, John,] "The Argument of an Appeal," *American Bar Association Journal* (December 1940) 26: 895-899. Appellate argument in the 1920's turns out to be very similar to economics seminars in the 1990's.

Epstein, Richard, "The Struggle Between Author and Editor over Control of the Text: Faculty-Edited Law Journals," *IIT Chicago-Kent Law Review*, 70: 87-94 (1994). Law reviews are a special kind of research outlet that more economists should learn about.

Fowler, Henry, *A Dictionary of Modern English Usage,* Second Edition. New York: Oxford University Press, 1965. This is a classic, though I find its format not as useful as other style guides. A book similar in outlook but more systematic is Ernest Gowers, *The Complete Plain Words*, London: Her Majesty's Stationery Office, 1954.

Graves, Robert & Alan Hodge, *The Reader Over Your Shoulder,* New York: The Macmillan Company, 1944. A book chock-full of real examples with discussion of how they should have been written. Of particular interest is the over 100 pages of word-by-word criticism of eminent writers (which Liddell Hart suggested they subtitle "A Short Cut to Unpopularity") in which the authors go after such excellent writers as T.S. Eliot, Ernest Hemingway, John Maynard Keynes, Bertrand

[47] Maybe not. Just memorize my article and forget about my competitors.

Russell, and George Bernard Shaw, an excellent reminder to us that no writer is so good that he can't improve.

Halmos, Paul , "How to Write Mathematics," *L'Enseignement Mathematique*, 16: 123-152 (May/June 1970). Halmos was a prominent mathematician who cared deeply about writing.

Harman, Eleanor, "Hints on Poofreading," *Scholarly Publishing*, 6: 151-157 (January 1975). Not only this article, but the trade journal in which it appeared is good reading.

Leamer, Edward, "Let's Take the Con out of Econometrics?" *American Economic Review*, 73: 31-43 (March 1983). This is about econometrics, not writing, but Leamer's concern is ultimately the same: communicating ideas.

McCloskey, Donald, "Economical Writing," *Economic Inquiry*, 24: 187-222 (April 1985). Every economist should read this useful and entertaining article, later expanded into book form,

Munter, Mary, *Guide to Managerial Communication,* 3rd edition, Englewood Cliffs, N. J.: Prentice-Hall (1992). This book is oriented towards business writing and presentation.

Posner, Richard, "Goodbye to the Bluebook," *University of Chicago Law Review*, 53: 1343-1352 (Fall 1986). The Bluebook is the standard law review guide to citation style, published by the students at the top law reviews. The University of Chicago has tried to reform legal citation in the direction of clarity and simplicity.

Rasmusen, Eric, *Games and Information*, Second Edition. Oxford: Blackwell Publishers (1994). Third edition, forthcoming. See the preface and introduction especially.

Sonnenschein, Hugo & Dorothy Hodges, "Manual for Econometrica Authors," *Econometrica*, 48: 1073-1081 (July 1980). This is more about mechanics than anything else, but we all need to worry about mechanics too.

Stigler, George, "The Conference Handbook," *Journal of Political Economy*, 85: 441-443 (April 1977). This is humor, possibly with deep meaning (there really *are* questions that apply to every paper).

Strunk, William & E. White, *The Elements of Style.* New York: Macmillan (1959). The classic; good writing hasn't changed. Attitudes have though, so be sure you get the third edition, not the 1999 fourth edition. In general, avoid writing guides written after 1985; in recent years, English departments have decided that the politics of feminism, race, and class warfare are more important than clarity and beauty, with predictable results for how they teach writing.

Thomson, William, "The Young Person's Guide to Writing Economic Theory," *Journal of Economic Literature*, 37: 157-187 (March 1999). Good for tips on how to write up mathematics, in a style very similar to my article here.

Tufte, Edward, *The Visual Display of Quantitative Information.* Cheshire, Conn.: Graphics Press (1983). A delightful book about graphs and charts, which is as good a coffee-table book as a guide to one's own writing.

Tullock, Gordon, "Does Mathematics Aid in the Progress of Economics?" pp. 201-214, *On the Trail of Homo Economicus: Essays by Gordon Tullock*, eds. Gordon Brady and Robert Tollison, Fairfax: George Mason University Press (1994). Useful hostility for those of us who use algebraic notation.

Weiner , E. , *The Oxford Guide to the English Language.* Oxford: Oxford University Press (1984). Older style guides such as this are more likely to be correct, given the current popularity of political correctness and gender-neutered language among literature professors.