Help with Methods

First – taking 1 or 2 three-hour grad courses in statistics or semiotics or ethnomethodology does not make you a statistician or a semiotician. That comes with practice. It means that with the help of your committee you should be able to do a publishable study. Elaine Hsieh, my wife had 5 graduate level quant methods classes at the University of Illinois including doctoral level seminars in multivariate analysis and meta-analysis and still she does not consider herself a statistician (though she is very good). Still she asks others to review her work. I have had lots of stats as a sociology undergrad and masters student and again as a Ph.D. student in telecommunications. But I am not a statistician. So realize that both quantitative and qualitative approaches have long traditions and there is much to learn. But this should not be intimidating. Rather what I mean to say is, be realistic and have patience with yourself. Getting a Ph.D. is like getting a black belt in martial arts. It means after 2 or 3 years of going to classes 3 or more times a week you have gotten some basics down, you are finally stretched out, and now you can really begin. Becoming a researcher is not easier than learning martial arts.

All of my students have heard me proclaim that you can never have too many tools… too much expertise in methods. The bigger the toolbox the better an investigator you will be. Tools are your channels for learning. The more you learn about methods the more you will understand the strengths and weaknesses of each one as compared to others.

Encouragement with Common Quantitative Approaches

Remember, stats is all about using a sample of a larger population to make inferences about that larger population. Stats is creating a little virtual picture, like a map, of a much larger actual population. You cannot observe every person. Stats enables estimates based on manageable sample sizes. Sometimes reading a different explanation of the same thing you are covering in class can help. And practice makes perfect. To help students I have vetted and suggest these widely used FREE online statistics texts.

1) 2013 is the International Year of Statistics. There is a fantastic website called Statistics 2013 Organization at:

http://www.statistics2013.org/

And within this is a page filled with links to great instructional material. Tons of it. Go to:

http://www.statistics2013.org/primary-secondary-school-teacher-resources/

2) Another free source is: OpenIntro Statistics…. http://www.openintro.org/stat/

3) A third free stat text is: Online Statistics Education…. http://onlinestatbook.com/

The second (OpenIntro) has been used for quite a while here at OU in several departments and especially in our Advanced Programs courses.

The third (OSE) is solid and if you write to David Lane (http://www.ruf.rice.edu/~lane/) in the Psych Stats Department at Rice University, he will send the instructor's text to you so you can check your answers. In my experience, he is amazingly prompt.

4) Another fun quantitative resource is Teaching With Data. They have a Facebook page packed with great stuff.
https://www.facebook.com/pages/TeachingWithDataorg/156573044375638

More Specific Suggestions
Let's peek at first principles first. The x y axis was introduced back in the 1300's by Bishop Orseme in his *Tractatus de configurationibus qualitatum et motuum*. He and others such as Roger Bacon before him were rehabilitating Aristotle and later Rene Descartes would base his co-ordinate system on Orseme's two-dimensional structure. Orseme called the y axis "latitudo" and time "longitudo." Which is which? Old trick, "x is left" "y to the sky." Orseme and others understood that one does not measure measures but one measures qualities. Quantification is a translation process allowing subjective perceptions to become available for logico-mathematical manipulation. Remember variables are factors that affect things including each other (other measures) like smoking and longevity. Variables are measures of factors that vary. For instance, does making more money increase happiness? Randomness is the background against which we compare our observed data. Fit is how much our observations match the pattern that pure randomness would create. The more your observations deviate from random chance, the more interesting they are. The next question is why.

Sampling will determine the quality of your results – valid generalizability. Garbage in/garbage out. You might want to skip to the last page and read about how the vast majority of social psychology studies published use college students as their subjects and how expanding global research is now showing that this sub-sub population is statistically anomalous (outliers) – not representative of the species at large. So there's lots of opportunity for expanding research to other populations.

Let's get started.

If you need to collapse or consolidate variables into clusters based on common factors influencing responses (very high correlations) I suggest you look at
http://www.stat-help.com/factor.pdf
for **factor analysis**. It does a solid job explaining both exploratory and confirmatory factor analysis. Another is

http://www.statisticssolutions.com/academic-solutions/resources/directory-of-statistical-analyses/factor-analysis/

This one does an okay job of explaining principle component analysis whereby you identify and extract maximum variance into factors.

If you want to look at the effect of more than one independent variable on a dependent variable, you need to use **ANOVA** (or regression). But also, if you have one variable that has more than two groups, you would have to use ANOVA rather than a t-test. A t-test can only do the limited job of looking at one independent variable with two groups. If you want to test several null hypotheses at the same time and to compare variance among and within more than two groups, which is the limit for the old (literally over 100 years old) T-test, you'll want to use the Fisher technique called **ANOVA**. For this check out http://www.statisticssolutions.com/academic-solutions/resources/directory-of-statistical-analyses/anova/
ANOVA (Analysis of Variance) is a statistical technique that helps in making inferences about whether three or more samples might come from populations having the same mean; specifically, whether the *differences* among the samples might be caused by chance variation.

Chi-Squared (the ed is usually dropped these days) is one of many goodness-of-fit tests. It is both a distribution and a test. Chi-Squared tests are performed to test always and only null hypotheses and to construct confidence intervals (more on that latter and their relationship to parameters shortly). It compares the distribution of a discrete *random* variable with a given observed distribution. If you want to test "goodness of fit" **Pearson's Chi-Squared** test is a very popular technique. Every undergrad in biology 101 uses this test when she replicates the old fruit fly study or Gregor Mendel's pea plant work – that's where I first learned it (sorry soc.). If the population at large has a normal distribution, then the larger your sample size the more you will have goodness-of-fit. This is also why significance of measures of variance increases with sample size.

Goodness of Fit means the degree to which your observed actual data distribution matches the virtual data distribution you would expect if your null hypothesis is true and the actual population has a normal distribution. Soooo Chi-Squared is a way to test null hypotheses. A null hypothesis expects no difference between your actual observations and what you expected to find given a normal random distribution. When they don't match is when things get interesting. That means something not random is happening. How that is possible in a universe that is supposed to be totally random is a deeper question that crazies like me who are interested in isomorphic dissipation (spontaneously emergent structures – "patterns") think about… but not here and not now.

Back to $\mathbf{X^2}$. First of all we all know what squared means. It means multiplying a value by itself. In this case the X in X^2 is the difference between actual observed data distribution and the expected or hypothesized distribution. So you find the difference, multiply it by itself and then dived by the expected measure. It's a ratio. Nothing more or less. Quite simple actually. We square the difference in order to exaggerate the difference so that it is easier to detect. This technique of inflating values is commonly used in stats from Chi-Squared Test to the weightings used in structural equation

modeling. It's like zooming in for a better look. Look at what? The difference between what you expected to find and what you actually found.
A helpful source of Chi-Squared Test is from Penn State:
http://www2.lv.psu.edu/jxm57/irp/chisquar.html

Chi-Squared is non-parametric. You calculate the Chi-Squared with actual numbers, not ratios or averages. Parametric pertains to parameters. Don't get confused about parameters. In parametric equations the independent variables are called parameters. But in stats a parameter is a distribution based on observed data or tested hypotheses. What this means is that a parameter forms the limits to a system. For instance, the parameters of a normal distribution are the mean and the variance. A **parameter** is not a variable or constant. It is a numerical summary of a population… the mathematical characteristics of your samples such as a mean. A parameter is an extrapolation from what you observe in your sample to the larger hypothetical population from which your sample was taken. A parameter is a numerical value that describes one of the characteristics of a probability distribution or population. Now it gets a little confusing. In Bayesian hypothesizing parameters are random variables. Their uncertainty is itself a distribution. Correlations can be computed as parametric and nonparametric. Spearman rank correlation coefficient is a non-parametric test. That means it is computed from the order of the data no matter their value relative to the parameters. Pearson's r is a parametric test and is computed directly from the actual values of the data. So much for parameters. Oh one last thing. Confidence interval has to do with parameters. The more often a parameter, such as a mean, appears in an observed interval the higher the confidence level of your estimated distribution.
Chi-Square is non-parametric. It helps you figure out the difference between what you actually find and what you expected to find. The "fit" in "goodness of fit" means, how well did the actual distribution you found match or fit with the predicted probability distribution. Remember, stats is all about random chance versus what you find and what you guessed would happen and what you find. Another source for Chi-Squared is http://www.statisticssolutions.com/academic-solutions/resources/directory-of-statistical-analyses/chi-square-goodness-of-fit-test/

For help with using a decision tree or regression tree to help you discover the relationship between variables -- how they combine to explain outcomes use **CHAID**. The CHAID Analysis (Chi-Square Automatic Interaction Detection) is a form of analysis that determines how variables best combine to explain the outcome in a given dependent variable. CHAID analysis is especially useful for data expressing categorized values instead of continuous values. For this kind of data some common statistical tools such as regression are not applicable and CHAID analysis is a perfect tool to discover the relationship between variables. One of the outstanding advantages of CHAID analysis is that it can visualize the relationship between the target (dependent) variable and the related factors with a tree image. For help with CHAID Analysis see:
http://www.statisticssolutions.com/academic-solutions/resources/directory-of-statistical-analyses/chaid/
Most surveys categorize answers instead of generating continuous values. CHAID Analysis is a good way to find the statistical relationships among survey data.

Regression analysis (or the method of least squares). Regression analysis provides a "best-fit" mathematical equation for the relationship between the dependent variable (response) and independent variable(s) (covariates). As is basic to all applications of stats to data you are trying to understand how much random influences combined together lead to observations. How much random variation is there in your observations. Remember what I said about sampling? The use-value of any regression analysis depends on how data are generated. This affects the stochastic character of your study meaning how a set of observed distributions relate to or fit the probability distribution. Stats is always about what you observe versus what should happen randomly. Regression analysisseeks to discover the relationship between variables such as the effect of price increase on demand. More specifically what happens to a dependent variable when all independent variables are held constant but one. These are expressed as averages. Galton (one of the founders of eugenics… the less than flattering original inspiration for applying statistical analysis to human beings – Galton, Charles Darwin's ignominious cousin who coined the phrase "survival of the fittest" endowed a university chair in eugenics and his good friend, Carl Pearson… Pearson changed the spelling of his name to the more Germanic Karl… was the first and last holder of this chair which was unceremoniously eliminated after his demise) used it to study regression toward the mean, for instance, how over time tall genes regress toward the normal or average height of people in England. The issue of time (one I'm personally interested in) has lead to newer Bayesian methods for measuring predictor variables. Regression is an old technique invented back around 1800 by Legendre and Gauss. Like so much early stats it involved trying to predict the orbits of the wandering planets. It was further developed by Fisher and Yule (my stat prof in T-Com was obsessed with Yule's Q…don't know why). The point of regression is to discover type-1 error. You predict a temporal/causal relationship but it is not confirmed by the data. A nice introduction can be found at: http://www.law.uchicago.edu/files/files/20.Sykes_.Regression.pdf

There are a few different kinds of regression; linear, logistic, and multi-linear. First you need at least 2 variables that you can scale as ratio or interval. They should be multivariate normal (Q-Plot), which you can check with a histogram. Not unlike the Chi-Squared Test, you're looking for goodness of fit between an expected random normal curve and whatever kind of distributions you actually find. The Kolmogorov-Smirnof test is another common test of fit.

Pearson's r or **Correlation coefficient** is a measure (which Pearson borrowed from Galton and tweaked) of the strength of a linear dependent relationship between two variables expressed on a little scale from +1/-1. It is the covariance of two variables divided by the product of their standard deviation. We like to say we never speak of causation but +1 means 100 percent probability of a relationship between variables and -1 means 100 percent probability of no relationship. Remember it's all about relationships and co-relations, which is a little bit weird because it always takes two to have a relationship. The co- may be confusing because it is about two things too. Back to the scale. The numerical values you calculate in stats fall between these two absolutes and these two parameters give meaning to your stats. Without ends on the rope, you can't tell where you are. So we ***are implying causation*** but as mere mortals, as Nietzsche used to say, we do not have immaculate perception. We always have error in direct empirical, which is to say personal, observations because we have limitations that affect our sampling of reality. That is why our claims are always only probabilistic. I agree with Einstein. Causation is the bottom line but it is hard, indeed impossible for us to prove with apodictic certainty.

Standard Deviation (σ sigma – Greek letters are so ethnocentric, why not Chinese characters or emoticons?), is all about how observations are distributed. As always the average is the "expected value" or "normal." If you drop salt over a piece of paper it should form a circular pattern with most of the salt landing in the middle (center – average) and as you move out from the middle of the pattern you should find fewer and fewer granules (or data points) – outliers being the ones farthest out (less likely). Cut the pattern in half and you have a nice symmetrical curve that is actually more accurate than the loopy two-dimensional bell curve in terms of presenting randomness. As Wolfgang Kohler the great logician and mathematician and friend of Jean Gebser lamented, because we do calculus on pieces of paper we have only two dimensions and so we lose the actual spherical nature of probability as a graphic.

A low standard deviation means all your data points or salt granules tend to cluster close to the middle. High standard deviation means they tend to spread out farther from the middle. A weird pattern indicates something not random going on. Something has influenced the way your salt dropped such as the wind.
"Normal" is the average expected grouping. When applied to humans, it can be problematic because often deviance is valuated as "bad…" hence eugenics. Yet there is no art or progress without deviance. After the wave of eugenics cleared, normal in statistical terms was no longer a judgment but simply a fact of random distribution.

Statistical Inference, which is what this is all about, is the process of applying inductive reasoning to data. It is the process of drawing conclusions from datasets that are affected by random variation. Such variance typically comes from random sampling and observation errors.

Measures of significance are used to determine if you can be confident that the true relationship between variables is close to the estimated, expected normal one.

A quant study should have this outline:

Data Analysis Plan

- Edit your research questions and null/alternative hypotheses
- Write your data analysis plan; specify specific statistics to address the research questions, the assumptions of the statistics, and justify why they are the appropriate statistics; provide references
- Justify your sample size/power analysis, provide references
- Explain your data analysis plan to you so you are comfortable and confident

- Two hours of additional support with your statistician

Quantitative Results Section *(Descriptive Statistics, Bivariate and Multivariate Analyses, Structural Equation Modeling, Path analysis, HLM, Cluster Analysis)*

- Clean and code dataset
- Conduct descriptive statistics (i.e., mean, standard deviation, frequency and percent, as appropriate)
- Conduct analyses to examine each of your research questions
- Write-up results
- Provide the latest APA fromatted tables and figures
- Explain chapter 4 findings

Ongoing support for entire results chapter statistics

The whole point is to guess (based on prior research) what is going to happen or what causes what to occur. In this process you want to avoid error. There are basically two kinds of errors we make. **Type I error** is the incorrect rejection of a true null hypothesis. A **type II error** is the failure to reject a false null hypothesis. Type I leads to a false positive. This means that you believe a relationship exists between two things when it does not. So I think drinking lots of water will cure my diabetes. But that is false. Type II error leads to a false negative. This means that I believe that there is no relationship when in fact there is. Drinking water will not affect the likelihood that I will get cramps. But it does. What we are after is to understand the basic relationship between measured factors that affect each other (variables). A dependent variable *depends on* the independent variable. A dependent variable is the effect of the presence of the independent variable. If peanuts are introduced into the food they will cause the boy to get sick. The peanuts are the independent factor and the sickness is the dependent result or effect. What we seek to find is if relationships are real – night always follows day but does night **cause** day --, which direction causation is going – the chicken/egg problem --, how strong the relationship is, and if there are other factors involved. A correlation is not an explanation.

Common Qualitative Approaches

For phenomenology there is the awesome resource *Encyclopedia of Phenomenology* (Embree, et al., eds). I've read much of it and know many of the contributors very well. I can attest to its quality. Each piece is spot on. The problem with this one is that it is over $800! If you can find it in a library, go for it. Another great, and much more affordable resource for beginners is *The Phenomenological Movement* by Herbert Spiegelberg. Spiegelberg personally knew many of the major founding figures in the phenomenological school and does a masterful job of explaining their commonalities and differences. For our purposes, the last chapter about how to do phenomenology is especially helpful.

For Semiotics you can't beat *Handbook of Semiotics* by Winfried Nöth. It is essential. This book clearly lays out all the variations of semiotics and offers many suggestions for doing serious research. Some like to use the books of Arthur Asa Berger for nuts and bolts research but I find his work too elementary for publishable research. I suggest the works of Thomas Sebeok, Roland Barthes and John Fiske for guidance in conducting serious semiotic research.

For qualitative coding there are many sources. I suggest *The Coding Manual for Qualitative Researchers* by Johnny Saldana.

For Grounded Theory there are two essentials; *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis* by Kathy Charmaz, and *The Discovery of Grounded Theory: Strategies for Qualitative Research* by Barney Glaser and Anselm Strauss.

For help with ethnographic research see the many titles published by Alta Mira Press. There are several. One is, *Essential Ethnographic Methods: A Mixed Methods Approach (Ethnographer's Toolkit, Second Edition)* by Jean Schensul and Margaret Le Compte.

For Hermeneutics see Richard Palmer's *Hermeneutics* and also *Truth and Method* by Hans-Georg Gadamer and last but not at all least, Paul Ricoeur's *Hermeneutics and the Human Sciences*, and *Interpretation Theory.*

For deconstruction as a strategy for insightful decentering see Jonathan Culler's *On Deconstruction: Theory ad Criticism after Structuralism*. Much of Derrida's ideas are based on Edmund Husserl's work, especially his examination of regional ontologies.

For structural analysis see Claude Levi-Strauss' 1) *Structural Anthropology*, 2) *The Raw and the Cooked*, and 3) *Myth and Meaning: Cracking the Code of Culture*. Also Jean Piaget's *Structuralism.*

For network analysis there are about a million software packages now. Some are really great. Go to Gizmo's for free network analysis software.
http://www.techsupportalert.com/best-free-network-analysis-tools.htm
Note that just because someone constitutes a quantitative node in a network does not mean they are significant cultural leaders. Secretaries often show up as nodes but they are typically conduits for dispersing information rather than originators of initiatives and cultural change.

For Structural Equation Modeling see *Principles and Practice of Structural Equation Modeling, Third Edition* (Methodology in the Social Sciences) by Rex B. Kline. I sat in a class taught by Michael Pfau on structural equation modeling. Like others, it takes more than one semester to master this method.

I think a great project would be combining network analysis with structural equation modeling.

When it comes to "**rhetorical analysis**" I've read everything from Aristotle to the New School of film criticism to Wittgenstein, Burke, Black, Blitzer, Apel, Habermas (with whom I personally studied), Toulmin, Perelman, Rorty… My problem with rhetorical analysis is that it ranges all over and there is no clear-cut method. Many works of rhetorical analysis (be it focused on values or argumentation) are genius but you can't coach speed and you can't teach genius in a methods class. I tend to tell students to stick with the pentad. To me, that is the closest lifeline Burke threw to the rest of us mere mortals.

Critical Studies. I feel similarly here as with rhetorical studies but I think critical cultural studies if even more confused. I personally studied with Gadamer, his student Habermas, Ricoeur, Detlef-Ingo Lauf, AlgisMickunas, Thomas Seebohm and others. I've spent hours discussing the issue of truth in both philosophy and sociology. I once had a public debate with Derrida. I think critical thinking is a redundant phrase. And as Gadamer used to say, if you are not critical of my writing you are not reading it. I tend to fall with Habermas and against Derrida on the debate over critical cultural studies. But both have strong points. This is my take: Marx argued that we can be deluded by false consciousness, by powerful interests who work to hide and/or distort the truth. To me that means this: there can be no liars without a truth. False implies true. I am well aware of post-Nietzschean champions of "our new infinity," meaning endless pluralism. I understand that due to perspectivism there can be many valid descriptions of "one and the same" event. A description of WWI from the point-of-view of a child may be just as valid if not as interesting as a description of WWI from the perspective of a nurse, an infantryman, a general, a horse… But at the same time, social justice suggests that there can be situations where and when individuals are wrongly, yes wrongly accused and persecuted based on the facts. Not always, but sometimes the facts can be known and they can be isolated enough to make a difference. Discovery in law and science is a worthwhile pursuit; it is not senseless. When a business hides the true profits from its workers who are asking for a raise, debate cannot be rational – fair. So when a student says to me that their method is "critical theory," I believe this student is utterly lost. The Frankfurt school sponsored some of the first wide-scale surveys (conducted by Lazarsfeld and Park) because they were trying to find the truth. E-N. Neumann's spiral of silence presumes a truth about oppression. Groupthink presumes a truth that is discursively denied. Foucault's work implies unjust punishment and the evils of panoptic power. Critical assessment of any situation requires an effort to get at the truth and that means that someone concerned with social justice must master and exploit every method at her disposal just like a detective would. This is where arguments over the ideology of empiricism become worse than useless. Debates from the philosophy of science obstruct the pursuit of justice. A criminal detective uses stakeout observation, they may go undercover and do ethnographic observation, they conduct interviews, crime scene data techniques including DNA analyses, archival research such as cellphone records, anything and everything to solve a case (including trying to establish motive). So should social scientists. A critical studies student who tells me they don't believe in positivism without explanation, or statistical data, this a student, who, in my mind, is very confused about what it is they are trying to do and how. Even a person interested in rhetorical analysis should understand statistics so that they can tell how they are being used and abused in the process of persuasion. To do otherwise, given our current semantic environment, would be like a medieval pursuing Biblical exegesis while refusing to learn Hebrew or Greek just because they like Latin better.

For handling large amounts of transcripts and also video data nothing beats **NVivo**. My wife Elaine Hsieh and I took a workshop at Columbia University on NVivo in 2011. It is very very useful but like any other instrument you need to practice. Wish it had existed when I was a grad student. But then I had to go to the mainframe office to type out my punch cards and feed them into the card reader (after standing in line for an hour) in order to run SAS and SPSS. No one had a terminal or screen in their offices… just typewriters and reams of wide gauge computer printout with sprocket holes. Desktop super computers have made things so much easier. Still nothing has replaced good data collection techniques. Good in, good out.

Adendum (Reflections)

My students often hear me ask what method should one use to study methods? My answer is phenomenology. Actually every research effort should start with phenomenology. However many simply presuppose things about the ontological nature of what they want to study.

You will find the word phenomenology used in the manuscripts of many a great scientist and mathematician -- from Einstein to Hempel, from Hubble to Hilbert. The goal of phenomenology is first principles, namely, to logically establish the essential qualities of a phenomenon, which then will dictate which instrument and design one should use. Of course if all you have is a hammer then every question better be a nail.

One does not measure measures. One measures qualities such as temperature, length, duration, density… Each is different from the other in fundamental/essential ways and each requires a different kind of instrument to investigate and describe it and how it relates to other phenomena. For instance, due to the essential nature of vascular phenomena, it would be fruitless to try to use a telescope to study blood pressure. However, that does not mean the telescope is a stupid instrument to have around. It means you need to pick a different method that fits the phenomenon you are investigating. Many methods have been invented to fit specific qualities of diverse human behaviors. By the way **method** is a tool. **Methodology** is the study or logic of method. One can study a method without applying it. Francis Bacon, the inventor of experimental logic, never ran any experiments. He was a methodologist. In your dissertation don't get bogged down into trying to be a methodologist. However you should know why you are using the method you have chosen and not another. Your method is your tool. The subject of your dissertation should be something other than your method.

Method is not new. Prehistoric humans applied methodical processes to cure illness, promote fertility, and make things such as spear points. Method means a step-by-step process guided by logic to create results that can be repeated. The presumption is that if you do the same process again it will result in the same kind of arrowhead. It would not be a crazy question to ask whether birds employ methods when building nests, bees when building hives, beavers when building dams, single celled lifeforms when they come together to build stalks out of their own bodies so that others may climb to the top to be carried to a new water source by the wind. Having thought about this a long time, and being fully aware of the fallacies of reductionism including systemism (as Nietzsche called it before it became fashionable beyond those familiar with Hegel) and mechanism applied to the cosmos, still I wonder if method is not fundamental to the universe.

If everything were truly random, we would not be able to predict anything. The only place things are random are in our efforts to sample and even there chaos theory applies. As Einstein noted, "The most incomprehensible thing about the universe is that it is comprehensible." I do not subscribe to intelligent design theology. But I do find things such as the golden ratio to be amazing. Phenomena such as the golden ratio do reveal something truly wondrous about the universe. For this reason for a time I was very interested in isomorphism or the symmetrical relationship (or even identity) between two different things such as a mathematical model and that which it models. Aron Gurwitsch and Edmund Husserl (both Ph.D.'s in mathematics and founders of phenomenology) discuss this issue extensively. As the great mathematician Alfred Renyi pondered, "Is it not mysterious that one can know more about things which do not exist than about things which do exist?" True, to ask what color a chi square is or how much your method weighs or how long science is, is to reveal a profound misunderstanding of the nature of such phenomena. They are not empirical objects. And so to speak of "empirical methods" or "empirical science" is to make an absurd utterance – absurd used here in the technical sense of being self-contradictory. Empirical science denies the existence of anything that is not a material object and which can be known through the external senses. This means that empirical science must deny its own existence. This is the crux of the mystery Renyi addresses but it is mysterious only so long as one is entangled in metaphysical speculation, which Husserl avoids. You can hold an empirical object in your hand called a book and it has ink on paper but to communicate, to "read" and comprehend the book is a much more complicated process than simply beholding the object. This is what social science must address. The questions we must ask are what and how does meaning occur to humans because humans react to what things mean to them. Why is also essential. In a court of law, motive is essential. It is the difference between accidental death (negligent homicide) and murder.

Husserl can help out Renyi. Husserl brackets metaphysics (the first step in phenomenology which makes activities like investigating mathematics and logic valid). He would say to Renyi that mathematical objects do exist and are meaningful even though they are not empirical objects. And reducing them to brain tissue loses their meaning. Looking at blood movement in the brain is not the same thing as the direct experience the mathematician has when calculating. The blood is no more real than the cogitation of logical relationships. They are correlated to be sure but not identical. To not realize this is to fall into the fallacy of reified reductionism. Operationalization involves the isomorphic process of converting the virtual into the actual.

I follow the version of operationalization common to natural science and engineering, which states that when a virtual model such as a blueprint is followed to construct an actual bridge or building or a water pump that actually pumps water, then one can say that the blueprint has been operationalized. Stating a relationship in numbers is still a virtual process. By itself, it does not constitute operationalization. The virtual relationships between the depicted parts is as real and as meaningful and important as the actual pump. In fact one can have all the parts to an automobile lying in a pile in one's garage but without the logic of systemic communication between the parts, you will never be able to cruise down the highway listening to your favorite music in air conditioned comfort. Empirically the "car" is in my garage. But it is not really a car as such but just all the parts that could be a car if all the parts where arranged relative to each other according to a very specific logic. Synergy – logic -- is real but has no color, weight, texture, length… none of the essential qualities necessary to call something an empirical object. Yet it is fundamental to actual processes. In fact empiricism is an epistemological school of thought that is absurd because it defines itself as non-existent. Methodical activity is a logic. Whatever method you choose, your method is not an empirical object. And you should choose your method based on the essential qualities of the phenomenon you wish to investigate.

Saying that the only definition of a thing is to define it as a measure is an ideological tautology, steeped in metaphysical bias. It is measurism. It is part of a cultural trend that can be pinpointed originating in a particular place and time. Science and the obsession with measuring everything are cultural products and activities. But this does not mean they are bad or useless. Quite the contrary. But it does mean that they are not godly or Otherworldly in the Platonic sense. To think otherwise is to reify science and measurement. Think tools.

Isomorphism is mysterious simply because we do not exactly understand how the virtual and the actual communicate. The statistical description of a group or differences among groups is not the same thing as the group itself. That's like confusing the menu with the food. To define a thing as the sum of its measures is not operationalization to me. Rather, expressing something as a measure is translation in the style one finds in symbolic logic. It is a form of re-presentation. Since grad school, one of my obsessions has been about the isomorphism between mathematical/geometric logic and the actual universe. It is amazing to me that one can sit at a desk and work out a logico-mathematical model that then predicts the orbit of the planets ala Kepler and Einstein (for Mercury). But the desk work is not the same thing as the orbit it predicts. The joy of getting a prediction right is rooted in isomorphism. Another case in point -- if you don't know who Leonardo Pisano Bigollo (c. 1170 – c. 1250), aka Leonardo of Pisa aka Fibonnaci was, stop reading and go right now and find out. The Fibonnaci sequence is sublime.

As a doctoral student I was very fortunate to assist Guido Stempel when he was editor of *Journalism Quarterly*. Even in "retirement" he remains a leader and master quantitative researcher and was the founding director of the Scripps Survey Research Center at the Scripps School of Journalism at Ohio University. There he and others pioneered the use of computer aided interviewing. And later I assisted James Webster in the Audience Research Lab in Mass Communications at Ohio University in part because, in that doctoral cohort, I was the only student with a quantitative background (thanks to my degrees in sociology). Stempel taught me the value of being inventive and elegant in research design. He had authored a major text in quantitative research and was amazing at thinking up ways to test hypotheses. He showed me the art of quantitative research design. Webster, who later became a Dean at Northwestern, taught me not to overstate claims and not to abuse statistical tests in an effort to make something out of nothing.

Now I am a teacher. For over two decades I have taught the Doctoral Capstone class at the University of Oklahoma. It is a four-hour class while the rest are three. Often students at the end of the class will say they wish they'd had it sooner in their doctoral coursework. In that class and also in the Introduction to Graduate Studies class, which I teach now and then, I tell students that doctoral level work is difficult. They have to work hard and be patient as they assimilate and comprehend new ways of thinking because they are literally growing new networks of neurons.

Tissue takes time. As Jean Gebser observed, first there was light and then the eye evolved to perceive it. No light, and the eye disappears. We don't burn calories for nothing. So too methods classes present something that it takes time for your brain to grow into. As you focus effort be patient for yourself to catch up. Steady as she goes. Everyone is in a hurry. We even put stopwatches on children as they take exams to see who is "quick" but complexity requires dedication over time – meditation on themes. Don't worry about what others think about you. Braggadocios and show-offs are immature. Just keep at it.

This is true with something like phenomenology, which is not immediately self-evident. It is also true with statistics. One would not expect to learn a foreign language or a musical instrument in just one semester. The same is true of complex methods. Concerned that doctoral students were not getting enough time with methods, years ago Jon Nussbaum and I were tasked to set up two required tracks in our doctoral program. One was a two-course sequence in quantitative research design and statistics and the other was a two-course sequence in qualitative research. I remember Jon leaving out nominal data generation (sorting/categorizing) from the category "quantitative" rousing the ire of at least one fairly famous researcher.

Both quantitative and qualitative research methods generate empirical data. One quantifies observations and the other does not. The direct observation of behavior, be it aided by microscopes and stethoscopes or interviews and ethnographic techniques, is very empirical and thus we find the gold standards in studying primates set by ethnographers such as Dian Fossey and Jane Goodall. Whether one is studying molecules, galaxies, fish, or humans (ala Desmond Morris) one must go and personally investigate. Direct observation is always personal. You can introduce manipulations or investigate naturalistic behavior. It does not matter. You need to get directly involved. I like how Nietzsche says to know something is the same as being familiar with it. Whether one is learning to build cabinets or run SPSS, practice makes perfect.

The fact that all direct observation is also personal means that all investigations are perspectival. This we cannot avoid. This is why the key to knowledge is replication and cross-examination based on observations by other researchers. In between we communicate -- publish. While it is the case that I "cannot see around my own corner," I can ask others what they see. Learning methods gives you more views.

One huge problem with perspectivism but which has also created a huge opportunity for young scholars is one noticed years ago in Anthropology and people doing studies in comparative civilizations (i.e., Gebserians). And that is:

> A 2008 survey of the top six psychology journals dramatically shows how common that assumption was: more than 96 percent of the subjects tested in psychological studies from 2003 to 2007 were Westerners—with nearly 70 percent from the United States alone. Put another way: 96 percent of human subjects in these studies came from countries that represent only 12 percent of the world's population. (Waters, February 25, 2013)

This needs to be expanded if we want to make robust claims that generalize beyond this group. Why? Because people doing serious multi-national social science are finding very significant differences among populations and that Western, Educated, Industrialized, Rich and Democratic people (mostly White college students from a "Midwestern University") generate results that make them statistical outliers. See Joe Henrich, Steven Heine and Ara Norenzayan's buzz-creating 2009 paper "The Weirdest People in the World: How Representative are Experimental Findings from American University Students? What do We Really Know about Human Psychology?" Here's their abstract:

> Broad claims about human psychology and behavior based on narrow samples from Western societies are regularly published. Are such species-generalizing claims justified? This review suggests not only substantial variability in experimental results across populations in basic domains, but that standard subjects are unusual compared with the rest of the species— outliers. The domains reviewed include visual perception, fairness, spatial reasoning, moral reasoning, thinking-styles, and self-concepts. This suggests (1) caution in addressing questions of human nature from this slice of humanity, and (2) that understanding human psychology will require broader subject pools. We close by proposing ways to address these challenges.

Later the write:

> Even within the West, however, the typical sampling method for psychological studies is far from representative. In the *Journal of Personality and Social Psychology*, the premier journal in social psychology—the sub- discipline of psychology that should (arguably) be the most attentive to questions about the subjects' backgrounds—67% of the American samples (and 80% of the samples from other countries) were composed solely of undergraduates in psychology courses (Arnett 2008). Furthermore, this tendency to rely on undergraduates as samples has not decreased over time (Peterson 2001, Wintre et al. 2001). Such studies are thus sampling from a rather limited subpopulation within each country. (Henrich, Heine & Norenzayan, 2009, p. 5).

See the entire paper here:
http://www2.psych.ubc.ca/~henrich/pdfs/Weird_People_BBS_final02.pdf

Joe Henrich and his colleagues have conducted over 600 studies around the world and Western College Students are statistically proving to be "weirdoes" – statistical outliers. I've been in communication with him but he is very busy so I suggest, as always, that you focus on just reading his stuff before bothering him.

Special thanks to Amy Janan Johnson, Ph.D. stats expert for looking this over.

Bib.

Waters, E. (February 25, 2013). We arent' the world. Pacific Standard. You can find this article online at: http://www.psmag.com/magazines/pacific-standard-cover-story/joe-henrich-weird-ultimatum-game-shaking-up-psychology-economics-53135/#.US0HhwXLYPN.facebook