

Levels of Measurement

1. Purely by the numbers
“numerical” criteria
2. Theoretical considerations
“conceptual” criteria

“Numerical Criteria”

- 1. Nominal = different “categories” based on some kind of “typology”
- 2. Ordinal = add “ranking” to no. 1
- 3. Interval = add “distance” to no. 2 & 1
- 4. Ratio = add a “true zero” point to no. 3, 2 & 1
- The Levels of Measurement sometimes have different names in different disciplines (e.g. psychology)

“Conceptual Criteria”

- In Quantitative Research Design the numerical criteria are often considered enough, at least in practice. There are conventions about how a variable can be classified (usually as interval or ordinal).
- But in Qualitative Research Design the conceptual criteria become more important. That is one reason we have Qualitative Research Design. It is often felt that the numbers do not necessarily mean what some people think they do. The underlying phenomena are “qualitative”.

“Income Level” as an example

- It would seem, at first glance, that income level is definitely a numerically ordinal level of measurement. After all, we can measure income in dollars and cents! It is possible to conceive of a “zero point”.
- But no living adult person can survive for long with absolutely zero income.
- Moreover, the intervals are not necessarily the same at different ends of the income spectrum. That is, if you earn \$200,000 then \$5,000 means a lot less to you than if you earn \$5,000!
- Even the ranking may be different qualitatively.

SES = Socio-Economic Status

- If that is true of “income” taken by itself, it is even more true of “inequality” measures such as “SES”. SES is a composite index of income and years of formal education.
- But to think of a Ph.D. in zoology making \$60,000 per year to be comparable to an M.D. who also makes \$60,000 per annum to be thought of as exactly the same is to ignore an important qualitative difference about future earning capacity. Both are highly educated and intelligent but their potential future earnings and social status are quite different.

“Religion”, “Attendance”, IQ and Age: Qualitatively Nominal, Ordinal, Interval and Ratio?

- Religion is listed as an example of a nominal level of measurement variable. But in some situations it can be ordinal in terms of all kinds of qualitative implications. Think of Arab Israeli citizens.
- Attendance is seen as ordinal but is someone who attends services more frequently really more religious in a qualitative sense?
- IQ Score is seen as ordinal but is it really possible to say that an IQ of 120 is a significantly higher IQ than an IQ of 110?
- Is Age ratio? What is “true zero” for sociology?

Scales, Indexes and Qualitative Significance for Research?

- Another problem with simply accepting the numerical value of a specific variable is that often we construct scales & indexes.
- A scale is assumed to be based on a continuum & therefore at least ordinal.
- An index is often constructed using several scales that are added together, further confounding the problem.
- Numerically a scale or an index may be thought of as interval or even ratio when in terms of conceptualization of the problem it may be simply an artificial construct.

Conceptualization of “Race”

- “Race” is rarely used in the social sciences in the strictly biological sense (hss).
- Sometimes we differentiate “ethnicity” as cultural and “race” as somehow not.
- But even our common sense notions of race are actually “cultural” & not “scientific” (e.g. “Anglo-Saxon”, “Caucasian”, “Black”)
- Hence, an index or scale using “cultural race” to represent some aspect of an IV or DV is problematic conceptually.
- For example: 0 = White and 1 = Black! Ratio?

Quantitative = Numerical

- To repeat, if we have a Quantitative approach to Research Design then many of these conceptual problems are seen as not problematic. The “data set” is taken at face value & assumptions are “stretched”.
- But if we have a Qualitative approach to RD then these conceptual problems often are taken so seriously that the use of sophisticated quantitative techniques may be avoided. That is not because QI researchers cannot handle numbers! (It is a common joke to imply this!)

Use of Numbers to Illustrate subsidiary points in QI RD

- In Qualitative research one often finds percentages, but these are always illustrations and never “proof” of anything that is central to the main objective.
- QI Research Design may even incorporate certain “non-parametric” statistics (e.g. Chi Squared, Somer’s d, Kendall’s tau, etc.)
- But, again, the central focus in QI research is never merely “numerical” analysis per se.
- No QI research features Pearson’s r or other statistics (e.g. r squared) as central to the conceptual problem being investigated.

QI vs Qt or Interpretive vs Positive?

- There are several “Approaches” (or “Meta-Paradigms, Pm) to social science research (e.g. sociology, anthropology, psychology, geography, linguistics, political science).
Two of the most important are:

Positive

Interpretive

Positive and Quantitative

- Most Quantitative Research Design is also Positive in terms of the conceptual “Approach” to the problem being studied.
- Most Qualitative Research Design is also Interpretive in terms of the conceptual “Approach” to the problem being studied.
- However, there are other “Approaches”.
- Moreover, Qt RD is not always based on a Positive “Approach” in the more general sense.
- Similarly, not all QI RD is based on Interpretive.

“Approach”: What is it?

- The term “Approach” is used by Neuman (2003, 2000, , 1997, 1994, 1991!)
- But what is an “Approach” as opposed to a “Research Design”?
- The term approach can be seen as a way of using the term “Paradigm” without implying Thomas Kuhn’s specific version of the paradigm concept.
- Sociology is seen as a “multiple paradigm science” by some sociologists (Ritzer 1975).
- But Kuhn (1970, 1962) argued differently.

Kuhn's notion of a "Paradigm"

- Thomas Kuhn was a Ph.D. student in physics who "discovered" the importance of the history of his science.
- Most "history of physics" was written by "retired" physicists and was not necessarily good history from the standpoint of the discipline of history.
- Kuhn wrote about the Copernican Revolution in a historically-sound manner.
- Later he extended his ideas and introduced a revised conceptualization of the term Paradigm.

“Paradigm” in Physics or Biology versus Sociology?

- In the natural science, according to Kuhn (1970) there are Paradigms that hold the discipline (or sub-disciplinary and/or inter-disciplinary field) together to establish norms of “normal science”.
- Sociology (& its sub-disciplinary fields) was not viewed as having one Paradigm.
- Some tried to argue that Talcott Parsons’ Structural Functionalism was THE Paradigm.
- But, others resisted that and argued that sociology was “pre-paradigmatic” or a “young science” which was NOT YET fully scientific.

The idea of a “Multi-Paradigm Science

- When George Ritzer (1975) published his book on sociology as a “multi-paradigm science” (rather than “pre-paradigmatic” or paradigmatic in terms of S-F) it made him famous.
- Many people saw this as a good compromise.
- The key difference suggested in the 1960s & 1970s was between S-F and S-I
- Symbolic Interactionism was viewed as “the Loyal Opposition” using a metaphor from politics. It was “Interpretive” and emphasized “qualitative methods & techniques”.

Ritzer's original Schema versus Neuman's Schema of Multi- Paradigmatic Science

- Ritzer (1975) argued that there were three Paradigms in sociology.
- He applied the labels “Social Facts”, “Social Definition” and “Social Behavior”.
- Those labels are not used very much today, but the idea of multi-paradigmatic science is still very important in sociology since it provides a kind of political safety-value within the discipline. (“You do your thing and I’ll do my thing!”)
- The newer terminology can be found in Neuman (2003) and in a host of books.

The Key Differences in Methodology and in method

- Methodology really refers to “Approach” and Qualitative versus Quantitative can be used in that way (i.e. QI Paradigm versus Qt Paradigm).
- Method really refers more to “techniques” and QI versus Qt are often used in that way; but, strictly speaking, the writer probably means “qi” versus “qt” techniques.
- Whenever we refer to “Positive” we always mean “Quantitative” in terms of Methodology.
- Whenever sociologists say “Intepretive” they usually mean “Qualitative” Methodology.

Methodology and Theory

- In sociology we differentiate between courses on “theory” and other courses on “method” as it relates to research.
- There is a “theory-research gap” –Menzies
- Hence, the term Methodology is often divorced in the minds of most sociologists from the Theory or Logic of Method and thought of mainly as methods & techniques and their justification.
- That is why there is an added layer of terminology. Neuman (2003) is trying to re-introduce “Theory” without getting too precise about why!

Bakker on “Theoretical- Methodological Paradigms”

- Bakker has attempted to develop the notion of Paradigms further by making the theoretical importance of a Paradigm central to BOTH Theory and Methodology.
- Moreover, there are different “levels” of Paradigms (Meta, Super and Research).
- There are also different “levels” of Theory (Middle Range and Research [specific]).

Terminology and Conceptualization

- The words we use are “signs”.
- The way we use those “signs” tends to strongly influence how we think about them.
- If we use the term “Social Definition Paradigm” (Ritzer 1975) we get a different impression than if we use the term “Interpretive Approach”.
- The two are almost the same thing, but there is one major conceptual difference.
- Neuman (2003) is trying to use “Interpretive” in a way that links DIRECTLY to the study of “research methods” (i.e. M & m!)

Steps in the Learning Process and the Gradual “Evolution” of “Signs”

- No one can learn everything at once!
- We tend to be taught a “physical science” or a “social science” as things stand now.
- But some idea of the evolutionary (& even sometimes revolutionary) changes in conceptualization (Theory, Methodology) can help to make some of the seemingly confusing terms somewhat clearer.
- Every word (“sign”) we use has a human history and once meant something very specific (e.g. the letter “A” in the alphabet or “alefbet” once meant an “ox”; think of an upside-down “A” !)

Positivism and Interpretivism

- Today some sociologists use the words “Positivism” and “Interpretivism” only to mean quantitative and qualitative research methods.
- However, the words should probably be used to designate Method rather than merely method.
- Moreover, Method is not just relevant for a course on “research methods” or “stats” but is also entirely relevant for courses on “Theory” (precursors, classical, contemporary, postmodern, etc.)
- Often researchers are somewhat ignorant of recent advances in theory and theorists are somewhat ill-informed about recent Method & method!

Michael Ruse's (1999) "Mystery of Mysteries: Is [biological] Evolution a Social Construction?"

- Ruse (1999) discusses Kuhn (1957, 1962, 1977, 1993) as an alternative "social constructionist" (i.e. CHS, "historical" perspective) on the history of evolutionary theory in zoology.
- But he does not clearly indicate that what Kuhn (1962) calls "Paradigmatic Revolutions" is something that operates at the level of what Bakker calls "Paradigmatic Theory"!
- Karl Popper (1959, 1972) wrote in the 1930s under the influence of "Logical Positivism" in Vienna and did not focus on "Paradigms" so much as "Research Theory" (T-r).

Popper AND Kuhn

- Ruse (1999) concludes that both Popper and Kuhn are correct.
- But, Ruse does not make the leap to understanding WHY both are correct.
- One possible explanation is that Popper worked at the level of the “Hypothetico-Deductive Method” (H-D Methodology)
- Kuhn’s essential point is at an even more abstract level of analysis!
- Kuhn himself did not necessarily make that perfectly clear. His book was a best seller!

Hegelian “Dialectic” and Kuhn’s “Revolutions in Science”

- G. W. F. Hegel is often viewed as not being important for physical science.
- Even in social science there is a bias against Hegel’s use of abstract terms, etc.
- But the essential insight found in Kuhn is already present in Hegel’s work on the “historicity” of ideas and the evolution of our way of seeing things.
- Juergen Habermas (1968) made that “clear”.