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What Constitutes a "Good Contribution" to the Body of Knowledge?

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What is a good contribution?

Too much to read, not enough time to read it all. The purpose of scientific research is to add to the ***body of knowledge***. It is important that you understand what we mean by this term. The planned or hoped for contributions to the body of knowledge are usually found in the introduction to the report. They are commonly referred to as "objectives of the research." Authors use phrases like "This research will address…" Almost never does someone say "I have three planned contributions to make to the body of knowledge." So – you must learn to identify the planned contributions, even when the author does not clearly state them, and you must distinguish between important contributions and trivial ones. Limit your reading to those materials that ***add value to the body of knowledge.***

What is the body of knowledge and how do I decide what to read?

The body of knowledge consists of three related components.

Component 1: What we know about the topic. Almost all researchers want to add to the body of knowledge about the ***topic*** of their research. This means increasing the empirical evidence reported in the literature about the phenomenon studied. You need to be selective. There are millions of articles and only a few hours of your time available to read them. For example, I have a bibliography of over 500 articles dealing with food insecurity – and those are just the "useful" ones. So ask yourself -- what kinds of contributions to the research literature about the topic (phenomenon of interest) does a researcher want to make? Put simply -- what's "new" about this study. Often, authors justify their work with statements saying things like: "Little research about 'my topic' has been conducted ..." or "Not enough is known about 'my topic'". For example, I recently got an alert about an article claiming that the obesity crisis in the U.S. is increasing more rapidly in the Hispanic population than in the white non-Hispanic population. A major justification for the work was that "not enough is known about the obesity crisis in the Hispanic-Latino population. I went to Academic Search Premier (UF Library search engine) and entered the search string "obesity Hispanic or Latino." Only 12 publications appeared. Sure enough, there's not much published empirical data about obesity in the U.S. Hispanic population. This is a legitimate rationale for a publication about this topic. Unfortunately, this claim is often not supported by the literature. I am interested ways to address food insecurity and the many adverse outcomes it produces in poor communities. I used Academic Search Premier with the search string "community gardens benefits." I found 3,624 articles. A claim that there is "not enough information" about the benefits of community gardens hardly seems justified. I have read many articles about community gardens and potential health, quality of life, and community development impacts of gardens. I am unconvinced that any of the first 10 articles add anything new to this discussion – a conclusion based on the abstracts. **This justification is often weak.** You must be knowledgeable of the existing literature about the topic. Otherwise, you cannot know whether the claim that we need "more information about x" is

true or not. This is a primary purpose of the literature review you must conduct prior to starting a research project.

Component 2: How well we can why a given condition or phenomenon develops – what causes it – and how confident we are that the evidence we have is valid and reliable. Often, we have good descriptions of a phenomenon, but lack a well-accepted and documented explanation of *why* it occurs. There may be no accepted explanation or persistent disagreements about the explanations that we have or scientists may contest whether the evidence supporting an accepted explanation is adequate. Understanding and the quality of evidence supporting what we think we understand is what we call in research design the ***"explanatory power" of the body of knowledge.*** Explanatory power refers to both the completeness of our understanding of how and why something occurs and the overall confidence in the scientific community that there is adequate evidence of high quality to justify accepting an explanation. The researcher will often discuss filling a "gap" in our understanding or knowledge. Sometimes phrases like "provide a more robust explanation," or "explore XXX in more depth" are used. This planned contribution is often identified in a literature review where the researcher first establishes what is well understood, documented, and generally accepted by scientists and then explains what we do not understand, or the author may draw your attention to the poorly supported conclusions in the literature. You will see phrases like, "Although Y has long been proposed as the primary cause of Z, surprising little empirical evidence supporting this idea is available," or "Despite abundant research about the causes of X, there are many conflicting explanations in the literature." Controversy is critical to good science. When scientists disagree, it means that the explanatory power of a body of knowledge is under intense scrutiny. This is a *good thing,* not a bad thing. A common complaint about science and science-based recommendations are that "… they (scientists) are always changing what they say about what we should do…" When a scientific community consisting of the active researchers in a given area *change their conclusions,* it means that we understand *more than we did when we reached the earlier conclusions.* Science throws out bad explanations. It discards even very well-established ideas if weaknesses in the explanatory power that led to a given conclusion come to light. ***A major goal of this class is for you to develop your ability to assess the explanatory power of research about topics of interest to you and develop research projects of your own to address weaknesses in the scientific explanation(s) and evidence about those topics.***

Component 3: Developing theory = developing complete and consistent explanations. Theories are logically consistent explanations of the relationships (linkages) between well-defined components (constructs). Scientists do not apply the term "theory" to any proposed explanation. In science, a theory is a logical and complete explanation of a measurable phenomenon, including human behavior and ideas and including qualitative measurements, that is supported by a well-establish, strong body of evidence. In short, it takes a very long time for an idea to become a theory. Nor surprising then, very few scientists try to develop entirely new theories, but many do want to ***contribute to theoretical development.*** Sometimes the author wants to explore linkages in the theory that are not clear. For example, the strength of the linkage between attitudes (behavioral beliefs) and decisions to change behavior in the theory of planned behavior is not at all clear. Some studies show a strong effect of attitude on behavior. Others show no effect. Perhaps this component of the theory is flawed. Sometimes authors want to extend or expand a theory -- add constructs and/or linkages. For example, the theory of planned behavior does not include any construct that about the role of exposure to alternative behaviors in creating behavior change. Yet, we know from research based on other theories that this is an important stimulus to behavior change. Some research looking at whether incorporating exposure to alternative behaviors into TPB (theory of planned behavior) might

improve this theory. Sometimes researchers want to compare two or more theories. There are multiple theoretical explanations for many social phenomena. Eventually, weight of evidence that one theory (explanation) is superior should emerge. The only way to do this is to directly compare two theories in terms of how well they explain the phenomena in the same conditions. Sometimes researchers want to expand the domain of a theory. They may want to test a theory's applicability to a new phenomenon. Does a theory that explains the persistence of smoking, despite the well known health risks, also explain the persistence of poor dietary choices? They may want to test the theory with a new population. For example, we may want to know whether a theory that has been very useful in understanding adult behavior is also useful in understanding the behavior of adolescents or young adults. ***Simply using theory as the basis for research does NOT constitute developing theory. Theory development means the study focuses on improving theory.***

Beware "false" claims of theoretical development. For example, many authors extend the application of a theory to a population where it has not been used before. This may or may NOT constitute theory development. There are sound theoretical (well established) differences in the factors that affect adolescent versus adult behavior. Asking whether a given theory seems to be useful in understanding adolescent as well as adult behavior is a legitimate, even a "thick" research question. However, using a theory for "one more setting" or "one more group rarely helps ***develop theory.*** If there is evidence that the two populations differ in ways *that could affect the outcomes of a study*, the researcher has a legitimate claim to developing theory. If the author really cannot explain ***why*** s/he think the two would differ, the research really does not contribute to theoretical development. ***Do not confuse using theory and developing theory. Relatively few articles focus on theory development. If the author does not want to develop theory do not include theoretical objectives in your flow chart.***

How can you decide what kind(s) of contributions to the body of knowledge the author plans to make and whether it is "worth your precious time" to read the article? Ask yourself how the researcher will contribute to each of these three components in the body of knowledge. Not all studies contribute to all three, but any study should contribute to at least one of the components. If you identify these proposed contributions, you will almost always be able to state the research questions, even if the researcher does not do so very clearly, and they will make sense because the research objectives typically grow directly out of the planned contributions to the body of knowledge. In this course you will fill out a template I have developed to help students find the key components in a research report. The very first one is the author's objectives and I list all three types of objectives. Don't invent things. If there are no intentions to contribute to theoretical development, that's just how it is. But do ***look for*** all three types of objectives.

Some "rules" for reading research reports result from all this.

Rule 1. The researcher determines the research question. You cannot base your assessment of the contribution (value, validity, generalizability) of a study on whether you "like" or "agree with" the research question or not. It is valid to decide not to read a study because you think the question is weak. However, once you decide to read an article (you have decided it's worth your precious time), you must assess the value of the work to the scientific community based on the researcher's question and how well s/he answered it.

Rule 2. You assess the quality of the research question (and decide whether you want to read the article or not) based on the authors objectives those planned (or hoped for) contributions to the body of knowledge. A really good question will make contributions to all

three components. If you can see no justification of how answering the question will contribute to the body of knowledge, it's probably not a study worth reading.

Rule 3. You distinguish between results and conclusions and generally want to focus on the conclusions because these are generally applicable, not limited to the specific people in a study. A result is specific to a study – just what the data showed. It does not matter whether the data are "quantitative" or "qualitative." For example, a result would be that "There was a positive correlation (R^2 = 0.83) at a p-value of 0.05 between reduced cognitive function and childhood maltreatment." Another would be "Three themes emerged from the focus groups asked to define culturally appropriate healthy foods: (A) that the foods reflect the traditional diet of the family modified to reduce consumption of fat, salt, sugar and other detrimental nutritional additives; (B) that the foods reflect important aspects of group identity, such as the historic importance of root crops, greens and pulses in the diet; and (C) that the food can be prepared and served in a way that saves time for the female head of household." Conclusions can take many forms, but three are what you will see three most commonly. (1) Researchers often make recommendations for changes in practice or policy. These are generally easy to identify. (2) Researchers often state a general relationship that emerges from their findings. For example, in the first example of a result above (and depending on the supporting evidence), the researcher might conclude that "Prolonged exposure to childhood maltreatment, whether psychological, social, or physical, can be expected to have lifelong impacts on the ability of the individual to develop higher cognitive abilities." In the second example, one might conclude that: "Providing access to culturally appropriate foods is critical to improving diet in poor communities. Access to unusual foods that represent significant changes in traditional dietary patterns are apt to be poorly received…" (3) Conclusions can be drawn about the theory itself. For example, one might conclude that "The theory of planned behavior provides unsatisfactory explanations of behavior change in many arenas because it fails to include key components in the decision-making process, most importantly the influence of social norms and values well beyond the reference groups traditionally incorporated in the construct of behavioral norms. This is especially important for people who are highly engaged with broad, sometimes overlapping and sometimes quite distinct, social networks through social media."

Now, you are ready to assess the validity and overall value of a study. This is one of three course goals – e.g., ***it's important.*** But there are rules to the game. It's not whether you LIKE the conclusions; it's whether they are warranted.

Step 1. Assess the internal validity of the conclusions stated by the researcher. We can only assess the internal validity of conclusions. There is no "absolute yes and absolute no." The assessment includes both design of the study and methods of data collection. This course deals with the design considerations. Are there aspects of the design that increase confidence in the conclusions – convinces the reader that the conclusions are justified by the evidence provided. For example, it's really hard to conclude anything about whether some intervention "works" or not if there is no comparison group (people who did not get the intervention). This would raise questions about the internal validity of the conclusions. Some studies require repeated measurements. I cannot really know if you have changed your diet by asking you once about changes you made a few days or right after some educational program. Right then, hopefully, the dietary changes you want to make are on your mind. But as we all know, many things we want to change do not remain high priorities. You need a multiple post-test design to see if the change is persistent and consistent.

Step 2. Assess the external validity of the conclusions stated by the researcher. We rarely want to extend or generalize results. Those just naturally vary from study to study. We do want to generalize conclusions. Again, look at the design decisions the researcher made. Sampling

can be very important. Rarely – again almost never – do we need a "statistically representative sample of the population of the US (or anywhere else) as a whole in terms of demographic characteristics." We do need a sample that is representative of the theoretical population (the people to whom we do want to extend the results) – but these are characteristics of the population and the sample that could affect the results of the study. This is very often NOT race, class, gender, educational level, and such. We will discuss this in detail in the modules on sampling. Whatever you do, please ***do not conclude that conclusions cannot be generalized simply because the sample does not reflect the racial, ethnic, gender, income, and educational levels of the U.S. population (or that of some other any country or place place) as a whole.*** This MAY on occasion be true, but more often does not matter because we rarely want to extend a conclusion to "everyone, everywhere in the country (or county or town)." The real question is "***how far*** can we extend these conclusions?

Step 3. Assess the explanatory power of the conclusions. Are the conclusions based on a logical explanation (a theory in other words) that adds to our understanding of the phenomenon of interest? Overall, does the evidence presented in this study support the conclusions? Does the evidence in this study build on the previous body of knowledge? Remember, extraordinary claims require extraordinary evidence. In general, we expect a progression of knowledge, not a reversal of all previous evidence or the appearance of some phenomenon never before observed. Negative evidence is fine – we were wrong about X aspect of what we thought we knew. In fact, negative (unexpected) findings are the most valuable kind of evidence for scientists. But that's not the same as "Throw out all previous evidence based on one study." In short, did the logic and evidence presented in the study justify the general conclusions that were reached? Is it really something "new" or "unanticipated" that can improve future practice and research? In this class, as always, focus on the design features that support (or not) the three types of conclusions – recommendations, generalized statements about the nature of structures, processes, etc., or statements about the completeness, predictive power, weaknesses, or proposed changes to the theory.