

Comment on *Dimensions of Research*

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The article [Dimensions of Research](#) in the current issue of Sportscience provides a framework to help people conceptualise different approaches to problem solving and the acquisition of knowledge. I consider the article to be useful, timely, and worthy of publication. I wonder if the article is itself part of the beginnings of a paradigm shift in Kuhn's terms: a response to a perceived crisis with respect to the prevailing confusion amongst many research students and supervisors? The accompanying slideshow provides an excellent complement to the article. This presentation, or sections of it as appropriate, would make a useful contribution to upper level undergraduate or graduate studies in exercise science. In the slideshow, the point is well made about the need to disseminate research findings in an appropriate form. This crucial aspect of research is sometimes neglected. Some academics describe themselves as active in research yet rarely publish their work or even present it at scientific meetings. In essence, if research findings are not disseminated, the research effectively does not exist. My comments relating to particular sections of the article and slideshow are set out below.

The first dimension of research identified in the article, the nature of the topic, relates closely to the "levels of analysis" framework currently advanced as a guideline for research funding applications by the National Institutes for Health (NIH) in the USA. For instance, the [recent report](#) of the NIH Office of Behavioral and Social Sciences Research, "Behavioral and Social Sciences Research in the 21st Century", recommends that "research on health and disease must be interdisciplinary, encompassing multiple levels of analysis and integrating across levels". The NIH define these levels within a pyramid, with *social/environmental* factors as the base, through *behavioral/psychological*, *organ systems*, and *cellular/molecular* factors at the apex (no status hierarchy is implied by the pyramid). The same report also recommends that new methodologies and statistical tools be developed and employed, including "narratives and other qualitative measures [that] must be added to the more traditional quantitative ones". Hence, the call is to blur or remove disciplinary boundaries and to mix methods to match to research questions.

I realize that only brief definitions/descriptions were provided for the methods dimension, but would it be useful to extend the description of qualitative methods to better reflect the true scope? I am thinking of the addition of, for example, the broad heading of ethnographic methods, which include all of the things mentioned in the article but also different kinds of observation-participant, non-participant, covert-and the use of associated field notes.

The simplification of the ideological dimension is commendable, but some elaboration would make an important point. Burrell and Morgan (1979) identified four sets of assumptions under this subjectivist-objectivist dimension. I am not suggesting these be adopted, but their description informs a key issue in the development of the evidence base. The four sets of assumptions are *ontological*, *epistemological*, *human nature*, and *methodology*. Some researchers from qualitative and quantitative schools hold that one's conception of social reality (ontology) *determines* one's beliefs in the most appropriate ways of knowing (epistemology), which in turn determine one's assumptions about free will and determinism (human nature), and ultimately the methods and tools one adopts to answer the research question (methodology).

I feel uneasy about this philosophy, according to which a subjective as opposed to an objective view of reality (nominalist as opposed to realist, in Burrell and Morgan's terms) ontologically compels the researcher to adopt qualitative rather than quantitative methods of enquiry. According to this inflexible philosophical position, a nominalist world-view necessarily leads to an anti-positivist epistemology, a view of humans as free agents that do not respond mechanically to manipulations and, therefore, an absolute requirement for qualitative or idiographic methods. In other words, there can be no mixing of research philosophies and methods to match particular research questions.

I have debated the above problem with several researchers who refuse on ideological grounds to even entertain quantitative approaches based on alternative conceptions of social reality. No doubt some objectivist researchers similarly do not entertain qualitative methods, but in my limited experience, this purist philosophical stance is more prevalent among subjectivists. Of course, this phenomenon could well relate to the fact that the objectivist paradigm is dominant, and thus subjectivist researchers may adopt more radical or critical stances in order to promote praxis and try to shift the dominant paradigm. I have one final point regarding this section: *objective* could be enclosed in quotes or replaced with *allegedly objective*, to reinforce the notion of the value-laden nature of all science. Indeed, no work, whether subjectivist or objectivist, can justifiably claim to be theory neutral or value free. In the political dimension I would also deal with *impartial* in the same manner.

I like the notion of a multidimensional research space, in which a given study is located. The division of this space into areas that are popular, unusual but rewarding, and inhospitable is also instructive. In this section Will Hopkins gets to grips with the approach of matching research design and method to research questions. Ironically, by insisting that ontological assumptions necessarily give rise to particular research methods, some subjectivist researchers adopt a rigid stance that appears to me to be equally as deterministic as the extreme objectivist, positivist approaches they vehemently oppose. As Hopkins suggests, qualitative methods can be used to inform quantitative and vice versa, in the spirit of triangulation of multiple lines of evidence. One approach to this mixed-method research is the use of qualitative methods such as semi-structured interviews as a follow-up to larger questionnaire-based survey. Researchers often select a small sample of cases for interview based on extreme scores from the questionnaire, because these cases may provide the richest, deepest data. Researchers need to be aware that such extreme scores can be misleading with respect to the research question, because they can arise in part from random error (by the same process that gives rise to the problem of regression to the mean) and in part from factors that have little effect on the majority of subjects.

Problems with projects in inhospitable regions of research space involve not only publication but also disciplinary rivalries, researchers' comfort zones, and the publish or perish culture. However, the tide may be turning for projects of an interdisciplinary nature, involving an integration or symbiosis of approaches and knowledge across two or more disciplinary boundaries. Pressure to publish has sometimes resulted in interdisciplinary projects being broken down into disciplinary chunks and shipped to mainstream discipline journals in a kind of "several articles for the price of one" approach. Calls for interdisciplinary/multi-method approaches by major funding bodies like NIH in the USA and the Research Councils in the UK will make such research more attractive to researchers and journal editors.

With other novel approaches, the challenge is to "be creative and break rules" in order to get past the gatekeepers of knowledge that are the funding bodies, journal editors, and research grant and article reviewers. Only in this way do paradigm crises, shifts, revolutions, and new dominant paradigms arise. As the philosopher Karl Popper

remarked, “I am on the side of the search for truth, and of intellectual daring in the search for truth; but I am against intellectual arrogance, and especially against the misconceived claim that we have the truth in our pockets, or that we can approach certainty”.

The section in which the author analyses his own article using the dimensions framework is enlightening. It could be argued that the topic ‘what is research?’ is beyond the bounds of sociology alone, and requires additional insight from the philosophy and history of science. However, perhaps in making that statement I am placing artificial boundaries on the sociology discipline—after all, good sociological research is at once historically and philosophically grounded. In any event, the points in this section are well made.

In the brief critique of the unpublished manuscript of Giddings and Grant, the four paradigms identified are similar to those of Habermas (1972), who identified three main interests in the definition and acquisition of worthwhile knowledge: *prediction and control*; *understanding and interpretation*; and *emancipation and freedom*. Essentially, Giddings and Grant’s framework expands the *understanding and interpretation* factor into two categories: poststructuralist and interpretive. I agree that the terms qualitative and quantitative are more properly applied to methods and tools rather than paradigms, consistent with the previous discussion of ontological, epistemological, and human nature assumptions.

Hopkins’ statement that logic is the basis of problem solving in most case studies, whereas inferential statistics are required to generalize from sample to population, is sustainable. However, there are several clear examples in the literature of quantitative methods and analyses applied to single case or so-called N=1 designs, particularly in the biomechanics/motor control domain. Examples include Bates (1996), who presented a critical review of statistical approaches to the analysis of such designs to answer questions relating to areas such as individual performance patterns/strategies and injury mechanisms. While the generalizability of such findings may be questionable, it does make the point that case studies are not necessarily approached within a qualitative framework.

On a related point, in a recent summary of a Sportscience email list discussion on sample size issues, Will Hopkins concluded that “the best way for researchers to study an effect is for very many researchers to conduct very small studies, ideally of one or two subjects. The researchers would measure all the variables in the subject and in the environment that might modify the effect, then pool all the data into one giant study. There would be no meta-analysis of the kind currently in vogue”. It seems that such an approach may represent bridge-building across Hopkins’ *case vs sample* dimension, permitting the amalgamation of many quantitative case studies in order to derive generalizable findings. A caveat here is that, unlike traditional notions of a case study, the methods must be standardized to reduce the threat to external validity of locally specific factors.

In summary, I feel that Will Hopkins has developed a useful tool with which to analyze types of research along sensibly chosen dimensions. The article should promote further reflections on these important issues and encourage researchers to match research design and methods to the questions they wish to answer.

Bates BT (1996). Single subject methodology: an alternative approach. *Medicine and Science in Sports and Exercise* 28, 631-638

Burrell G, Morgan G (1979). *Sociological paradigms and organizational analysis*. London: Heineman

Habermas J (1972). *Knowledge and human interests*. London: Heineman

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