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### Data-Analysis Tutorial

Will G Hopkins, Sports Studies, Auckland University of Technology, Auckland 1020, New Zealand. [Email](#). Sportsscience 6, sportsci.org/jour/0201/inbrief.htm#data, 2002 (143 words). Published October 24, 2002.

I indicated in an [item](#) in the previous issue of this journal that I would be publishing more installments of a series of slide shows representing talks I have given on various aspects of research. See below for a link to the latest in the series, an overview of quantitative data analysis. The slide show is effectively a selective summary of the following topics from my [statistics website](#): summarizing data (variables; simple statistics; effect statistics and statistical models; complex models), and generalizing from sample to population (precision of estimate, confidence limits, statistical significance, p value, errors).

(Right-)click to view/download [PowerPoint](#) or [Acrobat PDF](#) versions.

Reference: Hopkins WG (2002). Quantitative data analysis (Slideshow).

Sportsscience 6, sportsci.org/jour/0201/Quantitative\_analysis.ppt (2046 words)

### Comment on Qualitative and Quantitative Research Designs [Letter and Response]

Letter: Douglas Booth, School of Physical Education, University of Otago, Dunedin, New Zealand, [Email](#).  
Response: Will G Hopkins, Sports Studies, Auckland University of Technology, Auckland 1020, New Zealand, [Email](#). Sportsscience 6, sportsci.org/jour/0201/inbrief.htm#db, 2002 (Letter 663 words; Response 629 words).  
Published October 24, 2002.

*The editor has included the author's response after each point, indented.*

As an historian actively engaged in what Will Hopkins labels qualitative research in an [item](#) in the previous issue of Sportsscience, I find his distinction between qualitative and quantitative research remarkably trite. For so few words the list of problems in Hopkins's comment is long but I shall limit my reply to six points.

1. Does qualitative research involve only single cases? Hardly. Consider Hopkins' own example, "what can we learn from attitudes to sport in the 1930s?" The Soviet, Nazi, French, American and New Zealand "systems" of, and corresponding attitudes towards sport in the 1930s certainly do not amount to a single phenomenon as Hopkins ironically implies by his use of the plural term "attitudes."

I viewed the 1930s appropriately as a single case of a period in history, and of course I had in mind an historian looking back at attitudes to sport in his or her own country. Naturally, if you want to compare independent or interdependent cultures in the 1930s, you have a series of cases to work with.

2. Generalizability, looking for predictive rules and laws, is not the sole domain of quantitative research. History, philosophy, psychology, anthropology, sociology and other qualitatively-driven disciplines also seek to confirm that which is verifiable and predictive.

Sure, anyone can make generalizations, but to do it properly you need the statistical methods that are properly labeled quantitative.

3. As Keith Davids correctly reminds us in his reply to Hopkins (Sports Science 5(3), 2001), "What's happened here" is also the basis of much quantitative research. Biomechanists investigating stress fractures in fast bowlers, or exercise physiologists investigating missed tackles in rugby will testify to that.

These examples are case series, not individual case studies. You have missed the point, which is that sorting out what happened in an individual case of injury requires a fundamentally different approach from sorting out what happens in such injuries generally. Exercise physiologists don't often investigate missed tackles, by the way.

4. Despite Hopkins's pronouncements, cause and effect analyses are common in qualitative research: what caused New Zealand attitudes to sport in the 1930s?, what caused those attitudes to change? Sophisticated comparative approaches to such questions enable "qualitative" researchers to prove their cases (Booth, 2000) with as much veracity as "quantitative" experiments.

I am not sure what the problem is here. The quest for cause and effect or other truths in single cases is fundamentally different from that in population studies. If you start making comparisons between several cases, you are engaging in a population study. By the way, you cannot prove or disprove anything other than in pure mathematics. Truth in the world is probabilistic.

5. To presume that data collection can be summed up by "observing" and "interviewing" is to ignore the enormous and disparate range of methodologies in qualitative disciplines such as history, philosophy, politics and education, to name a few. These disciplines test evidence against hypotheses in the same spirit as the quantitative disciplines of physics and chemistry. Interestingly, Hopkins seems to acknowledge this when he says, "I don't think [testing] should define the [qualitative and quantitative] paradigms."

There are two issues. The first issue concerns data collection in qualitative research. Yes, I should have included "reading [texts]" along with "observing [behaviors] and interviewing [people]". The second issue appears to be a misunderstanding of the word "test". When I wrote that quantitative researchers "test and measure", I meant that they test subjects or blood or whatever, not test hypotheses. I am a critic of hypothesis tests, which I see as inferior to precision of estimation.

6. Hopkins seems to imply that "pure" science is objective and value free. According to his definition, "pure" science may, apparently, under certain strict conditions, include qualitative research, but it is predominantly quantitative in nature. But few, if any, of the questions that scientists ask, or the answers they seek, are value free or resolved simply by "facts." The exclusion of women from vigorous sport in the nineteenth and early twentieth centuries is a classic example of values determining scientific facts. Guided by various combinations of chivalry, eugenics and political control, biologists and medical practitioners found women physiologically and psychologically unsuited to anything other than the most gentle physical exercise. This scientific "fact" underpinned numerous recommendations including one that women pass each menstrual period in the recumbent position!

I have looked through my article again, but I cannot see where I "seem to imply" anything about pure science being value free. The humorous anecdote goes down well at dinner parties, because it appears to undermine the paradigm responsible for vanquishing smallpox, putting men on the moon, inventing the computer, documenting 15 billion years of history, and so on.

In conclusion, the distinction between qualitative and quantitative is decidedly unhelpful. The terms are simply too broad to allow meaningful comparison. Both quantitative and qualitative methodologies deal with facts, generalize, and claim to discover reality and truth. For these reasons, most scholars today dismiss the distinction between qualitative and quantitative as passé. Interestingly, scholars with a postmodernist bent criticise both qualitative and quantitative “science,” or, indeed, any form of knowledge that claims access to an unquestionable reality or truth. Of course, Hopkins simply dismisses postmodernists as radicals. My comment should not be misconstrued as a defence of postmodernism; all my research is grounded in empirical facts and in beliefs about basic universal human values (i.e., truths). Nonetheless, postmodernism affords a welcome skepticism when evaluating scientific knowledge which Hopkins promotes as Holy Grail.

I agree that the terms *qualitative* and *quantitative* can be confusing, if their meanings are not well defined. My article was an attempt to clarify the meanings in terms of the nature of the research that people describe with these terms. In particular, I was adding a new perspective, that of studies of cases vs studies of samples. In your rush to criticize my view of research, you have failed to recognize the importance of distinguishing between these two fundamentally different types of study. Nevertheless, partly in response to your criticism I have written [another article](#) on the different kinds of research, using what I hope are better terms informed by a broader perspective.

I did not dismiss post-modernists as radicals. I am actually a fan of post-modernism, and have coauthored a minor paper promoting a post-modern perspective in medical ethics (St Clair Gibson and Hopkins, 2000). Radicals and other zealots are another matter.

Your concluding statement about the Holy Grail is a repetition of your inappropriate Point 6.

Finally, categorizing disparate methodologies into tidy baskets is a trivial pursuit. The primary task of all researchers is to ensure that their methodologies are congruent with the questions they ask.

It seems reasonable to me that researchers will do a better job of selecting appropriate methodologies for a given question or problem if they have a better understanding of the different kinds of research project available. Categorizing projects is one way to get a better understanding, but I accept it will be a trivial pursuit for people who already understand research so well that they always select the best approach for a project.

Booth D (2000). From allusion to causal explanation: the comparative method in sports history. *International Sports Studies* 22(2), 5-25

St Clair Gibson A, Hopkins WG (2000). Postmodernism, the law and ethical dilemmas in medicine. *South African Medical Journal* 90, 479-480

### **Editorial: Continual Publication of...?**

Will G Hopkins, Sports Studies, Auckland University of Technology, Auckland 1020, New Zealand. [Email](#). [Sportscience 6, sportsci.org/jour/0201/inbrief.htm#editorial](http://Sportscience.6.sportsci.org/jour/0201/inbrief.htm#editorial), 2002 (317 words). Published June 30, 2002.

Regular visitors to this site will have noticed a delay of several months in publication of a new issue this year. The problem was partly other demands on my time, including a move to an institution in another city and a family bereavement. And when I don't have enough time to write articles, the other main problem becomes apparent: people don't submit enough acceptable articles for an issue every four months.

I've had the occasional supportive enquiry about the next issue, but without an upsurge in submissions of good quality articles, sportsci.org will not last much longer. I get more

support for my statistics site newstats.org, so I will definitely keep putting time into that for the next few years. Meanwhile, to keep sportsci.org alive, I have decided to publish articles continually as they come in, to build up one volume for the year.

I am open to creative suggestions about dealing with the lack of articles. Rob Robergs suggested the site could be an outlet for plain-language summaries of graduate research projects. His students now have to write such a summary as the concluding chapter in their PhD theses. Great idea. The opening lit review in the thesis would also be welcome, if it's well crafted.

I don't expect people to submit original-research articles that they can publish in conventional journals with a reasonable impact factor. But if you think you have a good article that those journals have bounced for no good reason, send it to me. I've included such an article in the current issue, by a masters student (Jo Morrison) who I co-supervised with a colleague (Gord Sleivert) a few years ago. Apart from formatting, the only substantial change we've made to this paper is to include probabilities of practical benefit.

[editor](#)  
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