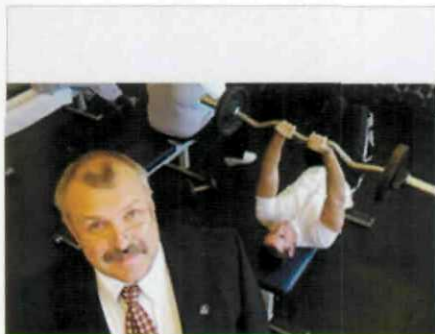




William J. Kraemer, PhD, CSCS
Column Editor

summary

The body of knowledge is the sum total of our human understanding of the world around us. Studies in the area of strength and conditioning make up one of the many fields of knowledge, and strength and conditioning professionals must understand how our understanding is created to successfully use it to optimize their professional practices, approaches, and exercise prescriptions.

The body of knowledge is the sum total of human understanding of the world around us. Each scientific study provides a building block of knowledge in a specific area of study. We look to the body of knowledge in various fields in the quest for answers to our questions.

The body of knowledge in a particular field, such as strength and conditioning, is made up of many different blocks.

The Body of Knowledge: Use and Professionalism

William J. Kraemer, PhD, CSCS
Editor-In-Chief, *The Journal of Strength and Conditioning Research*
University of Connecticut, Storrs, Connecticut

These blocks are the scientific studies. Each study is bounded by its experimental design, its controls, its breadth, and the scope of its implications. As with the quest for the perfect game by an athlete, few, if any, studies are perfect, because only so much ground can be covered and addressed. Nevertheless, a peer-reviewed scientific paper will make a contribution on a continuum of information to be contemplated, from the simplistic to the complex, from the small step in our understanding to the definitive breakthrough in our understanding, and each paper helps the body of knowledge grow and develop.

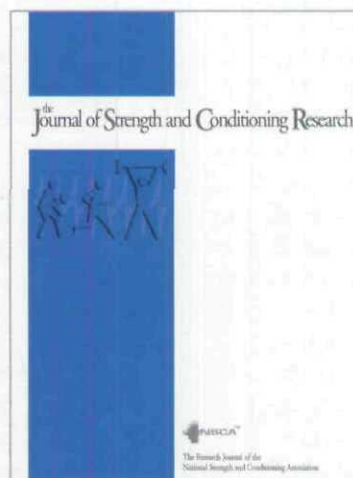
The Single Study

It is the single study that contributes to our understanding and builds the body of knowledge in a particular field.

The true scientist tries to answer questions. The true scientist is an inquisitive person—a scientific detective, so to speak. If the question can-

not be answered by the existing body of knowledge, the practicing scientist then sees the need for a scientific study. This means that a study must be designed. This involves setting up some of the conditions of the experiment we have previously mentioned, such as the intervention, the age of the subjects, their training background, their gender, etc.; these constitute the independent variables. Then, what is left is to observe how the dependent variables, such as strength gains or body composition, may change because of the intervention (eg, one or more strength training programs), compared with a control condition in which there is no intervention. In studying elite ath-

letes, control groups would be highly unethical, because withholding important training would be detrimental to the athlete's progress; thus, the challenge of doing studies in sport science. To overcome this fact, the stability of the dependent variables (i.e., making sure they can be measured



with accuracy day to day or week to week) must be established with test-retest reliability measures, or what is in statistics called the intra-class correlation coefficient or R , to show how stable the measure is. You will notice these two designs in *The Journal of Strength and Conditioning Research*, and the latter in many sport science training studies.

Once you have your study design, you have to implement it, and this takes time (sometimes a lot of time), money (sometimes a lot of money), and effort (sometimes a lot of effort) by a research team. To demonstrate this, we had our time commitment in a project for a training study analyzed for the Department of Defense, and the numbers were staggering: the study required about 28,000 contact hours with subjects, with over 100 research team members conducting one phase of the study over one year of a four-year study. So, the effort and money to add to the body of knowledge is not trivial, and scientists put their life's energy into it.

The study's results are published following a peer review process, which involves critical review by two other practicing scientists in the field. In the *JSCR* this is a double-blind review process, in which the authors do not know who the reviewers are and the reviewers do not know who the authors are. So, the results are what they are! Results can be debated and analyzed, as they are by readers. However, never diminish the commitment needed for this very demanding research process (see the Figure). The study findings then contribute to our body of knowledge.

Synthesis of Knowledge

The body of knowledge is made up of a host of studies. For some questions, only a few studies may apply, and therefore the need for more investigations becomes obvious. This implicates the breadth and scope of our understanding in various fields.

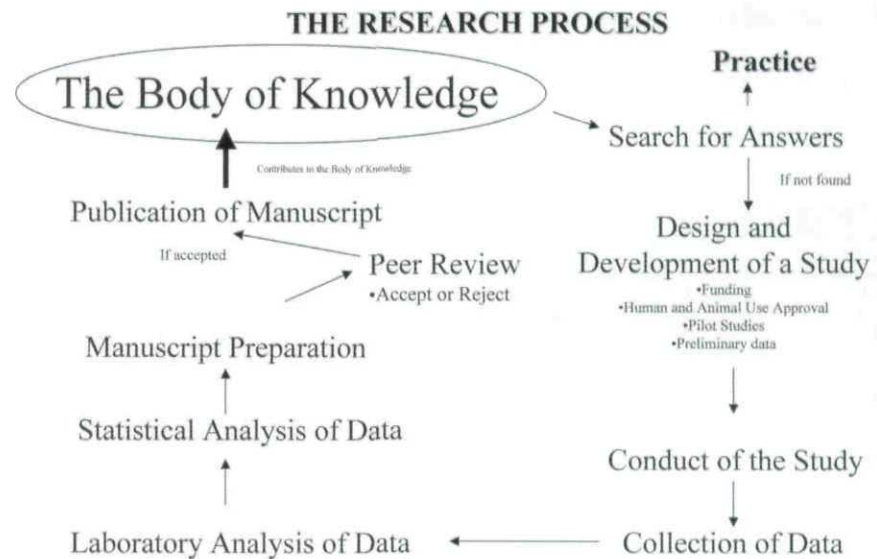


Figure. The research process.

To come to grips with certain questions (e.g., single sets versus multiple sets) within the body of knowledge, narratives in the form of chapters, books and reviews are written to synthesize its meaning. Such narrative information will be based on the perspective of the individual writing the document and that individual's experience with the field of study. In the fitness world, too often individuals with no experience at all with particular content areas write reviews and online critiques and criticize studies, without any significant credentials as scientists or even research experience in the area. For this, one can only give the consumer alert of "reader beware"!

In mainstream science, reviews are typically written by individuals who have undertaken significant scientific work in the area of study, and not by bystanders to the process. So, with such narrative documents, readers are forced to evaluate their veracity, credibility, and professionalism of the authors.

Getting beyond the perspectives and hype that some narrative documents can involve, a more quantitative way to look at the studies is with the use of

a meta-analysis. This is a time-consuming statistical analysis of studies in a field of study on a particular topic (1). Studies are quantitatively examined, removing the aspects of perspective and prejudice from the equation. In *The Journal of Strength and Conditioning Research*, we publish both reviews and meta-analyses on different topics. It is the challenge of the strength and conditioning professional to see what they say and take note of the direction in which they point, remembering the differences. No one ever said that being a professional in the strength and conditioning field was going to be easy, and the field has been hurt over the years by coaches who have tried to "dumb down" the practice of the profession; it deserves more respect.

Conclusion

The body of knowledge is filled with a host of findings that can help the strength and conditioning professional think in many different dimensions in his or her practice. In essence, the role of *The Journal of Strength and Conditioning Research* and of the scientists who spend their life energy doing studies is to con-

tribute to the body of knowledge and to improve our understanding of our strength and conditioning practices. Remember, "bridging the gap" in our profession between practicing scientists and practicing professionals is a team effort.

Your Research Challenge

In today's world, we see a lack of professionalism in people writing reviews and critiques of research. Be on the lookout for the "shock approach," for the "snotty and arrogant" reviews and critiques of the body of knowledge. Determine whether the reviewers are practicing scientists by typing their names in on "PubMed" (<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>)—making sure that you have the right person (for example, there are lots of Smiths). Such reviews and critiques are often meant to distort and discredit studies, and have a hidden agenda, whether it be self-promotion, a training mythology, corporate interests, or too much time on the writer's hands. There is a place for debate on issues, but books, chapters, or reviews need to meet a level of professionalism devoid of the personalization and "attitude" used by a few today. This "attitude" only stops when professional standards are kept high and debates are kept positive and professional in nature and are not degrading. As practicing scientists, we are well aware of the fact that none of us have done the perfect study, and criticism is part of our everyday lives, but constructive criticism and debate on a positive professional level to see how and what a study contributes is what you should look for. Otherwise, we drag our profession down to a lowest common denominator, and something is being hidden with the snooty attitudes, shock, and attack approach. Readers, beware of this type of document! ♦

References

1. Rhea, M. Synthesizing strength and conditioning research: The meta-analysis. *J. Strength Cond. Res.* 18: 921–923. 2004.

Don't Miss Out

Take advantage of ALL your membership has to offer. Here at the NSCA, your membership dollars support a full menu of benefits and services, including two highly respected publications, *Strength and Conditioning Journal* and the *Journal of Strength and Conditioning Research*. Other benefits include:

- National Certification Program
- Career Services
- National Conferences and Clinics
- Regional Clinics
- Personal Trainer's Referral Program
- Liability Insurance
- Health and Life
- Contract Review
- Distance Learning
- Scholarships and Grants
- Online Journals and Articles
- Education Recognition Program
- Educational Materials
- Special Interest Groups

New and Improved!

- Education Financing Program
- Credit Card Program
- Rental Car Program



For further details on these member benefits, contact the Membership Department at 800-815-6826 TODAY!

Ideas?

If you have ideas about new membership benefits, please contact your Membership Committee Chair Mark Roozen at mroozen@itexas.net or Membership Director Karri Baker at kbaker@nsca-lift.org.



NSCA National Strength and Conditioning Association

800-815-6826 • www.nsca-lift.org

Copyright of Strength & Conditioning Journal is the property of Alliance Communication Group and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.