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PERISH

THE THOUGHT

BY LON KILGORE

Lon Kilgore explains how the pressure to publish has created libraries full of useless exercise-science publications.





Why doesn't exercise science answer even the most basic questions about creating fitness?

In answer, many publications in recent years have pointed out problems in exercise science:

"Paradigm Lost"

"Conventional Wisdom and the Fitness Industry"

"Exercise Science Is not a Sound College Investment"

Some of these pieces have been written without an understanding of the inner workings of modern academia, while some are written from within the belly of the beast.

Although it's tempting to lay blame for the shortcomings of the exercise-science field at the feet of university faculty, it's not necessarily academics who are the sole problem; the modern university system has played a large part in whatever shortcomings exist. A number of issues in modern academic administration have created the current perception that exercise-science publications are inadequate and even meaningless.

Tenure and Promotion

As an academic device, tenure is often misunderstood. Although it's defined as holding an academic post on a permanent basis without periodic contract renewals, it is not intended to signify a cushy slide into retirement. Rather, it is intended as a safeguard for academic freedom of speech, and it is both reward for a proven career and stimulus for additional productivity. Tenure can open doors to lines of thought and research outside the norm, and it ensures employment is not terminated due to controversial research or thinking outside the box.

In general, tenure is not easy to obtain. Every young assistant professor has to prove himself or herself in three areas: teaching, research, and service to the profession, university and community. After about five years of employment—this term varies by university—an assistant professor is eligible to apply to the university for the award of tenure. This timeframe is essentially aligned with the time required before an assistant professor can be promoted to associate professor. As such, these applications generally go forward at the same time: You can apply for tenure, apply for promotion or apply for both.

Specific to the research component, it is publication, or, more pointedly, the number of publications and grant dollars obtained, that determines success in this area of application evaluation.

Most universities will only say publication is required and do not provide a specific expected number of publications for someone moving from assistant to associate professor or from associate professor to professor. This provides a great deal of leeway, uncertainty and potential bias for the reviewing committee when determining promotions. Some universities provide very specific guidelines. One notable medical school, [Duke University](#), has published guidelines for tenure and promotion that require a minimum of 25 publications for promotion to associate professor with tenure. That works out roughly to one experiment and one published paper every 10 weeks for the first five years of employment. Even if half this productivity rate was required—it often is—it represents a large undertaking.

What happens at Year 5 if an assistant professor applies for tenure and does not receive it? The candidate is provided a second opportunity within a certain period—frequently one year—to strengthen the application and resubmit. If it fails the second time, that generally marks the end of the applicant's career at that university, as he or she will need to seek employment elsewhere and begin the promotion-seeking process again. The pressure to publish successfully is overwhelming because employment and financial stability are at stake.

Nobel laureates from less than 50 years ago have suggested they would not be able to meet current standards in frequency of publication

It hasn't always been this way. Nobel laureates from less than 50 years ago—such as Peter Higgs and Sydney Brenner—have suggested they would not be able to meet current standards in frequency of publication and grant acquisition. This suggests tenure and promotion are no longer a means of providing the best and brightest with the academic benefits that allow them to meaningfully extend knowledge. Brenner commented on a host of problems in the scholarly world in the [Kingsreview.com](#) article "How Academia and Publishing Are Destroying Scientific Innovation: A Conversation With Sydney Brenner."



The calm, stately face of universities hides a pressure-filled environment in which frequent publication is part of the relentless struggle toward tenure and promotion.

Tai Randall/CrossFit Journal

Even if the process does not fulfill its noble intent, getting tenure is a watershed moment in an academic career because it establishes professional and personal stability. Due to publication pressures, it also unfortunately provides a stimulus for poor and often-meaningless research, shoddy paper production, and, as we have seen in the headlines, data manipulation and fraudulent papers.

It's easy to criticize exercise scientists, but they are simply following their job descriptions—at least the majority who are not manipulating data or writing fraudulent papers. These job descriptions are created by university committees run by committees. Brenner has an interesting and insightful take on university committees in the previously mentioned Kingsreview.com article: “Nothing happens because the committee is a regression to the mean, and the mean is mediocre.”

So it appears following committee guidelines creates an environment where average is excellence and mediocrity is framed as cutting edge for PR purposes. Institutions of higher education seem to have devolved from places of thought and experimentation to factories characterized by bureaucracy and standardization.

Follow the Money

Two types of money are important to all academics: salary and grant funds. Despite popular portrayals in film and TV, the academic's life is often far from affluent. In some places, academic offices approximate a call center. In others, several academics share a small office space, while others might have a private but very small office equipped with shoddy furnishings that were the result of a lowest-bid government contract some decades prior.

While media makes it seem as though academics make a great deal of money, the average starting salary of exercise-science educators has been published on numerous job-search and academic websites at between US\$43,000 and \$61,000—the low end of the scale for all disciplines of higher education. To put this into perspective, here are a few numbers from the U.S. Bureau of Labor Statistics and Inside Higher Education:

- The overall (across all occupations and demographics) U.S. average gross annual income is \$47,000.
- The U.S. average gross annual income for anyone with an associate's degree is \$41,184.

- The U.S. average gross annual income for anyone with a bachelor's degree is \$57,252.
- The U.S. average gross annual income for anyone with a master's degree is \$68,952.
- The U.S. average gross annual income for anyone with a doctorate (excluding medical doctorates, juris doctorates and so on) is \$82,732.
- The average academic faculty member works 61 hours per week.

Considering the average starting wage of \$43,000-\$61,000 and the fact that the majority of exercise scientists have a doctorate, it is important for these educators to move up the ranks as quickly as possible. With the average annual academic-merit salary increase of 2.1 percent, it takes someone at the low end of the salary scale five years to bring the salary up to the national average for all workers. This is especially important when you consider academic debt load.

According to The Institute for College Access and Success, almost 70 percent of graduating seniors had student loans in 2013, with the average debt being \$28,400. Add on \$58,000 of post-graduate debt and you have \$86,400 of long-term debt. This equates to payments of approximately \$1,006 per month for at least the first 10 years of professional life at current rates. Given the starting salary of \$43,000 listed above, 28 percent of the pretax monthly income of \$3,583 is gone before taxes, insurance, housing, food, transportation or any other living expenses are considered. Factoring in the 61-hour work week noted above means the gross hourly rate of a fledgling academic is between \$18 to \$26 per hour—a decent rate but hardly supportive of Hollywood's portrayal of the professorial lifestyle.

And we can't forget the overall economic picture. Economic inflation rate for the past century has averaged around 3.22 percent. That means the average 2.1 percent raise ensures academics regularly go backward in economic well-being if they do not get promoted.

These salary pressures drive academics to aggressively climb the ladder, and they must publish regularly to gain tenure and promotion. Already burdened with teaching and service requirements, academics are not provided the time or support to conduct intensive, large-scale experimentation that would support creation of a major opus of exercise science. Instead, they are rewarded for numerous small and rapidly created



reports of research. These reports provide the most efficient way to meet publication requirements and eliminate the possibility of the elegantly designed research of the past.

The other type of money important to an academic is extramural funding—money obtained from external sources to aid in the conduct of research or in support of some academic activity or program. Obtaining a grant or many grants is critical to obtaining tenure and promotion. Even though the current state of exercise science and exercise-science journals enables publication of small-scale, unfunded research, tenure and promotion committees use grant acquisition as a quality standard when evaluating the research conducted by faculty. If academics are able to attract funds, their research is deemed to be of acceptable quality.

But the world of grants is very murky. In a grant application, the researcher creates a budget to conduct the proposed research, and the university will then add on an “overhead” budget line that can be half or even up to two-thirds of the proposed research budget. Overhead is touted by university administration as the price of supporting researchers by bearing the costs of utilities, administrative salaries and building depreciation. Therefore, active and successful grant writers pay for their own research and contribute to overall university operations.

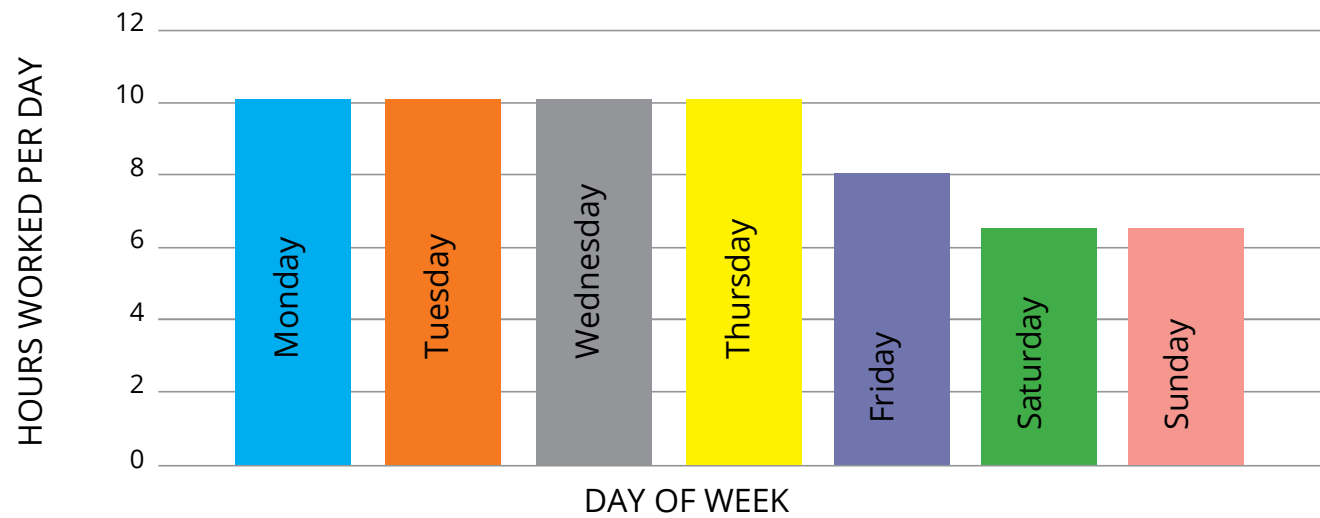


FIGURE 1: A typical academic workday. (Source: The Blue Review and author's professional experience.)

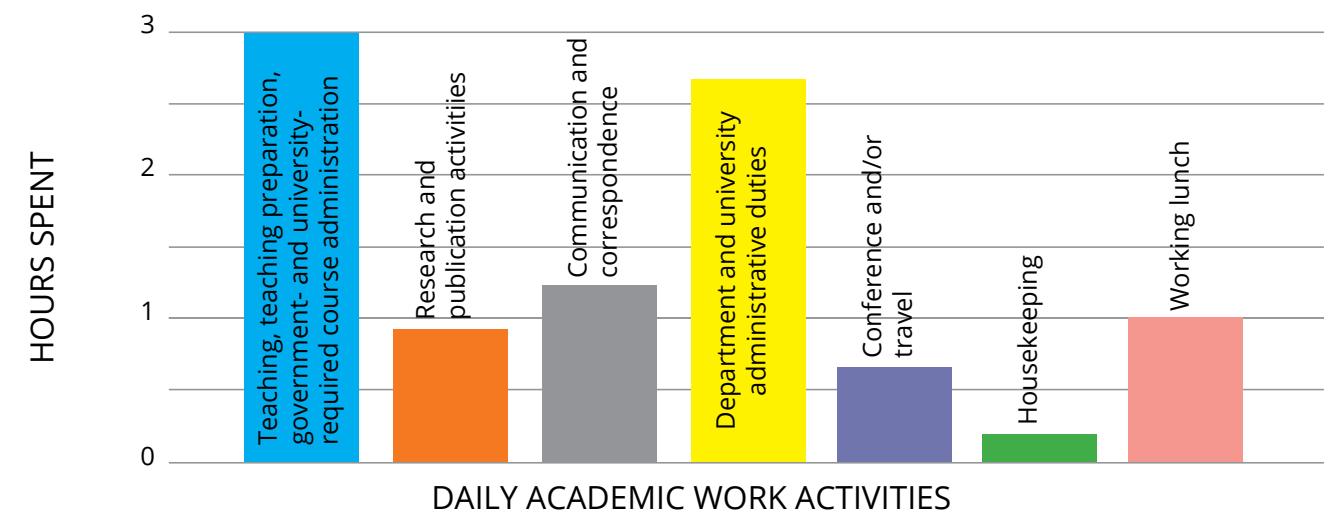


FIGURE 2: A typical academic work week. (Source: The Blue Review and author's professional experience.)

The public perceives exercise research as a sort of sexy topic, and people generally believe lots of organizations and businesses want to spend money on exercise-and-sport research, but this is not the case. For the majority of the last half-century, it has been the shared experience of exercise scientists that almost no grantors were willing to fund research if the focus was sport performance or fitness. Exercise research was only funded as a tool for investigating health and medicine.

Only about 21 percent of all grant applications actually get funded, according to National Institutes of Health data. In this environment, funding sources such as the Gatorade Sports Science Institute became major players in the exercise-science field because money was available for research into their products and for development of new products.

Think about what companies benefit from research identifying the best methods for becoming fit or better at sports. Are they fitness-machine companies? Barbell manufacturers? Supplement companies? Professional sports organizations? Cost-benefit issues generally preclude such companies from speculating in research support and drive them instead toward creative marketing. While there are instances of small investment in research by exercise-equipment and supplement companies, they are very few and far between. Gatorade, however, spends a great deal on sports and fitness research, as it pioneered funding exercise science as a tool for product promotion and development.

It is a rare instance that academics interested in research in fitness or sports performance will find significant funding in their specific area, so exercise scientists are forced to seek very small grants for very

small studies, do research with no funding or seek research funds for projects that don't directly support their primary interest. In a worst-case scenario, they change their area of specialization completely in order to move toward tenure and promotion. Interestingly, a history of publication relevant to the proposed research is required when seeking grants, so once again we see academics are financially tied to regular publication.

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All this does nothing to produce a cohesive body of excellent research that would help the public get fitter. Instead, the overall output can be characterized as the fractured product of those who are using research—anything that can be published—as a means to climb the academic ladder and escape debt. Obscure studies with no practical application dot the landscape. Questionable or lazy research can be found with little digging. Outright fabrication is exposed all too frequently. And even the best research might have been done better with less artificial pressure to publish and more time and resources.

And in those rare cases in which excellent research has been completed and published, its limited accessibility often removes any impact.

Every exercise scientist wants to believe his or her work will somehow make a difference. But the likelihood of a single paper creating change in the fitness industry is small. The obsequious nature of academic writing, the lack of public availability of the articles, and a frequently perceived lack of relevance mean exercise-science papers are written for other exercise scientists and will generally have little or no effect on fitness professionals.

Many academics will argue that their work is easily accessible, but the majority of research articles are guarded by their publishers and can only be read for a subscription fee. The average price of a subscription to a scholarly periodical in the U.S. stands at \$1142—a great expense considering that many of the journal's articles will be of no interest to a fitness professional. In most cases, journals can be accessed on a per article basis, but will a personal trainer pay \$35 to buy access to a single eight-page research paper? Can he or she afford to read even a dozen papers in a year? A dozen papers—\$420 at \$35 each—would represent a microscopically small fraction of 1 percent of the papers published in exercise-science journals in any given year.

If it is unlikely fitness professionals are the intended audience of exercise-science papers, exercise scientists must be the primary target audience—at least sort of. Academic journals are rated by “impact factor,” a squishy statistical assessment related to how many times an article is cited by other publications. Articles in publications with a higher impact factor are assumed to be of higher quality. Publication in higher-impact journals is used primarily to make a stronger case for tenure and promotion.

The lowest score is obviously zero. The current maximum value of a journal is 54.4 (New England Journal of Medicine). The average impact factor of exercise-science-related journals hovers around 2.3, according to my research—definitely not a stellar impact. Explore impact factors for a large selection of exercise-related journals [here](#). It also has to be understood that a large number of exercise-science journals are not included in impact-factor calculations (for a variety of reasons), so the actual average impact factor is likely much, much lower than current figures. Based on these figures, exercise scientists appear to be the only readers of exercise-science papers, and those papers are not read often, so their utility in informing practice or future research is very low.

Academic publication is a requirement for tenure and promotion at universities, but where the publication appears generally has only a moderate effect on the process, and actual readership has none whatsoever.

A number of factors have combined to create chaos the public apprehends but academics do not: the artificial but required link between publication and professional progression, the fragmentation and lack of overall disciplinary direction in exercise science (see “Paradigm Lost”), the disconnect between exercise academia and true practical application, and the failure of the peer-review system to create a reliable and approachable collection of publications on exercise science (“Peering Through the Academic Blinds”). Those in academia are simply following the rules, doing their jobs and working toward success as defined by their employers. They are operating within the given parameters of the system. They are excellent employees.

The rest of the world has historically looked to academia for answers, but being given incomplete or irrelevant information creates professional chaos and generates a list of important questions.

Where is the trustworthy information on which to make decisions about fitness practice? If the clinical or disease-related aspects of exercise are researched most frequently, can those findings legitimately be generalized to apply to the healthy gym-going population? How can practitioners in the field defend themselves against criticism and legal action if there are few areas of academic data and practical agreement?

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Fixing What's Broken

How can the publication process be fixed?

Asking and researching questions relevant to the practicing trainer would be a start. Scientists have a stake in this renovation because they are the source of all data and publication. It is only through their efforts that we can realize improvement in research and publication. They must gather together to demand that universities provide them with the time and resources to publish quality and meaningful research that is of use to more than tenure and promotion committees. And they must demand that those same tenure and promotion committees are charged to treat applicants fairly in evaluation of their pursuit of realistic publication demands.

If exercise science is to occupy a place in the ivory tower, then academics must be encouraged and nurtured to produce larger, deeper, more relevant and more applicable research projects and papers. We need to end the myopic mad dash for publication to earn tenure and promotion. Even though this approach requires more time applied to single projects, the quality-over-quantity mindset might reduce the artificial and overwhelming pressures of publication and funding, which can only benefit academia, the fitness industry and the public.

Exercise-science journals need to participate in change. The acronym-riddled perfunctory method of journal writing needs a facelift. Endless acronyms and the word-limited, short, terse structure of scientific papers is a function of the cost of old-school typesetting and printing—processes no longer relevant in our world of technological marvel and cloud storage.

Exercise-science journals need to allow scientists to write for clarity and understanding by people who are not exercise scientists. Peer review—held up as a gold standard but very much in need of reconsideration—needs to be refashioned into a functional means of quality control or abandoned for some other model.

Exercise scientists need to publish useful data in outlets that are affordably accessible to a real target audience. This can be accomplished through open-access journals and by publishing accounts of how data and research can be applied in journals and magazines fitness professionals actually read. Doing so would push vague pseudo-science, fluff and product placement to the back pages of these magazines and give them renewed relevance to the fitness industry. Publishing academic research in fitness-related blogs will wrinkle the noses of stodgy professors who are satisfied with the status quo and believe they currently connect with fitness professionals, but we need to try new avenues of dissemination so we can succeed in finally getting information to people who will actually use it.

This is where university tenure and promotion regulations must be altered and committees must change their approach. Only within the past decade has online journal publication been viewed as academically legitimate. Publication in fitness magazines and blogs has not and still does not count toward publication credit at all. Yet if a university truly wants its exercise academics to deliver data and a message to the world and make a difference in the fitness industry, these types of publications should be counted toward tenure and promotion.

If universities fail to modernize publication requirements and exercise academics continue to have publication dialogs with only themselves, nothing in the fitness industry will change, and exercise science will continue to become marginalized to the point of irrelevance.

That is a waste of academic talent and of no benefit to anyone. ■



Restricted by quotas and archaic methods of publication, many exercise scientists fail to push the discipline forward and increase knowledge.

Mike Markentin/CrossFit Journal

About the Author

Lon Kilgore graduated from Lincoln University with a B.S. in biology and M.S. in kinesiology from Kansas State University, and he earned a Ph.D. from the Department of Anatomy and Physiology at Kansas State University's College of Veterinary Medicine. He has competed in weightlifting to the national level since 1972 and coached his first athletes from a garage gym to national-championship event medals in 1974. He has also competed in powerlifting, the first CrossFit Total event, wrestling and rowing. He has worked in the trenches, as a coach or scientific consultant, with athletes from rank novices to professionals and the Olympic elite, and as a collegiate strength coach. He was co-developer of the Basic Barbell Training and Exercise Science specialty seminars for CrossFit (mid-2000s). He was a certifying instructor for USA

Weightlifting for more than a decade and a frequent lecturer at events at the U.S. Olympic Training Center. He is a decorated military veteran (sergeant, U.S. Army). His illustration, authorship and co-authorship efforts include the best-selling books "Starting Strength" (first and second editions) and "Practical Programming for Strength Training" (first and second editions), "Anatomy without a Scalpel," "FIT," and recent release "Deconstructing Yoga," magazine columns, textbook chapters, and numerous research-journal publications. His professional goal is to provide the best quality, most practical, most accessible and highly affordable educational experiences to fitness professionals through his university work and through his curriculum-development work for universities and for continuing education for the fitness industry. His students have gone on to become highly notable figures in weightlifting, powerlifting, cycling, fitness and academia.