The impact of PhD training

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In the following paper, Choi et al.¹ set out to present the reader with evidence for two questions they believe are of keen interest to academic neurosurgeons—firstly, how to pick future academic neurosurgical winners (as they define it); and secondly, what prior data are reliable predictors of future performance in scholarship. Armed with this evidence, can one proceed to propagate this rare species? Of course, we are interested in both issues, certainly academic headhunters (program directors seeking medical students for residency slots and deans and chairs seeking new faculty to populate their lower academic ranks) are.

Let us first review the question of whether the PhD degree helps in picking academic winners. The question is, do Choi et al.¹ present us with that secret formula? It is indeed fair to say that the answer has been equivocal up till now, with proponents and opponents alike. In his book Moneyball,² Mr. Lewis examined the somewhat related question of picking baseball players and provided evidence that the collective wisdom of baseball insiders is subjective and flawed and that picking successful prospects was better accomplished—more cheaply and more efficiently—by using more analytical gauges of player performance. In this regard, the analysis of the value of the PhD metric is consistent with the Moneyball thesis. Moneyball takes us though the story of picking winners in baseball and presents persuasive data that the time-honored paradigm of raincoat-clad talent scouts stalking minor league teams can be replaced with data-driven formulaic methods that are purely objective in their derivation and deduction. Does the mere possession of a second degree, specifically the PhD, carry sufficient weight per se to dispense with other metrics or the gestalt of a program director with 10, 15, 20, or 30 years of experience in picking winners who would thrive in top-tier academic programs, or does the degree merely serve as proxy for the real qualities and circumstances of the candidates who ultimately succeed in an academic neurosurgical career, with or without a doctorate degree?

As we lift the veil of the somewhat persuasive number crunching adduced by Choi et al.¹ to answer this, one question immediately jumped to my mind. After a couple of readings, I still could not find the answer. Here is the thinking: neurosurgical programs are somewhat unique in that they at least provide, if not outright require, 1 or 2 years of research, often basic or applied but sometimes clinical. When done properly, as is the case at top-tier academic programs (such as those in the authors’ paper), this research time can be enriching and productive, complete with a buffed research grant, mentor, and resource-rich environment. It also often comes with the added advantage that it is specific to an applied neurosurgical or closely related basic question that it really engages the resident more significantly than a more oblique PhD thesis project in a lab that just happened to be most convenient at the time. The authors did not parse the MD-only cohort into those who went through this intra-residency research pathway and then directly compare them with the MD-PhD cohort that did or did not have this intra-residency rotation. The hypothesis is that the PhD degree would not confer an advantage over the MD degree combined with proper research training. The comparison would be illuminating in that it would likely adjust for some of those troubling confounding variables they mentioned, such as motivation, opportunity, and so forth, by more directly isolating the effect of a PhD degree and allowing the question to be more distilled. Of course, it would not be perfect. (What analysis is?) We would probably find that the “PhD effect” diminishes or even disappears, as the equally preparatory effect of a 2-year mentored stint in a rigorous, resource-rich laboratory at a top-tier academic program may annul the PhD effect. In fact, Choi et al. did find that to be the case, even without performing the additional analysis I suggest. It is, in fact, not a trivial question; if we did find that both options were equally effective, it would clearly be more cost- and time-effective to proffer the MD degree with 2 years of intra-residency research training. Moreover, with the trend toward a contracted core neurosurgical training that allows room for enfolded fellowships or research, this intra-residency research pathway could then be the de facto avenue for those seeking long-term academic careers. Of course, I do not have the data, but certainly Choi et al. may or can at least procure it and perform this additional analysis. An addendum or a future letter to the editor on this analysis would be welcome to this commentator.

There are other notable findings in their paper. For example, the PhD effect seems to undergo attrition over time in that, among neurosurgeons who had received at least one NIH grant, there was no statistically significant
difference between MD and MD-PhD holders (2.2 vs 2.3). This also means that the well-prepared MD candidate catches up—another point in favor of the intra-residency 2-year research training model. It should also serve as caution; current trends and recent history can also be dangerously misleading. In his book *The Black Swan*, Taleb uses the Thanksgiving turkey that is being prepared for slaughter to illustrate the point. From the turkey’s vantage, the butcher serves up a daily meal and is a nurturing caretaker until, of course, the day of slaughter when the butcher reveals his true intentions and the turkey comes face to face with a personal black swan event. Leading up to the denouement, the turkey clearly misinterprets what is happening. The moral of the story, according to Taleb, is that “it is not a good idea to be a turkey,” but he adds that statistics and numbers often turn us into our own version of the proverbial turkey. “When you have numbers, you tend to take greater risks, even when the numbers are totally random.” In reality, the conditions that led to a given record of past performance may no longer exist by the time the new performance (future) begins. The expectant, hopeful observer is lulled into a false sense of security by repetitive results only to be shocked into reality when they do not materialize.

From the sex perspective (their Table 2), we find that the proportion of females in neurosurgery has nearly doubled (from 7.5% to 12.5%) in the period under study. Furthermore, the proportion of female PhD holders has decreased from 32.1% among neurosurgery residents recently graduated to 21.7% among residents currently in training. Taken together, both sex data points confirm other observations of a growing attraction of females into the neurological pool. This is welcome news.

In spite of the usual caveats and limitations, most of the authors’ findings are reassuring and in line with our intuition and hunches. (http://thejns.org/doi/abs/10.3171/2013.8.JNS131489)

**Disclosure**

The author reports no conflict of interest.

**References**


**Response**


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We thank Drs. Dacey, Oyesiku, and colleagues for their interest in and accompanying editorials to our paper related to the impact of PhD training on academic pursuit and grantsmanship among neurosurgeons. According to their comments, there appears to be a general consensus that obstacles for academic neurosurgeons are rapidly evolving and that careers in research have become increasingly difficult owing to a number of these changes.

As competition for the pool of funds from the NIH and private foundations becomes more intense, the ability of neurosurgeons to compete effectively in this arena must increase accordingly. One modifiable factor for grant applicants in the race for funding is additional training dedicated to research, such as that pursued in doctoral studies toward a PhD. However, as Dacey and colleagues describe, a PhD certainly represents only one of several ways to achieve this end; supplementary professional programs that foster innovation, such as those for clinical investigation or device development through the engineering sciences, will continue to represent major opportunities for advancement for neurosurgeons in the years to come.

In addition, we thank Dr. Oyesiku for his insightful comments supporting the further expansion and improvement of the dedicated research training years that are already in place at most neurosurgery residency programs throughout the country. These would provide yet another opportunity for neurosurgeons, several with MD-only training, to gain the necessary experience to thrive in a fast-paced, highly competitive academic environment. In future studies, subgroup analyses of such MD-only neurosurgeons may yield additional personal and professional factors (for example, number of papers, mentoring interactions, time spent in laboratory training) that could be considered as predictors of eventual academic activity and productivity throughout an individual’s career.

In summary, aside from a PhD, there are probably several factors that can be associated with a long-standing commitment to excellence in academic neurosurgery. Thus, one critical question at hand may not simply resolve around “how” we should train the next generation of neurosurgeons, but rather “why” the education of the next generation of neurosurgeons represents such a critical issue. One of the reasons we believe this subject is particularly relevant is the quality of current neurosurgical literature, which often lacks Level I evidence and as such does not adequately reflect the talent and commitment of scholars that our time-honored profession attracts. That is to say, for a specialty that recruits the best and the brightest, it is unfortunate that so few of our studies reach the level of impact to set standards for physicians and researchers in other fields, many of whom may eventually design the very trials that seek to contrast their therapies against our own.

Certainly, a PhD degree could serve to arm future neurosurgeons with the necessary skills in scientific methodology to enhance their academic performance not only within the field of neurosurgery but also on a global scale—all with the end goal of becoming the best critics of our own studies as well as those of others and in turn demonstrating real advantages that translate into better outcomes for our patients. Intra-residency research years