Commentary: Go down the rabbit hole!

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Gregory D. Rushing, MD (left), and Nahush A. Mokadam, MD (right).

Central Message

Initial experience should be broad, mentored, and balanced to build a successful foundation for a career in academic cardiothoracic surgery.

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Chaos theory has been described in a variety of settings in nature. Although it is commonly understood to induce a “hurricane in Texas” from a “butterfly beating its wings in Brazil,” the mathematical basis for this is far more complex. Chaos theory has been subsequently applied to evaluate social, engineering, and medical sciences.¹ At its heart, chaos theory describes nonlinear dynamical systems.² The theory brings individual components of a system together and has them interact. In doing so, their sum is much greater than their individual parts. These individual components change with time and clearly do not follow simple rules. The longer the relationship, the more varied are the outcomes. Every system, however, is fundamentally dependent on its *initial* conditions.³ Because measurement of real-world conditions is never absolutely accurate, these interactions commonly produce unpredictable and often divergent outcomes in what might appear to be a random manner, making any forecast of this process challenging and often leading to unanticipated results.

In this issue of the *Journal*, Coyan and colleagues⁴ have submitted a Young Surgeon’s Note describing the importance of early career focus for academic pursuits. Coyan and colleagues⁴ have assembled a thoughtful argument that is based on expert opinion, survey results, a handful of retrospective analyses, and real and perceived challenges in the current funding structure. There is a clear and appropriate emphasis on mentorship, which is invaluable for any career path. They implore us to advocate for statistical analysis, study design, scientific writing, and grantsmanship in medical education and residency training. Outlined is a paradigm for the early-career surgeon-scientist to evaluate employment opportunities, to obtain seed funding, to seek early investigator mentored research awards, and to develop of a sustained research strategy. The pathway described by Coyan and colleagues⁴ maintains ongoing focus as a young

career progresses and ultimately culminates in successful grantsmanship and overall achievement.

If we are to believe the concepts embedded in chaos theory, we would be wise to guide our young faculty to maximize their *initial* conditions, to maximize their possibilities, and, until they have achieved true focus, to add more *initial* conditions continually. In essence, say “yes to everything,” at least early on. This can be applied to clinical as well as research progression throughout a career. Academic surgeons tend to work at tertiary and quaternary referral centers. Early exposure to and mentorship in approaching a variety of complex problems is important to development of surgeons who will competently manage and balance the high clinical acuity of cardiothoracic surgery with academia. Broad clinical and research endeavors, particularly when coupled with one another, can lead to a rich experience. Focus of academic pursuits, when rooted in experience, will then be strong enough to withstand the rigors of academic pressures. We should deliberately go down the rabbit hole early in our careers, because our futures depend on it.

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