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Opinion

The growth mindset in Neurosurgery: apropos Evandro de Oliveira

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This paper explores the significant contributions of Evandro Pinto da Luz de Oliveira to the field of international neurosurgery. Through his dynamic leadership and global representation, de Oliveira has performed countless surgeries, many of which have been documented in instructional videos. His mastery of microsurgical techniques has been shared worldwide through his educational courses, further solidifying his influence in the neurosurgical community. Moreover, de Oliveira's notable scientific publications have left a lasting impact on the field. He founded a Microsurgical School, which has dedicated and enthusiastic members worldwide. This article focuses on a less tangible yet profoundly influential aspect of de Oliveira's legacy: his mindset. By examining de Oliveira's approach to neurosurgery, this paper aims to shed light on the intellectual and philosophical underpinnings that have driven his remarkable career and contributions to medical education and surgical practice.

Keywords
Mindset, Education, Neurosurgery, Microsurgical Anatomy Lab

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Evandro Pinto da Luz de Oliveira has made his mark on international neurosurgery through his leadership, his representation, his countless surgeries - many recorded in didactical videos; his microsurgical techniques - taught around the world during his courses, as well as his landmark scientific publications. Dr. de Oliveira has created a Microsurgical School that has distinguished and passionate members in Brazil and several other countries.

This paper delves into a more subtle - but no less impressive - contribution of his: Evandro´s Mindset.

What is mindset?

Mindset is a concept the social sciences have been unveiling for the last 15 years (1). These notions have grown in importance and evidence and are taking space in educational policies in the US and several other countries (2, 3) and are centered on the notion that we function based on our mindset.

The mindset is, therefore, the belief we have on the capacity we or other people have. These views, acquired throughout an individual's life, profoundly affect the way they lead their life, cope with failure, and expose themselves to new experiences (1, 3-5).

Mindsets are at the center of the educational discussion and share seeds with the study of Theory of the Self, Resilience and Motivation (1, 3, 4, 6-8).

For the sake of simplicity, mindsets can be arbitrarily divided into two types: 1) fixed and 2) growth mindsets (9).

People can have different mindsets in different areas; and mindsets themselves are not stable, as they can change according to different phases of life or in response to triggers.

In the fixed mindset, abilities, skills, and talent are fixed – usually thought to be defined at birth - and cannot be significantly changed by effort and/or training (Figure 1A). In this mindset, people are "either-or" and if their skill is found lacking, or below their own expectations, they frown away from challenges that may not validate their inner assumptions (4) avoiding exposing themselves. In the fixed mindset, a person considers the outcome (failure is "irreversible and final"), while the process - and the learning it may bring - is wasted on them.

In the growth mindset, on the other hand, people are turned on by challenge (6) and are willing to put in effort as their fundamental belief is that effort ignites ability/skill (8) and makes it grow no matter what the ability/skill was in the first place - there is a sense of enjoyment in stretching one's abilities/skills (Figure 1B). Failure, in this case, does not define a person – it is a problem to be faced, dealt with, and learned from.

Why is surgery a fixed-mindset field?

In surgery there is a widespread belief that a person must have talent. Talent being defined here as an innate ability that favors and defines people, setting them apart from others.

Some admit that, up to a certain point, talent can be enhanced by practice - but if no talent is present, it is advisable to plan on another career. In neurosurgery, it is frequent for talent to be praised, neglecting the fact that motor skill development involves training abilities that span from focus to dexterity (Figure 1A-B).

There are also other fixed beliefs in our field that are passed on from senior to junior neurosurgeons almost imperceptibly, more in some centers than in others and this includes the notion that the main part of a procedure is the important part of it and, therefore, the others can be accomplished by less talented surgeons and even that some subspecialties in neurosurgery are more special than others and destined for a handful of neurosurgeons (Figure 1C-E).

In surgery - in general, and neurosurgery - in particular, there is also the belief that, after a certain point in their careers, surgeons are ready (Figure 1F). Nothing else remains to be learned.

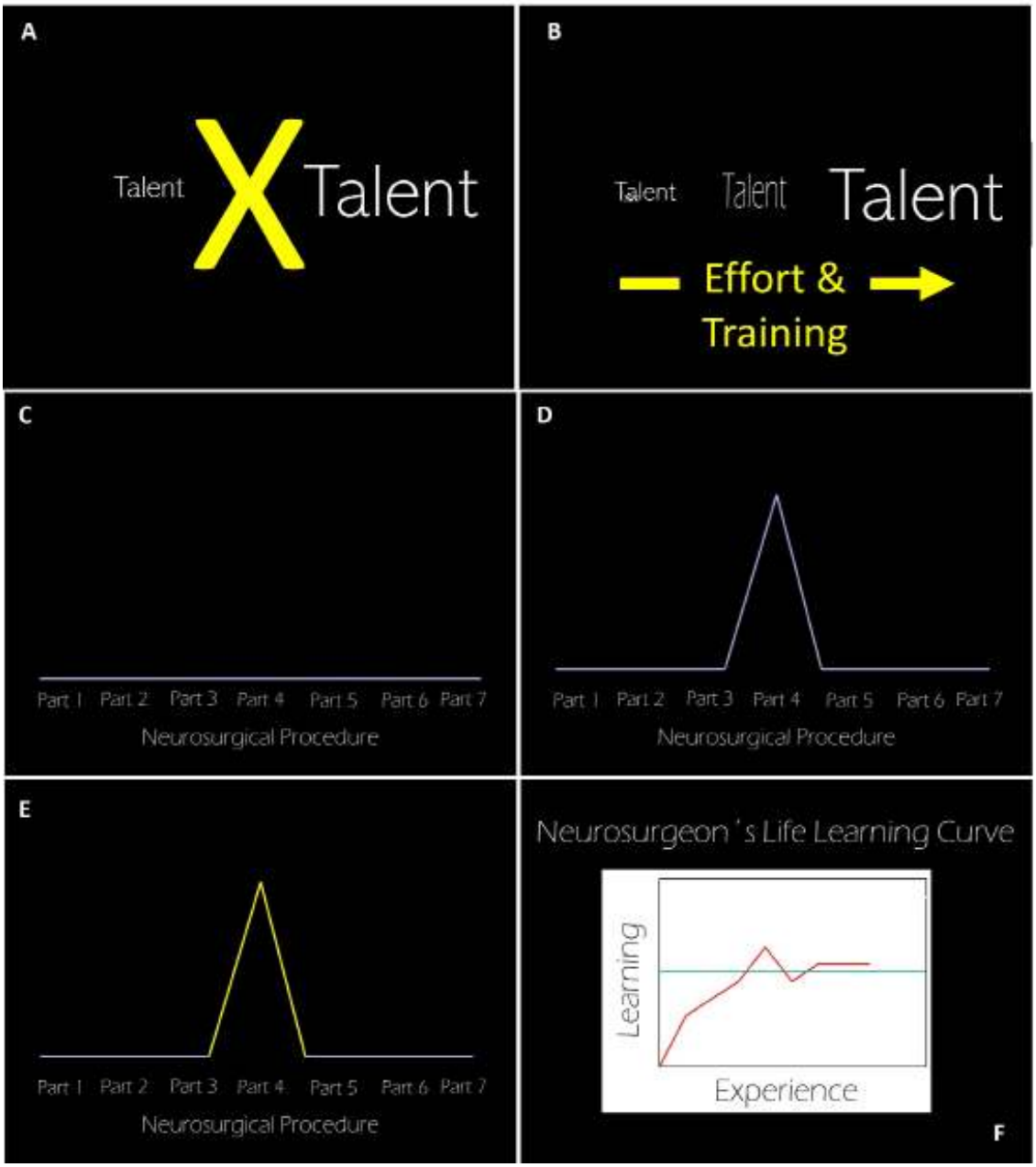

Figure 1. Representation of "Talent" according to the mindsets. A. In the fixed mindset, a person has less or more talent. This is a fixed trait and cannot significantly be changed by training or effort. A similar belief in this type of mindset is that if someone is putting effort into something is because this person is not talented enough. B. In the growth mindset, any amount of talent can be significantly enhanced by dedication, method, and diligent effort in training. A naturally talented person embedded into a growth mindset environment can achieve things apparently impossible to others. C-E. A second fixed belief in surgery: "Not all parts of a surgical procedure are equal", a surgical procedure can be divided into several parts (C), but not every part has the same importance (D). There are parts of a surgical procedure that are so important that can only be performed by very talented surgeons (E). Less talented surgeons can execute other, less important, parts of a surgical procedure. F. The third fixed belief in surgery: "The fully educated surgeon": According to this belief, after a point, a fully educated neurosurgeon has nothing else to learn, exemplified by the flattening of the neurosurgeon's life-learning curve with increasing experience. This particular "fixed mindset" concept can be very discouraging for fully educated neurosurgeons.

Evandro de Oliveira's growth mindset

Even though, in several neurosurgical circles, Evandro de Oliveira was considered especially talented and gifted, in his activities, he always professed and behaved according to a different belief.

Those who had the chance to participate first-handedly in his preparations for courses, surgeries, congresses, listened to his remarks in courses and training sessions, and observed the value he placed onto things, will agree that one of the largest - and probably least acknowledged - of his contributions to neurosurgery as a field was his unavoidable, pervasive, and aggressive growth mindset.

What is the evidence that Evandro de Oliveira had a growth mindset?

Eight well-known behaviors and preferences of Professor Evandro de Oliveira can be listed as evidence of his growth mindset (Figure 2).

One of the first instances in which one would be faced by his mindset was his post-surgery behavior. He used to say: "Whenever I finish a procedure, I start thinking about how I can do it better next time" - that need for reviewing and improving each of his microsurgical acts and hand motions being one of the main reasons he recorded his procedures on tape (Figure 2A). People's reaction to this would be either utter puzzlement ("How can perfect be better?") or disbelief ("he must be showing off...") - both within the spectrum of a fixed mindset.

In his courses, he spent time discussing how he did approaches in the past and the experiences that have made him do them differently (Figure 2B). In practical sessions with heads, he demanded that emphasis be given to microsurgical ergonomics, positioning of the patient/head, and how to lay in the drapes (Figure 2C) and would not cease to talk about the importance of a clean, spotless field of work (Figure 2D).

Evandro de Oliveira always considered every anatomical structure in his surgical field (Figure 2E). No vein could ever be taken from a patient of his without resulting in strong complaints.

The microsurgical anatomy lab was known as his habitat. Only a person who believes himself and others to be "in the process of becoming…" would value the Lab work as he did. The lab was always, for him and his group, a transitional space between cases, the place to test ideas, to hone and brush up on skills and be ready to perform at the highest level (Figure 2F-G); and, for long he pointed to meetings that discussed surgical complications as the fast track to improve our specialty (Figure 2H).

Not only did Professor Evandro valued equally every part of a neuro surgical procedure (Figure 2I), but he also set the bar high for any of these surgical steps (or preparation steps for a course, for that matter) and would not accept lower standards (Figure 2J). Because of this, he not only pointed out what was adequate, but also opened up the road for bettering any of these steps. A team working with him in any of these stances could not help but very quickly focus on their own learning curves and how to improve on that, and this, in a sense, explains the quality of surgeons that have been associated with him over the years.

What is the impact of Evandro de Oliveira´s Mindset in Neurosurgery?

The net result of Evandro de Oliveira´s Mindset is a quality leap in anything he was involved with: surgery, course, congress or society. With him, people were always engaged and learning - all happening very fast.

From neurosurgeons with a fixed mindset, or trained in a fixed mindset organization/culture, this effort, commitment, attention to detail, and whole process of individual and group improvement was lost, and it only meant that he and his group were simply "chosen".

Reflecting on the fixed beliefs in neurosurgery, one cannot but concede that it is very demanding for surgeons to sincerely speak about improving when the material we are working with is people – people's brains. It is easier to think that, once a surgeon is fully trained, they are foolproof, and results are what they are. It had to be someone like Professor Evandro de Oliveira, with his scientific sincerity, to have advised over the years that there were better and safer ways to take each step - simple or complex - in neurosurgery and that we ought to keep looking for them daily.

His way of rearranging the roles of neurosurgeons in a procedure, imprinting value into every one of them, gave neurosurgeons a roadmap to work on their own self-improvement, become engrossed in it and grow - at the same time making procedures safer for patients.

The application of the microsurgical anatomy knowledge into his procedures is the most extreme example of a tool perfected by continuous and methodical use.

By insisting on discussing complications and looking for better ways of doing things daily, he demonstrated that neurosurgery is an endless road of learning, that no one is ever ready and senior neurosurgeons must stay engaged and passionate about our specialty.

Dr. Evandro de Oliveira was the paramount example of a growth mindset in neurosurgery (Figure 2K), and this must be acknowledged among his many, lasting contributions to neurosurgery.

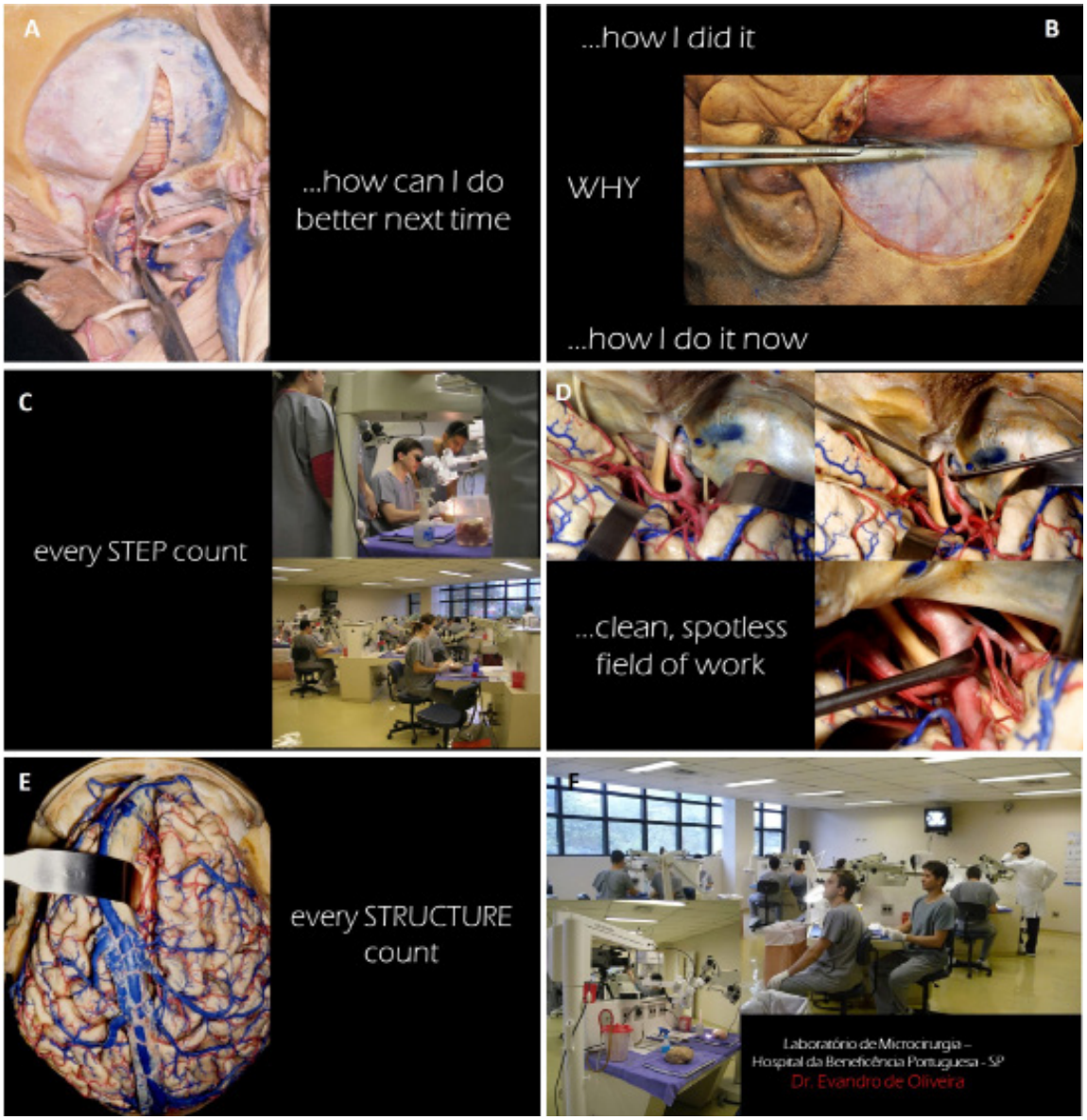

Figure 2. The Eight Evidence of Evandro de Oliveira´s Growth Mindset. Anyone who has worked with Dr. de Oliveira can recognize one or more of these pieces of evidence in his behavior. A. Evidence 1. Procedures should be reexamined and revisited to identify "how things can be done better next time". B. Evidence 2. There was no single way to do an approach. Approaches evolved along the time according to experience. The reasons for changing the way things were previously done were important, and reason for discussion. C. Evidence 3. Training does not encompass only the main part of a procedure. Every step of a procedure should be visited, enacted in the lab, and reflected upon for improvement. D. Evidence 4. The surgical field must be clean, so that (E.) neurosurgeons can see and preserve anatomical structures (Evidence 5). F. Evidence 6. The Lab is the hub for honing skills, revisiting anatomy, and preparing oneself for a procedure. The Lab at Beneficencia Portuguesa Hospital, in São Paulo and several Labs around the world – (G.) as this one at the University of Valencia, Spain - were such hubs; not only for him and his crew, but also for hundreds of neurosurgeons worldwide. H. Evidence 7. Discussing surgical complications is the fast track to improve neurosurgery. This evidence could be felt in any neurosurgical congress organized with his help, as was this XXVIII Brazilian Congress of Neurosurgery in Salvador, Brazil in 2010. From left to right: Drs. Mussi, Kadri, Campero, Ribas, Rhoton, Martins, de Oliveira, Wen, Tedeschi and Borba. I. Evidence 8. There is not a single, individual learning curve, representing a life-time achievement, but several, asynchronous and parallel learning curves, dynamic and evolving for every single surgeon. Not only every part of a neurosurgical procedure is important, but they must be named, revisited, and discussed, raising the bar of quality during their execution. J. Once a higher level of quality and performed was achieved, no less was acceptable. This created the net result of global improvement of procedures. It also confronted people with their own, specific learning curves, at a given moment in time. Dr. Evandro´s culture proved to younger colleagues that neurosurgery is a field of continuous learning and enjoyment. K. Evandro de Oliveira is the paramount example of a growth mindset in neurosurgery. Evandro´s growth mindset is one of his most important contributions to neurosurgery and must be accounted for.

continuation of figure 2



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