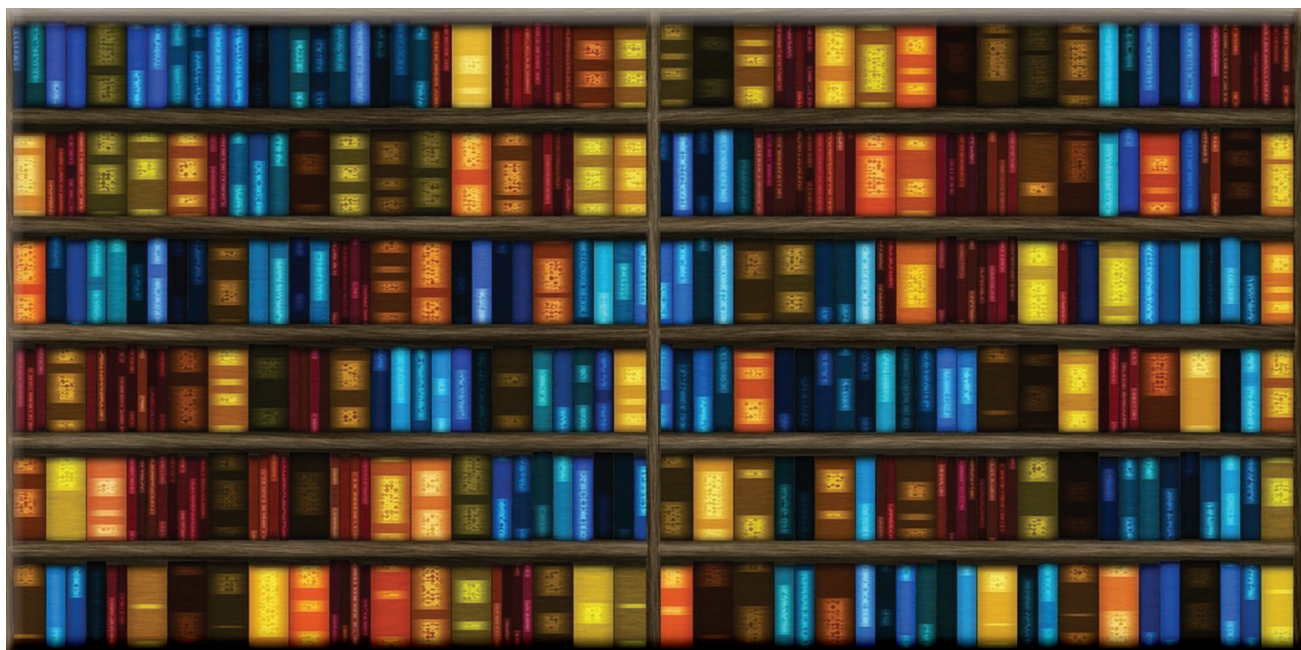


Notable Notes from the Goodreads Gang: Chapter 2

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Editor's Note: Thousands who would like to join the ISPE Book Club will find the Goodreads.com link on the Members' Only page of our ISPE website. Just log in at www.thethousand.com and then scroll down to the ISPE Book Club info.



1. Introduction

The ISPE Goodreads Gang Book Club is an opportunity for ISPE members to suggest, vote on, read, and write about some amazing books selected by book club members. In this article, we share “notable notes” in the second chapter of our journey through three more erudite books over the last six months. We hope that the upcoming sections, one per book, inspire you to come on by and spend some quality time with your cranial colleagues in the Goodreads Gang.

2. A Spoon Full of Sugar

In our first book reading since our last *Notable Notes* report,¹ the Goodreads Gang voted in Sam Kean's book, *The Disappearing Spoon*.² We were eager to find out how the periodic table of the elements had become the subject of a national bestseller. The peculiar main title of the book also immediately piques one's interest, and we could

hardly wait to find out more about its rationale. We were not disappointed. Kean begins the book with a magical description of the periodic table as a structure resembling a castle, and then he builds this beautiful castle, brick by brick, orienting us to the noble elements, the halogens, the transition metals and semiconductors, and the radioactive heavy metals. With each building block, we see our world at its very basic chemical/elemental level. Not only did Kean capture the wonder of our natural world, but he goes into detail about why the periodic table is called a periodic table due to the periodicity of elemental properties brought on by symmetries of electron energy levels. Our sound advice to those who read *The Disappearing Spoon*: (a) also read the many interesting endnotes for each chapter, and (b) open the periodic table from Wikipedia³ or similar so that you have the elements' names, symbols, and atomic numbers all in the same place and at the ready as you read. Our Goodreads Gang discussants enjoyed

exploring the scientific world of chemistry, well known chemists such as Bunsen and his eponymous burner that led him to work on spectral analysis, the iterative synergy between experimentation and theory, the interplay between theory and experimentation that can lead to social advocacy and activism like the work of Patterson and his identification of toxic lead poisoning, and surprising learnings from Kean about carbon dating of the age of the earth. Discussants also had some fun choosing their favorite element and identifying why it was their favorite. Members reflected on the cosmological wonder of uranium (U) and carbon as a life-supporting “diamond” of the periodic table. We think that Kean has created a national bestseller because, as you read, you get the sense that Kean is madly in love with the periodic table and wants all of us to see its beauty and significance. We think Mr. Kean achieves this goal and, as one discussant said, “As you reach the end [of the book], you still want to keep going.” This is a sign of a truly Goodread, and many of our relatives will be receiving copies of this book by the time you read this article. Finally, there will be no spoilers here regarding the meaning of the title, *The Disappearing Spoon*, so you will just have to read the book to find out.

3. Grits are Great

For July/August 2023, the Goodreads Gang chose *Grit: The Power of Passion and Perseverance* by Angela Duckworth.⁴ This book defines grit as an important psychological construct and also discusses how to increase one’s own grit and how to nurture grit in others. Early in our discussions, one member noted that *grit*, when operationalized, manifests as actions demonstrating ferocious determination, resilient hard work, and focused direction and aspirations, despite pain and frustration.⁵ Duckworth identified two factors responsible for those actions: passion and perseverance. While there is little ambiguity in the meaning of perseverance, one member noted that the sense in which the word *passion* is used is not in-the-moment passion but rather the essence of sustained interest and sense of purpose that can sustain us

over decades to keep coming back to a pursuit, even if we occasionally need respite from the difficulty of it.

One member noted that there had been some controversy about whether grit was distinct from conscientiousness because, in a researcher’s study, cited in Wikipedia,⁶ only the perseverance component of grit was found to be statistically significantly different from conscientiousness. Another member noted that the researcher’s study⁷ did not appear to be constructed to measure passion as Duckworth means it. However, the member also later noted that much of Duckworth’s research has the limitation that it compares various other constructs to the total score on the Grit Scale only, rather than also to the separate subordinate scores for passion and perseverance. This is problematic because summing the scores for two factors can hide underlying true relationships with the other construct being studied, and this can cause a controversy. For example, in the researcher’s study above, Duckworth’s approach would have found a significant difference between total grit score and conscientiousness; but this would have been misleading, since the significant difference is between only the perseverance component and conscientiousness within the context studied by that other researcher.⁸

Gang members also noted other limitations to Duckworth’s current research on grit. One was that the subjects of the quantitative studies using the Grit Scale and especially the anecdotal reports of interviews tend to be groups or individuals who are not representative of the general population. Instead, the subjects are those who have typically already demonstrated a relatively high level of grit. For example, Duckworth quantitatively studied West Point cadets and anecdotally referred to interviews of famous, wealthy people. Another limitation was that Duckworth associated interest and purpose only with passion and associated practice and hope with only perseverance, which both seemed specious and forced. When excerpts from Duckworth’s interviews are considered, it appears that varying amounts of both passion

and perseverance can be found in all four elements (interest, practice, purpose, and hope). Yet another limitation pertains to Duckworth's reliance on research involving self-evaluation and self-reporting, rather than having trained external observers performing evaluations of the grit of research subjects.

From these discussions, it is clear that more research, and more rigorous research, must be conducted to continue to develop our knowledge of grit and its place among psychological constructs most important to helping humans live and thrive. Still, a number of Gang members gave Goodreads evaluations recommending this book due to the important messages it does convey. Perhaps the most notable of those messages is Duckworth's emphasis on the difference between natural talent and cultivated skill. Even if one has lower natural talent in some area, one can apply more effort to still enable one's success, and a great amount of natural talent often will not amount to much without the effort to cultivate skills needed to be successful in a pursuit.

4. We Know Not and We Know that We Know Not: Teach Us

I believe. Compared to "I know," these sound like tentative words for members of the International Society for Philosophical Enquiry, yet they are words that offer hope for our world. Robert A. Burton's book, *On Being Certain. Believing You are Right Even When You are Not*,⁹ makes the case for building consensus by relaxing our feelings of certainty. Starting in the Preface and reaching a crescendo in his Final Thoughts chapter, Burton conveys understanding that there may be strong differences in our beliefs and opinions, yet he encourages us to consider the neurobiological limitations of our feelings of certainty as we seek to understand our world and each other.

Interestingly, there was an opportunity for a meta-experience of Burton's main thesis about the feeling of knowing. Early on, Burton explains the architecture and operation of artificial neural networks (ANNs), which are modeled after

characteristics of biological neural networks. First, he describes the neuronal input layer, output layer, the hidden layer(s) in between, and the *weighted* connections between neurons in successive layers. The neural connections, artificial or biological, establish *relationships* among neurons that help the neural network transform inputs into (hopefully) intelligent outputs. Burton then gives an example of an ANN in action based on Amazon product recommendations: "Envision each book on Amazon as a neuron connected to all the other available books (neurons)... How a book relates to another book is being constantly recalculated (reweighted) based on shifting relationships among all of the books."¹⁰ After reading this content, one could have a very strong "feeling of knowing" exactly how artificial neural networks provide and learn to provide Amazon product recommendations ... except one gets quite a different sensation if one is already familiar with how ANNs work.

As Gang members discussed, not only weren't Amazon product recommendations based on the results of ANNs until several years after publication of Burton's book in 2008, but even once they were, around 2016,¹¹ the ANN version's hidden-layer neurons do not each represent a separate conceptually complex object like a book. Rather, each hidden-layer neuron in an ANN is only a repository for the weights of its connections to neural outputs of the preceding layer and a single numeric output value that is calculated over its inputs. Conceptually complex objects are represented entirely at the input and output layers, and relationships between such objects are emergent phenomena resulting from indeterminately many and varied weighted connections throughout the hidden layers. This is true of both biological and artificial neural networks. Throughout the rest of the book, Burton used the term "hidden layer" as a name for the unconscious mind. He further asserts that it is the unconscious mind's thoughts that may be heavily biased by feelings and irrationality, which he distinguishes from systematic, sequential, entirely rational "conscious" thought. One must put aside these aspects of Burton's book

in which he attempts to connect his expertise in neurobiology to the current wave of interest in artificial intelligence. The neurobiological structures that correspond to “hidden layers” are involved in all thought, whether conscious or unconscious and whether entirely rational or biased by feelings. Furthermore, emotions can bias conscious thoughts, not just unconscious thoughts.

It is necessary, therefore, to ignore sensations related to Burton’s misapplications of artificial neural-network concepts because they don’t really detract from the main thesis of the book. Burton entreats us in our regular parlance to replace the words “I know” with “I believe.” Why, you ask? There is sensorial pleasure in being right and in knowing, but these are only sensations, and, quite often, we may not be able to control the sensory input. Burton encourages us to take an oath, “*primum no nocerum*: Above all, do no harm.”¹² When we do no harm, we are humble in our interactions, we formulate and are willing to accurately and honestly test our hypotheses, we become tolerant of the ambiguity of not knowing, and we open up our hearts and minds to the wonderful potential of learning something new. After all, we may only believe that we know and simply not know that we do

not know. There is always more to learn, and this should always lead us to seek more information and to find out how we can be more humanely human. In all ways, *Quaere Verum*.

5. Conclusion

In this second chapter of Notable Notes, we hope we have given you a sense of the ISPE Goodreads Gang experience of three more excellent books that have elicited intense intellectual stimulation and further investigation. Discussions of the correct workings of artificial neural networks, the limitations of human subjects studies of grit, and an entire separate article¹³ on the likelihood of many naturally occurring transuranic elements are but a few examples of what can happen during six months of ISPE Goodreads Gang membership. Reading, reflecting, writing, and sharing are foundational to the experience. If you like to challenge yourself to learn more about what you do not know and share your unique perspectives about what you do know, please join us on the Goodreads platform. You will be glad that you did!

NOTES.....

1. John Boyer and Wanda Boyer, “Notable Notes from the Goodreads Gang,” *Telicom* 35, no. 2 (Apr 2023): 22-25. https://www.thethousand.com/docs/John_and_Wanda_Boyer_Notable_Notes_from_the_Goodreads_Gang.pdf.
2. Sam Kean, *The Disappearing Spoon: And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements* (Boston, MA: Little, Brown and Company, 2010).
3. Wikipedia contributors, “Periodic Table,” *Wikipedia, The Free Encyclopedia*, (2023). https://en.wikipedia.org/wiki/Periodic_table
4. Angela Duckworth, *Grit: The Power of Passion and Perseverance* (Toronto, ON: HarperCollins Publishers Ltd., 2016).
5. Duckworth, 8.

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6. Wikipedia contributors, “Grit (Personality Trait): Scientific Findings and Controversy,” *Wikipedia, The Free Encyclopedia*, (2023). [https://en.wikipedia.org/wiki/Grit_\(personality_trait\)#Scientific_findings_and_controversy](https://en.wikipedia.org/wiki/Grit_(personality_trait)#Scientific_findings_and_controversy)
 7. Ibid.
 8. Ibid.
 9. Robert A. Burton, *On Being Certain: Believing You Are Right Even When You’re Not* (New York, NY: St. Martin’s Griffin, 2008).
 10. Burton, 48.
 11. Amazon Archives, “DSSTNE: History for FAQ.md,” (2016). <https://github.com/amazon-archives/amazon-dsstne/commits/master/FAQ.md>
 12. Burton, 222.
 13. John Boyer, “On the Likelihood of Many Naturally Occurring Transuranic Elements,” *MC²: Journal of Mensa Canada* 56, no. 5 (Nov./Dec. 2023): 6-8. Reprinted in this issue of *Telicom*.
 14. Burton, 160. Apropos due to Duckworth’s Grit Scale being used as a self-assessment in many psychological research studies.Ω

“Any self-assessment [must] be seen within
the light of its biological constraints.”
—Robert A. Burton¹⁴