

The Viennese Child

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Eric Kandel, a 2000 winner of the Nobel Prize, has lived a remarkable life filled with both professional and personal accomplishments, which include uncovering the role synapses play in learning and memory. In his autobiography, *In Search of Memory*, Kandel mentions the opinion of Gerald Holton, a historian of science at Harvard University: "for many Viennese emigres of my generation, the solid education we obtained in Vienna, combined with the sense of liberation we experienced on arriving in America, released boundless energy and inspired us to think in new ways;" perhaps it is this significance in timing that is responsible for Kandel's greatness. However, Kandel himself describes himself as being "almost like a child, with a naïve joy, curiosity, and amazement" (Kandel, p. 417) when exploring science. Throughout his autobiography, it is his childlike qualities of curiosity, humility, adventurousness, and optimism, combined with the grit he has perhaps inherited from his Viennese history that has allowed him to lead a well-lived life as a great scientist.

Kandel's curiosity inspired his life path, an accomplishment which has led him to unexpected places. Kandel's thirst for knowledge is first seen when he became a Modern European History and Literature major at Harvard in order to have some sense of understanding about his expulsion from Vienna, (p. 37). He then met the Kris family, who ignited his curiosity in psychoanalysis. Through psychoanalysis, Kandel hoped to understand the underlying motives of human behavior. Psychoanalysis eventually led to medical school, where Kandel hoped to find the biological bases of psychoanalysis. Soon enough, however, Kandel learned that it is scientific research and not medicine that had the answers he sought. While he pursued a career in research and made significant progress in our understanding of the hippocampus, he realized that he needed to go to Paris and work on developing an understanding of how individual neurons worked in the sea slug, *Aplysia*. Kandel's overarching goal was to understand how memory worked, which he had determined to be the primary psychological process underlying psychoanalysis. The purpose of elaborating on Kandel's journey is to highlight how curiosity drove Kandel down his life path, from Harvard to medical school, then to Paris and onwards. His curiosity enabled him to find enjoyment in learning many disciplines, and he wrote that he enjoys "tackling problems at the border of two or more disciplines" (p. 424). His eagerness to learn multiple disciplines allowed him to collaborate with partners from several different disciplines and, thus, to contribute to a field as multidisciplinary as neuroscience.

Furthermore, his curiosity also humbled him and made it possible for him to learn from others. He writes in his autobiography, *In Search of Memory*, that he has "learned not only from [his] mentors, but also from [his] daily interactions with an extraordinary group of graduate students and postdoctoral fellows" (p.417). This approach to working with others has allowed him to have many successful collaborations that have led to life-long friendships, which include his friendships with Richard Axel, Alden Spencer, and Paul Greengard. His humility extended past his work and into his household as well. Once, Denise, his wife, lost her temper due to his overly diligent work ethic and said "You can't go on like this! You are only thinking of yourself and your work! You are just ignoring the two of us!" (p. 156) Instead of closing his ears and allowing the tension to persist, Kandel reviewed his actions and came "to realize what my actions must have seemed like from Denise's point of view." He then decided "to spend more time at home with her and Paul" (p.156). It is perhaps his willingness to learn from his wife that has encouraged him to be bold in his research, as "Denise sensed, perhaps more than I did, that my idea of examining the biological basis of mental function was original and bold, and she urged me to explore it" (p. 50).

His adventurousness translated into his ability to take risks and has made it possible for him to pursue novel research. He "to be bold, to tackle difficult problems" (p. 427). Deciding to go to Paris and study the neurons of the *Aplysia* was difficult. Many of his mentors believed he was making a terrible mistake as he had accomplished a lot with his work on the mammalian hippocampus (p. 149). However, he persisted, and his courage paid off. *Aplysia's* large synaptic potentials made it possible to

work, for the first time on the precise wiring diagram of behavior (148). Without his ability to take risks he would not have made it to Paris and might not have learned the role synapse's play in memory and learning. On a more personal note, because they "so enjoyed Paris and because *Aplysia* was so easy to work with" he "did not work on weekends for the first time in years and was home for dinner every night at seven" (p. 173). Paris taught him that "he could make a go of it in science" (173) and that "one ultimately has to trust one's consciousness, one's instincts, one's creative urge" (p. 149).

Eric Kandel's ability to make lemonade out of lemons made it possible for him to truly enjoy his life and to contribute substantially to neuroscience. When he fled Vienna, instead of viewing America as a poor replacement, he described his life in America as being "privileged" (p. 413). In America, he excelled in both academics and sports which paved the way for him to attend Harvard University. In his autobiography, he quotes A.V. Hill who once said "'to tell the truth, sir, we don't do it because it's useful; we do it because it's amusing.'" (p. 172). This approach to science is reflected in many of Kandel's descriptions of the lab, such as when he wrote "the exciting finding in my laboratory illustrates that basic science can be like a good mystery novel with surprising twists: some new, astonishing process lurks in an undiscovered corner of life and is later found to have wide significance" (p. 275) when finding prion-like CPEB proteins underlie long-term memory. In the lab, his relationship with his co-workers challenged the popular view of many and noted by Michio Kaku (Kaku, 2014, p. 143) that scientists are anti-social and awkward. He describes discussions in the lab as being "penetrating and sometimes marvelously gossipy about other scientists' work, their work, their sex lives" (p. 106). He enjoyed the "camaraderie of making an interesting discovery together" (p. 417). At first, he was "reluctant to become involved in biotechnology because I thought such an endeavor would be uninteresting" (p. 324). He found "intense pleasure along the way" and was "invigorated intellectually" (p. 419). If Kandel had not enjoyed science and working in the lab as much as he did, he might not have had the motivation to make important contributions to science.

The grit which he might have obtained from his childhood in Vienna and all that he had lost, made it possible for him to work on the same project for a long period. Towards the end of *In Search of Memory*, he writes that he "likes long term commitments, not brief romances" (p. 424). This preference can be seen, not only in his science but in his dedication to Denise and in the life-long friendships he has maintained. Eric Kandel's grit, when combined with his more childlike qualities of curiosity, humility, adventurousness, and optimism, has made it possible for him to make significant contributions to science and to live a well-rounded life. These qualities have enabled him to pursue work that has led to a fantastic life that climaxed when he collected his Nobel Prize in Stockholm. Eric Kandel's life challenges the stereotype of the cold, anti-social scientist who only pursues science for the fame. His life is one that has been mostly influenced by knowledge and thus has led him down a path that is truly remarkable.

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References

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