

Dr. Robert Sapolsky: Baboons, Stress Research, Connection and Determinism

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Introduction

In today's episode of the podcast, we are joined by neuroscientist and primatologist, Dr. Robert Sapolsky, to discuss his work with baboons, stress, and his own mental health journey. Dr. Sapolsky is professor of biology, neurology, and neuroscience at Stanford University, as well as an author of several books including, *A Primate's Memoir: A Neuroscientist's Unconventional Life Among the Baboons*, *Why Zebras Don't Get Ulcers*, and *Determined*. He has spent extensive time studying baboons in Kenya over the course of his career, a passion he attributes to his extensive time spent in the American Natural History Museum in New York. Joining our conversation is Alexander Horwitz, M.D., a 4th-year psychiatry resident who previously enlightened us on serotonin syndrome in an earlier episode.

Sapolsky's Work with Baboons

Dr. Sapolsky's study of baboons in Kenya began immediately upon college graduation. Over the next 30 years, he would continue to spend several months a year studying the same troop of baboons in the Serengeti. He began his research of primates with a distinct interpretation of the dominance hierarchy, of which the baboons were initially a textbook example and served to further solidify the concept of social dominance. He initially hypothesized that in the hierarchical and male-dominated dominance structure, baboons at the top would show fewer stress hormones.

For the first twenty years of his research, Dr. Sapolsky was able to observe many identifiable and research-based benefits of being a high-ranking baboon in the troop. Low-ranking baboons experienced higher levels of psychological stress, lack of control, lack of predictability, lack of outlets, as well as elevated basal cortisol levels and trouble turning off their stress response when compared to baboons occupying the higher-ranking positions.

Over time, two pivotal observations prompted Dr. Sapolsky to reevaluate his perspective. The first was a consistent observation he made across various troops: males with stronger social bonds, who didn't bear the constant stress of maintaining dominance, often enjoyed longer lifespans and lower stress hormones. This understanding set the stage for an even more profound revelation, which emerged from the surviving troop of an unexpected tuberculosis event.

After a severe tuberculosis outbreak, caused by infected beef left by a local selling meat to tourists, the dynamics within Dr. Sapolsky's baboon troop underwent a significant shift. The most aggressive baboons (those most willing to fight others for food) were primarily the ones who consumed this tainted meat. As a result, over half of the troop's aggressive male population succumbed to tuberculosis, leading to a notable change in the dominance hierarchy.

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In the aftermath of the tuberculosis outbreak, the troop's composition changed dramatically, with more docile, friendly males and a two-to-one female-to-male ratio remaining. This led to a transformative shift in the troop's social dynamics. Remarkably, low-ranking males no longer exhibited high cortisol levels, indicating a less stressful and more cooperative environment. This shift underscored the power of leadership in shaping culture and highlighted the importance of non-genetic transmission of traits. It emphasized that behaviors aren't solely hardwired in DNA but can be significantly molded by the environment and passed down from one generation to the next.

Dr. Sapolsky's extensive work with primates not only expanded the academic horizons but also deeply informed and potentially transformed his personal worldview. His empathy towards the marginalized or those situated lower on society's dominance hierarchy, such as criminals, underscores his belief in a more humane understanding of behavior. Recognizing the complex interplay between genes and environment in shaping decisions, he advocates for a perspective that minimizes judgment and embraces compassion, especially for those who might seem disadvantaged by their circumstances or genetics. Intriguingly, as he discerned the happiness of more socially connected baboons, Dr. Sapolsky entered into matrimony. He has hinted in our interview that this academic epiphany about the importance of affiliative bonds might have paralleled or even influenced his personal life decisions. This intertwining of scientific discovery and personal evolution showcases how profoundly one can impact the other.

Sapolsky's Work With Stress

Humans and animals both exhibit an intrinsic fight-or-flight response when confronted with perceived threats. In his book, *Why Zebras Don't Get Ulcers*, Dr. Sapolsky showcases research illustrating the harmful consequences of prolonged stress on our physical and mental well-being. While real threats like extreme temperatures or physical injuries activate the stress response, it can also be triggered by non life-threatening situations. These include consistent perceptions of nonexistent challenges or threats, feelings of helplessness or hopelessness, enduring feelings of loneliness or the perception of being isolated (notably, depression often comes with a heightened perception of social isolation). Interestingly, the narratives we craft about our health, particularly negative or disease-oriented ones, can exacerbate our stress levels, underscoring the power of beliefs in influencing our well-being. At the "[MEND IOP & Partial](#)," for which I have been the medical director for nine years, the therapists incorporate Dr. Sapolsky's invaluable research and book to address and treat chronic stress effectively.

While both animals and humans possess the innate fight-or-flight mechanism, the nuances in their nervous system responses set them apart. For instance, when a zebra perceives a threat, it acts immediately on its instinct to either fight or flee. In contrast, humans, navigating our complex societal structures and expectations, often suppress or delay this physiological response. Some of our stressors, like protracted child custody battles after a painful divorce,

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can persist for years or even decades. Although we might not always be able to change the external circumstances, we can work towards managing our internal reactions. Engaging in therapy empowers individuals to confront and manage persistent anger, discover forgiveness, and heal from traumas, offering a sense of control in areas where they might have felt powerless. This prolonged activation of the sympathetic nervous system, rather than a swift return to a resting state, has serious implications for our health. Chronic activation is associated with a myriad of health issues, from heart disease and cancer to gastrointestinal problems and migraines.

Research on baboons, including studies by Dr. Sapolsky, reveals that strong social bonds can mitigate stress. Baboons with active social interactions, such as grooming and bonding, exhibit lower stress hormone levels and better overall health. These affiliative behaviors stimulate the parasympathetic nervous system, counterbalancing stress responses and highlighting the protective nature of social support.

Dr. Sapolsky emphasizes the protective role of perceived control against stress. However, he cautions against misleading individuals into believing they had control in situations with negative outcomes. Such beliefs can lead them to ruminate on how things might have been different, exacerbating psychological distress. In the nuanced realm of Dialectical Behavior Therapy, we adopt a similar caution. In the dialectical framework of DBT, maladaptive behaviors like cutting are not viewed as failures but rather as the most adaptive responses individuals could manifest given their situations. Yet, juxtaposed with this acceptance is an unwavering commitment to facilitating changes that align individuals with their aspirational goals.

Each individual has a specific bodily system that becomes particularly vulnerable under the pressures of chronic stress. Dr. Sapolsky's candid sharing of his battle with depression not only exemplifies this, but also significantly contributes to breaking the stigma associated with mental illness. He openly shares, "Since my teenage years, I've struggled with depression. At times, the medication works wonders, and life feels as radiant as hiking above the tree line on a stunning snow-capped mountain — a feeling most pronounced when I'm amidst the joys of my family. Yet, more often than not, depression lurks just beneath my consciousness, a pervasive melancholy. I've learned to stave it off by immersing myself in work, driven by a relentless ambition, and sometimes sidelining the very things that should, by right, matter most."

In the interview, he humbly shares his struggle being an uphill battle and how he eventually met the (remarkably patient) love of his life, who helped him realize there was more to life than the length of his CV. He stated that continuing to run as fast and as long on the achievement treadmill was not as important as lifelong, deep attachments, such as to his wife.

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Environmental vs. Genetic Influence

Sapolsky makes a powerful argument for how much the environment and genetics shape our reality. A good example from mental health is looking at [borderline personality disorder](#).

In a longitudinal analysis that spanned from infancy to adulthood (28 years of age), Carlson (2009) investigated the relationship between relational experiences and the manifestation of borderline personality symptoms. The study, encompassing 162 participants, yielded noteworthy results: attachment disorganization at 12-18 months was associated with a beta of 0.20, maltreatment within the same age range revealed a beta of 0.20, maternal hostility at 42 months was linked with a beta of 0.42, boundary dissolution had a beta of 0.17, family disruption from 12-64 months showed a beta of 0.12, and emotional regulation at 12 years presented a considerably high beta of 1.39.

To provide some tangible context, consider a hypothetical medication given to a man that increases his child's height by a full effect size, or 3 inches. In this scenario, a beta of 0.2 would signify a height augmentation of 0.6 inches, and a beta of 1.39 would indicate an impressive 4.17 inches. By translating these statistics into more comprehensible measurements like inches, it becomes easier to grasp the profound impact certain experiences can have on the eventual onset of a diagnosis tied to emotional dysregulation.

No one would argue that having BPD is a choice; rather, we would all say it is largely determined. In a similar way that having diabetes leads to the responsibility to get the necessary treatment, so does BPD require one to pursue necessary treatment (which may take years and be very difficult to obtain).

If we recognize that treatment can enhance the ability of someone with severe affect dysregulation to control tendencies like self-harm, we can then explore the notion that certain choices (such as seeking treatment or altering one's environment) can bolster what many define as free will—a term encompassing self-control, rational decision-making, proactive planning, and active choice.

Free Will vs. Determinism

My point of contention with Sapolsky lies primarily in our differing views on free will. Sapolsky leans toward a stringent interpretation: for him, free will would entail a neuron's ability to fire without any external influence, be it environmental or biological. In his hard determinism approach, he contends that every behavior we exhibit is an inevitable outcome of prior environmental and biological conditions, negating any possible self-directed influence. A question I neglected to ask him is: since you are asking I show you a neuron that is able to fire

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without external influence, can you show me an outcome that is completely predicted based on all inputs coming into it? Of course, both are impossible tasks.

Central to Sapolsky's argument is an empirical challenge: it's impossible to replicate and verify that a neuron's specific firing pattern, which precedes an action, would remain unchanged even if all predisposing factors were modified. Because these influential factors are beyond our control, Sapolsky asserts that the concept of free will is both unprovable and implausible, thus advocating for its nonexistence.

When reflecting on the dilemma of individual neurons, I pondered whether the combined actions of the entire neural system might transcend its individual components. Just as the wetness of water cannot be attributed to singular water molecules, life itself isn't defined by isolated cellular components. Instead, life emerges from the intricate interplay of non-living molecules—a classic example of emergent properties. Similarly, traffic jams don't arise due to one car but from the collective behaviors of numerous vehicles on a roadway. In this vein, concepts like self-control, rational decision-making, and planned behavior are not the products of isolated neurons but emerge from the complex interactions among our 86 billion neurons. Each neuron has thousands of connections, and this immense complexity suggests that the collective behavior of these neurons might spawn novel emergent properties, such as consciousness, self-awareness, or even the phenomenon of free will. Neurons never function in isolation—their intricate interconnections create results far more profound and intricate than any individual neuron could produce on its own, much like the countless components of a cell collectively produce the phenomenon of life, which a singular part could never achieve independently.

To this argument Sapolsky responded, "but that [chaotic emergent complexity or non-linearities] sure as hell ain't where you're gonna find free will because every attempt to somehow wave your hands and get free will out of chaoticism or emergent complexity or quantum indeterminacy or stuff every single time, when you look closely enough, there's a step in there that requires you to say, 'and then magic happens.' It doesn't really work."

Transitioning to a psychoanalytic lens, I believe that through therapy, individuals can unearth and confront their latent, darker impulses residing in the unconscious. Engaging with these hidden aspects can offer a deeper understanding and, perhaps, even a form of mastery over them. While a strict determinist might view this introspective journey as merely another external influence, I argue that it amplifies our capacity for conscious choice, allowing us to respond rather than react impulsively. For example, in working with a client who yells at his girlfriend, when asked about it he said, "when she disrespects me, I just go black and lose control. I just can't stop myself." I asked him why he did not harm her further, and he said, "Well, I don't want to go to jail." He viewed his reality as he had no choice, until he realized he was making choices he did not fully know he was making. Of course, Sapolsky may respond, "Yes, here as a therapist you were helping him realize something, so you were acting on him to change his brain." In a jovial way, I would wonder how embracing "hard determinism" might have been a coping mechanism for a younger Sapolsky.

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In a similar way, in training therapists, if we help them become aware and effectively process their countertransference (unconscious motivations, drives, desires, longings, unmet needs), therapists become less likely to be swept into enactments, role reversals, and projective identification. A therapist can thus learn to choose to give empathy and keep the frame when they would have otherwise unconsciously acted in a deterministic way. Becoming aware of our influences can give us more choice or choice that aligns with our meaning and purpose.

If our stress systems are trained, we can metabolize future stress in a different way and dissociate less. This occurs both through progressive strength or heart training and therapy (processing stress with a stable attachment). Through choosing to suffer a bit in the short term, one might be able to better not dissociate under pressure in the future.

While Sapolsky and I may diverge in some aspects, there is undeniable common ground in our perspectives. We both believe change can occur. Similarly, we both agree that with change come biological changes in the brain. He emphasizes the transformative power of hero narratives, such as John Newton's crucial role in ending the slave trade. Sapolsky suggests that sharing such stories can nurture a form of heroism. This resonates with the notion that by exposing individuals to certain concepts, such as the bystander effect—a psychological pattern where people, in the presence of others, are less likely to assist someone in need due to distributed responsibility—we can shape subsequent behaviors. In fact, raising awareness of this phenomenon has been shown to mitigate its occurrence.

Sapolsky would likely agree with this sentiment as well, as he stated in our interview, "The last thing on earth that means is that things cannot change. And it certainly does not mean the next step, which is you should not attempt to try changing things because why bother. When you study the mechanisms by which we change and things change, and neurons change and ion channels change and societies change, all it does is reinforce that much more, that there are mechanistic underpinnings to it. And sometimes the way you access it is by stopping somebody's serotonin reuptake. And sometimes the way you access it is by spending hours and hours listening to someone. . . . Like nervous systems change, change happens, but you don't sit there and decide, that's it, I'm going to change. Because you can't will yourself to have willpower. You gotta be lucky enough to have, like the, the neurons lined up in a way so that the right circumstances can change you." In a sense, he was advocating for attempting positive change, just in case you can actually change! Interestingly in the Free-will and Determinism Scale: Version 4B, question 5 sounds very similar to what he would lean, in a way, towards a belief in free will: "No matter how hard you try, you can't change your destiny."

We both agree there are many influences on us. Think of determinism as a chess board, with our genes and environment dictating the rules. Sapolsky posits that each of our moves is predestined. I concur that our movements within this chess game of life are constrained, yet it's crucial to understand that there's flexibility in how we move. Each piece represents different choices, and there are myriad ways to navigate them. As an illustration, as we gain more

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self-awareness, a sense of our meaning, purpose, and values, we can constrain our decisions to successfully move the pieces towards our intended goal. As we gain more insight to understand our once unconscious motives, we can perhaps see more pieces that can be moved. For instance, being someone who naturally leans toward agreement, I found it challenging to prepare for a discussion where I'd be opposing a mentor I've always admired, like Sapolsky. Through therapy, I've come to recognize the anger that was previously adaptively surprised in my unconscious and often manifested physically as migraines. With this new understanding of my anger, I might actually disagree with someone like Sapolsky and have the capacity to choose to think independently.

Drawing from Sapolsky's journey, the path to self-discovery can often begin in unexpected places. He once shared a whimsical fantasy of darting a professor. Yet, this same imaginative spark, when channeled appropriately, propelled him towards groundbreaking discoveries. For example, he found that baboons with stronger affiliative attachments tend to be happier. Simultaneously, this intense drive, when redirected towards personal pursuits, led Sapolsky to meet the love of his life. Such a deep connection, as his own research might suggest, can potentially contribute to the reduction of stress hormones.

Let's say you still choose to believe in determinism...

If you find yourself aligning with Sapolsky's perspective and lean towards determinism, believing that we're essentially biological machines shaped entirely by our genes and environment, I'd urge you to contemplate one crucial aspect: the value of cultivating a heightened locus of control and discovering profound meaning in life. Research underscores this sentiment: a study by [Aviad-Wilchek in 2019](#) revealed that a higher locus of control and a more profound sense of life's meaning correlated with reduced suicidal tendencies (with correlations of -0.82 and -0.49, respectively). Thus, regardless of one's deterministic beliefs, there's undeniable merit in seeking and cherishing life's purpose and significance.

Summary

From an early age, Sapolsky identified himself as a determinist and developed a passion for studying apes. His drive and natural intelligence, according to his belief, determined his success in both primatology and stress research at the highest levels. The influence of watching the apes, and his becoming aware of the importance of connection in stress and happiness, coincided with his meaningful relationship and subsequent family. It could be said that he himself is the alpha in many domains of his life. Just look at Joe Rogan's supplicative posture towards him as an example. He, however, chooses to construct in his mind the most humane world he can imagine, thus his focus on how because we are determined wherever we are in life, we can utilize this to have more compassion on those who might have lower places than ourselves in various dominance hierarchies.

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There was a moment in the interview when he also expressed that even if this is an intellectual insight or desire of his, his emotions do not always follow. Of course we all want to be seen as competent and hard working, despite his ideology believing that we can't take credit for this. And even with his belief of not taking credit for hard work and doing something important, he would simultaneously say a sense of control is a positive way to reduce stress. He shares that despite one's drive, like his own, to climb dominance hierarchies, there is a beauty in his epiphany that the happier, less stressed baboons had closer friendships, and thus we also should focus on our relationships, despite our drives that might take us away from such things. We can appreciate his drive for humanism and kindness towards all humans, and how he creates meaning in "choosing to," sometimes pushing up against the drive for achievement and, rather, focusing on deep meaningful relationships.

Further episodes on this topic:

[Episode 084: Free Will in Psychiatry & Psychotherapy Part 1](#)

[Episode 085: Free Will in Psychiatry & Psychotherapy Part 2](#)

[Episode 086: Free Will in Psychiatry & Psychotherapy Part 3](#)