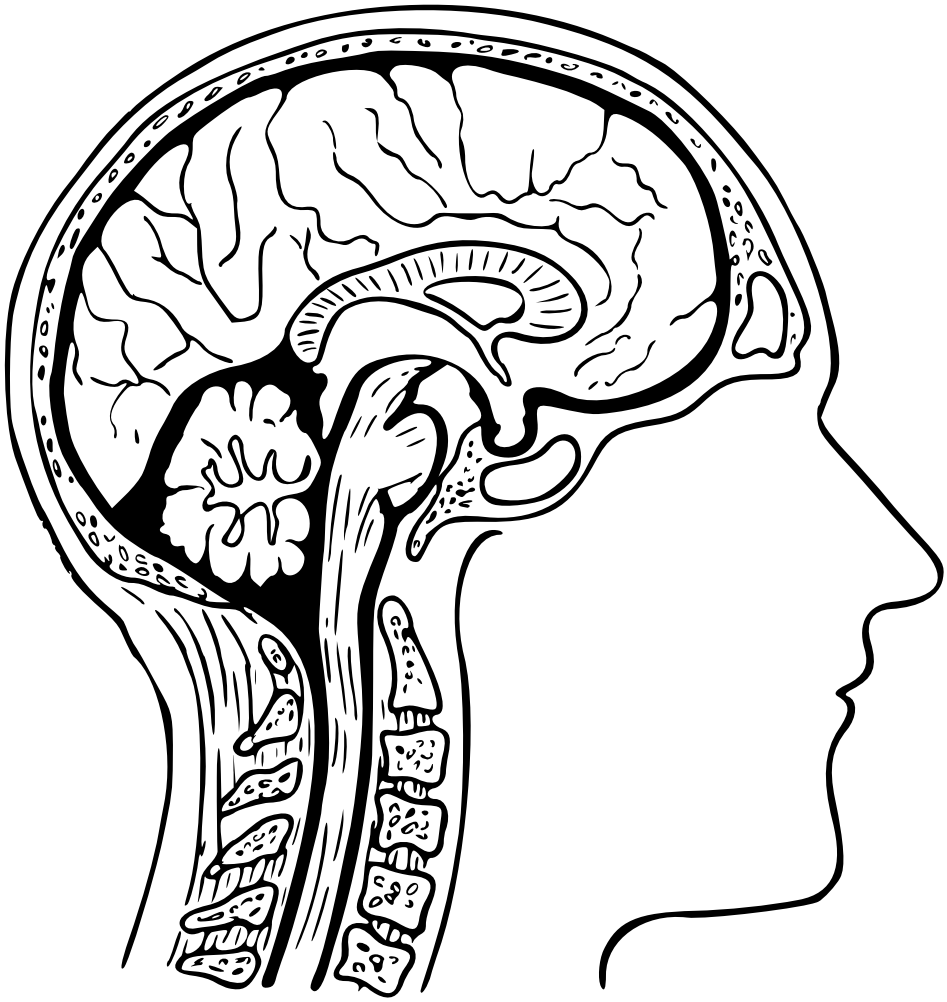
HUMAN SYSTEMS INTELLIGENCE & RESILIENCE

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Book 1: Resilience

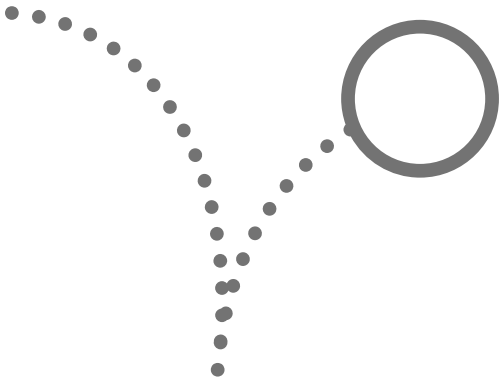
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What do we mean when we say someone is resilient? Generally speaking, we include an idea of ‘bouncing back’ from an adverse event or challenge. But what exactly does this mean? Are we implying the person goes back to the way they were before the event? If we define resilience from this simplistic perspective, we miss out on a few key features that make systems truly resilient, according to systems and resilience research.



First, let’s look at the idea of ‘bouncing back’. Within this idea is the nervous system's ability to return to baseline or rebound [GELLHORN1956]. When a person (or animal) is encountering a stressful event, different systems engage in order to mobilize (or immobilize) that organism to fight against, protect itself or escape whatever that threat may be. The mobilization systems that get activated are called ergotropic [HESS1949]. Ergotropic systems expend energy, and are tied to sympathetic nervous system activation. Muscle tone and heart rate increases, stress hormones may get released, posture and attention become alert, narrow and vigilant [PAYNE2015].

After a stressful event, it’s important for an organism to be able to return back into an energy-expending mode that is appropriate for whatever is occurring in the environment. This reflects the idea of bouncing back.

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The challenge is that if a person goes through excessive or repetitive exposures to stress, it may become difficult over time to return to that baseline. This is also known as ‘tuning’ [GELLHORN1970; PAYNE2015A]. It occurs when a person or animal becomes biased towards remaining in a sympathetic nervous system mode, regardless of whether that amount of energy is actually needed for a situation. In that case, the ability to bounce back is impaired.

Appropriate Energy Expenditure

its important for our nervous systems to respond with an amount of energy that is adequate and appropriate to handle challenges *and* opportunities.

Over-expending energy on things that are not threats, or on opportunities that will not actually benefit us means that we may become depleted of energy and need recovery more often. This may then also take away energy from situations that will actually benefit us.

An example of this might be reacting to something that happens on social media in a way that has a person expending energy (increased muscle tone, heart rate, release of stress hormones, etc.) as though an actual threat is happening to them in their physical environment in live time.

This is a mismatch and over-expenditure of energy. Once the system uses energy for things like secreting adrenaline and cortisol and increasing muscle tone and heart rate, it then needs to replenish that energy to help it perform its other ongoing functions for homeostasis, such as blood flow and nutrients for digestive organs.

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Another example of over-expenditure may be tied to perceiving opportunities as being more beneficial than they actually are at the time point in which we are encountering them. An example of this may be finding out about an opportunity or ‘secret formula’ related to career, relationships, health and finances.

Over-expending may occur when we perceive something as being the ‘golden ticket’, the solution to all our problems. If we perceive something in this way, we may devote excessive amounts of attention, time and resources to that opportunity without discerning if it truly is as miraculous of a solution as we think it is.



We may also neglect spending time on other resources and opportunities that contribute to our wellbeing, such as supportive relationships, exercise, nutrition, and other healthy habits that are not a one-time deal that solves our problems but ongoing supports that require daily energy.

By over-expending energy in ways that may be excessive for either a perceived threat or opportunity, we may deplete energy and resources that are important for long-term functioning of us as systems.

Under-expending energy is another challenge to resilience. An example of not using enough energy to deal with a threat would be if a person is in a dangerous situation or unhealthy relationships or situation that could either harm that person or deplete their energy over time. If a person does not use energy to fend off a threat, or if they do not use energy to make changes necessary that allow them to leave an abusive or unhealthy relationship, or a toxic work situation, they are under-utilizing energy that will benefit them in the long term.

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Staying in unhealthy, dangerous or toxic situations can be detrimental to a person's nervous system and brain functioning as well as physical health, due to continuous stress and related secretion of stress hormones. Constant exposure to this can lead to allostaic load, which makes it difficult to rebound and recover because there is not enough time spend or ability to enter a paraysmpathic mode of restoration and recuperation.

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So, one part of resilience is related to energy expenditure, and particularly when it comes to responding to events and people. In order to get better at using energy appropriately, another aspect of resilience is a strategy called rupture and repair. This can be useful for systems to test out and build up capacities for withstanding and recovering from adverse events and challenges.

Rupture, repair and flexible responsiveness

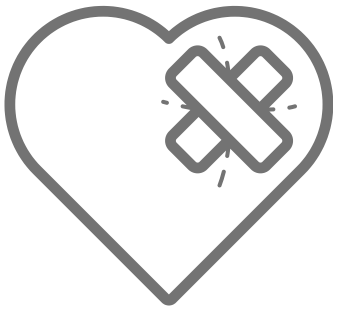
From a system's optimization viewpoint, flexibility is key. Flexible responsiveness—the ability to constantly adapt, cease, increase, or change strategies according to continuously emerging and dynamic inputs—holds the key to not only survival but also optimization of energy use for future projection. To build this flexibility, the task of a system is to build tolerance and a large repertoire of strategies to tolerate a variety of levels of challenge and opportunity. The wider the range of these strategies, the more the system can adapt. Therefore, being exposed to a large variety of stimuli and states of arousal is a strategy for building sophisticated self-regulatory systems.

One mechanism for doing this is the distress-relief or rupture-repair sequence [SCHORE1994]. The goal of a complex system like a person or relationship is not to only maintain a constant state of positive arousal or calm, but rather experience a wide range of internal and external fluctuations to help develop strategies and sequences of behaviors for navigating as many different types of scenarios, and thus improve chances of long-term survival and thriving.

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For example, in couples research, it is not the absence of conflict that predicts whether a couple will report marital satisfaction and/or remain married, but rather the types of strategies used, particularly during and after conflict. It is the recovery that matters [GOTTMAN2015].

Effective repair attempts include reducing negative affect or increasing positive affect during conflict. [GOTTMAN2015]. Pre-emptive repair, which occurs in the first 3 minutes of conflict is also shown to be most effective at repair and addresses the affective tone of the interaction as a way to create emotional connection instead of cognitive appeals to solve a problem [GOTTMAN2015]. Some of these affective repairs include words or gestures that indicate “we’re okay,” shared humor, affection, self-disclosure, expressing understanding and empathy, as well as taking responsibility for an aspect of the problem being discussed [GOTTMAN2015].



Rupture and repair strategies within relationships engage a range and repertoire of arousal states and affect-modulation strategies, with each partner playing a role in the system’s ability to regulate. When recovery techniques used by these relational systems are effective, they help free up neural and behavioral resources for problem-solving and recovery.

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Mission and Purpose

A third element of resilience is tied to purpose. This sense of resilience comes from the military definition of suvivability, which contains within it the ability to remain mission-capable after an engagement [FIRESMITH2003]. Keeping the military definition of survivability as a foundation for resilience, a system is resilient if it is able to carry out its mission despite disruptions, excessive stressors, threats and other challenges [FIRESMITH2003].



This is important to think about when it comes to systems. Note that a person is a system. So is a brain, a body, a family, a relationship and a community. A system is a network of interacting parts that come together in constantly emerging and dynamic ways to achieve a function that each part alone could not achieve on its own.

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When we think about systems, it is always important to think about its function or its purpose. This allows us to examine how many incredible and diverse ways it can continue to carry out its mission, even if events disrupt one trajectory. If the mission is clear, the system can re-configure and re-allocate what is needed to continue with that function.

We see this occur in the brain. In a stroke patient, for example, if one part of the brain is damaged, through rehabilitation it can become possible for a person to regain strength because the brain is capable of re-routing and re-allocating energy and resources to different areas of the brain [CAREY2019]. This can be extremely challenging, but with the right amount of work and within certain time frames, it is possible.



We also see this as we look at a person as a system. When a person who is determined to survive, flourish and be of value to other systems, this function and mission can be a guiding principle for how energy and resources are allocated. When this mission is clear, events and people can come up as obstructions and challenges, but the person is able to re-allocate energy as needed to move around or eliminate those obstacles to fulfill their function.

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Adding Value to the Systems Around Us

Part of our function as a system nested within other systems is to be of service and value to the people and environments around us. This is because when people and environments that we interact with are functioning at their optimal levels, it means that they are using energy in appropriate ways. What this means is that they are not seeing threats that are not there or over-exaggerating benefits of other people or events.

How this translates to us is that when people around us are healthy, they become self-regulating and autonomous. We then can turn to them in times of need, and by becoming self-regulating ourselves, we can also be sources for them when needed. If the people and environments around us are depleted, this can lead to dependency and can make it more difficult for us to cultivate interdependent and reciprocal relationships.

As we understand this, we can see that being of value to others and becoming as high-functioning as we can IS our mission. Our own resilience depends on the optimal functioning of our systems and of those around us.

Resilience is made up of multiple features, including using energy adequately and appropriately for challenges and opportunities that present themselves. It is also about creating support systems and levels of awareness that allow us be sensitive to context and to discern when and how to use our energy or to conserve it. And it reflects an ability to achieve our function as systems - to remain viable, robust, capable of surviving, projecting into the future, and contributing value to the other systems we interact with.

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Guiding principles for resilient systems

Below are some guiding principles suggested by systems engineering research expert Donald Firesmith [2020]:

Focus on mission-critical capabilities. The goal of systems resilience is to ensure that mission-critical capabilities are not disrupted during adverse events or conditions. One way to cultivate this focus is to become more explicitly aware of how our optimal functioning serves the world in some way. Thinking about this can help us create boundaries to protect our energy from toxic situations, as well as hone our energy onto habits and support systems that keep us feeling accepted, regulated and inspired. What strategies can you implement to support this goal?

Identify critical assets. In systems engineering terms, critical assets include hardware and software, systems data, and system-external data sources. Within the realm of human systems, this could include brain-body systems, information we receive from teachers, leaders and other people, our communication signals during social interactions, and the people and environments we are surrounded by and connected to. To enhance systems resilience, it is important to acknowledge which of these assets are critical to our overall functioning.

Concentrate on common critical assets. Common assets include shared networks, services, and data repositories. From a human systems perspective, this includes all types of social communication platforms, as well as the spaces where people are exposed to and rely on a shared source of information, such as a teacher, leader, or role model.

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Concentrate on disruptive harm. Not all conditions or events are actual life threats and require energy and resources that deplete our energy from other tasks and people. Focus on those that are in fact disruptive.

[Please note: the guiding principles listed above are from Firesmith 2020 - cited at the end of this document]

Summary

To become resilient, we must be more discerning of how we spend our moments of each day using neural and behavioral resources to attend to different things. For example, ruminating in one's mind about a past or future event requires energy. If we ruminate over stressful things, we may also be activating sympathetic nervous system features that also require energy from our system. This is an inefficient way to use energy because no action is actually be taken to resolve the issue.

Resilience engineering is about concentrating on disruptive harm and using energy to build up the system to withstand future challenges. We can use energy wisely in this way by building up social supports and engaging in habits that help activate blood flow in healthy ways, such as in play, rest, optimal nutrition, exercise and social engagement.

The better we get at discerning what factors in our physical, internal, and social environments are actual threats, and which ones can be lowered into a different category of energy consumption, the better we get a using energy to improve system functioning.

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Resilience is more than just bouncing back—it's about adapting, optimizing energy, and thriving despite challenges. The nervous system has incredible abilities to rebound after stress,. HOWEVER, chronic stress can impair this recovery process. Overreaction to perceived threats or exaggerated opportunities—keeps the nervous system from allocating resources efficiently. For example, reacting to social media as if facing a real-life threat drains resources needed for other critical functions, leaving the system depleted.

Flexibility, a cornerstone of resilience, thrives on experiences of rupture and repair. Whether in relationships or personal challenges, our ability to recover effectively from disruptions builds our nervous system's adaptability and strength. Conflict, for instance, isn't destructive in itself; it's the strategies employed to repair and reconnect afterward that foster growth and strength. This dynamic process equips us to navigate a wider range of scenarios, which helps us enhance our long-term survival and thriving.

Resilience draws power from a sense of mission and interconnectedness. Like a well-designed system, humans function optimally when their purpose is clear, allowing them to adapt and allocate resources effectively despite disruptions. Being of service to others creates a ripple effect—strong, healthy systems inspire resilience in those around them. By aligning with their purpose and nurturing mutual support, individuals contribute to a thriving, interdependent network of systems.

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About Me

I'm a neuroscience specialist with expertise in optimizing learning, performance, attentional control, cognitive flexibility, neurodiverse challenges and emotion regulation using biofeedback, cognitive training and frameworks that integrate mindset, childhood experiences and family systems.

I have worked as a counselor, cognitive trainer, reading therapist, research analyst, coordinator of learning programs, and have analyzed many physiological aspects of nervous system states and brain functioning including electric conductance of the skin (GSR), facial electromyography (EMG), heart rate variability and quantitative electroencephalography (QEEG). I Integrate all of this with my experience training in monasteries with meditation masters from Vietnam, India and West Africa.



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