

What You Need to Know.

by Dr. Stuart Shanker

Self-Regulation: Science Backgrounder

What is self-regulation?

Recent research in neuroscience and physiology has profoundly altered our understanding of the mechanisms behind a child's response to stress, and has also reinforced what physicians have intuitively understood for generations: that children's physical and mental health are inextricably intertwined.

Nowhere is this phenomenon better illustrated than in the rapidly growing understanding of self-regulation. The core concept of self-regulation refers to the manner in which the brain maintains physiological stability through complex feedback mechanisms. It is the ability to self-regulate that allows a child to respond to stressors in their environment.

As in any homeostatic system, the brain regulates the amount of energy expended in order to deal with stressors and then recover so as to promote restoration and growth. When explaining self-regulation to parents and caregivers, we use the classic example of a furnace as a simple homeostatic system.

A furnace is regulated by a thermostat—a simple bimetallic strip that is rolled into a coil and then expands or contracts depending on the ambient temperature. In the case of the brain, the “thermostat” is an array of systems and sensors running throughout the body—everything from

baroreceptors in the blood vessels to neural systems in the subcortex that constantly monitor for potential challenges or threats.

These systems and sensors behave essentially in the same way as a thermostat, with both positive and negative efferent (motor) signals being sent from the brain to different organs in the body, in response to the afferent (sensory) signals received from the various organs back to the brain.

At the heart of this self-regulating process is the autonomic nervous system (ANS). Just as it did millions of years ago, at the first sign of predator and prey—or anything that seemed threatening or exciting—the ANS dispatches neurohormones that prime the body for action: fight, flight or hunt and capture. These stress responses consume an enormous amount of energy, so the ANS has another mechanism to rapidly restore balance once the danger has passed or the hunt (or math test) is done.

These dual opposing mechanisms that maintain equilibrium are: 1) the sympathetic nervous system (SNS), which releases adrenaline and cortisol for acceleration and quick action, and 2) the parasympathetic nervous system (PNS), which releases acetylcholine and serotonin to slow things down to a rest point for recovery. Together these two systems continuously regulate every biological

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detail of a child's existence like breathing, eating, sleeping, studying and getting along with peers. But if this recovery mechanism is overused, and the signs that the individual needs to rest and restore are ignored, then the system can become strained and over time the first early signs of downstream physical, behavioural, attentional and/or mental health problems appear.

The brain's response to high energy demand is to shut down those parts that are not immediately necessary—rather like living in a very large house in which you close off the vents in rooms that aren't being used in order to reduce heating costs. The brain operates on a similar principle; but unfortunately, the "vents" it turns off may be some of the most important ones a child needs in terms of monitoring and modulating his emotions, behaviour and attention. The brain directs its energy to attend to the body's core needs—heart, respiration, thermoregulation, large muscle groups—and away from such things as the immune system, metabolism, the prefrontal neural systems needed for modulating impulses and strong emotions, and even the systems in the middle ear that detect the human voice.

Signs of stress

How do we know when a child is expending too much energy? There are several simple signs that parents and other caregivers can look out for to identify when a child's stress system is overworking:

- Trouble falling asleep or staying asleep
- Crabby mood in the morning

- Easily upset, even over little things, trouble calming down when this happens
- Volatile mood
- Trouble paying attention, or even hearing your voice
- Frequent anger, or signs of sadness, fear or anxiety

Recognizing and responding to stressors

A traditional self-control approach to such problems would focus on trying to suppress or extinguish the behaviours. But these behaviours are often signs that a child's stress load is too high. Recognizing the sources of the stress load allows a much more effective upstream approach to easing the child's stress level and therefore bringing the child back to a calm and focused state. This approach underpins the self-regulation approach, a concept rooted in basic preventative health.

Recognizing stressors is therefore critical for supporting stressed children. Some common stressors for children are:

- The child's biology—for example, his sensory/motor system
- Poor sleep regime
- Poor diet (high in processed foods)
- Lack of physical activity
- Stressors in the environment—for example, too much noise, light or crowding
- Demands being made on the child—for example, by family, school, etc.
- Too much screen time

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5 steps Shanker Self-Reg®

Shanker Self-Reg® offers five critical steps that parents and other caregivers can take to address these issues and help children return to calm.

1. Read the signs and reframe the behaviour
2. Recognize the stressors
3. Reduce the stress
4. Reflect
5. Restore

This same process helps everyone regulate their own stressors and responses.

Next steps

Primary care physicians and community nurses can play a critical role by helping families recognize and mitigate stressors through the principles of self-regulation. In this way, health professionals and parents can work together to identify issues early and promote a healthy developmental trajectory in children.

Contact The MEHRIT Centre at info@selfreg.ca or visit www.self-reg.ca for further information.

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