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Optimizing Stress

Abigail Chaver

You glance at the clock for the third time this minute. You've got twelve minutes and 13 — no, 23, no, 13, 12 seconds left. Your limbs are rigid and vibrating, your heart is pounding, and your cheeks are hot. You're trying to remember how to take the integral of a square root and all you can hear is the scratching of others' pencils. You did this just two days ago, but right now you can barely remember the times tables.

When stress reaches extremely high levels, it becomes debilitating. But when it's not overwhelming, and instead moderate, stress is a crucial factor in success. Without it, our minds are disengaged, slow, and unproductive. This idea is captured well in a classic Buddhist teaching: A person has to be tuned like the string of an instrument: If it is too taut, it will snap. If it is too slack, it will not play. We can benefit from "tuning" to this ideal tension. The question is, how?

The theory of stress tuning is well displayed by the Inverted-U graph, which plots stress against productivity (*Figure 1*). Finding actual data to fit this graph is difficult. The science of stress can be approached from several angles including biology, psychology and economics. However, data from these three fields looks quite distinct. Understanding the method of data collection and its precision will help determine its usefulness in stress management at both the individual and organizational levels.

Psychology Metrics

Surveys are commonly used in psychology and are fairly easy to administer. However, stress-related surveys often fail to differentiate constructive stress from destructive stress. For example, the Perceived Stress Scale uses a survey to rate an individual's stress level. The PSS asks subjects to report the frequency of thoughts, on a scale of 0-4 (never - extremely frequently), relating to both positive and negative items. For example, a negative item might be, "In the last month, how often have you been upset because of something that happened unexpectedly?" A positive item might be "In the last month, how often have you felt that you were on top of things?" (Cohen, 2013) The results for the positive items are reverse scored (a 0 on a positive item becomes a 4 indicating high stress), and then the numbers are summed, giving the score from 0 to 40, where 40 is the maximum stress level.

This survey, and others like it, attempts to measure feelings of frustration, emotional instability, and failure. This makes it a very poor metric for identifying a good stress level – it implies that the ideal amount of stress is 0. In fact, most stress research presents a negative relationship between stress and productivity. A review analyzing this correlation concluded that these findings were constrained by methodology. Because of stress's negative connotations, most research focuses on its negative effects— surveys rarely ask questions about feeling under-stressed. (Muse, 2003) The PSS is a good example of a survey that fails to measure the under-stressed condition. The review suggests adding questions to stress surveys regarding feelings of boredom and levels of engagement.

Figure 1: Inverted U Model

Part of the problem may be the ambiguous definition of "stress," which is inconsistently defined in research (Muse, 2003). Language varies: sometimes constructive stress is called "Eustress," while the destructive stress is called "Distress." Others describe a positive stress condition as being "arousal," a condition separate from stress. A more uniform

> **"However, stress-related surveys often fail to differentiate constructive stress from destructive stress."**

understanding of stress as a continuous gradient with both positive and negative aspects may improve psychological metrics and research.

Biological Metrics

A chemical indicator of stress, such as adrenalin or cortisol levels, is a less subjective measure (*Figure 2*). There are blood, urine and saliva tests. These tests must be processed by a lab and therefore require some resources beyond the scope of personal home testing (ADAM, 2013). Cortisol levels reliably fluctuate throughout the day (ADAM, 2013). They also fluctuate in response to specific events, so chemical levels taken once are not necessarily indicative of long-term stress levels. For these reasons, chemical indicators may not be ideal for managing stress. However, they do have the advantage of measuring stress at excessively low and high levels. This could be useful in identifying an optimal range.

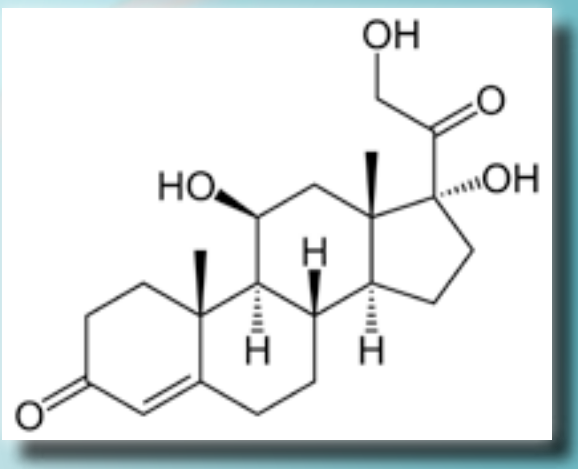

Figure 2: The molecular structure of the hormone cortisol.

A less direct measure of stress that is subject to fewer short-term fluctuations is health data. Most companies pay for their employees' health insurance and lose money when employees are ill. They would have an interest in following figures like health care costs and frequency of stress-related illnesses, and would have an incentive to reduce stress if it was correlated with tangible costs such as sick days (APA, 2010).

Being under-stressed has less discernible health effects and thus measuring health care costs is not ideal for finding the optimal range of stress as it cannot provide insightful or actionable data about being under-stressed.

Economic Metrics

An economic approach would consist of looking at productivity figures rather than stress directly. This approach is somewhat risky as it might encourage increasing stress until productivity begins to fall. There is likely to be a lag before stress begins to seriously affect performance.

Productivity metrics depend on the situation. Sales revenue, grade point average, time frame to complete a project, or number of bugs in a product are all possible metrics. None of these external indicators offer much information about stress levels. However, if they were paired with a direct measure of stress levels, like the previously mentioned psychological or biological metrics, they could be insightful.

Economics can also illuminate why stress has become a severe problem. Economies that increasingly rely on automation shift humans into jobs that require more responsibility and critical thinking (*Figure 3*). While these jobs are more mentally stimulating, they are associated with higher stress levels (Maxon, 1999).

Alternative Metrics

A practical approach might be to find proxy indicator of stress rather than a direct measure. For example, low reaction time is a plausible indicator of optimal cognitive function and is highly influenced by stress levels. Using a test of mental reaction time could be low-cost, and could yield an excellent metric. The activity itself would be a small stressor that could raise stress levels moderately, which should be accounted for when considering the data. An activity that tracks both speed and correctness, like a timed sorting game, would be helpful for determining peak mental faculties and when anxiety has become destructive. An activity done over a computer interface would allow mouse tracking, another source of anxiety-related data. Frequent and unnecessary mouse movements might be a good indicator of stress above optimal levels. This data would not be trackable on a touchscreen device, somewhat limiting the utility of this test.

"An activity that tracks both speed and correctness, like a timed sorting game, would be helpful for determining peak mental faculties and when anxiety has become destructive."

Figure 3: Macroeconomic trends are partly responsible for increased stress levels in the workforce.

Finding a proxy with an already established data stream would be ideal, but this would differ across organizations. The amount of time it takes to respond to an email could be a good corollary, or it could indicate high distractibility. Other interesting indicators could be speed of movement or speech, but these are difficult to measure.

This data could be tracked by individuals or aggregated. If optimal stress levels varied widely between people, aggregation of data would make it difficult to track specific trends. There could be some effort to normalize the data or plot inverted-U curves for individuals. It might also be extremely valuable to an organization, especially while hiring, to have data about a person's stress curve. Many professions are self-selecting for stress levels, but adding more data as a reference for this process can help many make better decisions regarding the external stressors in their lives.

Stress Coping Ability

A study of a high-stress occupation, military combat, identified a trait that showed a high positive correlation to excellent leadership performance: psychological hardiness. (McDonald, 2013) While this study was specifically about military leadership, psychological hardiness has been studied in employees, social workers, and other groups. Psychological hardiness has been broken down into three components: Commitment, Challenge, and Control. Respectively, these can be understood as a person's commitment to their pursuits, belief in their ability to handle a challenge, and their belief that they have a measure of control over the rewards and punishments they receive. (Bartone, 1991) Evaluations of psychological hardiness are typically subjective and qualitative, but many of them avoid the self-reporting trap by soliciting information from supervisors and peers.

What insights does this theory provide? Commitment is fairly easy to understand: A person's belief in the importance of what they're doing will increase their tolerance for setbacks and their desire to persevere. Challenge is almost circular reasoning: A person's belief that they can handle a challenge is probably based on past experiences successfully handling challenge. This would correlate to being good at handling challenge. Control is the most insightful— a feeling of power over one's own life is strongly correlated to high stress tolerance. The application of this idea would be increasing individuals' autonomy. This requires trust in the judgment of people as well as their ability to function without close oversight.

There is question as to whether psychological hardiness is a personality trait or a skill that can be learned. For example, some theorize that psychological hardiness is simply low neuroticism, as measured on Big 5 personality scales. There does seem to be some correlation, but whether the two are equivalent remains to be seen. (Bartone, 2009) Building psychological hardiness seems more plausible if it is not a personality trait.

Solutions

While none of the metrics discussed are perfect, they can be useful, especially when combined. Using a self-reported or chemical indicator of stress and a measure of productivity can help individuals and organizations set reasonable productivity goals and stress boundaries. Awareness of stress levels and stress tolerance should guide decisions regarding beginning a new activity or cutting down on responsibilities. Sources of stress that don't contribute to productivity, such as unclear communication of expectations, should be eliminated first when stress is too high. Stressors like workload and novel problems are appropriate to increase when stress is too low. Lastly, a conscientious

effort to increase psychological hardiness can help stress tolerance rise, improving productivity.

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