



Practical Applications in Lifespan and Healthspan: Leveraging the Science of Novel Experiences, and Applications in Behavioral Economics

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Abstract

Healthspan is presently losing ground to lifespan, in countries across the world. This trend results in an elevated rate (more people disabled) and length of disability (more life years per person). People are living longer, while consuming more healthcare and more caregiving - in all forms. While we have more knowledge and better options to choose more healthily now than we have ever had in the pillars of nutrition, supplements, sleep aids, and exercise – we are not adopting these healthy choices. Choice burden, friction, the arrival fallacy, the horns effect, negativity bias, and more – are some of the most cited barriers between knowledge and adoption. In this second part of a two-article series, we detail these barriers that inhibit us from achieving an optimized health span and lifespan. Most constructively and importantly, this article provides practical strategies to improve adoption at the level of the person, for the wellness provider and perhaps most importantly, for the healthcare professional.

Introduction

This is the second article in a two-article series on healthspan. The first article was an introduction to the science of choice, and then a handling of each of the five main pillars of health that impact both lifespan and healthspan: physical activity; nutrition; social connection and finally the combined pillar of sleep, rest, and play. This second article focuses on the science of a fifth pillar – that being the health benefits of challenging ourselves (outside of our comfort zones, and with novel activities) as well as the complementary knowledge of applied behavioral economics as related to decisions that impact healthspan and lifespan. Readers may benefit from reading the articles in order. To provide the most comprehensive experience, this article begins with a summary of the first article, followed directly by the applications and strategies.

As a couplet, these two articles will guide both laypersons and healthcare providers to achieve the following outcomes. By the end of this series, you could expect to be able to:

1. Identify the power of choice, in healthspan and lifespan decisions
2. Debunk the myths of aging, specifically what can be controlled and what should be “blamed on” the physiologic processes of aging

3. Identify the power of physical activities that optimize safety and wellness
4. Identify nutritional strategies designed for longevity and function
5. Identify the science of social support and purposefulness on healthspan
6. Identify wellness opportunities through a balance of rest and challenge
7. Identify controlled, extreme conditions in the form of temperature, exertion, pressure and novelty in an effort to remain capable, adaptable, and healthy

Improving your familiarity and confidence in the translations of science across the five pillars. (Physical activity, nutrition, social connection, sleep/rest/play and novel experiences) *may* nudge you to make healthier choices for yourself. In addition, knowing these practical and evidence-based applications *will* empower you to not only choose for yourself, but also empower you to guide both patients or family members accordingly, by providing them with fewer prescriptions and more choices.

Summarizing and Extending: The Power of Choice

It now appears likely that the science is accurate and that it is the solutions, the implementation, that is the problem. We now have more education, fewer work hours/more time for self-help, more gimmicks and life hacks than we have ever held. What is going to move people to choose better, to adopt evidence-based strategies to extend their healthspan? The approaches that have been used to coerce, guilt, shame, or convince people have been ineffective. These approaches have included more myths about aging than ever, more approaches endorsed by figures of authority, and even more legislative solutions. We have tried these and are *barely* living longer than we were decades ago.

The solution may be in stepping back from the fads, hype, myths, legislation, prescription and coercion...and providing choice. When we believe in a surgeon, medication, supplement, hospital, exercise program, diet, sleep routine, or even a restaurant...we select “it”, we choose it and it works better if for no other reason than the power of

choice. Consider your impression of the placebo effect, elevating the benefit of a sham or null intervention, ointment, procedure. What if we were provided options to make our own choices? Imagine a healthcare and wellness world wherein health seekers were given the opportunity to make choices for ourselves from a menu of a few healthy options to improve our healthspan? How much more healthspan could we realize, if we made our choices from scientifically-supported options? **Choice** enhances three powerful attributes that can make any solution more effective: autonomy, self-efficacy and belief.

Two identical environments or conditions will be diametrically opposed in how they are received, when one is chosen, and the other is imposed. Consider the difference that being pushed into a 41 degree pool and intentionally entering a cold plunge. How about the time of night that you prefer to go to sleep? Compare forced labor versus a volunteer experience of yard cleanup for an injured neighbor? When we choose, we vote. We endorse an option. We tolerate directions and selections that we choose, best. This effect is seen in our daily experiences in choosing a driving or running route, a movie, a meal/restaurant, a vacation destination, a social gathering, and more. When you choose, you are more likely to stay with that option, than if it were forced upon you, prescribed for you, legislated, or delivered with the pressure of guilt. Choice increases your consistency, attention, belief, intensity, and engagement – variables that make any healthy option more effective, healthier, and applied more consistently over time.

Any healthy option that *you choose* in the realms of healthspan, and lifespan will have a better chance to succeed.

When two or more options in wellness or healthcare are equally healthy for you (forms of exercise, diet strategies, or medications), the option that you choose will be more successful because of your belief in that option [1]. In time, a series of choices made consistently can become a habit and even more permanent still –by creating an identity.

We blame too much on aging

Are we giving in to aging, when we don't even clearly understand it? Our society and our experiences may cause us to feel hopeless against aging, a dangerous position that may disincentivize us from choosing healthier options (or actions) because we cannot control aging after all. If we feel that we are genetically predisposed toward a collection of diseases and maladies, then our choices will have no impact. We have no control. We have no self-efficacy, so, "What's the difference?"

In fact, aging is comprised of our genetics, our life choices, experiences, perception of aging, and more. With exception for nerve conduction velocity, [2] there are very few age-associated processes that cannot be mitigated. Not eradicated but mitigated. The common misconception that fitness cannot be improved while aging, may largely be a function of inactivity, illness, or injury – rather than the true physiology of aging itself [3]. Capacities that can be mitigated (slowed down from a commonly-accepted trajectory from aging) may include strength, force production, muscular endurance, cardiovascular endurance, pain free range of motion, cognitive flexibility, and more [4-7].

The mere notion that these processes can be controlled, that our choices matter, is powerful. A deeper dive on aging can be found in the first article of this series. An even deeper dive still can be found in the book, *The Brain That Chooses Itself*.

The Effects of Perception and Choice on Physical Activity Adoption Rates

The World Health Organization's recommendations for physical activity are often misinterpreted, misapplied, and misunderstood. All exercise is physical activity. Not all physical activity must be "exercise". As noted in the first article of this series, physical activity is a term used to refer to movement of all types – daily mobility,

recreational, athletic, avocational, vocational and for the purposes of gaining fitness. In contrast, exercise is but one form of physical activity, the later, that which is conducted for gaining fitness: power, strength, endurance (all forms), painfree range of motion (flexibility), balance, dexterity, and agility. There is much more movement in our lives that should "count". It is healthy to move more (with variety), outside of the time that we have as available to exercise. The farther that we feel away from 300 minutes of moderate intensity movement per week...the less likely we will be to reach toward that goal.

When we see the goal of 300 minutes of moderate intensity movement including a post-meal walk, doing yardwork, pushing a grandchild in a stroller, we may see ourselves as healthier, as capable and most importantly closer to the target. Close enough to try to bridge the gap with some structured exercise, a recreational game of pickleball, an extra walk, or one more outdoor project (garden, yard, community volunteering, trash pick up).

When we choose our best, most convenient, or favorite form of physical activity – it becomes healthier. Having the autonomy to choose, creating a belief, and making the choice are the ABCs of health and wellness: autonomy, belief, and choice. In physical activity, these ABCs give our movement more mental health (release of natural antidepressants), [8, 9] cognitive capacity (release of neuromodulator dopamine and cerebral blood flow), [8, 9] and enhance our relationship with movement (reducing pain, increasing frequency, increasing tolerance for intensity) [8-10].

The physiology of physical activity and related effects to reduce the expression of disease, reduce the risk for many diseases, and improve our prevention of the three primary killers (injury, inactivity and illness) is detailed in article one, as well as the book, *The Brain That Chooses Itself*.

Nutrition Beyond the Hype: Healthy Options for lifespan and healthspan

Remind yourself here, that if there were one best diet or approach to nutrition for everyone, that there would be no benefit of choice. In the realm of nutrition, there may never be a consensus, "winner" or best, across the variables of timing and content. We are coming to a consensus regarding high sugar, Ultra Processed Foods (UPFs), variety, and to some extent...what is unhealthy. These near-consensus agreements consolidate four main concepts in nutrition:

1. Adequate protein intake is rare, but critical.
2. Consistent grazing is unhealthy.
3. Liquid calories are rarely the best method (exception being when this is the main route for protein acquisition).
4. We do not know much about our microbiome. It (they, our collective microbiome) does "know" a lot about us. Treat these microorganisms well with fiber, low sugar, and time between feedings.

Again, the first article in this series covers nutrition much deeper – covering specifics on the microbiome, UPFs, chronotropic feeding and more. Still yet, the book, *The Brain That Chooses Itself* covers the topic more comprehensively.

Expanding Healthspan Through Social Interactions

Unintentional solitude (loneliness) is on par with alcoholism, obesity and smoking more than 15 cigarettes per day [10, 11]. We can perform better under stress, deal with unexpected life events, fend off infection, build and maintain diversity of thought, and improve the balance mitigate most chronic diseases (cardiac, metabolic, degenerative)– with the social contact that we prefer (choose).

Our social contact can come in the form of friends, former workmates, significant others, family...and even pets. The pathways for extended healthspan through social connection are broad and wide-reaching, including benefits to our mental health, immune system, cognition, autonomic (heart rate variability) and cardiometabolic systems [13, 14, 15].

It is often lost in the conversation about the benefits of a health social support network (expansive, diverse, reliable) that we can both gain from and learn from our inner circles. Research by Harvard professor David McClelland informs us that we improve in cognitive capacities when we have exposure to diverse social networks, through a mechanism that likely exists via expanding our pool of solutions for any given problem. Additionally, by living vicariously through the struggles and successes of our social network members, science informs us that we are more tolerant of unexpected stressors in our own lives and can feel more aspirational about our future potential through the same connections.

Optimized Healthspan Through Sleep, Rest, and Play

The final section summarized from the first article, is the singular but powerful pillar of sleep, rest and play. Again, choice matters here. How we define rest, when we prefer to go to sleep, and our preferred opportunities to be carefree, playful, at times. some populations have tight schedules that rule when one can go to sleep and when one must get up- whether it be work, family, or other obligations. Should add a comment for those who have ample time to choose their bedtime or something to that effect.

We gain healthspan and lifespan through rest and play in very similar pathways. Mental health (reduced cortisol), cognitive stimulation (creativity, hemispheric connectivity), improved cardiovascular profiles (blood pressure, heart rate variability), and improved metabolic function (digestion, blood sugar) [16-18]. Both rest and play are individually defined and are really only healthy in the forms that we choose.

Sleep is a unique pillar across those covered in article one. While there is gain from stressing the system in each of the others (one more repetition, a little faster pace, a little longer between meals, a diversity of social connections) – sleep appears to benefit from consistency, from regularity. The returns that we can realize from consistently optimized sleep are too long to summarize here. A very superficial list includes: recovery from illness and exertion, immune function, preventing degenerative disease, reducing metabolic and cardiac dysfunction, improving mental health, and more. For the next level of detail, see article one. For the physiology behind sleep and a more comprehensive coverage, see the book, *The Brain That Chooses Itself*.

Beyond the Comfort Zone: The Health and Wellness of Choosing Novel and Challenging Experiences

The final pillar of actionable opportunities for optimized healthspan and lifespan, was not covered in article one. That is the pillar and benefit of novel and challenging experiences. As we are choosing the actions and activities (for them to be received in full health), a person could consider these to be intentional stressors.- should label this as the pillar- choose either intentional stress or novel experiences Novel and challenging experiences that can come in the form of exertion, thermal extremes, psychological stress, cognitive difficulty/complexity, and more. Intentionally stressing systems within safe constraints will benefit the brain and body in a multitude of ways. The exception, again, is sleep.

While we can all accept that strength training may prepare us to endure or even more effectively stabilize when we encounter an unexpected force (perturbation) such as a grandchild's hug around a leg, a dog jumping up on us, or contact with an opponent in sport. In this regard, strength training can promote resilience – protecting us from musculoskeletal or even traumatic injury (fall) as a function of our resistance training [19-21].

We may benefit from extending this “expected stressor training” into other realms, beyond strength. It may be healthy to consider that exposure to psychological stressors, “psychological strength training” in the same fashion as resistance training, endurance exercise, and intermittent fasting, can prepare us for unexpected psychological stressors. Training our mental health using the boundaries of hormones

(just enough exposure to improve us) is grounded in research [22, 23] which shows that we can do just that – improve our psychological strength. Persons that have endured reasonable life trauma (to the level that can be overcome) will experience future resilience from trauma. As Dr. Victor Carrion suggested during his 2024 [24] interview on The Huberman Lab Podcast, this resilience comes in the form of improved coping skills, problem solving, and seeing their social support system is capable of helping (available and reliable).

In summary, a belief that, “I can do hard things, face hard times, and I have strong social support” is predictive of mental health and ultimately longevity. What more could we ask for? How do we arrive to possess a sense of resilience, grit, or self-efficacy though, were it not for thriving and surviving challenging experiences? Notice the use of the operative word, “belief.” Having enough (most any type of resource – food, financial resources, social support) or having access to the same, can buoy our belief sufficiently to have a positive effect. The science of *choosing* some discomfort, is an ever-expanding field in the realms of psychologic discomfort, thermal, exertional, and cognitive. A summary with resources for the health and wellness provider follows:

1. Brain health (your memory centers, specifically) improves with varied experiences, including intentional exposure to pressured and stressful situations that remain in our control
2. Adrenaline, epinephrine, cortisol are essential for us to occasionally elevate - when we and how we prefer to do so for alertness and intensity [25, 26].
3. Heart rate variability (HRV) can be a reflection of total cardiac health and moreover nervous system balance. Emerging science informs us that we can positively influence HRV through our life experiences and training [27].
4. Cognitive decline can be prevented in some cases through high-intensity exertion, stimulating the blood-brain barrier with elevated lactate levels. The primary pathways include adrenocorticotrophic hormone (ACTH), beta-endorphin, cortisol, catecholamines and cytokines [28].
5. Immune health can improve directly through cold exposure-induced promotion of cytotoxic T lymphocytes (combating cancer), the release of myokines, cytokines, the reduction of C-reactive protein (inflammatory biomarker), and reductions in pro-inflammatory cytokines and molecules, including PCG1-alpha as well (reductions in) pro-inflammatory molecules IL-6 and TNF- α [28].
6. Cold dosage (mode, totality or percentage of body immersion, duration, temperature and time) is a developing science. The benefits are clear, the prescription is not [28-30]. y sources?
7. Low temperatures can additionally have a positive effect on inflammation, glucose regulation, metabolism/thermogenesis, Brown Adipose Tissue (BAT) mobilization, as well as mitochondrial biogenesis [31].

Examine this equation within the context of your life, and potentially the life of someone aging in the United States today:

Familiar = boring = absence of novel stimulation = neural pruning = cortical atrophy

One could substitute “easy” for “familiar” and get the same result. A life without stimulus, novelty, and surprise does not challenge the brain to make new connections.

When life is too routine and too easy, we can disengage, pay less attention, and potentially commit some uncharacteristic errors. With fewer consequences and less novel stimuli, a brain may be less likely to encode/consolidate new information and make more redundant connections through the night. When we have a less stimulating existence, both pruning (losing connections) and cortical atrophy (reduction in brain volume) become more likely, just like a muscle that loses bulk with insufficient work. This concept of a “less-stimulating existence” is born out in critical illness (bedridden),

economic distress, and childhood neglect, with the evidence being most prolific in animal studies of impoverished environments [32, 33].

The science of extreme experience within physical activity and their effect on mental health or tolerance to unexpected stressors, can be seen in approaches of interval training, periodization, multi-sport exposure, and in each of the seven parameters of physical fitness include (as noted earlier): balance, flexibility (pain-free range of motion), muscular endurance, aerobic fitness, strength, power, dexterity and agility [34, 35].

The science of nutritional health (as alluded previously) includes efforts to ensure a **comprehensive diet** that provides the timing of fueling, as well as the full complement of micronutrients, minerals, and macronutrients. Extreme experiences that can be healthy for some in the realm of nutrition can include exposure to intermittent fasting – intentionally extending time between meals. It is worth restating here that this article provides introductions to the possibilities from which you can choose and investigate prior to applying on yourself, as no patient relationship is established in this informative and perspective article.

The science of diverse **social connections** as noted in the first article of this series will also benefit from experiences beyond one's comfort zone. This might include meeting people with differing opinions, being in larger crowds than one had been previously comfortable with, or even being in front of/the focus of a larger group of people. Harken the notion of “psychological strength training”. Benefits again can include improved tolerance of future unexpected social stressors, the diverse benefits that emanate from vicarious experiences, the benefits of hearing individual perspectives, and unique approaches to problem solving.

The science of **cardiac and endocrinologic health** with the recent understanding of the health parameter known as heart rate variability, largely operating a balance of the two main branches of the autonomic nervous system as well as a homeostatic balance of our hormones. Extreme experiences of exertion and rest are healthy within a hermetic balance of dosage. Never having elevated the heart rate, is unhealthy...just as much detrimental as living with a persistently-elevated heart rate would be.

The science of brain health includes an understanding that varied experiences (motor, cognitive, experiential) yield gains in **neuroplasticity** (making connections) as well as psychological health (to be detailed below). A primary principle of neuroplasticity, “use it or lose it,” applies here as well. Dual tasking is an optimal example of beneficial stress applied to the cognitive system, wherein a person intentionally (chooses to) subjects themselves to a challenge of continuing to perform two separate tasks at the same time at or near the level of proficiency they performed each in solitude. These challenges are among the most robust interventions for cognitive health with aging and can result in health gains in the attentional and motor control resources of the brain [36].

Finally, we arrive at the science of health-seeking **extreme experiences** or operating outside of your comfort zone. This includes exposure to thermal extremes, challenging experiences, and even safe doses of venoms, allergens, toxins, fungi, and microbes – have a basis in health and longevity [37-39]. Many of these conditions (only when exposed at safe levels and chosen/exposed voluntarily) fall into the category of being a “state shifter,” through our neurohormonal and body chemistries.

Exercise does not sound healthy when we review the acute effects of elevated heart rate, blood pressure, elevated blood glucose and elevated cortisol. However, the acute effects of an activity (like mild hypoxia) can be the stimulus leading to long term improvements [40]. Consistent with the concept of hormesis, wherein the body benefits from exposure to a temporary stressor, what arena of health does not have evidence that variety and experiences outside of the

comfort zone or “extremes” are healthy? Sleep. Sleep is our health parameter that benefits from consistency in all forms: quantity, quality, regularity and timing [41].

Extreme experiences that we choose may stimulate an internal sense of resilience should also be read as a “belief” that one has grit and self-efficacy. I see these terms as complementary: resilience, grit, and self-efficacy. These experiences, accompanied by a win (or not) can promote the release of endogenous dopamine. Recall that science informs us that the release of dopamine is not inherently and independently tied to a “win.” In fact, the experiences that are most likely to trigger a dopamine release will include novelty, surprise, or the pursuit of a goal. These could include a new flavor, a new “move” (dance, basketball, skateboard, freestyle skiing), or a new person who you have met; an unexpected win; training for a competition or promotion, and more should put these above instead of exposure to toxins.

A common question that arises in the topic of intentional challenge is, “What should I do when I try to extend myself, but fall short of my goals, or ‘fail’?” This is an excellent question, an experience that should not keep us from striving, as it can extend the rewards experienced with, “a win”. This phenomenon is known as the “near-miss effect” has been studied widely and proven to be a reliable circumstance to promote dopamine. The effect is as the name suggests, a desire to persist because the last trial was nearly a success. Prescott and colleagues studied this closely and carefully with a robot model within a food-foraging simulation in their 2024 paper, and Peterburs and colleagues found similar reinforcement of the effect when studying healthy adults and predictions in a gambling context. Even though it's counterintuitive, consistent wins do not produce as much dopamine as the anticipation and surprise of a possible win.

We will conclude this section by summarizing the health benefits emerging from intentionally challenging ourselves to tolerate safe dosages (person-specific determination with medical guidance) should put the word safe here or you risk exposing yourself to liability extremes, such as: thermal, physical (exertion), situational (mental; distraction or novelty), and psychological (pressure or consequences). Consider the practical examples of intentionally seeking out (choosing) extreme experiences, and the health benefits in return. Each of these have personal “weights” to them, being a challenge to each of us, but here goes:

- One more repetition of a resistance exercise
- Volunteering to do a math problem in front of class
- Intentionally practicing falling
- Trying to relearn how to play an instrument after decades away
- Visiting a foreign country, and attempting to speak the language
- Running for office
- Talking about our fears, anxieties, or compulsions
- Competing in a spelling bee
- Re-entering school in a wheelchair for the first time after a traumatic injury

Wellness Through Intentionally Challenging Experiences – A Deeper Dive

Readers that are interested in the science of novel experiences may choose to pursue more information on this topic. The most comprehensive coverage on the health benefits of subjecting ourselves to challenging, novel or extreme experiences is available in the book, *The Brain That Chooses Itself*, summarized here with these seven principles:

1. Many physiologic processes are triggered or initiated by a temporary condition of hardship; tap into these – they are often free, safe, and efficient

2. Thermal exposures: Extreme cold for a brief period of time will stimulate changes in the central nervous system promoting alertness (catecholamines) and enhanced executive function.
3. Tolerating a challenge (temporal, thermal, psychological, exertional) and thriving can promote the release of dopamine and serotonin.
4. Intentional exposure to full-body, prolonged heat (20 minutes) by hot tub (104d) or sauna (168d) can imitate the cardiovascular benefits of aerobic exercise. The two interventions (aerobic exercise and heat immersion/exposure) utilize similar pathways leading to improved aerobic plus systemic fitness, those being both elevated heart rate in efforts to dissipate heat and the release of anti-inflammatory cytokines [42-44].
5. Succeeding by achieving a new personal best or tolerating uncomfortable conditions that one intentionally invites can provide tolerance for upcoming, unexpected uncomfortable situations (tactical training, health challenges)
6. Hormesis. There may be an ideal dosage for each individual in immune health, mental health, physical fitness, and cognitive aptitudes. Too much of a given stimulus can be poisonous, toxic, or harmful to the level of breakdown - while too little (being shielded/protected) from the same stimuli can leave someone with an inexperienced immune system, less grit, or limited endurance [45, 46].
7. Neuroplasticity (connections formed in the brain in response to learning) begin to associate sensations (how we feel), perceptions (how we feel) with activities and events. With experience and repetitions, these associations can become prominent (think hard-wired).

Leveraging the science of choice (and applying this knowledge)

Science informs us that change in the realms of our health and wellness (physical activity, diet, sleep, socialization) may be more likely to be adopted when:

- There is less friction
- The new method or option is nudged or seems convenient, easy to apply
- We receive reward (gamification, praise, or sense of wellness/purpose)
- We believe that this approach is built for us (personalized)
- We perceive ourselves to be improving (ideally supported by objective measures, more so than opinion)
- The novel activity or change seems playful (for some), experimental (for others)
- We are “in this” with people like us (social connectivity)
- We chose the change for ourselves (autonomy, separate from belief in something prescribed for us)
- This is a loss-aversion “win” (this option would be preferred to “doing nothing” and risking loss (aging, disease process, opportunity no longer available) [8, 47-49])

The following list of maxims and principles is intended to help the practitioner in any health field pull together the two articles in this series toward an effort to both become familiar with and to pique

interest for further introspection as desired in any of these arenas **that you choose:**

Exercise is king (it's not)

Exercise is healthy for us in just as many ways as it always has been. Physical activity (PA) is the reframe here. Participating in PA that you like, you love, you need to do, your community or family needs from you – can be equally as intense, stimulating to release exerkines, need to define this term but at the same time give back and give you a greater sense of purpose fragment. For more information on how to use physical activity to your advantage in mitigating disease or aging with health, some recent research would include the following: [3, 50-52].

You cannot move what you did not measure

Find your inner passion for healthspan by choosing an attribute to measure. Then try to beat that measure, repeatedly. That is the essence of gamification. If you have chosen an attribute that cannot be improved, or is bound to erode, then use the angle of preservation, known as loss aversion. Nobel prize winning economist Dr. Daniel Kahneman is credited with some of the initial discoveries on loss aversion and game theory.

“Thanks for being there for me, I could not have done it without you!”

Some people benefit by the presence of a friend that will be at the gym, track, or pickleball court. This is a commitment device. Additionally, stating aloud, “By this time next month, I will be able to walk to the mailbox without stopping.” Can motivate some toward elevated consistency and intensity. This phenomenon of a friend that is counting on us is often referred to as a commitment device. It can additionally be experienced when we place a bet (monetary or otherwise) on our future performance. Consequences matter and can shape our actions.

Don't let perfect be the evil of good

This is a very popular maxim in business, that is less frequently leveraged in matters of health and wellness. Perfection can be paralyzing. Waiting for the perfect time to start a new habit may seemingly never arrive. There is wisdom in the order of operation as follows: measure – effect change – re-measure and then implement a more comprehensive approach. No matter whether you are talking about sleep hygiene, physical activity, or eating better...there is nearly always, “a little more” that you could be doing. Leaving more variables to change in the future can actually help your self-efficacy and (bonus) keep your body from plateauing quickly by adapting to the new normal.

The easier (it is to work harder) the better

We are chiseled into our best shape, physically and mentally, by the intentional and occasionally very difficult work that we do to improve. This intentional and hard work can come in the forms of reshaping habits, committing to healthier lifestyles, and consistently investing in preparatory work to hone a skill, capacity, or talent. We are more likely to stay the course when this work is convenient (easy, nudged), tempting (rewarded or accomplished with others), and satisfying (rewarded just frequently enough to see the gains). Table 1. provides real-life examples of these three principles (easy, satisfying, attractive) in physical fitness, sleep, nutrition and social connections.

Health parameter	Easy	Attractive	Satisfying
Physical fitness	Walking path nearby Home gym, bike	Significant other to join	Seeing regular improvements My movement is helping others
Nutrition	New recipe	Colorful advertisement (TV, grocery)	Favorite flavors AND healthy
Sleep	Schedule agrees w partner	Environment feels and looks healthy	Welcoming, cozy place Measurable improvements (tracker)
Social connection	Best friends, similar likes Good friends live nearby	Everyone agrees (politics, religion)	Social cohesion (others like me)

Table 1. Nudging healthier decisions

Appropriate credit due to James Clear at this point (and for the following two principles) as well as the foundational principle of “nudge” from Dr. Richard Thaler and co-author Cass Sustein, 2008 who do not have similar tables, yet whose work inspired this table with their themes of nudge and friction.

Obvious choices are more likely to be chosen

Clear’s second principle is “obvious.” When an option is more obvious, it may additionally be more likely to be chosen. This might include the route around a pothole on a run or drive, or a clear, best way to learn a second language. As you may note in your life, obvious choices are most usually easiest and can also be satisfying and yet attractive.

A satisfying choice may be reinforced after the fact

In contrast with the easy/obvious principles leading us to a convenient and logical choice (before we make it), being satisfied indicates a level of reinforcement through a feedback loop that can occur *after* the event. This, “better-than-expected” sensation can lead to improved recall of the association, and create a lasting memory. This difference between expected and reality may be referred to as the Reward Prediction Error, yet another powerful topic for further discovery.

Habit stacking

Another recognized principle that can lead one to a choice, or reinforce a choice to be made again, is habit stacking. Habit stacking can make a choice more convenient and more approachable as an activity that is less likely to be chosen can be combined with a daily activity that must be done.

As you recall from the first article in this series, Vigorous Intermittent Lifestyle Physical Activity (popularized by Stamatakis et al., [53] and extended with colleagues Pang et al., [54]) includes moving intensively and briefly throughout your normal life actions. A few more examples of habit stacking (some being VILPA, others more accurately referred to as an exercise snack) follows:

- Raking your leaves intermittently, faster
- Seated heel raises while in the waiting room or passenger seat
- Using a resistance band/loop between flights, during flights, on the bus
- Isometric contractions of your trunk muscles while watching TV
- From standing, retrieve a sock from the floor, don it and do the same for your shoe. Get dressed and work on your balance

Temptation bundling

Temptation bundling includes a new activity that is not yet a habit, being rewarded. If a daily walk is not part of your after-dinner routine, but you would like to make it so for the purposes of better metabolic health, a temptation bundle may include a nightly ritual to walk over to a local dog park because you love to watch dogs interact with one another. Temptation bundling makes something arduous or undesirable, more attractive. Pick up a newspaper on your run. Watch the sunrise from a vista reached on your walk.

Availability bias

One of the most common human errors in making a timely choice, is the misconception that an opportunity or solution will always be available later. This notion is known as availability bias. Our health and wellness opportunities will not always be “there” or available for us to choose. For a society most typically becomes less active with age, our chances for illness and injury increase. When it comes to making commitments to healthier choices, we have all succumbed to inertia and decided (at times), to act by modifying the “seize the day” mentality and substitute an adage like, “There’s no time like the future.”

Removing friction

Removing friction is yet another inherent principle that is included in nudge. Making a health related choice easier can be accomplished through geographic (“The gym is so close.”) and temporal proximity (“I can get a few extra steps in right now.”). These attributes are positive traits that can make a choice more likely, again leveraging human tendencies known as behavioral economics. Choices can additionally be made more likely by removing the friction that serves as a barrier between you and the option. Examples of removing friction can be seen in offers that include “No gym membership for the first two months of the year” or “I will drive will drive us there, you can wake up on the way.”

Loss aversion

Essentially, loss aversion is a principle that speaks to the natural tendencies of humans to prevent all controllable forms of errors, erosions or reductions. In this article, you have read about loss aversion as related to the investment principle applied to strength training earlier in life to offset forthcoming age-related losses. Within these three contexts, you have seen the outlines of loss aversion. In each, please note that loss aversion can be leveraged when you, your patient, or your family member is having difficulty finding a source of motivation.

Loss aversion can be misused or overused toward fear mongering. This is quite easily seen in the healthcare and eldercare settings where it may be tempting to change behavior through fear: “If you try to walk on your own, you are going to fall and break a hip, or worse.”. This should not feel like a healthy statement and is a misuse of loss aversion. Similarly, smoking cessation or addressing alcoholism can include comments that feel like fear mongering, or even threats. As we have seen and will continue to read throughout this article, choice is important for consistency and new habit formation (longevity).

The endowment effect or “effort paradox”

We place a higher value on the health attributes that we have worked to achieve – biomarkers, scores, and measures such as body weight, fasting blood glucose and blood pressure. When we have earned these new health levels, it is more likely that we will hold onto them and value them, as a function of this principle known by either term, “the endowment effect” or “effort paradox”. Scientists point to these features as key differences between a “fixed fast” route of surgery, an “easy” approach of using a medication, contrasted with the persistent gains achieved and valued from consistent effort over time.

It is important to reinforce the relationship and distinction between loss aversion and the endowment effect. See below.

Loss aversion: Preventing age-related declines in cognition, strength, endurance with the investment principle. Motivating one to contribute to their health and create a reserve or redundancy.

Endowment effect (or effort paradox): The sense of elevated value placed on health after recovering from a long illness or surgery.

Combining the two, “You worked hard to earn this level of fitness – be proud – and work to keep it.”

The fresh start effect

One of the most powerful principles in the application of behavioral economics for health and wellness choices, can be the fresh start effect. We are all familiar with the common versions of this principle, realized with New Year’s resolutions, decisions for a life pivot after a milestone, and even choices made after an unexpected medical event.

In each example, we see that the fresh start effect provides permission and a nudge, if you will, to make a wholesale change. This could include: a change in identity (“I am going to become a happy person”); a change in diet (“I have eaten my last donut ever!”); a change in physical activity (“Once I retire, I am going to take up Tai Chi again”); or even a pivot to participate in extreme experiences (“Once I turn 60, I am going to try skydiving”).

Most commonly, these sentences are self-directed, as we saw in each example. However, a respected family member, caregiver, or health care provider can use the Fresh Start Effect with a well-intentioned reference that is offered with autonomy, like this, “Would this be a good time for you to invest some time in your endurance to prepare for the upcoming knee replacement? I would be happy to help you find some pain-free continuous exercise options.” Readers are directed to Dr. Katy Milkman’s book, *How to Change: The Science of Getting From Where You Are to Where You Want to Be* and listen to her podcast, *Choiceology*, for more information.

Conclusion: The Science of Choice Applied in Aging – A Deeper Dive

Seeing and stating aloud what you plan to do and prefer to do, does help. The science of commitment devices takes this one step further and includes such examples as people placing an actual wager on what they will do. In some cases, this involves real risk and the loss of real money.

The term “commitment devices” is used frequently in the field of behavioral economics. This refers to factors that may compel a person to be more likely to adhere to an intended behavioral change. Common commitment devices include a person waiting for us at the track for a workout, a subscription or membership that is already paid or on “auto-renew”, or a promise/prediction that we have stated aloud. Commitment devices can compel a person to be more likely to use the strategies and “pull the levers” listed in this article. These motivations commonly include some sort of loss aversion, such as “I don’t want to lose this money,” or “I don’t want to be wrong (and embarrass myself).” As Nobel Prize-winning author Daniel Kahneman was quoted to say in his life’s work with colleague Amos Tversky, “Loss aversion refers to the relative strength of two motives: we are driven more strongly to avoid losses than to achieve gains.” While we see that loss aversions themselves can be powerful motivators, perhaps more than success or “wins” can themselves, this should be considered statistically true for populations, yet not universally true for people. It should be noted that loss aversions can motivate, yet can feel punitive to some, even cause resentment, or not last a lifetime. However, adopting an identity can be positive and long-lasting. Evidence tells us that when we adopt an identity, we are more likely to make choices that are consistent with our identity. Meaning, start with, “I am a person who will”...and finish with these statements, as they are written, or worded as you prefer:

1. Consistently choose physical activities to optimize safety and wellness
2. Choose healthier options and portions to gather needed energy
3. Surround myself with diverse people to expand my social health
4. Optimize wellness through a balance of rest and activities with people, in places that feel healthy
5. Expose myself to conditions in the form of temperature, exertion, pressure and novel experiences in an effort to remain capable, adaptable, and healthy

We now understand that adopting an identity for yourself is powerful. Again, we benefit most when we have autonomy and are making a choice. We opt-in. Choosing your identity does not mean an “alter ego” or another persona/personality. Dixon & Dweck [55] help us to see that adopting an identity can be accomplished by merely iterating a growth-mindset affirmation. Research has demonstrated that there are health benefits to be gained when one declares that they are, “a non-smoker” or “a person who eats healthy foods,” or “a runner,” or “an active person.” They have essentially branded themselves and will be more likely to make choices consistent with their brand.

Life includes many choices. Every time that you are faced with a health-based choice (nutrition, activity, rest, social and challenge/extreme), you have the opportunity to follow your identity, or not.

When the choice that you make agrees with your identity, this serves as a long-term reinforcer of your ultimate behavior. This concept is layered and deep, but very simply reinforces the brain-based connections that limit your temptations for donuts, alcohol or cigarettes, for example. You receive a very simple and reliable chemical reward for making “the right choice.”

Adopting an identity strengthens the connections of neurons and will make it more likely that you make that choice again in the future. Additionally, not having that donut, as time goes by, will reduce your desire for that which you had craved. It is important that you are aware of a few of the other powerful and most common strategies that can both get you – and keep you – on track. These principles, as identified by the study of human decision making and motivation known as behavioral economics, include gamification, commitment devices, habit stacking, temptation bundling, nudge/eliminating friction, and loss aversion. For more depth on these concepts, refer back to Table 7, or the references provided.

Providing patients with the autonomy to make their own decisions, a choice, from a base of evidence, can be more powerful than a prescription, coercion, or forceful education. Giving each decision maker an identity, agency, and a role in their healthcare team can improve engagement and prove empowering. We expect three positive results from this reframed approach at wellness and healthcare. These include:

Improved self-efficacy, which has a powerful effect on most outcomes.

Elevated autonomy, which can provide a boost to most outcomes.

The permission to commit, to believe in a plan, which additionally can have a powerful effect on most outcomes.

I can change = self-efficacy

I get to decide, my decision matters = autonomy

I think this would be best = belief

There is a distinct difference between choices that we make with full autonomy (free choice) and those that we make with limited or a singular option (forced choice). When we have autonomy and free choice, selecting from a few options or deciding not to make a choice...we have less cognitive stress, and less stress experienced throughout the body (physiologic).

Perhaps with this pivot, we can help more people achieve wellness, and reduce the need for health care, reduce the length and incidence of disability, and feel more empowered to control how they age.

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