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Human Mind: Both the Cause and Solution to the Global Pandemic of Physical Inactivity

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Abstract

Objective: To explain the global pandemic of physical inactivity. An innate human tendency to choose an alternative that leads to the same goal with the least amount of effort is a major obstacle for sustained physical activity. A path of least resistance for goal achievement is selected because it requires less effort and energy, causes less cognitive strain, and provides faster gratification. Physical activity, in contrast, demands cognitive and physical energy, is cognitively straining, and necessitates delay of gratification. On first glance, then, it is a small wonder that physical inactivity has become a global pandemic. Theory and Evidence: While the human mind, through its conscious and nonconscious processing, inherently works against physical activity, it can be harnessed to make sustained physical activity possible. Conscious processing works against exercise when it makes people think, "should or should I not go for a run/walk"? Nonconscious processing also works against exercise because it, in and of itself, is inclined to select a path of least resistance and immediate gratification (e.g., TV watching). Yet, nonconscious processing can be made to work for physical activity when exercise is continuously repeated as a response to a situational cue (e.g., sneakers placed next to a door) without cognitive deliberations. Constant repeats of the same physical activity strengthen the cue-behavior link and eventually make the behavior nonconsciously driven and automatic. Thus, paradoxically, nonconscious processing seeks to make demanding and effortful activities paths of least resistance through constant repeats of behavior. Conclusion: As exercise is more of a cognitive than physical battle, delegation of the decision to exercise to nonconscious processing increases the likelihood of sustained physical activity. But if the activity is not repeated with regularity, any decision to engage in physical activity has to rely on conscious thoughts, which, at best, can make people only "occasional" exercisers. Practical Implications: Conscious thoughts, however, can be used to serve nonconscious processing when one's environment is rearranged to maximize situational cues for exercise and minimize cues for competing activities. Another important (conscious) strategy is to build an exercise infrastructure via if-then plans of when, where, how, and with whom to exercise. These implementation intentions quickly become nonconsciously operated and automatic, thus enhancing the likelihood of sustained physical activity. In this process, personal physicians can play a major role.

Keywords

Physical Activity, Exercise, Conscious-nonconscious Processing, Automaticity, Motivation, Behavioral Medicine, Health Practices

1. Introduction

The epidemic of physical inactivity is a major public health problem. It is well established that physical inactivity significantly increases an individual risk of non-communicable diseases [1] and premature mortality [2] worldwide, causing 5.3 million deaths per year and $67.5 billion dollars in economic costs to the health-care system globally. [3] Yet, exercise is "the single most important thing" people can do to improve and maintain their health. [4]; it is "the best buy in public health [5]". Despite all the known physiological benefits of regular exercise, physical activity levels have not improved. [6] This is because sustained physical activity, at its core, is a psychological problem having much to do with the operations of the human mind and little with muscle movements. [7] It is more a cognitive than physical battle that most people have trouble winning. [8]

Ultimately, it is an individual who decides to go for a 30 min. walk, but this decision can easily be "vetoed" nonconsciously [9-11] or consciously. [7-8, 11] Because every decision to exercise is individually made, it is hardly surprising that media campaigns have been ineffective in promoting physical activity and why interventions at the population level have generally failed, with the number of active participants having remained unchanged over decades. [12] This suggests that interventions would have to be individually tailored for them to be successful.

2. Irrational Thinking

Given the indisputable evidence for health benefits of regular physical activity, why do people not make rational decisions to do what is best for their health? In USA, this irrational decision making is reflected in the fact that about 78% of the population is non-exercisers and about 70% obese or overweight, a deleterious combination that significantly increases the risk of serious illnesses. Lack of rational choices is not just limited to health practices but is common to other behaviors as well, such as financial savings and use of leisure time. Evidence has shown that people's financial decisions are emotionally based and geared toward short-term gains. [13] As a result, retirement savings of 50-55 olds are inadequate and insufficient, only about $8,000 on average. Saving, of course, means delaying immediate gratification for greater future gains. The irrationality is also seen in how people use their free time. On average, people spend nearly five hours a day watching TV, five hours every day peering at phones, and 50 minutes per day using Facebook's platforms. [34] They check their phones an average of 47 times a day (i.e., every 19 minutes of their waking hours). Naturally, these entrenched patterns of free time use make it difficult for physical activity to become a regular part of people's daily behavioral repertoire.

3. Nonconscious VS. Conscious Processing and Path of Least Resistance

What is driving such irrational decision making? Is it the human mind itself or some underlying human tendency? An answer seems to lie in a combination of the two. That is, most of everyday decisions are made nonconsciously in the service of the path of least resistance. This summary statement is derived from three decades of research conducted in cognitive neuroscience and social psychology. Although a review of the reported research is beyond the scope of the present paper, it can be found elsewhere. [8] Several points from this research are relevant for understanding why most people choose not to exercise regularly. First, although researchers have recently debated the relative superiority of conscious vs. nonconscious processing in human decision-making in general [14], there is no question about the veracity of empirical evidence for the influence of both. [10-11, 15-16] The two processes, however, are manifestations of one human mind. [17]

Of the two, nonconscious processing is more dominant in everyday life. [10, 15] In fact, all human behaviors are permanently inclined to be driven by nonconscious thoughts and decisions. For example, we keep repeating the same behaviors (e.g., washing hands) over and over and in doing so, make them more and more nonconscious and automatic, which in turn makes them easier to execute and repeat. Increased automaticity requires less energy and reduces cognitive or physical strain, all of which serves the principle of the path of least resistance. The law of least effort means that people are predisposed to strive to achieve the same goal with the least amount of effort. [13] Nonconscious thoughts and processing serve this predisposition as they are increasingly triggered by situational cues that lead to behavioral repeats without cognitive awareness. The stronger the cue-behavior link, the easier it is to repeat a given behavior. Nonconscious processing is perfectly suited for this task as it is intuitive, involuntary, impulsive, associative, and seeks instant gratification [13]. In contrast, conscious and deliberate thoughts are effortful and cause cognitive strain and are therefore generally avoided. None of this means that conscious and deliberate thoughts are not used in decision making. In fact, they can override nonconscious thoughts and decisions when needed. [11] However, if one had to consciously think of every little movement when getting out of bed in the morning, it would not only be mentally exhausting but would prevent anything meaningful from getting accomplished. [15, 32] That is why humans are permanently inclined to make their behaviors automatic, and their nonconscious mind is the main tool to accomplish it. In short, situational cues trigger nonconscious thoughts (e.g., about goals) and decisions for repeating behaviors and thereby continuously build and reinforce behavioral paths of least resistance.

3.1. Delay of Gratification

Second, the fact that people are inclined to follow the path of least resistance means that they are also inclined not to delay gratification. Instead, they generally seek instant or immediate rewards, and nonconscious processing in turn facilitates this tendency for two reasons: (1) as research suggests, nonconscious processing, in and of itself, seeks instant gratification [13] and (2) by responding to situational cues, nonconscious processing makes the repeating of a behavior cognitively less effortful and, therefore, the achievement of rewards easier. [18-19] If gratification has to be delayed, it, of course, means that one has to work more and longer, which is contrary to the principle of the path of least resistance. Although delay of gratification may not be a general tendency, it nevertheless can play an important role in human affairs. As the vast research literature has demonstrated [20], achievement and success would not possible without delay of gratification. For example, to become a world-class performer in any activity, or to obtain a college degree, would not be possible without an ability and mental strength to delay gratification. This is important when considering such demanding behaviors as exercise, because it suggests that in theory, sustained exercise is possible, albeit difficult, for most people.

3.2. Temptations

Third, hard behaviors, such as dieting and exercising, are difficult for most people not just because of physical requirements but above all, because of mental demands. In this regard, temptations become a major obstacle. For dieters, certain foods can turn into temptations that derail attempts to control calorie intake. For exercisers, TV watching, internet, smart phone, and video games can do the same thing. Succumbing to temptations provides instant rewards, saves energy and effort, and circumvents cognitive strain and agony. Thus, temptations serve the path of least resistance, which in part explains why they are difficult to resist. As Kahneman concluded, "we conduct our mental lives by the law of least effort. [13]"

It is important to note the empirical evidence showing that social environments provide abundant temptations against healthy behaviors. For example, fast food logos promote time-saving and financially inferior decisions [21], and the prevalence of fast food restaurants in neighborhoods is associated with financial impatience. [22] Fast food logos and restaurants become cues for temptations that are difficult to resist. More generally, these kinds of social environments support "laziness built deep into our nature [13]", in two ways: (1) by displaying abundant cues for non-demanding unhealthy behaviors and simultaneously overpowering infrequent cues for demanding healthy behaviors, and (2 by triggering, through these environmental cues, goals for enactment of unhealthy behaviors. In other words, few cues for healthy eating cannot compete with the abundance of cues for unhealthy eating. Similarly, cues for exercise are almost non-existent, whereas cues for non-exercise activities abound; TV in the corner of a room and a smart phone in one's hand are the most obvious and influential cues for non-exercise activities. Is it then any wonder, given the dominance of nonconscious processing, that people have great difficulties controlling their dieting and temptations for not exercising.

Certainly, physical environments can also play a positive role, but research suggests that the effect is quite minimal. For example, according to CDC's National Center for Health Statistics 2017 data, there are more regular exercisers in Colorado (32%) than in other states as a whole (22%). While noticeable, the difference obviously is small and only supports the point that the human mind, not the environment, is the key determinant of exercise behavior. If the number of regular exercisers increases only by 10% in the most alluring environment, it is not surprising that the increase is negligent or nonexistent in less enticing environments. Moreover, Oklahoma cannot be turned into Colorado.

4. Exercise and Conscious VS. Nonconscious Decisions

What does all of the above mean for exercise? Several implications follow from the reported research:

(1) Regular exercise is not plausible if it is based on conscious decisions. If people have to think every time before putting sneakers on whether they should or should not go for a run/walk, or if they have to weigh pros and cons of participation, or if they think of what kind of exercise they would like to do today, they will not engage in it regularly. As noted, conscious decisions are cognitively straining and therefore generally avoided. Surely, conscious thoughts will get people off the couch now and then, but if every decision, or most decisions, to exercise are consciously deliberated, sustained exercise will not come into being. In short, conscious decision-making is the reason why 54% of the population is "occasional exercisers".

(2) Sustained exercise can be achieved if it is primarily based on nonconscious thoughts and decisions. In other words, the behavior is triggered by situational cues with minimal or no conscious deliberations. Only about 22% of the U.S population is comprised of regular exercisers. They have achieved regularity and automaticity of the behavior by delegating decision making to nonconscious processing. This is made possible by continuous repeats of the behavior and the subsequent strengthening of the cue-behavior link. Situational cues (e.g., exercise gear in a corner of the room) prime nonconscious thoughts that select an appropriate exercise activity from the behavioral repertoire and detect, without conscious awareness, potential rewards associated with the behavior (e.g., feeling good after physical activity). [8, 18]

(3) In regular exercise, gratification is generally delayed. The main reward of physical activity is improved health. This reward, however, is a long-term reward, the achievement of which is only made possible by continuous exercise, five times a week of moderate exercise at the minimum, according to the Center of Disease Control (CDC) guidelines. In theory, then, exercise is never finished and its long-term reward constantly delayed. If exercise is consciously seen in this light, it becomes mentally hard for most people. Another reward that people pursue through exercise is weight loss. It, too, is a long-term reward that, upon realization of the difficulty of achieving this goal, discourages continued participation.

(4) Recent research suggests that the long-term delay of gratification in exercise can be minimized or mitigated by intermediate rewards (e.g., enjoyment derived from a single bout of exercise); such short-term rewards appear to enhance the maintenance of exercise in the long run. [23] Moreover, if exercise is based on

nonconscious processing, the mere doing of physical activity becomes its own reward, thereby eliminating any need to consciously deliberate on long-term benefits. As research has shown, exercise becomes rewarding for those individuals who are physically active. [33]

(5) From a theoretical standpoint, the combination of the human tendency to follow the path of least resistance and inability to delay gratification is potentially a major obstacle for sustained physical activity. To eliminate this barrier, paradoxically, exercise has to be turned into a path of least resistance. It is achieved when exercise is initiated and maintained by situational cues that prime nonconscious thoughts or decisions about the behavior and its reward value. [8] Ultimately, nonconscious processing makes exercise as automatic as brushing teeth in the morning [7]. When it happens, exercise becomes a path of least resistance and is undertaken with little, if any, cognitive awareness, strain or demands.

(6) According to a new theory, exercise has three stages. [8] In the first, people make a conscious decision to start an exercise program or activity. With time and repeats, they advance to the second stage where exercise is partially based on conscious and partially nonconscious processing. According to evidence, most people are unlikely to ever progress to the third stage where exercise is fully or primarily nonconsciously operated. [8] Instead, they (54% of the U.S population) stall in the second stage and quit regular participation. Only about 22% are able to get over the hump and move to the third stage; they do so by removing conscious thoughts on exercise and letting nonconscious decisions direct the behavioral engagement. [7-8] This 3-stage model is illustrated in Figure 1.

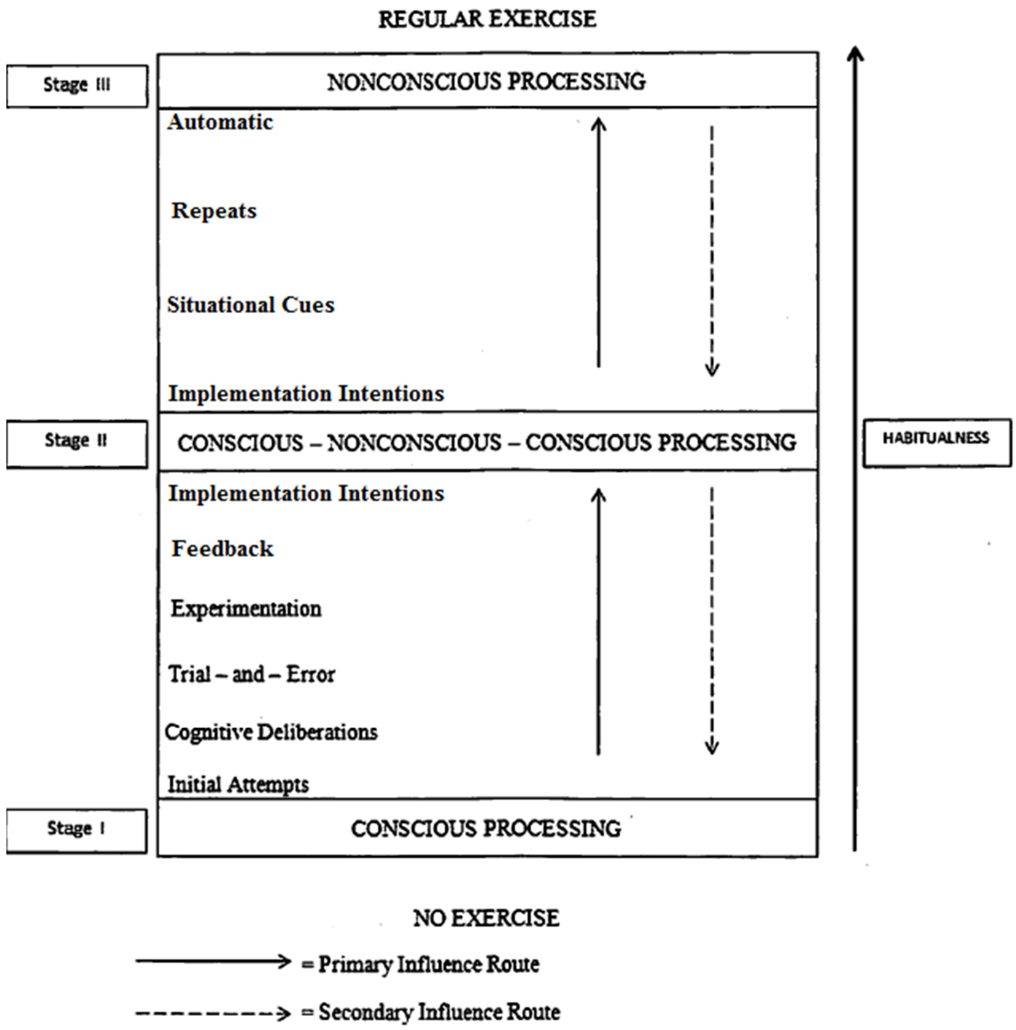

Figure 1. *Model of three stages of exercise behavior (modified from Iso-Ahola 2017).*

In advancement from conscious to nonconscious processing, implementation intentions play an important role. They are specific if-then plans that form the foundation for an exercise infrastructure [8] of when, where, how, and with whom to exercise. [8, 24] In other words, by building their exercise infrastructure, people go beyond general intentions to exercise and make a commitment to a specific plan to execute the behavior. Research has shown that with relatively few repeats, use of implementation intentions becomes automatic and thereby contributes, in a major way, to making an activity itself nonconscious and automatic. [24-25]

As noted, the beginning of an exercise program or activity requires an initial conscious decision. It is either a short-term or long-term decision. The decision is for long-term if a person has committed him/herself to the behavior regardless of the conditions (i.e., to exercise rain or snow). Research has shown that so-called "self-as-doers" are individuals who are able to make such a self-disciplined decision for long term [26]. For them, progression from conscious to nonconscious processing is relatively easy. But most people are not able to make this decision, as reflected in the fact that only about 20% of people continue their exercise program five weeks after starting it. [27] In theory, though, they could be helped if taught to build an exercise infrastructure. This hypothesis remains to be tested empirically.

5. Solutions

5.1. Personal Physicians and "Nudging"

Given that most people are not "self-as-doers" and not able to make a long-term decision and commitment to exercise, they need help from others. Presidential candidate Mike Huckabee's case demonstrates this point. His doctor gave him only 10 years to live because of his full-blown diabetes--if he did not change his lifestyle. But he did. In the beginning, "walking a city block just about had me winded", he said. City blocks, however, grew into marathon running and unhealthy diets into craving apples and vegetables. As a result, his diabetes was reversed and medications eliminated. To him, the key was the realization that exercise is a lifestyle, not an activity or a program that is undertaken for certain outcomes; it means living fit rather than being fit. In other words, for him, exercise became a long-term commitment and process for its own sake.

Unfortunately, only about 30-35% of personal doctors recommends or urges their patients to start exercising for their health. Yet, evidence indicates that personal physicians can be effective. [28-29] Behavioral economists, like the 2017 Nobel Laureate Thaler, have shown that "nudging" people to set up financial default systems (e.g., setting aside a certain percentage of one's salary for pension) leads to marked increases in savings. [30] Such default systems are not dissimilar to a long-term decision and commitment to regular exercise regardless of the circumstances. The difference, of course, is that in the former (i.e., an automatic deduction from a monthly paycheck), a person is not continuously reminded about the default system, whereas in the case of an exerciser, the default system is more likely to be observed when physical activity is undertaken. Thus, other things held constant, it is easier to opt out of an exercise default system than the financial one. It should be noted, however, that people generally do not opt out of strong default systems. [13, 30]

But nudging and encouragement received from personal doctors can be helpful in starting and maintaining physical activity. Nudging alone, of course, is not sufficient for making exercise a default system to be driven nonconsciously by situational cues. As noted, continuous repeats of an exercise activity are required because they strengthen the cue-behavior link, thereby making exercise more and more habitual, and eventually automatic. [7-8, 31] However, it is more likely that people will begin an exercise program and stick to it if it is supported and encouraged by personal physicians.

5.2. Exercise Infrastructure and Implementation Intentions

Personal doctors could make a significant difference if they encouraged and instructed their patients to build an exercise infrastructure from an "if-then" plan of when, where, how, and with whom to exercise. They could easily suggest and prescribe such a plan for their patients. In Vermont, physicians are already prescribing outdoor activities (e.g., hiking) to their patients, and the practice is spreading to other states. Accordingly, an idea would be for a doctor to focus on the how component (i.e., frequency, duration and intensity of an activity) and for a patient on devising a plan for when, where, and with whom to exercise. In this way, both would work together to lay the foundation for an exercise infrastructure and enhancement of automaticity for physical activity. It should be added, however, that in general, it is more difficult to build habits for physically and mentally demanding activities (e.g., exercise) than to eliminate habits for less demanding behaviors (e.g., smoking) [32]. In the U.S., the documented drop in smoking prevalence from over 50% to the present 14% is one of the greatest achievements in public health. Is a corresponding success ever possible for physical activity?

5.3. Environmental Cues

Ideally, in the beginning, a person would make a life-long decision to exercise regularly. However, as noted, research suggests that most people are not able to make such a decision [8]. Alternatively, they could grow into this decision from early positive experiences with physical activity. But research has indicated that this is unlikely to happen as most people quit their exercise program five weeks after starting it. [27] This then calls for a conscious rearrangement of one's environment so that situational cues (e.g., sneakers set ready for a morning run/walk) for exercise would be many and easily noticed. As discussed, such situational cues are essential for nonconscious processing and subsequent maintenance of physical activity in the long term. A conscious rearrangement of one's environment also means that competing cues are removed. For example, televisions can be placed in the house so that they are not readily seen or accessible. It is worth noting that in this process, conscious and nonconscious thoughts and decisions work together for the same goal. Situational cues are consciously organized for the benefit of nonconscious processing and development of automaticity of a behavior.

6. Conclusion

The question about "why some people exercise but most don't" can only be answered by understanding conscious and nonconscious processing of human decision making. [8] Environment does not make a decision whether or not to exercise, but an individual does. Research has shown that even the most alluring outdoor environments cannot turn people into regular exercisers. Nor can regularity in physical activity be achieved if one has to consciously deliberate every time before putting walking/running shoes on, "Should I" or "Should I not"? Instead, sustained physical activity can only be achieved if it is driven by situational cues and resultant nonconscious thoughts and decisions. However, because an exercise program is a mentally demanding activity in its early stages, the transitioning from conscious planning to nonconscious decisions is generally difficult and has made most people "occasional exercisers". Before exercise can become a regular physical activity countless repeats are required. Each repeat strengthens the cue-behavior link and thereby gets a participant closer to automaticity. In this process, construction of an exercise infrastructure plays an important role. It is based on specific if-then plans of when, where, how, and with whom to engage in physical activity. Reliance on implementation intentions itself becomes quickly nonconscious and thus facilitates the achievement of automaticity of behavior. Nonconscious processing is further facilitated when people rearrange their environment to maximize situational cues for physical activity and minimize cues for competing activities. Personal physicians can play an important role by not only "nudging" their patients toward physical activity but by helping patients build an exercise infrastructure and if-then plans.

Conflict of Interest

The author declares no conflict of interest.

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