

Health, Technology, & Behavior Science

An Introduction to the Special Section on “Health, Technology, & Behavior Science”

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Abstract

This special section of the Perspectives on Behavior Science focuses on health, technology, and behavior science. The aim is to provide reviews and empirical research that integrates the latest technological innovations and behavior science. The selected papers are categorized into contributions in which technology is used to study health-related behavior and papers on the use of technology to deliver health behavior interventions. The contributors in this special section demonstrate that behavior science can guide an understanding of why people do or do not engage in a healthy lifestyle and help to identify what is needed to design a successful health behavior intervention by the use of technology.

*Keywords:* health behavior, technology, behavior science, behavior interventions

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People wanting to engage in a healthy lifestyle often do so by avoiding harmful behaviors, but acquiring new health behavior will be more enduring. Despite being aware of the desired consequences, healthy behaviors such as healthy eating, exercising, protected sex, controlled alcohol consumption or smoking cessation, are difficult to control. Regardless of common knowledge, recommendations, and the introduction of healthier substitutes, the appeal of unhealthy alternatives and the immediate consequences that follow often exceeds that of the healthy alternative, which is usually accompanied by more delayed reinforcers (Briefel & Johnson, 2004; Nielsen, Siega-Riz, & Popkin, 2002). According to Glanz, Rimer, and Viswanath (2008), the most successful health interventions are based on an understanding of the behavior and its environment. Behavior change is an evolving process as multiple steps of sustained health behavior change are accumulated over time (Glanz & Bishop, 2010). Thus, to develop successful interventions, it is vitally important to understand how environmental conditions promote or block the acquisition of healthy behavior and how new environments contribute to behavior change. Behavior analysts can contribute by assessing functional relations between environmental events and healthy behavior (Cassey, Washio, & Hantula, 2016; Hustyi, Normand, Larson, & Morley, 2012).

Unhealthy behavior is often a problem of self-control wherein people recognize behaviors that could be harmful to their health but continue even when the undesired consequences appear (Rachlin, 2000). To fight this trend, technologies that generate, store, and process data are available; they can describe, analyze, predict, and modify self-control. The main aim of such technologies is to prevent and mitigate the physical and financial burdens of health-related behavior, and they can also be employed by behavior scientists to facilitate the acquisition and maintenance of healthy behavior. There are several advantages of

using technology to study health-related behavior and deliver interventions. For example, technology can break the tether between the individual seeking behavior change and their support services, allowing for the distribution of information, bypassing personnel and geographical restrictions. This dramatically extends the ability of health-care providers to make contact with their clients for treatments. The technological advances can include eye-tracking, simulators, wearable sensors, mobile devices, biomarker detectors, and real-time access to therapeutic interventions via information technology (Dallery, Kurti, & Erb, 2015).

Behavior science must be promoted better as many application developers seem oblivious to the presence of a basic science of behavior (Dallery et al., 2015). Technology can be harnessed by those employing environmental interventions and assist in analyzing the effectiveness of these interventions. As a consequence, they change the way scientists and practitioners present and analyze antecedents, behavior, and consequences. Technology helps in generating and sharing health information and can, therefore, facilitate the acquisition of new behavior. Merging behavior science and technology into the realm of health behavior is applicable, especially since choices regarding health are made during everyday activities. As Schroeder (2007, p. 1222) noted, influencing choices about frequently performed, routine behavior constitutes the “single greatest opportunity to improve health and reduce premature deaths.” Technology-based methods call for methodological, practical, and conceptual advantages for behavior analysis.

This special section addresses the importance of behavior science and technology in positively impacting people’s behavior in support of a healthier lifestyle. The aim is to provide timely reviews of research that integrates the latest technological innovations and behavior analysis. In the following section, we present the different topics categorized into papers in which technology is used to study health-related behavior and papers on the use of

technology to deliver health behavior interventions. The classification is, though, imperfect since some of the papers can be placed in both groups.

### **The use of technology to study health-related behavior**

Otterbring, Gidlöf, Rolschau, and Shams (2020) show how using technological tools, such as eye-tracking methodology, captures consumers' entire choice-making processes in a grocery shopping situation. Results from a lab-based experiment show that the health status of a different customer influences an individual's visual attention toward certain groceries. Interestingly, prior exposure to a seemingly unhealthy consumer resulted in a relative increase in peoples' visual attention toward products perceived to be healthy, which prompted a healthier alternative. Thus, small choices, such as where to focus attention, are being affected continuously even while undertaking such routine activities as scanning the items at a grocery store. The practical application of this study is also related to how the impact of products' physical appearance influences attention to healthy food.

In the paper by Arntzen and Eilertsen (2020), stimulus-equivalence technology is used to teach skills about nutritional content. A stimulus sorting test was arranged in which participants were asked to sort the names of food items into one of three different categories of carbohydrate values ("less than 20", "20–40", "more than 40" grams per 100 grams). Twenty-one of the 22 participants responded correctly on at least one test for equivalence class formation by sorting the food items correctly in a post-class formation sorting test. Arntzen and Eilertsen (2020) highlight two main implications of this study. First, the procedure is not time-consuming. Second, a procedure based on stimulus-equivalence technology efficiently improved knowledge about the nutritional content in a variety of food items.

In a driving simulator experiment, Romanowich, Chen, and Xu (2020) used simulation technology to examine the association between delay discounting and driver error by

providing participants with a series of simulated driving tasks, along with measuring their delay discounting rates. There was a clear relation between delay-discounting and driving safety: People with high delay discounting rates made more driving errors during a driving task than those who discounted more slowly. The authors conclude that these results support the idea that delay discounting can negatively affect a large range of health-related behaviors, including driver errors.

### **The use of technology to deliver health behavior interventions**

Page, Massey, Prado-Romero, and Albadawi (2020) embrace self-monitoring techniques and technology, such as fitness trackers, to increase physical activity. Their paper highlights a systematic review of the self-monitoring literature with the purpose of determining how self-monitoring techniques and technology have been applied to increase physical activity. Results from the literature review of 19 articles show that most successful studies used a mixed set of self-monitoring techniques and technology intervention. Fitness trackers were the most frequently used technology. Moreover, results show that most of the studies indicate an increase in physical activity when participants used self-monitoring. A limitation of the literature is that few studies reported behavior maintenance, and those that did, reported varied results.

Berardi et al. (2020) investigate how financial rewards can increase health behavior. Participants (N=512) used an ActiGraph wrist-worn accelerometer for one year and were prescribed one of two types of moderate-to-vigorous physical activity goals: a static 30-min goal or a dynamic adaptive goal based on the moderate-to-vigorous physical activity that a participant produced over nine days. When participants met their goals, they transitioned through a sequence of reinforcement stages. Immediate reinforcement resulted in more moderate-to-vigorous physical activity relative to a comparison group, and the relative effectiveness of adaptive versus static goals depended on the magnitude of daily moderate-to-

vigorous physical activity goals.

Finally, Saboia, Almeida, Sousa, and Pernencar (2020) explore the aspects of behavior and social media in the realm of health challenges presented by influential people on social media. This study was designed to investigate the impact of social media (Instagram) health challenges on healthy eating behavior. A literature review provided the basis for identifying and analyzing the health challenges of opinion leaders, such as nutritionists, health lifestyles, and patient opinion leaders. Most of the health challenges are promoted by patient opinion leaders and health leaders. Also, followers adhere to online health challenges related to weight loss and sometimes engage with opinion leaders. Results from this study point to areas of future research on how online opinion leadership might deliver health behavior intervention.

### **Concluding comments**

Overall, the papers introduced in this special section aimed to extend the literature and produce timely reviews of research that integrate technological innovations and behavior science. All of the papers demonstrate how technology can be used when studying health-related behavior or how technologies are used to deliver interventions. Behavior science helps to describe health behavior by providing a basis for developing more effective ways to use technology to influence behavior. Constantly delivering more accurate and nondisruptive assessments of how people behave and how they react to environmental stimuli is the value of the technology. Therefore, there is a real opportunity to develop practical behavioral approaches at the expense of theoretical, indirect, nonexistent, and even circular constructs. However, as stated by Ruckenstein and Schüll (2017), increased datafication of activities such as buying behavior, social interactions, reading and writing, listening and looking, and walking and eating, needs to incorporate responsibility and critical analysis.

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