

# Health, Behavioral Design, and the Built Environment White Paper

## EXECUTIVE SUMMARY

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### ***Purpose of the Health, Behavioral Design, and the Built Environment Project***

The National Collaborative on Childhood Obesity Research ([NCCOR](#)) brings together four of the leading health research funders in the United States—the Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), the Robert Wood Johnson Foundation (RWJF), and the U.S. Department of Agriculture (USDA)—to address the problem of childhood obesity in America. In 2014, NCCOR initiated the Health, Behavioral Design, and Built Environment Project in recognition of an important knowledge gap, namely, how do specific aspects of the built environment influence healthy living? A series of meetings in 2015–2016 brought together a multidisciplinary group of experts to discuss methods and evidence on applying behavioral design principles to foster active living and healthy eating, and to inform the development of this white paper. This Project seeks to enhance the ability to understand, translate, and operationalize strategies that alter the human experience with the natural and built environment for the advancement of public health. The purpose of this paper is to *provide an overview of behavioral design, describe and consider the conceptual domains and their relevance to behavioral design, guide research and practice to develop applications that enable and promote healthier behaviors among children, and stimulate further discourse on the application of behavioral design through dissemination.*

The Project took a domain-level approach, inclusive of art, philosophy, political science, science, and spirituality, to draw core principles and theories from diverse disciplines to develop a framework for considering and applying behavioral design strategies to promote healthy eating and active living. Specifically, the principles and theories

of design and human propensities and behavior guided the framework development. With respect to the design arena, this white paper draws from fields of study and practice that construct, organize, and present the physical and informational world, such as art, architecture, and community design fields. With respect to the human behavior and psychology arena, the paper considers the theories of human behavior and cognition, such as conscious, reasoned behavior, automatic thinking, and social thinking. While the existence of the agent (i.e., individuals or groups of people) within the environmental sphere of influence is generally acknowledged in public health efforts, the ability to effectively create and apply strategies to enhance health promotion requires an increased consideration of the agent and environment interface. Considering behavioral design principles from theoretical concepts to practice application may facilitate a more comprehensive understanding and ability to influence how the agency-exposure interaction produces experiences. It also considers the exposure aspects that influence the agent and the inherent reciprocity and conditioning perpetuated by that interaction. Given that few such interactions are health-neutral, advancement in behavioral design can incentivize the design and building process to maintain health as a proximate performance outcome.

### ***Key Aspects to Consider for Behavioral Design Relevant to Active Living and Healthy Eating***

The built world, whether intentional or not, influences the human experience. The lack of behavioral focus may be due to competing requirements (i.e., time, cost, safety, esthetics), but also may be due, in part, to a lack of awareness or interest in how the designed and constructed environments influence people. If behavioral outcomes are desired and attempted, limitations exist

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in knowledge and understanding of how design affects behavior, and in the standards and skills of designers, architects, and others on how to most effectively apply these theories to practice. Regardless of the quality and extent of the environment’s design aspects, individual or group responses to it may vary based on inherent individual factors (such as developmental stage, gender, or mindset) and competing influences. Design considerations are relevant to health behaviors in most if not all settings, such as homes, buildings in general, schools, playground and parks, community layout and content, transportation, and worksites. Many aspects of these settings are designed and have the ability to influence a range of issues—from seemingly small matters, such as the shapes of rooms, types of furniture, or paint color in buildings, to the broader scale issues of connectivity of streets and access to public transportation.

Within food settings, behavioral design strategies can support healthier food and beverage choices by informing, encouraging, enabling, and generally making the healthier choices easier, default, normative, and less expensive. Behavioral design may also be able to increase transparency in food choices and could potentially bring more awareness to one’s actions. In doing so, behavioral design seeks to not only make the healthier choice the easier choice, but to create a culture of healthier food behaviors. The relationship of behavioral design to the physical activity environment has similarities to that of its relationship to the food and beverage environment, but the interfaces may be more direct and immediate. Modern built environments are shaped in ways that impede or reduce activity, such as through labor-saving devices or efforts to improve safety. However, it has the potential to be shaped in ways that not only encourage but require physical activity. As with food, physical activity is a continuous and cumulative habit, and thus small repetitive changes over long periods of time are sufficient to create notable outcomes (positive or negative). Incorporating behavioral design to facilitate physical activity efforts can systemize synthetic approaches to the whole environment.

As opportunities for children to spend time outdoors have declined and research has expanded on the potential beneficial effects of exposure to the natural environment, more attention has become focused on how to increase exposure to “natural environments.”

In terms of human behavior, much research has shown that sensory stimulation regarding food can later influence behaviors. In addition to thinking automatically, people also think socially. In a similar way that thinking automatically results in people being influenced by the effects of defaults, salience, priming, and affect, thinking socially results in people being influenced by the effects of norms and ego. In the past two decades, the recognition of the limitations of education-only intervention strategies aimed at individuals has led to a focus on multi-level, systems-based interventions that employ environment and/or policy to promote healthy behaviors. With this paradigm shift has come a greater connection between public health and environmental psychology, and an opportunity to leverage environmental psychology concepts and theories to promote healthy eating and active living.

### *Application of Design Strategies*

While several sectors of society affect a child’s eating and exercise behaviors, and health outcomes, research indicates that well-designed, well-implemented, school programs can effectively promote physical activity, healthy eating, and reductions in screen time. To improve the schools’ ability to promote healthy eating using design principles, an NCCOR-sponsored tool was recently developed—the Healthy Eating Design Guidelines for School Architecture.

Over the past decade, the application of design strategies to the retail food environment has been considered at the local, state, tribal, and national levels, particularly to address disparities in access to healthy foods and with special attention on promoting healthy eating among participants in federal food and nutrition assistance programs.

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Recognizing that more Americans are eating food prepared away from the home, restaurants have used behavioral design strategies to promote healthy eating. Much work remains to understand the full potential of menus, along with other facets of restaurants including playgrounds and on promoting the selection and consumption of healthier foods and beverages. Besides healthy eating, researchers and practitioners are increasingly exploring the application of behavioral design principles in the school physical environment to foster active living and reduce sedentary behaviors. Outside of the school setting, the application of behavioral design principles to foster active living has primarily focused on promoting walking and walkable communities including improvements to public transit, especially considering disparities in access and opportunities for improvement among low-income, racial/ethnic minorities, and rural communities.

### *Conclusions*

Research and evaluation will play an instrumental role in determining which combination of strategies has the greatest potential to positively impact active living and healthy eating among youth. Case studies will be an invaluable learning tool, particularly ones detailing multidisciplinary approaches. Equally important, periodic reviews and meta-analyses may help identify the most promising strategies, relevant rigorous methodologic designs for addressing different types of questions, and future research needs and opportunities.

An exhaustive summary of the many behavioral design approaches and strategies is beyond the scope of this current effort. However, we have outlined a formative list of aspects to consider, along with examples, when evaluating or intervening in the behavioral design process:

- **Individual—agent-level; includes consideration of the developmental stage, conditioning, experiential load, and privacy needs**
- **Social—group-level; includes consideration of interaction mechanics (i.e., cohesion versus separation), social heterogeneity (leadership, staff), and social norms**
- **Economics—includes consideration of affordability, transparency, and incentives**
- **Space—includes consideration of flow paths, density, scale, and zoning**
- **Time—includes consideration of history, priming, sequence, and routine**
- **Atmosphere—includes consideration of ambience (i.e., general “feel”), materials, and landscape**
- **Information—includes consideration of policy, availability, and meaning.**

NCCOR provides information on current tools and resources on [its website](#) and is engaging with many disciplinary fields and experts to understand how these issues are being addressed in their fields and to consider the application of these approaches to public health.