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Unidirectional or Bidirectional Relationships of Behaviors: The Importance of Positive Behavioral Momentum

Abstract: *Theoretically based behavioral interventions provide the most evidence for successful change; however, several issues should be considered when applying these interventions. For example, school-based obesity prevention programs can be used to teach children how to adopt healthy lifestyle behaviors from an early age. Ecological systems theory provides a framework to design, implement, and evaluate school-based obesity prevention programs. An ecological framework emphasizes that the characteristics within and between systems place children at risk for obesity. Although this developmental process is considered to occur continuously and simultaneously, in practice, we tend to consider the relationships to be unidirectional. Using a positive behavioral momentum approach in practice may assist in addressing these complexities.*

Keywords: bidirectional relationships; childhood obesity; ecological models; unidirectional relationships; systems theory

changes to lifestyle. Additionally, issues arise when taking these interventions and applying them to practice. Anyone working in the field of lifestyle

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The importance of using theoretically based interventions to change behaviors is well established.¹⁻⁶ As discussed in this issue by Joseph et al⁷, considerable work is still needed in determining which theoretical backgrounds to consider when attempting to make long-term

medicine would likely agree with the maxim, “In theory, theory and practice are the same. In practice, they are not.” In this article, we provide childhood obesity and the ecological model as an example of the complexity of theory in treating and preventing this disease. We conclude by giving practical

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suggestions of incorporating theory-based treatment into the practice of lifestyle medicine.

Childhood Obesity

Despite some research indicating that childhood obesity is stabilizing and consequently plateauing,⁸ this is not the trend for certain segments of the population. Prevalence rates have not decreased among race/ethnic minority children and children from lower socioeconomic status groups, along with children classified as severely obese.^{9,10} Early childhood obesity tracks into adolescence and adulthood,^{11,12} placing individuals at risk for chronic diseases, such as diabetes and cardiovascular disease. Apart from the negative health consequences of experiencing a chronic disease, the associated society cost of treating these diseases is staggering. The 1-year cost of treating adults with cardiovascular disease is estimated to be over \$455 billion,¹³ while the estimated cost of treating diabetes is \$174 billion.¹⁴ The majority of the cost to treating cardiovascular disease and diabetes is dedicated to hospital costs, medical supplies and drug therapy, and physician visits.^{13,14} Adopting healthy lifestyle behaviors can prevent the development of chronic disease, keep health care cost low, and increase individual lifespan.

To assist individuals with adopting healthy lifestyle behaviors and maintaining health and functional independence, health promotion and disease prevention programs have been created. Behavioral health theories provide a necessary framework to design, implement, and evaluate health promotion and disease prevention programs geared to adopting healthy lifestyle behaviors.^{15,16} The ecological model¹⁷ has the individual at the center with concentric circles representing the microsystem, mesosystem, exosystem, and macrosystem radiating outward. This model is meant to represent the continuous interaction between individuals and their proximal and distal systems. An individual's development

occurs as a result of the interactions within and among the various systems. This model is frequently used in developmental psychology and has been adapted to address the multifaceted predictors of childhood obesity.¹⁸ Yet, interventions designed to address the predictors of childhood obesity have rarely used this framework. This is probably on the basis of the time and cost of implementing and evaluating such intervention, along with the pressure for quick results.⁷

Multifactorial Determinants of Obesity

Schools provide a great context to establish healthy lifestyles at a young age by addressing the multifaceted predictors of childhood obesity. Applying an ecological model of childhood overweight,¹⁸ several school-based interventions have been designed to address the most proximal system—child characteristics. For instance, numerous school-based interventions have been developed that focus on dietary intake and physical activity of children through nutrition and physical education.^{19,20} To address the second most proximal system—parenting characteristics—interventions to address parenting style, feeding styles, and feeding practices have been created.²¹⁻²³ More recent studies have identified sleep problems as a predictor of obesity.²⁴ School-based interventions to increase sleep knowledge and improve sleep problems among adolescents is a novel method and emerging area of study.^{25,26} To address the most distal system—community and societal characteristics—several studies have been conducted on the federally funded School Breakfast Program and National School Lunch Program.²⁷⁻²⁹

In the context of the ecological framework, the various characteristics that place children at risk for obesity are occurring continuously and simultaneously. For instance, children's level of engagement in physical activity and their dietary intake is directly influenced by the feeding styles and

practices in the home environment, along with the amount of sleep they obtained the night before. Children's dietary intake and consequently their level of energy expenditure is also influenced by the nutritional quality of the food in the School Breakfast Program and/or the National School Lunch Program. The strength and direction of the developmental effects of the interactions—to create a positive or negative influence on development—depends both on the developing person and on the environment.³⁰ In the case of a low-income child with limited resources, poor dietary intake, short durations of sleep, and limited physical activity could place the child at risk for obesity. In turn, excessive weight gain could place the child at increased risk for poor sleep and less energy to be physically active. Unfortunately, childhood obesity interventions are typically not designed to address all ecological systems.

Directionality

Most studies predicting child weight status that have used the ecological framework treat the relationships as unidirectional, despite the theory emphasizing a continuous and simultaneous process that influences individual development. Likewise, studies that have focused on the multifaceted predictors of obesity have mainly treated the association as unidirectional. This makes it difficult to understand whether the various characteristics (or systems) are antecedents or consequences of obesity, or whether there is a bidirectional relationship between these two factors. To address the directionality of the relationships, applying statistical methods, such as cross-lagged regression models, can help to establish whether bidirectional relationships exists within and between systems as suggested by ecological models or whether the relationship is solely unidirectional. It is hypothesized that various bidirectional relationships within and between systems do exist that we have not yet considered, mainly because in terms of

prevention we have solely focused on reducing obesity or maintaining weight status. By not fully attending to these complex interactions, we have limited our ability to understand the usefulness of this theory in promoting or deterring health behaviors.⁷

Conclusion

Not only is the practitioner faced with the issue of diseases that are influenced by a host of lifestyle factors, many of these factors are most likely bidirectional. If this is the case, our efforts to improve the quality of the diet may be affected by the quality of sleep, which is, in turn, affected by the amount of physical activity, and the reverse of this is true as well. The complexity of these relationships may cause some to become discouraged early on in the change process because it seems too daunting of a task. Others who fail to recognize that there are many factors affecting behavior may instead place an emphasis on a single behavior and have initial success in making changes; over time, the other factors that influence the chosen behavior slowly make it more difficult to maintain the initial change. The goal of the health care professional should be to help patients be more aware of the multiple factors impacting behavior. In doing so the health care professional should start the patient in the change process by assisting with modifying one behavior and slowly add additional behaviors that need modification as they successful master change in an area of their life.

After an individual feels successful with a change, many times future changes are met with less resistance. We consider this to be positive behavioral momentum. In order to start this process, the patient should list in order of difficulty the behaviors that need to be changed. For example, in the instance of weight loss, patients should rank multiple behaviors that affect energy balance such as (but not limited to) eating healthy foods versus eating junk foods; eating patterns; serving sizes; frequency, duration, and type of physical activity; duration of

sedentary activity; and sleep. Once the patient identifies how difficult each of these behaviors would be to change in comparison with the others, a starting point is determined. It is important to start with a behavior that ranges in the middle of the list. The behaviors in the middle of the list should represent a manageable challenge. Once the patient has been successful in changing a behavior over time, the next and more difficult behavior is addressed. The success of changing a “less difficult behavior” gives confidence in changing the “more difficult behavior.” Of course, it may be necessary to initially address areas that are significantly affecting the patient first, but this process should be incorporated as soon as is practical. Using a positive behavioral momentum process will assist the healthcare professional in addressing the multiple lifestyle factors that are affecting health and accounts for the probable bidirectional nature of behaviors. **AJLM**

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