

Psychology

Research Quarterly for Exercise and Sport
©2012 by the American Alliance for Health,
Physical Education, Recreation and Dance
Vol. 83, No. 4, pp. 570-578

Including Overweight or Obese Students in Physical Education: A Social Ecological Constraint Model

Weidong Li and Paul Rukavina

In this review, we propose a social ecological constraint model to study inclusion of overweight or obese students in physical education by integrating key concepts and assumptions from ecological constraint theory in motor development and social ecological models in health promotion and behavior. The social ecological constraint model proposes that constraints exist on five different levels and interact within and across levels to affect overweight students' engagement, learning, and physical activity in physical education. This model can provide a theoretical framework to guide and organize research on the inclusion of overweight students. It can also guide teachers in manipulating these constraints to create a culture for inclusion and provide instruction to meet the needs of overweight or obese students.

Key words: engagement, exclusion, inclusion, learning,

Obesity rates among children and adolescents have increased at an alarming rate and are associated with many cardiovascular and heart diseases as well as serious psychosocial consequences. Peers at school often stigmatize overweight or obese children and youth as being unmotivated, less intelligent, less attractive, or less athletic (e.g., Puhl & Latner, 2007; Zeller, Reiter-Purtill, & Ramey, 2008) and commonly tease or exclude them from participating in physical education (Curtis, 2008; Fox & Edmunds, 2000; Li & Rukavina, 2012; Trout & Graber, 2009). It is well documented that weight-related teasing is associated with psychological and emotional damage in children (e.g., Li & Rukavina, 2012; Storch et al., 2007) and can lead overweight students to dislike physical activity (PA; Faith, Leone, Ayers, Heo, & Pietrobelli, 2002) or be dissatisfied with their physical education lessons (e.g.,

Kamtsios & Digelidis, 2008). Widespread obesity and its associated health and psychosocial consequences have presented a challenge for teachers to create inclusive and safe classrooms for overweight or obese students to engage in physical education.

Teachers often lack the knowledge and skills to create inclusive and safe learning climates for overweight or obese students in physical education classes or to provide differentiated instruction in terms of their unique characteristics. Numerous factors, such as physical and social environments, interactions among students, characteristics of individual students, and instructional tasks can influence inclusion of overweight or obese students. Currently, there is no theoretical model to fully integrate these factors at multiple levels for including overweight or obese students in a physical education setting. Identifying and conceptualizing these factors systematically have great potential to guide research to better understand the interrelationships among these factors and how they interact to affect overweight or obese students' physical education engagement and learning. Identifying these factors can also assist teachers in providing better instruction and class climates for overweight or obese students.

In this paper, we propose a social ecological constraint model to study the inclusion of overweight or obese students in physical education. We derived this model by integrating key concepts and assumptions from ecologi-

Submitted: December 17, 2010
Accepted: November 18, 2011

Weidong Li is with the School of Physical Activity and Educational Services at The Ohio State University. Paul Rukavina is with the Department of Health Studies, Physical Education and Human Performance Science at Adelphi University.

cal constraints theory in motor development and social ecological models in health promotion and behavior.

Ecological Constraint Theory

Often, overweight or obese students are considered relative to their physical inabilities and how they differ from their peers. Even worse, physical educators may be negatively biased toward overweight or obese students (Greenleaf, Martin, & Rhea, 2008; Greenleaf & Weiler, 2005) and may have stereotypical views of lifestyle behaviors, lack of individual control, and outward appearance (Chambliss, Finley, & Blair, 2004; Rukavina, Li, & Rowell, 2008; Rukavina, Li, Shen, & Sun, 2010). These expectations can lead physical educators to focus on what overweight or obese students are not willing to do or cannot accomplish in an inclusive setting. Potentially, this mindset can cause teachers to lower their expectations, provide less feedback or less than adequate instruction, or make overweight or obese students feel embarrassed or excluded from actively engaging in physical education or PA (Greenleaf, Martin, & Rhea, 2008). Moreover, emerging evidence suggests that teacher candidate preparation programs can lead to an increased bias toward overweight students (O'Brien, Hunter, & Banks, 2007). An emphasis on personal responsibility or belief that weight is controllable can exacerbate these biases (e.g., O'Brien, Puhl, Latner, Mir, & Hunter, 2010).

Obesity is commonly associated with negativity. Therefore, it is important to conceptualize the notion of being overweight or obese as constraints in a more positive or "inclusive way" relative to the individual's situation (e.g., Gagen & Getchell, 2006; Getchell & Gagen, 2006). Constraint is a neutral term that encompasses all factors that facilitate or inhibit movement or PA relative to situations (Newell, 1986). For example, body weight is a constraint that can either enhance performance or restrict or limit it. Weight has a positive impact on a football lineman's movement performance. On the other hand, weight can restrict a person's running and jumping performance. By conceptualizing being overweight or obese as a positive constraint, overweight or obese students can be empowered to explore the physical activities or sports at which they are good at or even better than their peers. Additionally, physical educators can create an inclusive positive learning environment and provide individualized instruction based on individual differences, to challenge all students to improve their skills and reward learning.

From an ecological perspective, constraint theory posits that individual, task, and environmental constraints interplay to affect students' acquisition of movement skills and PA patterns (e.g., Haywood & Getchell, 2009; Newell, 1986). Individual constraints are defined as an individual's unique biological characteristics. Two types of individual

constraints are structural versus functional. Structural constraints are related to specific body structures, such as height, weight, or muscle mass. Functional constraints are related to specific functions of body structures, such as attention, motivation, memory, agility, endurance, strength, cognition, or balance. Task constraints are the task goals or objectives, the rules governing the task, and the equipment used to perform the task. Environmental constraints refer to the characteristics of the physical or sociocultural environment, such as gravity, gym floor surface, temperature, lighting, cultural norms, and gender expectations.

Two principles underlying constraint theory are: (a) everything matters, and (b) everything changes (Gagen & Getchell, 2004). An individual's movement is "shaped" or bound by constraints in a situation, which includes the individual's characteristics (i.e., nervous system, skeletal system, cardiovascular system, emotion, affects, motivation) and aspects of a particular task in a particular environment. "Everything matters" means that individual, task, and environmental constraints should be considered when trying to understand an individual's particular movement in a specific context. Each constraint has some level of influence on how an individual moves. "Everything changes" means individual, task, and environmental constraints are dynamically changing as individuals grow and learn; they continually interact with one another to affect movement development. Most overweight and obese children's individual constraints change over time (motivational disposition, weight, height), whereas other constraints change daily (arousal state, knowledge).

Constraint theory in the ecological perspective provides a foundation for physical education teachers to strategically modify constraints to design developmentally appropriate and differentiated instruction and practice for all students. In essence, the teacher matches task and individual constraints along task progressions. As movement improves, critical task components are scaled to provide appropriate challenges (Getchell & Gagen, 2006). However, there are limitations to its instructional application in physical education settings from teaching-learning and public health perspectives. First, constraint theory has been situated within a motor development context. Therefore, it neglects aspects of learning-based and health behavior outcomes that can be meaningful in teaching and learning in physical education programs. School physical education programs have been identified as an ideal place for obesity prevention and intervention (U.S. Department of Health and Human Services [USDHHS], 2000). Health-related behavioral outcomes should be equally represented in an inclusion model. Second, individual constraints should be expanded beyond functional and structural constraints to include social aspects. Social individual constraints refer to characteristics related to social groups or networks, including gender, race, so-

cioeconomic status (SES), sexual orientation, etc. Many of these social constraints can significantly contribute to health disparities within and outside school in the United States. For example, minorities, girls, and lower SES populations are at greater risk of being overweight or obese (USDHHS, 2000).

Most crucial is the influence of environment on overweight or obese individuals' learning and engagement in physical education and health-related behaviors. However, constraint theory within an ecological perspective neglects the impact of various environmental facets: social networks, public policies, social contexts, communities, and organizations. Research has demonstrated that weight-related stigma and discrimination toward obese individuals are pervasive and associated with many serious health and psychosocial consequences (Puhl & Heuer, 2010). With 16% of U.S. children and youth now overweight or obese and most of those vulnerable to weight prejudice and its negative consequences, promoting individual responsibility to curtail the obesity crisis and reduce weight discrimination has not been effective (Schwartz & Brownell, 2007). There has been a call to develop antidiscrimination laws to rectify health disparities and facilitate public health efforts to address the obesity epidemic (Puhl & Heuer, 2011).

Schwartz and Brownell (2007) argued that humans are innately vulnerable to "toxic environments" (cheap caloric food, exciting sedentary activities) and that simply providing education about a healthy, active lifestyle will not bring about widespread change. Their argument parallels research on environmental design; large-scale health and health-related change occurs as a result of global or environmental modification. For example, research on the built environment (i.e., neighborhoods, roads, buildings, recreational facilities, parks, and food sources) and obesity has provided evidence for their significant contributions to children's and youth's lifestyles (e.g., Kumanyika & Grier, 2006; Sallis & Glanz, 2006). Individuals with access to safe places to exercise and neighborhoods with sidewalks, biking trails, and playgrounds are likely to be more physically active. School, home, and family settings have also been identified as potential contributors to differences in the obesity rate among children and youth (e.g., Kumanyika & Grier, 2006).

Children and youth are highly influenced by their environment and vulnerable to particular factors. The lack of differentiated effects at various levels (i.e., physical education instructional settings, school, community, and society) limits use of ecological constraint theory to guide research on how to successfully include overweight and obese children in physical education. Environmental differentiation at various levels would allow researchers to question how changes at one level would influence constraints at different levels and ultimately influence inclusion. Ultimately, this knowledge can help teachers

design optimal learning environments and quality instruction to influence children to adopt healthy, physically active lifestyles.

Social Ecological Model

The social ecological model emphasizes the "transactions" between the individual and specific social, cultural, and physical environments in which he or she lives (Stokols, 1992, 1996). Four core assumptions underlying this model are: (a) multiple facets of the physical and social environments influence health behaviors; (b) human environments are multidimensional and complex (they can be characterized by their physical and social components, objective or subjective qualities, scale or immediacy to individuals and groups, an array of independent attributes, such as lighting, temperature, space arrangement, and group size, or by the composite relationships among several features); (c) multiple levels of analysis and diverse methodologies are incorporated in the social ecological analysis of health behaviors; and (d) various concepts from systems theory are incorporated into the social-ecological perspective to understand the interconnections between persons and their environments, including interdependence, negative feedback, homeostasis, etc. The interactions between individuals and environments are represented as cycles of mutual influence. The physical and social features of environments directly affect their occupants' health and behavior. Concurrently, people can change the quality of their environments through individual and collective actions. Various levels of environments are complex interdependent systems, in which local settings and organizations are nested within more complex and distant ecologies (Stokols, 1992, 1996).

The social ecological model has been widely accepted in violence prevention (Dahlberg & Krug, 2002), PA (Elder et al., 2007) and tobacco control (Centers for Disease Control and Prevention, 1999). It considers the complex interplay between individual, relationship, community, and societal factors that influence a person's health and health-related behaviors. The individual level identifies biological and personal history factors, including age, gender, SES, attitudes, motivation, self-efficacy, self-regulation, etc. The relationship level includes interrelationships with peers, intimate partners, and family members. The community level identifies different settings, including schools, workplaces, neighborhoods, organizations, and churches. The societal level includes social and cultural norms and policies and legislations related to health, economy, and education.

Despite the wide acceptance of the social ecological model as a paradigm for research and actions in many disciplines, its specific environmental stratification (i.e., relationship, community, and society) limits its applicabil-

ity in physical education due to the unique instructional settings at schools. Children in physical education under teacher-designed task structures experience student-peer and student-teacher interactions in a gym or outside instructional space in a school and community. Their resultant movements and personal interactions are shaped by numerous constraints in school environments, such as physical education curricula and school rules and policies. One assumption of the social ecological model is that the multidimensional and complex nature of human environments can be characterized by its scale or immediacy to an individual. Therefore, physical education instructional settings within the school should be a crucial environmental dimension to consider when using the social ecological model to study the impact of constraints on overweight and obese students' learning and engagement in school and health-related behaviors.

Social Ecological Constraint Model

By integrating the social ecological model in health promotion (Green, Richard, & Potvin, 1996; Richard, Potvin, Kishchuk, Prlic, & Green, 1996; Stokols, 1992, 1996) and constraints theory (e.g., Newell, 1986), we propose a new theoretical framework to study inclusion of overweight students in physical education: the social ecological constraint model. This model suggests that overweight or obese students' engagement and learning in physical education, health behaviors, and healthy lifestyles are an outcome of complex interactions of different constraints at multiple levels. Teachers can create environments of inclusion for these students in physical education through awareness and strategic configuration of particular constraints. Thus, in the present article, we define inclusion as the holistic engagement of all students through culturally,

socially, and developmentally appropriate instruction and practices as a function of individual, task, and environmental constraints at multiple levels.

Five assumptions underlie the social ecological constraint model. First, *everything* that could possibly influence inclusion for an overweight or obese student is a constraint. For example, a student's body weight may facilitate inclusion in a track and field unit in which students need to project heavy objects, but weight usually has a negative effect in running unless the student has appropriate leg strength. Second, the environmental constraints (i.e., physical and social) for including overweight or obese students in physical education are multidimensional and complex and can be characterized by unique features at different levels. Third, multiple levels of analysis and diverse research methodologies are integral to realizing the social ecological constraint model. Constraints within a level and across levels interact to facilitate or inhibit student engagement and learning, thus affecting their health behaviors and lifestyles. Fourth, constraints change as overweight or obese students learn and grow. Content and tasks change across time, just as students experience changes in their physical and mental capacities. Finally, concepts from social ecological model and constraint theory are incorporated in this model.

Constraints exist on five levels of the model: individual, physical education instructional settings, school/family, community, and society (see Figure 1). The individual level includes structural, functional, and social constraints. For example, a person's weight and height, attitudes and motivation, and gender and ethnicity can facilitate or restrict his or her engagement and learning in physical education.

The physical education setting identifies constraints in terms of the relation between an overweight or obese individual and other personnel and resources. These in-

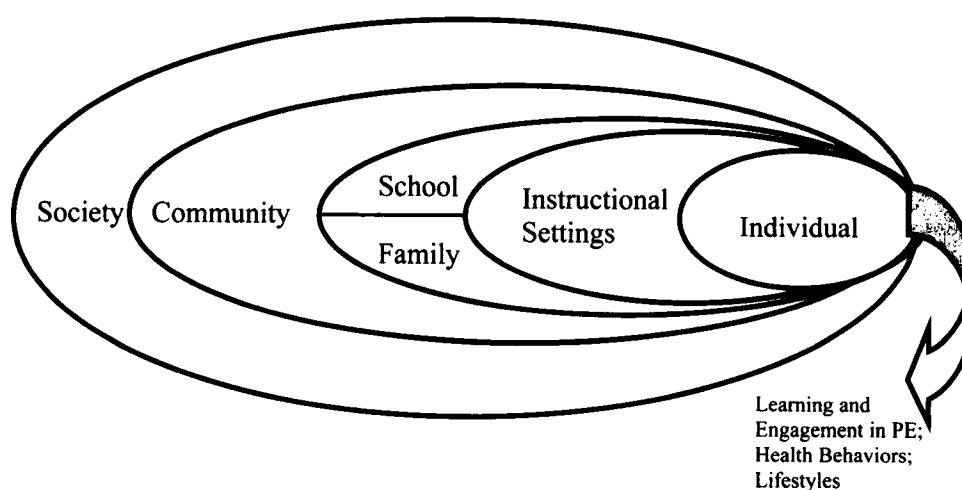


Figure 1. Social ecological constraint model for inclusion of overweight students into physical education.

clude the physical environment, equipment, peers, tasks (goals, task rules), learning environment (task-oriented versus ego-oriented), teachers, and teacher policy constraints (physical education rules, policies). For example, a constraint can be an aspect of a task structure. Task structures that allow students to choose the difficulty level for a particular activity or equipment size are more inclusive than those that do not allow choices. Teachers can be another constraint. Quality physical education teachers can have a positive impact on how students learn and spend their time (e.g., Graham, 1983; Hastie & Saunders, 1990, 1991; Silverman, Kulinna, & Crull, 1995; van der Mars, 2006). They can create positive climates to motivate students to engage in physical education by empowering them with choices and autonomy (e.g., Hellison & Walsh, 2002), focusing on personal improvement rather than social comparisons, and fostering a learning community in which students feel safe, supported, and cared for (e.g., Li & Lee, 2004; Papaioannou, 1998; Solmon, 1996; Standage, Duda, & Ntoumanis, 2005; Xiang & Lee, 1998).

School constraints consist of administrative strategies, rules, and policies from the physical education department, administrators, guidance counselors, school rules, and parent-teacher association. For example, overweight students will likely be included in physical education if the school has a positive climate, which can be created with no-tolerance policies and promoting prosocial behavior through initiatives (e.g., school themes or character education programs). In a review of the literature, Wechsler, McKenna, Lee, and Dietz (2004) recommended school constraints to increase physical activity and improve students' nutrition. Several aspects that can have a positive effect include designating a school health coordinator and maintaining an active school health council, implementing school health and physical activity policies, and increasing opportunities to engage in physical activity outside of physical education. However, other constraints can have a negative effect, such as budget issues.

Family-level constraints affecting inclusion are parental attitudes, relations of the child with parents, siblings, family relatives, home environments, family income, and parents' education and backgrounds. Parents play a critical role in their children's eating and exercise behaviors (e.g., Lindsay, Sussner, Kim, & Gortmaker, 2006). Their knowledge, attitudes, and behaviors have an impact on their children's development of healthy, physically active lifestyles (e.g., Kaplan, Liverman, & Kraak, 2005). As argued by many researchers, parents should become a central focus of national campaigns to reduce the childhood obesity epidemic (Epstein, 1996; Lindsay et al., 2006). Because parents who are overly protective or sensitive that their child is overweight or are "in denial" of their child's overweight status, school administrators may resist personal interventions by physical educators.

Community constraints include community organizations and resources, physical infrastructures, and neigh-

borhood environments. Research on built environments (i.e., neighborhoods, roads, buildings, recreational facilities, parks, and food sources) provides evidence of their influence children's and youth's lifestyles (e.g., Kumanyika & Grier, 2006; Sallis & Glanz, 2006). Those who live in communities with parks, playgrounds, and sidewalks are more likely to be physically active than those who live in communities without such physical infrastructures.

The societal level consists of constraints shared by the public, such as stereotypical beliefs about certain populations (e.g., obesity bias/weight stigma, gender stereotypes), legislations and laws, educational, economic, health, and social policies, and social and cultural norms. These constraints have a powerful influence on individuals' learning and health-related behaviors. For example, the pressure of standardized testing, which narrows the school curriculum toward math and science, could marginalize physical education and health-related subjects (Wechsler et al., 2004). Another constraint is obesity bias/weight stigma, often defined as the assumption that overweight people have negative character traits such as laziness, self-indulgence, or lack of intelligence (Puhl & Brownell, 2001). Weight-related teasing and bullying and the resultant unhealthy body image-related behaviors can be barriers to promoting healthy active lifestyles (Bauer, Patel, Prokop, & Austin, 2006). However, they can also be a motivator for overweight or obese students to change their health behaviors.

Societal constraints are different from functional and social individual constraints in that individual constraints are of one unique individual and not necessarily shared by others. For example, a social constraint may include one's sexuality (e.g., gay or straight). Although many people may share characteristics as members of the same group, the individual constraint is a specific characteristic that may affect one's engagement in and learning of health-related behaviors. Likewise, for functional constraints, one could have an obesity stereotype similar to other people in their community, but that individual's stereotype has its own strength and unique characteristics, which in turn has an impact on the person's functions and behavior. Depending on the degree to which an individual is disposed toward the stereotype and how environmental factors can shape his or her dispositions, stereotypical beliefs can cause great emotional and motivational damage or motivate a person to fight against the stereotypes. Sharing constraints on a societal level plays a role in socializing and reinforcing one's individual constraints.

The social ecological constraint model recognizes the interwoven relationship between individual and environmental constraints—instructional settings, school/family, community, and societal. While we recognize students' individual constraints are responsible for their physical education engagement and learning, environmental constraints, especially at the instructional settings level, play

a critical role in shaping individual constraints, which in turn, affect participation in physical education and health behaviors. This model recognizes that certain individual and environmental constraints cannot be manipulated, whereas others can be easily shaped to effectively include overweight or obese students in physical education. If a constraint is modifiable, it means an individual can effect a change in another constraint, either alone or with others.

Individual and environmental constraints interplay to affect students' engagement and learning in physical education and their health behaviors (e.g., Stokols, 1996). For example, a no-bullying school policy can affect constraints of physical education rules and peer relationships at the instructional level and individual constraints, such as one's attitudes and motivation. Second, individual constraints and lower level environmental constraints can affect higher levels. For example, overweight or obese students' individual constraints, such as height, weight, attitudes, cognition, and motivation, can influence how physical education teachers manipulate instructional constraints for effective inclusion. Also, teachers' practices or philosophies at the physical education program level can affect school operations or policies relating to inclusion.

Last, there is interdependence among constraints at all levels. Weight stigma and stereotypes are deeply ingrained in our society (for a review, see Puhl & Brownell, 2003; Puhl & Heuer, 2010; Puhl & Latner, 2007). These constraints are manifested in different ways in many places with the potential to cause much emotional and psychological damage. Also, constraint changes at one level can affect changes at other levels. For example, as overweight or obese students improve their skills and ability, physical education teachers will need to modify instruction to accommodate changes at the individual level. Although constraints at different levels play different roles in students' engagement and learning in physical education and health behaviors, the most effective approach to include overweight or obese students in physical education is a combination of efforts at all levels.

Implications for Practice

This model has significant teacher education implications. The rate of obesity has dramatically increased among children and youth over the past decade, and school physical education has been identified as an important area for obesity prevention and intervention (USDHSS, 1996, 2000). However, research has shown that overweight or obese students are commonly excluded from physical education (Curtis, 2008; Fox & Edmunds, 2000; Li & Rukavina, 2012; Trout & Graber, 2009). As part of physical education teacher education programs or teacher in-services, this model could be a guide to learn about overweight and obese students' individual

differences. Teachers need to understand that overweight students have unique characteristics that make participation in a stereotypical "one size fits all" physical education program challenging. Inclusion involves identification and strategic manipulation of constraints that allow developmentally appropriate instruction. In other words, physical educators need to be able to adjust what they already do to include students with larger body shapes and sizes. Overweight and obese students need also to be included socially. Social stereotypes and weight stigma are difficult to change. Physical education teachers need to be educated about curricular models that promote positive social interactions to create a culture of tolerance and acceptance. Even then, obesity stereotypes are resilient; thus, any approach at the instructional level should be coupled or integrated with upper level interventions. Physical education teachers need to understand how to integrate school-wide character education themes and behavior management policies with inclusive teaching practices in instructional settings.

The model can be a framework to help physical educators ensure their program is nested within the school, home, community, and social ecologies. Physical educators must focus their efforts at the instructional level (e.g., curriculum, physical education rules) and extend their influence to alter constraints at other levels to create inclusion for the overweight or obese child. Many teachers focus solely on their classrooms and do not get involved in school or community committees where policy is made. Changes such as implementation of school-wide character education programs or wellness policies (e.g., replacing soda with fruit juices and milk) can influence students' engagement and health behaviors. Also, teachers can influence change in school or family ecologies. For example, physical education content or successful approaches in the instructional setting can be shared with or integrated into other classes, such as math and science. In elementary schools, it is common for classroom teachers to lead functional physical activity exercises during the first part of class. Finally, teachers should consider the culture of overweight and obese students to successfully include them in physical education. Cultural competency is an important teacher attribute that informs the selection of appropriate teaching strategies (Harrison, Carson, & Burden, 2010). Discomfort with diversity and stereotypical beliefs about minorities are negatively related to mastery-focused learning strategies (Kumar, 2009).

Future Research Directions

This social ecological constraint model has important research implications. It provides a theoretical framework to guide and organize research on including overweight students in physical education settings, more specifically to

investigate the interconnection of constraints at multiple ecological levels and how this interconnection affects inclusion of overweight individuals in a group setting. This review is an initial step toward conceptualizing the model by integrating constraint theory in the ecological perspective and social ecological model. This new model is a foundation for future research on including overweight or obese students in physical education. Knowledge generated from this line of research has great potential to increase overweight or obese students' engagement and learning in physical education, thus, helping them to develop and maintain healthy, physically active lifestyles.

Future research could validate this conceptual model for including overweight or obese students in physical education. First, researchers should focus on identifying the most influential constraints at the instructional and individual levels, as factors at these two levels have the most impact on engagement and learning among overweight or obese students. For example, future research could include effective strategies teachers have used successfully to include overweight and/or obese students in physical education, and how teachers' philosophies, goals, beliefs, curricular choices, and pedagogical content knowledge have influenced their inclusion of overweight or obese students. Then, constraints at school/family, community, and societal levels could be examined, as physical education teachers have less power to manipulate these factors. Other questions should address how physical education teachers can work with other teachers, school administrators, parents, community organizations, legislators, etc. to develop inclusive cultures for overweight or obese students within and beyond the school. Evidence from the overweight or obese students' perspectives is important as well. As Shulman (1986) and Greenberg (1999) argued, students are active agents who mediate the teaching and learning processes. Knowledge about how overweight or obese students perceive the effectiveness of school initiatives and teachers' strategies for inclusion in physical education can be used to refine and improve these initiatives and practices. Finally, a comprehensive approach could be used to examine the interplay of constraints at multiple levels and their effects on including overweight or obese students in physical education. Constraints at multiple levels interact to affect students' engagement and learning in physical education. Answers to these questions will contribute greatly to our understanding of including overweight or obese students in physical education and facilitating the development and refinement of interventions for successful inclusion.

References

- Bauer, K. W., Patel, A., Prokop, L. A., & Austin, S. B. (2006). Swimming upstream: Faculty and staff members from urban middle schools in low-income communities describe their experience implementing nutrition and physical activity initiatives. *Preventing Chronic Disease*, 3, 1-9.
- Chambliss, H. O., Finley, C. E., & Blair, S. N. (2004). Attitudes toward obese individuals among exercise science students. *Medicine & Science in Sports & Exercise*, 36, 468-474.
- Centers for Disease Control and Prevention. (1999). *Office on smoking and health. Best practices for comprehensive tobacco control*. Atlanta, GA: Author.
- Curtis, P. (2008). The experiences of young people with obesity in secondary school. Some implications for the healthy school agenda. *Health and Social Care in the Community*, 16, 410-418.
- Dahlberg, L. L., & Krug, E. G. (2002). Violence—A global public health problem. In E. Krug, L. L. Dahlberg, J. A. Mercy, A. B. Zwi, & R. Lozano (Eds.), *World report on violence and health* (pp. 1-56). Geneva, Switzerland: World Health Organization.
- Elder, J. P., Lytle, L., Sallis, J. F., Young, D. R., Steckler, A., Simons-Morton, D., . . . Ribisl, K. (2007). A description of the social-ecological framework used in the trial of activity for adolescent girls (TAAG). *Health Education Research*, 22, 155-165.
- Epstein, L. (1996). Family based behavioral intervention for obese children. *International Journal of Obesity and Related Metabolic Disorders*, 20, s14-s21.
- Faith, M. S., Leone, M. A., Ayers, T. S., Heo, M., & Pietrobelli, A. (2002). Weight criticism during physical activity, coping skills, and reported physical activity in children. *Pediatrics*, 110, e23.
- Fox, K. R., & Edmunds, L. D. (2000). Understanding the world of the "fat kid:" Schools help provide a better experience? *Reclaiming Child Youth: Journal of Emotion Behavior Problems*, 9, 177-181.
- Gagen, L., & Getchell, N. (2004). Combining theory and practice in the gymnasium: "Constraints" within an ecological perspective. *Journal of Physical Education, Recreation and Dance*, 75(5), 25-30.
- Gagen, L., & Getchell, N. (2006). Using "constraints" to design developmentally appropriate movement activities for early childhood education. *Early Childhood Education Journal*, 34, 227-232.
- Getchell, N., & Gagen, L. (2006). Adapting activities for all children: Considering constraints can make planning simple and effective. *Palaestra*, 22, 20-27, 43, 58.
- Graham, G. (1983). Review and implications of physical education experimental teaching unit research. In T. Templin & J. Olson (Eds.), *Teaching physical education* (pp. 244-253). Champaign, IL: Human Kinetics.
- Green, L. W., Richard, L., & Potvin, L. (1996). Ecological foundations of health promotion. *American Journal of Health Promotion*, 10, 270-281.
- Greenberg, J. D. (1999). How do we value teaching? Voices of the students. *National Teaching and Learning Forum*. Retrieved from <http://www.ntlf.com/html/lib/suppmat/82green.htm>.
- Greenleaf, C., Martin, S. B., & Rhea, D. (2008). Fighting fat: How do fat stereotypes influence beliefs about physical education? *Obesity*, 16, S53-S59.
- Greenleaf, C., & Weiler, K. (2005). Perceptions of youth obesity among physical educators. *Social Psychology of Education*, 8, 407-423.

- Harrison, L., Jr., Carson, R. L., & Burden, J., Jr. (2010). Physical education teachers' cultural competency. *Journal of Teaching in Physical Education*, 28, 184–198.
- Hastie, P. A., & Saunders, J. E. (1990). A study of monitoring in secondary school physical education classes. *Journal of Classroom Interaction* 25, 47–54.
- Hastie, P. A., & Saunders, J. E. (1991). Accountability in secondary school physical education. *Teaching and Teacher Education*, 7, 373–382.
- Haywood, K., & Getchell, N. (2009). *Lifespan motor development* (5th ed.). Champaign, IL: Human Kinetics.
- Hellison, D., & Walsh, D. (2002). Responsibility-based youth programs evaluation: Investigating the investigations. *Quest*, 54, 292–307.
- Kamtsios, S., & Digelidis, N. (2008). Physical activity levels, exercise attitudes, self-perceptions and BMI type of 11- to 12-year-old children. *Journal of Child Health Care*, 12, 232–240.
- Kaplan, J. P., Liverman, C. T., & Kraak, V. I. (2005). *Preventing childhood obesity: Health in the balance*. Washington, DC: The National Academies Press.
- Kumanyika, S., & Grier, S. (2006). Targeting interventions for ethnic minority and low-income populations. *Childhood Obesity*, 16, 187–207.
- Kumar, R. (2009). *Evaluating the effectiveness of a teacher education program: Classroom teachers' proposed classroom practices, motivational goals, and attitudes toward diversity*. Paper presented at the meeting of American Education Research Association, San Diego, CA.
- Li, W., & Lee, A. (2004). A review of conceptions of ability and related motivational constructs in achievement motivation. *Quest*, 56, 439–461.
- Li, W., & Rukavina, P. (2012). The nature, occurring contexts, and psychological implications of weight-related teasing in urban physical education programs. *Research Quarterly for Exercise and Sport*, 83, 308–317.
- Lindsay, A. C., Sussner, K. M., Kim, J., & Gortmaker, S. (2006). The role of parents in preventing childhood obesity. *The Future of Children*, 16, 169–186.
- Newell, K. M. (1986). Constraints on the development of coordination. In M. Wade & H. T. A. Whiting (Eds.), *Motor development in children: Aspects of coordination and control* (pp. 341–360). Dordrecht, The Netherlands: Martinus Nijhoff.
- O'Brien, K. S., Hunter, J. A., & Banks, M. (2007). Implicit anti-fat bias in physical educators: Physical attributes, ideology and socialization. *International Journal of Obesity*, 31, 308–314.
- O'Brien, K. S., Puhl, R. M., Latner, J. D., Mir, A. S., & Hunter, J. A. (2010). Reducing anti-fat prejudice in pre-service health students: A randomized trial. *Obesity*, 18, 2138–2144.
- Papaioannou, A. (1998). Students' perceptions of the physical education class environment for boys and girls and the perceived motivational climate. *Research Quarterly for Exercise and Sport*, 69, 267–275.
- Puhl, R., & Brownell, K. D. (2001). Bias, discrimination, and obesity. *Obesity Research*, 9, 788–805.
- Puhl, R., & Brownell, K. D. (2003). Psychosocial origins of obesity stigma: Toward changing a powerful and pervasive bias. *Obesity Reviews*, 4, 213–227.
- Puhl, R. B., & Heuer, C. A. (2010). Obesity stigma: Important considerations for public health. *American Journal of Public Health*, 100, 1019–1028.
- Puhl, R. B., & Heuer, C. A. (2011). Public opinion about laws to prohibit weight discrimination in the United States. *Obesity*, 19, 74–82.
- Puhl, R. B., & Latner, J. D. (2007). Stigma, obesity, and the health of the nation's children. *Psychological Bulletin*, 133, 557–580.
- Richard, L., Potvin, L., Kishchuk, N., Prlic, H., & Green, L. W. (1996). Assessment of the integration of the ecological approach in health promotion programs. *American Journal of Health Promotion*, 10, 318–328.
- Rukavina, P. B., Li, W., & Rowell, M. B. (2008). A service learning based intervention to change attitudes toward obese individuals in kinesiology pre-professionals. *Social Psychology of Education*, 11, 95–112.
- Rukavina, P. B., Li, W., Shen, B., & Sun, H. (2010). A service learning based project to change implicit and explicit bias toward obese individuals in kinesiology pre-professionals. *Obesity Facts*, 3, 117–126.
- Sallis, J. F., & Glanz, K. (2006). The role of built environments in physical activity, eating, and obesity in childhood. *The Future of Children*, 16, 89–108.
- Schwartz, M. B., & Brownell, K. D. (2007). Actions necessary to prevent childhood obesity: Creating a climate for change. *Journal of Law, Medicine, and Ethics*, 35, 78–89.
- Shulman, L. (1986). Paradigms and research programs in the study of teaching. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 3–36). New York: McMillan.
- Silverman, S., Kulinna, P., & Crull, G. (1995). Skill-related task structure, explicitness and accountability: Relationships with student achievement. *Research Quarterly for Exercise and Sport*, 66, 32–40.
- Solomon, M. A. (1996). Impact of motivational climate on students' behaviors and perceptions in a physical education setting. *Journal of Educational Psychology*, 88, 731–738.
- Standage, M., Duda, J. L., & Ntoumanis, N. (2005). A test of self-determination theory in school physical education. *British Journal of Educational Psychology*, 75, 411–433.
- Stokols, D. (1992). Establishing and maintaining healthy environments: Toward a social ecology of health promotion. *American Psychologist*, 47, 6–22.
- Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion*, 10, 282–298.
- Storch, E. A., Milsom, V. A., DeBraganza, N., Lewin, A. B., Gefken, G. R., & Silverstein, J. H. (2007). Peer victimization, psychosocial adjustment, and physical activity in overweight and at-risk-for-overweight youth. *Journal of Pediatric Psychology*, 32, 80–89.
- Trout, J., & Graber, K. C. (2009). Perceptions of overweight students concerning their experience in physical education. *Journal of Teaching in Physical Education*, 28, 272–292.
- U.S. Department of Health and Human Services. (1996). *Physical activity and health: A report of the Surgeon General*. Washington, DC: U.S. Government Printing Office.
- U.S. Department of Health and Human Services. (2000). *Healthy people 2010: With understanding and improving health and objectives for improving health* (2nd ed.). Washington, DC: U.S. Government Printing Office.
- van der Mars, H. (2006). Time and learning in physical education. In D. Kirk, D. MacDonald, & M. O'Sullivan (Eds.), *The handbook of physical education* (pp. 191–213). Thousand Oaks, CA: Sage Publications.

- Wechsler, H., McKenna, M. L., Lee, S. M., & Dietz, W. H. (2004). The role of schools in preventing childhood obesity. *The State Education Standard*, 5(2), 4-12.
- Xiang, P., & Lee, A. (1998). The development of self-perceptions of ability and achievement goals and their relations in physical education. *Research Quarterly for Exercise and Sport*, 69, 231-241.
- Zeller, M. H., Reiter-Purtill, J., & Ramey, C. (2008). Negative peer perceptions of obese children in the classroom environment. *Obesity*, 16, 755-762.

Authors' Note

Please address correspondence concerning this article to Weidong Li, The Ohio State University, College of Education and Human Ecology, School of Physical Activity and Educational Services, Sport and Exercise Education, PAES Building A270, 305 West 17th Avenue, Columbus, OH 43210-1224.

E-mail: li.832@osu.edu