

APPLICATION OF SOCIAL ECOLOGICAL MODEL IN THE FIELD OF PHYSICAL ACTIVITY RESEARCH

Yaqun Zhang¹, T. A. Shilko²

¹ National Research Tomsk State University, Tomsk, Russia

² Shenyang Normal University, Shenyang, China

In the study of physical activity promotion, the traditional research overemphasizes the role of individual psychological factors and relatively ignores the role of environmental factors. The social ecological model, as a comprehensive and interdisciplinary framework, provides new ideas for the study of physical activity. This model comprehensively considers various levels of influencing factors of individuals and the environment: individual level, interpersonal level, organizational level, community level and policy level. This article reviews the evolution of the application of the model in the field of physical activity and the research progress at various levels in order to provide a theoretical reference for the future application of the model for physical activity correction.

Keywords: *physical activity, application prospects, physical health, social ecological model.*

Introduction. Regular physical activity as an active and healthy lifestyle can effectively improve people's sub-health status, improve people's physical and mental health, and reduce the incidence of various chronic diseases (such as cardiovascular disease, diabetes, etc.) [9; 12; 19]. In addition, in terms of the psychological benefits of physical activity, physical activity can reduce the occurrence of negative emotions such as depression and anxiety [17, p. 325].

Although physical activity can have a positive impact on physical and mental health, the problem of unhealthy lifestyles where physical inactivity and sedentary is still serious worldwide [2; 6; 7; 14]. How to motivate people to participate in regular physical activities to improve their physical and mental health is of great theoretical and practical significance. In this regard, early research mainly focused on the psychological perspective and explored the internal psychological laws of people to find interventions to promote physical activity [8].

However, people live in a social environment, and their behaviors are also affected by the environment. The social ecological model systematically combines social and environmental factors with other individual factors. The social ecological model integrates the effects of individual level, interpersonal level, organizational level, community level, and policy level on physical activity, and more comprehensively understands the factors that influence physical activity behavior [13, p. 360].

The purpose of the study. The literature research method was used to analyze the contents of the social ecological model framework and its application in the field of physical activity. Provide good sugges-

tions on the application of social ecological models in the field of physical activity.

Research methods. Collect and analyze literature review.

Research results and discussion.

Evolution of social ecological models. Bronfenbrenner first proposed the socio-ecological model in 1977 [4, p. 515]. It is used to study the various factors affecting the development of children in educational psychology, that is, the relationship between the growth and development of biological organisms and the environment. In essence, the concept of ecosystem in the natural sciences is applied to the research of the social sciences. He believes that human behavior is affected by individual internal environmental factors (such as individual motivation, beliefs, etc.) and individual external environmental factors (such as policies, culture, etc.).

In 1988, Mc Leroy [15, p. 356] explored the personal and social factors that influence physical activity. He believes that personal factors include individual characteristics such as knowledge, attitude, behavior, self-concept, and skills. Social factors include interpersonal, organizational, community, and public policies. In 2007, Wendel-Vos [21, p. 428] and others made further improvements to the social ecological model, and further subdivided the environmental impact factors in the model into physical environment, social cultural environment, economic environment, and political environment. Among them, the physical environment refers to objective physical activity conditions, the socio-cultural environment refers to the concept and attitude of healthy behavior in society; the economic environment refers to

the economic cost of healthy behavior; and the political condition refers to various rules and systems that may affect healthy behavior. The social ecological model was put forward to a large extent in order to solve the limitation of the early theory of physical activity, that is, it overemphasizes the internal psychological factors that affect people's physical activity, and relatively ignores the environmental factors that affect people's physical activity behavior. Subsequently, researchers of physical activity continued to dig out the connotations of the internal and individual levels, and eventually developed a relatively perfect social ecological model of physical activity. That is, the individual level, interpersonal level, organizational level, community level, and policy level.

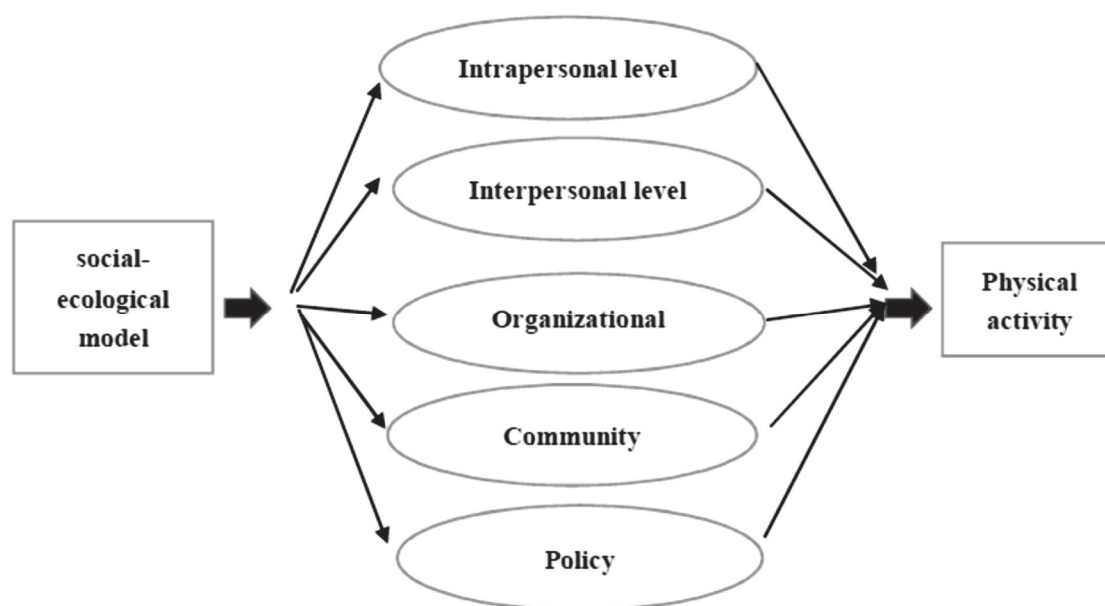
In general, a large number of international studies have been conducted on the behavior of physical activities using social ecological models. However, from the existing literature, the study of the interpersonal factors affecting physical activity behavior accounts for most of the proportion, while the number of external factors affecting individual studies is relatively small.

Therefore, researchers should conduct more research on the external factors affecting physical activity behavior. The following is a detailed discussion of the relationship between the five levels of the social ecological model and physical activity [15, p. 370].

There are many researches on the relationship between the levels within intrapersonal level and physical activities using social ecological models.

The relevant representative studies are summarized here into two ideas: First, study the relationship between physical activity and self-efficacy, enjoyment, subjective perception disorders, and personal health behaviors. Second, study the relationship between demographic variables and physical activity. In terms of the relationship between self-efficacy and physical activity level, the study found that there is a positive correlation between the two [3; 5; 7; 14]. For example, Baranowski [1, p. 273], after reviewing 25 intrapersonal physical activity intervention studies and 45 intrapersonal physical activity related factors, pointed out that self-efficacy plays an important role in intrapersonal physical activity.

Interpersonal level. Interpersonal level, as a level of the social ecological model, is very important for the participation and persistence of physical activities, and social support is an important variable to stimulate people's participation in physical activities. In addition, Social Norm can lead to changes in physical activity and even healthy behaviors. Social norms reflect standards of behavior and values generally accepted in society. The impact of social norms is more manifested when individuals lack experience in certain behaviors. For example, the promotion of physical activity by social norms has a positive effect on people's active physical activity [10. P. 135]. The existence of physical activity role models will also promote people's participation in physical activities. For example, frequent observations of the physical activity behavior of the surrounding population will have a positive impact on the individual's



Socio-ecological model framework Intrapersonal level

participation in physical activity, which can provide individuals with motivation for physical activity and self-management strategies to keep doing physical activity [13, p. 357].

Organization. The concept of organization in the socio-ecological model has a broad extension, including different types of organizations and workplaces. How the physical activity environment in the workplace directly affects people's participation in physical activities. Therefore, we can promote people's physical activity behaviors by creating a good physical activity environment [3; 9—11; 13; 14]. For example, building a shower room in the workplace so that employees can take a bath after physical activity will greatly facilitate employees' participation in physical activities [20, p. 383].

In addition, in the workplace, company bosses can provide policy support for employees by formulating rules and regulations that are conducive to physical activity. For example, it is possible to allocate a certain amount of time for employees to engage in physical activities in their daily work schedules, which is conducive to improving employees' physical activity levels [5, p. 1999].

Finally, targeted physical activity interventions can be performed on employees in the workplace. For example, invite relevant fitness instructors to design exercise prescriptions and plans for employees, provide professional guidance for employees' physical activities, and create a good physical activity atmosphere through the collective participation of company employees, and ultimately turn physical activities into employees' daily lives part.

Community. The social ecological model considers the community to be the area where the interacting group is located. From a small settlement, a street to a large town, it can be classified as a community [16]. From the perspective of the community environment, the availability of physical activity venues, facilities, and convenience in the community can improve people's participation in physical activities. In addition, the mode and condition of public transportation in the community is also an important aspect that affects people's physical activity behavior. If the community's public transportation is more congested, people using motor vehicles as commuting tools will be more inclined to choose commuting methods that require more physical activity such as cycling or walking. Most studies believe that creating a beautiful natural environment in the community can promote people's participation in physical activities. If the community's natural environment is beautiful, people will be more inclined to engage in physical

activities such as walking, cycling, running, etc. During the physical activities, enjoy the beautiful natural scenery and enjoy the body and mind. In addition, the safety of the community has also been valued by scholars. If the security of the community can be guaranteed, it will be more conducive to people's physical activities. Conversely, if the community environment perceived by people is unsafe, it will lead to a decrease in physical activity and a decrease in social communication between people [5; 20].

Finally, promoting people's participation in physical activities can also be achieved by creating a good community physical environment. By changing the «soft» environment that affects people's physical activity, such as providing physical activity stimulation through television, internet, radio, and bulletin boards, adding content that requires physical activity to community entertainment activities, and thereby promoting the occurrence of physical activity.

Policy. The policy level is the most macro level of the social ecological model. The policies here include policies related to physical activity of people formulated by various government departments from the country to the region. For example, Sallis [20, P. 390] pointed out that through the joint efforts of agencies such as the transportation sector, the news media, urban planning, architectural design, and the education sector to provide policy support for physical activities can promote the occurrence of physical activities. Relevant policies related to public transportation are closely related to the level of participation of the public in physical activities. For example, paving sidewalks and bicycle lanes in cities will not only reduce urban traffic congestion and environmental pollution caused by car exhaust, but also help more people to choose physical activities such as walking and cycling [5; 18].

Conclusions. Although early physical activity behavior theories analyzed physical activity behaviors from psychological perspectives such as beliefs, attitudes, motivations, etc., but relatively ignored the analysis of social and environmental factors that affect physical activity behaviors, which led to certain research limitations. In recent years, more scholars have tried to use the framework of social-ecological models to make a more comprehensive and systematic analysis of the factors related to the impact of physical activity behaviors, largely to overcome the limitations of early research.

This article summarizes the important factors affecting physical activity behavior from the five levels of the social-ecological model: individual internal level, interpersonal level, organizational level,

community level, and policy level. It will be used for future physical activity behavior intervention using the social-ecological model Increase reference. The social-ecological model comprehensively considers the influence factors of various levels of the model on physical activity, so as to achieve a significant increase in the effect of physical activity intervention, and improve the level of physical activity and physical and mental health.

References

1. Baranowski T., Anderson C., Carmack C. Mediating variable framework in physical activity interventions: How are we doing? How might we do better? *American journal of preventive medicine*, 1998, no. 15 (4), pp. 266–297.
2. Bertrais S., Preziosi P., et al. Sociodemographic and geographic correlates of meeting current recommendations for physical activity in middle-aged French adults: the Supplementation en Vitamines et Mineraux Antioxydants (SUVIMAX) Study. *American Journal of Public Health*, 2004, no. 94 (9), pp. 1560–1566.
3. Booth M.L., Bauman A., Owen N., Gore C.J. Physical activity preferences, preferred sources of assistance, and perceived barriers to increased activity among physically inactive Australians. *Preventive medicine*, 1997, no. 26(1), pp. 131–137.
4. Bronfenbrenner U. Toward an experimental ecology of human development. *American psychologist*, 1997, no. 32(7), pp. 513–531.
5. Brownson R.C., Baker E.A., Housemann R.A., Brennan L.K., Bacak S.J. Environmental and policy determinants of physical activity in the United States. *Journal Information*, 2001, no. 91 (12), pp. 1995–2003.
6. De B.I., Sallis J. Relative contribution of psychosocial variables to the explanation of physical activity in three population-based adult samples. *Preventive medicine*, 2002, no. 34(2), pp. 279–288.
7. De B.I., Teixeira P.J., Cardon G., Deforche B. Environmental and psychosocial correlates of physical activity in Portuguese and Belgian adults. *Public Health Nutrition*, 2005, no. 8(7), pp. 886–895.
8. Dishman R.K., Buckworth J. Increasing physical activity: a quantitative synthesis. *Medicine and science in sports and exercise*, 1996, no. 28 (6), pp. 706–719.
9. Dowda M., Ainsworth B.E., Addy C.L., Saunders R., Riner W. Correlates of physical activity among US young adults, 18 to 30 years of age, from NHANES III. *Annals of Behavioral Medicine*, 2003, no. 26 (1), pp. 15–23.
10. Fleury J. and Lee S.M. The social ecological model and physical activity in African American women. *American journal of community psychology*, 2006, no. 37 (1–2), pp. 129–140.
11. Grzywacz J.G., Marks N.F. Social inequalities and exercise during adulthood: toward an ecological perspective. *Journal of Health and Social Behavior*, 2001, no. 42 (2), pp. 202–220.
12. Humpel N., Owen N., Leslie E. Environmental factors associated with adults' participation in physical activity. *American journal of preventive medicine*, 2002, no. 22(3), pp. 188–199.
13. King A.C., Castro C., et al. Personal and environmental factors associated with physical inactivity among different racial—ethnic groups of US middle-aged and older-aged women. *Health Psychology*, 2000, no. 19(4), pp. 354–364.
14. Marquez D. X., Mc Auley E. Social cognitive correlates of leisure time physical activity among Latinos. *Journal of behavioral medicine*, 2006, no. 29(3), pp. 281–289.
15. Mc Leroy K. R., Bibeau D., Steckler A., Glanz K. An ecological perspective on health promotion programs. *Health Education & Behavior*, 1988, no. 15(4), pp. 351–377.
16. Mc Millan D.W. and D.M. Sense of community: A definition and theory. *Journal of community psychology*, 1986, no. 14(1), pp. 6–23.
17. Miles L. Physical activity and health. *Nutrition Bulletin*, 2007, no. 32(4), pp. 314–363.
18. Morandi L. The role of state policy in promoting physical activity. *Preventive medicine*, 2009, no. 49(4), pp. 299–300.
19. Roux A.D., Evenson K.R., Mc Ginn A.P., Brown D.G., Moore L., Brines S., Jacobs D.R. Availability of recreational resources and physical activity in adults. *Journal Information*, 2007, no. 97 (3), pp. 493–499.
20. Sallis J. F., Bauman A., Pratt M. Environmental and policy interventions to promote physical activity. *American journal of preventive medicine*, 1998, no. 15(4), pp. 379–397.
21. Wendel-Vos W., Droomers M., et al. Potential environmental determinants of physical activity in adults: a systematic review. *Obesity reviews*, 2007, no. 8 (5), pp. 425–440.

This study was supported by the China National Study Abroad Fund (no. 201808210208)

Поступила в редакцию 29 января 2020 г.

Для цитирования: Yaqun Zhang. Application of social ecological model in the field of physical activity research / Yaqun Zhang, T. A. Shilko // Физическая культура. Спорт. Туризм. Двигательная рекреация. — 2020. — Т. 5, № 3. — С. 69—73.

About the author

Yaqun Zhang — Postgraduate, student. National research Tomsk State University, Tomsk, Russia; Shenyang pedagogical University, Shenyang, China. 334812333@qq.com

Shilko Tatyana Alexandrovna — doctor of medical Sciences, Professor, Professor of the Department of theoretical foundations and technologies of physical culture and sports activities. National research Tomsk state University, Tomsk, Russia. tashilko@gmail.com

PHYSICAL CULTURE. SPORT. TOURISM. MOTOR RECREATION

2020, vol. 5, no. 3, pp. 69—73.

Применение социально-экологической модели в области исследования физической активности

Яцюнь Чжан¹, Шилько Т. А.²

¹ Национальный исследовательский Томский государственный университет, Томск, Россия; Шэньяньский педагогический университет, Шэньян, Китай. 334812333@qq.com

² Национальный исследовательский Томский государственный университет, Томск, Россия. tashilko@gmail.com

В исследовании по содействию физической активности традиционные исследования переоценивают роль отдельных психологических факторов и относительно игнорируют роль факторов окружающей среды. Социально-экологическая модель, как всеобъемлющая и междисциплинарная структура, предоставляет новые идеи для изучения физической активности. Эта модель всесторонне рассматривает различные уровни влияющих факторов отдельных лиц и окружающей среды: внутри индивидуальный уровень, межличностный уровень, уровень организации, уровень сообщества и уровень политики. В этой статье рассматривается эволюция применения модели в области физической активности и прогресс исследований на различных уровнях, чтобы обеспечить теоретическую справку для будущего применения модели для вмешательства физической активности.

Ключевые слова: *физическая активность, перспективы применения, физическое здоровье, социально-экологическая модель.*

Сведения об авторах

Яцюнь Чжан — аспирант, Национальный исследовательский Томский государственный университет, Томск, Россия; Шэньяньский педагогический университет, Шэньян, Китай. 334812333@qq.com

Шилько Татьяна Александровна — доктор медицинских наук, профессор, профессор кафедры теоретических основ и технологий физкультурно-спортивной деятельности, Национальный исследовательский Томский государственный университет, Томск, Россия. tashilko@gmail.com