



Review article

Toward a greater understanding of the syndemic nature of hypokinetic diseases

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Abstract

Physical activity participation has historically been conceptualized at the individual level with a strong emphasis on apparently healthy people. However, in the latter part of the 20th century and early part of the 21st century, a paradigm shift emerged whereby physical activity participation increasingly was acknowledged to be dependent on factors residing beyond an individual's control, with programming and intervention efforts necessary across the lifespan, in multiple settings, and under various life circumstances. This shifting emphasis has created opportunities and challenges for those involved in physical activity program delivery and research. In this presentation, physical activity behavior change, promotion, and retention efforts will be reviewed and critiqued. Emerging from this critical analysis is an understanding of the syndemic nature of hypokinetic diseases (i.e., the diseases associated with disuse and physical inactivity). The term syndemics is used to account for the interplay and synergistic nature of person, place, and timing in the development of disease. Not only are individual lifestyle behaviors and social factors considered in syndemics, but so too are the forces that link those causes together. To genuinely affect change among the masses, those involved in delivering physical activity interventions and programming must not only address each lifestyle behavior and social affliction that contributes to hypokinetic diseases, but also to the social and environmental forces that link those causes together (e.g., stigma, unequal access to resources).

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Introduction

Considering the theme, “Active Aging, Quality of Life, and Physical Activity as Medicine,” as well as the “Exercise is Medicine” initiative that was launched in the United States in 2007,¹ it is sobering to recall:

“The importance of exercise and diet was perhaps never more fully acknowledged than by the physicians of the present day. Experience has proved these means to be the

best preventive against disease, as well as a powerful auxiliary, if not a substitute for medicines, in many obstinate cases.” (Reviews,² p. 235)

Those words were written 190 years ago. They are still relevant today.³

The aim of this paper is to critically reflect on where the discipline of kinesiology has been and to offer suggestions about where it is going, with a keen interest in advancing inclusive physical activity practices. The complexities of physical-inactivity-related diseases is discussed, leading to recommendations for assuring the sociocultural relevancy of the work that is being done, work that can be enhanced by employing community-based participatory research methods.

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Academic discipline of kinesiology

There are mores in all academic disciplines, and kinesiology (also known as physical culture, physical training, physical education, exercise science, and sport science) is no exception. The idea that physical activity is important for the acquisition, maintenance, or restoration of health dates back centuries,^{4,5} yet it was not until the 19th century that the discipline of kinesiology began to codify⁶ and it did so primarily under the leadership of medical doctors.⁴ As it codified, certain traditions began to set in place, with the pendulum swinging within the degrees of freedom established by the early leaders in the discipline.

For example, the Department of Physical Education and Hygiene at Amherst College, recognized as the first of its kind in the United States (US), was instituted in 1859–1860 due to concerns over student health, not for the development of military personnel or sportsmen.⁷ Counter to this inclusionaryⁱ and health promoting perspective were those who promulgated a more exclusionary perspective whereby they believed the discipline should be focused on “...improving the development of the best developed, of improving the health of the healthiest”.⁸ Even though there is evidence that this exclusionary position has negatively affected the physical activity participation levels of the population at large, exclusionary practices persist.^{9–11}

These extreme value propositions have pushed and pulled the discipline of kinesiology to one degree or another — like the mythical Pushmi-Pullyu animal described in *The Story of Doctor Doolittle*¹² — for the past 150+ years.ⁱⁱ Such tension continues to this day.^{11,13} Consider, for example, that many in the US who are seeking baccalaureate degrees in the field and/or are interested in careers in physical education teaching, tend to be Caucasian, male, middle-class, conservative, and athletic.^{14,15} They also appear to be growing up in an increasingly narcissistic (i.e., self-oriented) society,¹⁶ which is perpetuated and reinforced by at least some in the commercial fitness industry.¹⁷

Concurrently, the science of physical activity and public health — and the more inclusionary physical activity practices that it aspires to foster and promote¹⁸ — has matured immensely during the later part of the 20th century and this has continued into the 21st century. The work of Pate et al.¹⁹ and the US Department of Health and Human Services²⁰ two

decades ago clearly accelerated progress in this area. There is now an unprecedented cadre of talented scholars from within and outside of the discipline of kinesiology who have a more inclusionary and health promoting orientation,²¹ and new talent is being recruited and developed with this orientation.²²

21st century diseases, 19th century wisdom

This shifting orientation is due to the rise of hypokinetic diseases, which are the diseases associated with disuse and physical inactivity (i.e., hypo = less, kinetic = movement).²³ Hypokinetic diseases encompass a range of medical conditions that afflict the world's population, such as cardiovascular disease, diabetes mellitus, hypertension, and obesity, to name only a few. At least in part, these medical conditions are preventable or otherwise mitigated through regular physical activity participation.^{3,24} Unfortunately, few people engage in physical activity at the level recommended to avoid or delay the onset of hypokinetic diseases and therefore they miss out on the many benefits that a physically activity lifestyle affords.²⁵

To some degree the benefits of physical activity are also characterized as the polar opposites of hypokinetic diseases. That is, not having cardiovascular disease, not having diabetes mellitus, not having hypertension, or not having obesity. While avoiding or preventing disease is certainly a worthy cause, loss-frame messaging such as this is not as effective as gain-frame messaging (i.e., emphasizing the positive benefits and values of physical activity participation).²⁶ Moreover, the benefits of physical activity can encompass so much more than what is depicted in loss-frame messaging, such as freedom of expression and will, fun and enjoyment, joy and pleasure, and the pursuit of meaning and self-fulfillment.^{27,28} These latter benefits can be immediate. Hiking a mountain trail and seeing and experiencing the natural beauty along the way and the vista at the end of the trail are prime examples. Another example is walking or cycling to complete short-trips and errands rather than driving or riding in a car. This has the immediate benefit of achieving tangible tasks while simultaneously having one less automobile on the roadway, which results in fewer carbon emissions being produced, and the personal value of saving money (and a natural resource for those who are environmentally conscious) by not consuming gasoline unnecessarily.ⁱⁱⁱ

As the second example begins to illustrate, the benefits of physical activity extend beyond the individual level. It also

ⁱ While the word “inclusionary” is used here, it is important to remember that Amherst College was an all-male institution at the time, with the students being Caucasian and from affluent families primarily.

ⁱⁱ Both within and outside of the discipline of kinesiology, other approaches and perspectives have existed (and do exist). For example, the discipline has contributed to advances in basic science (e.g., mechanistic work in exercise physiology and motor behavior); therapeutic and rehabilitation science and practice (e.g., the professions of athletic training and physical therapy); product design and safety in both sport and non-sport settings (e.g., adapted physical activity and biomechanics); acceptance, diversity, equity, human understanding, and international relations (e.g., sport and exercise psychology, sport history, sport philosophy, sport sociology); among others.

ⁱⁱⁱ Dargay et al.²⁹ estimated that the demand for private automobiles would grow from 800 million units in 2002 to more than 2 billion units by 2030. Much of that growth is expected to be in non-Organisation for Economic Co-operation and Development (OECD) countries, with a 20 fold increase expected in China alone. Beyond this sobering estimate, if American automobile passengers weighed what they did in 1960, an estimated 958,000,000 gallons of gasoline would be saved each year.³⁰ Given projections in population growth, the increased demand for automobiles worldwide, and the worldwide obesity trends, the pending demands on the biosphere could be cataclysmic.

begins to illustrate how complicated and intertwined the world we live in is. This was elegantly expressed by Chief Seattle (1780–1866), the Native American Indian Chief of the Duwamish Tribe that inhabited the region of the US that is now known as Seattle, Washington, when he said: “Human-kind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect”.³¹

For example, societies benefit from a healthy citizenry.^{32,33} Families function better when they play together.³⁴ Children are more attentive and have better behavioral regulation and cognitive outcomes in school.³⁵ Employers also benefit by having a healthier workforce through reduced absenteeism, lower health care costs, and higher employee morale and productivity.³⁶ Additionally, those who enlist to serve and defend their nations (i.e., military personnel) and those who choose to protect and serve its citizens (e.g., firefighters and police officers) are better able so to do.^{37,38} Clearly, an active, alert, engaged, healthy, and globally minded citizenry has many benefits.

That said, and though some have suggested people have a moral, patriotic, and/or social responsibility to be physically active,^{33,39} physical activity participation has most often been conceptualized at the individual level (e.g., Nike’s *Just Do It!* campaign) and/or with a strong emphasis on school- and sports-based programs delivered to children, youth, and young adults.⁴⁰ However, in the latter part of the 20th century and early part of the 21st century, in particular, a paradigm shift emerged whereby physical activity participation increasingly was acknowledged to be dependent on factors residing beyond an individual’s control (e.g., person–environment interactions), with programming and intervention efforts necessary across the lifespan (i.e., “womb to tomb”), in multiple settings (e.g., schools, worksites, healthcare, community, and home-based), and under various life circumstances (e.g., well, apparently healthy, unhealthy, ill).⁴¹

This is consistent with the third iteration of public health, which recognizes that lifestyle behaviors “...are powerfully driven by the social and physical environments in which people live, learn, work, and play”.⁴² This shifting emphasis, along with the two value extremes noted earlier in this paper and the backgrounds and interests of many who enter the field, has created opportunities and challenges for those involved in physical activity behavior change, promotion, and retention efforts, as have other changing social forces and conditions, many of which are sociocultural in nature (e.g., diversity, environmental concerns, human conflicts, population growth, self-entertainment, urbanization).^{43–45}

Understanding physical activity behavior: psychosocial and sociocultural perspectives

Within kinesiology the sociocultural domain encompasses the historical, philosophical, anthropological, and sociological aspects of human movement. History and philosophy, humanities-based disciplines, inform several social science disciplines including anthropology; the study of the whole of

humans and societies; from which sociology emerges, the study of humans in their social context, including their constructed social institutions, social groupings, and social interaction patterns. Individuals operate within these constructed societies (i.e., social structures) and social realities (i.e., social dynamics), and this is the essence of social psychology, a subdiscipline of psychology, which is a behavioral science that seeks to understand the mind and behavior.⁴⁶ Operationally, this collection of humanities and social and behavior science disciplines moves from the broad base of anthropology, to the narrower sociology, to the still narrower social psychology, to the still narrower psychology. All are informed by past and existing knowledge and simultaneously construct new historical and philosophical knowledge, which is a dynamic and forever iterative process.

Against this backdrop, spend a moment perusing the map showing the prevalence of obesity in the US⁴⁷ along with the map showing the availability of physical activity spaces in the US⁴⁸ and an interesting correlation emerges. That is, the regions of the country with the lowest prevalence rates of obesity are in the Northeast and West, which corresponds with the regions of the country that have the highest prevalence rates of access to physical activity opportunities. Moreover, those who actively transport to and from work vis-à-vis biking or walking – which generally corresponds with these same regions – are least likely to have diabetes, hypertension, and obesity and most likely to meet the recommended guidelines for physical activity.⁴⁹ Affluence, ethnicity, and race are important moderators in many of these relationships,⁴⁹ as are other factors such as age, disability, gender, immigration status, location (e.g., rural vs. urban), and sexual orientation.¹¹

Some of these factors are the opposite of what was occurring in the past. For example, historically physical activity levels were thought to decline when people moved from rural to urban environments because of the conveniences associated with living in urban settings. As Kraus and Rabb²³ said:

“Since the invention of the wheel, mankind [sic] has tried to substitute machines for its own labor. The logical development culminates in our mechanized era. Today more daily activities are performed by machines, and physical exertion has become unnecessary. When we analyze our daily lives, we can see how the active function of our muscles has been taken over step by step by labor-saving devices. We do not walk, but ride; we do not climb stairs, but use elevators; we do not lift anything of any weight, but we have devices that do that lifting for us. Most of the chores that used to require a certain amount of physical activity have been taken over by machines. We do not mow our lawns by pushing a lawnmower – it is become motorized. We have pushbutton heating, we have vacuum cleaners, we have dish washers. In short, we do not move at all.”

Similar ideas have been expressed for centuries.^{4,5} Moreover, these ideas are not dissimilar to what appears in contemporary literature.^{41,46}

In theory, the conveniences of automation, labor-saving devices, and technology should afford people more leisure time. However, a lack of available leisure time is often expressed as a primary barrier to physical activity participation.⁵⁰ Similarly, as people move out of the workforce and into retirement they should have substantially more leisure time available for physical activity participation. However, physical activity participation rates trend downward throughout the lifespan.⁵⁰ These are just a few of the contradictions within the realm of physical activity behavior studies, many of which center around time and how people use their time.

Isotemporal substitution model

The isotemporal substitution model seeks to “...estimate the effect of replacing one physical activity type with another physical activity type for the same amount of time (e.g., replacing slow walking with TV watching, by taking TV watching out of the model)”.⁵¹ From a physiological perspective, this calculation seems rather straightforward. That is, by engaging in slow walking instead of television watching energy expenditure doubles.⁵² However, from a sociocultural perspective, the matter is much more complicated than this. Consider:

“The number of hours in a day is finite and can be distributed among working, eating, sleeping, and discretionary time. However, not only can the activities in which one engages during discretionary time be highly heterogeneous between individuals (depending on socioeconomic status, occupation, and other social circumstances), but the relative expense and sacrifice of different activities displaced to partake in a period of activity may also vary widely. For example, although it may seem that a 1-hour walk by an unemployed individual should be equivalent to a 1-hour walk by a highly time-limited individual, the activity displaced by an unemployed individual (e.g., 1 hour of TV watching) is likely very different from the activity displaced by the busy individual (e.g., 1 hour of sleeping or jogging). Therefore, although the physiologic benefits of a 1-hour walk may be similar across individuals, the actual overall impact of a 1-hour walk may have a wide range of effects, depending on each individual's time limitations and general lifestyle.” (Mekary et al.,⁵¹ p. 524)

Sociocultural relevancy model and community-based participatory research

Morgan et al.⁵³ proposed a sociocultural relevancy model to guide physical activity health behavior change interventions and programs. Their model presupposes an understanding of the sample characteristics (i.e., population of interest; their challenges, motivations, preferences, and values), which they note is paramount to the ultimate success of any physical activity behavior change intervention. From that foundation, a sociocultural lens is then applied to aid with participant recruitment strategies, and four core intervention components,

namely content, format, facilitator, and pedagogy. They suggest that these four core elements are directly related to the participants' engagement in the intervention and ultimately the outcomes of the intervention (i.e., whether the intervention is successful and sustainable).

The sociocultural relevancy model also serves as a reminder that those in kinesiology likely have different views of and experiences with physical activity than do the majority of people with whom they interact and hope to serve. Consider the following statement: “I love telling people how to love exercise and how to treat their bodies with respect”.¹⁴ This rather naïve and narrow perspective is controlling, implies authoritative knowledge, and demonstrates little understanding of or respect for others. It seems doomed to failure and may do more harm than good. To address this, the sociocultural relevancy model integrates well with the community-based participatory research paradigm, which is “...a transformative research paradigm that bridges the gap between science and practice through community engagement and social action to increase health equity”.⁵⁴

Syndemic nature of hypokinetic disease and sedentary death syndrome

Emerging from the model of Morgan et al.,⁵³ the syndemic nature of hypokinetic disease becomes clear. The term syndemics is used to account for the interplay and synergistic nature of person, place, and timing in the development of disease.⁵⁵ Not only are the individual lifestyle behaviors and social factors considered in syndemics, but so too are the forces that tie the various afflictions together. Intervention and programming efforts must not only be directed toward addressing each lifestyle behavior and social affliction that contributes to hypokinetic disease, but also to the sociocultural forces that tie those afflictions together. This necessitates the use of the community-based participatory research paradigm in order for genuine, systematic changes to not only occur, but to endure.⁵⁴

Conclusion

Physical activity is unquestionably good for health. It is also good for the human spirit. It allows people to partake in life and to experience the joys and fullness of life. Regrettably, and in spite of efforts to promote physical activity to the masses for decades if not centuries, there is wide recognition that people and societies suffer from an affliction known as spectatoritis.⁵⁶ Spectatoritis is the propensity of people to watch others do physical activity rather than to participate themselves. Identified more than eight decades ago,⁵⁶ spectatoritis remains a modern day concern.⁵⁷

Many sociocultural forces affect whether or not someone will engage in physical activity. However, most efforts to bring physical activity to the masses have had a strong individual orientation aimed at people aged 5–18 years. This orientation has been informed and reinforced by the discipline of kinesiology, and in many ways it has failed.

Fueled by the Surgeon General's Report on Physical Activity and Health in the mid-1990s,²⁰ and an increased recognition that there are factors affecting physical activity behavior that reside beyond an individual's personal control, in the 21st century a greater emphasis has been placed on the social ecological factors that may influence an individual's physical activity behavior. To understand these factors, frameworks such as the sociocultural relevancy model,⁵³ and methodological paradigms such as community-based participatory research,⁵⁴ have emerged. These approaches encourage a deep understanding of people and their communities; they value local knowledge and partnerships; they are cooperative rather than authoritative; and they occur across the lifespan.

Conflicts of interest

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