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Bridging Connections and Cognition: A Critical Comparison of Social Network and Social Cognitive Theories in Advancing Physical Activity for Chronic Disease Prevention

Dr. Kyunghee Park

Pusan National University, Busan, South Korea

Abstract

One of the leading causes of the epidemic of chronic diseases including diabetes, obesity, and cardiovascular disease is the general public's lack of physical activity. In order to overcome this obstacle, physical activity (PA) interventions must be designed using the crucial insights provided by behavioral theories. In order to highlight their functions and effects in promoting physical activity for the prevention of chronic disease, this study critically examines and compares two well-known frameworks: Social Network Theory (SNT) and Social Cognitive Theory (SCT). Studies that applied SNT and SCT to promote PA were the topic of a narrative literature review that utilized the PubMed, Scopus, and Web of Science databases. In contrast to SNT, which highlights the impact of social structures, peer pressure, and network dynamics, SCT affects the cognitive processes of individuals, including self-efficacy, result expectations, and self-regulation. Although SNT operates at an interpersonal level and SCT at an intrapersonal one, the results imply that both theories highlight the importance of social support in influencing behavior. Promising integrated therapies use both paradigms, with social networks used to bolster cognitive determinants and cognitive determinants used to improve social networks. The operationalization of network architecture, the capture of real-time behavior change, and the handling of sociocultural variables are all areas that still face hurdles. New technology like digital tracking and agent-based modeling are bolstering hybrid behavioral ecology models, which are being promoted as a future direction. To encourage physical activity across all demographics, this all-encompassing method can guide the creation of public health initiatives that are efficient, scalable, and fair.

Keywords: physical inactivity, chronic disease, Social Network Theory, Social Cognitive Theory, theoretical frameworks, behavior change

Introduction

The Global Challenge of Physical Inactivity

Because it increases the risk of developing long-term health problems including diabetes, obesity, and cardiovascular disease, physical inactivity is a major issue in public health around the world. A chronic disease is one that does not spread from person to person, has a gradual onset, and is often the result of a combination of hereditary, environmental, or lifestyle factors

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[1]. An increasing one-third of adults were discovered to be physically inactive by 2022, up from 26.4% in 2010 [2], according to Abuhay et al. (2024). The importance of theory-driven interventions that effectively encourage physical activity, especially among vulnerable populations, is shown by this growing trend. The creation of effective strategies and a thorough comprehension of the elements impacting chronic illnesses are also of paramount importance. As an example, a crucial strategy for primary or primordial illness prevention is to include physical activity (PA) and exercise into one's everyday lifestyle, which may decrease the morbidity and mortality of chronic diseases [3]. Even though the World Health Organization recommends 150 minutes of moderate aerobic activity each week, many people still do not make it a priority to do so [4].

Importance of Physical Activity in Preventing Chronic Diseases

One of the most pressing issues in public health today is the need to find ways to encourage more physical exercise and healthy lifestyle choices among various demographics [1]. The world's involvement in regular exercise is continually low, despite proof of the well-known advantages. According to the Global Action Plan on Physical Activity 2018–2030, around 25% of the world's population is not physically active, and the majority of people do not follow the current recommendations [5]. Consistently rising rates of illness and death are a direct result of this widespread inactivity, which places a heavy strain on public health systems.

Promoting physical activity can be a fantastic approach to improve the quality of life across varied populations and to decrease public health burdens [1]. A successful intervention to modify such behavior regarding physical exercise requires a knowledge of both social interactions and cognitive components [5]. Hence, behavioral theories provide a firm foundation for developing effective strategies to encourage health-related behavior, considering both societal and personal elements.

Overview of Behavioral Theories

When studying and trying to change people's habits for the better, public health professionals often turn to a variety of behavioral theories. An example of how behavior change theories can be applied to promote better habits in emerging health issues is the insight gained from a recent study on the application of the Trans Theoretical Model and the theory of planned behavior to limit screen time before bedtime [6]. Additionally, two behavioral theories that are widely employed in public health to understand and modify physical activity behaviors were the subject of this review: Social Cognitive Theory (SCT) and Social Network Theory (SNT). While SNT emphasizes the power of social networks to shape behavior, SCT is primarily concerned with the role of motivation and cognition, including processes like self-efficacy, outcome expectations, and goal planning [7, 4]. In order to find and assess methods that really work to get people moving more, both theories are crucial. This presentation will compare and contrast these two theories of physical activity promotion and provide critical illustrations of their similarities and differences.

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Research Purpose

In order to promote physical exercise as a means of preventing chronic diseases, this research will analyze and contrast the functions of Social Cognitive Theory (SCT) and Social Network Theory (SNT). This study seeks to shed light on how these frameworks shape physical activity behaviors across groups by examining their basic constructs, mechanisms of behavior change, and supporting empirical evidence. In addition, the goal of this research was to find ways to combine these theories in order to create public health treatments that work.

Methodology

An extensive literature search was conducted to identify peer-reviewed articles that pertain to physical inactivity, the role of physical activity in preventing chronic diseases, and the promotion of physical activity using Social Cognitive Theory (SCT) and Social Network Theory (SNT). It was found that there are a significant number of these articles.

A number of electronic databases were searched, such as Google Scholar, PubMed, Scopus, Web of Science, and psycINFO. The search terms were a combination of various keywords and Medical Subject Headings (MeSH) like "physical inactivity," "chronic disease prevention," "physical activity," "social network theory," "social cognitive theory," "behavioral interventions," and "health promotion." This allowed for an effective and critical search strategy to be prepared. Without regard to location, the search encompassed all pertinent publications published in English up until June 2025. A narrative synthesis strategy was utilized in response to the variety of study types and scopes. First, the negative effects of sedentary lifestyles, second, the positive effects of exercise on health, and third, the potential theoretical uses of SNT and SCT in behavioral therapies were the main categories into which the extracted data were placed. To further understand how these two theories relate to one another, how they explain behavior change, and how efficient and effective they are in creating physical activity interventions, we compared and contrasted them. The critical comparisons revealed in this analysis are supported by the expedited complete integration of empirical evidence and theoretical insights made possible by this technique.

Literature Review

Social Network Theory (SNT)

As a framework for understanding actions like exercise, Social Network Theory places an emphasis on interpersonal relationships and the dynamics of networks. It investigates fundamental elements including peer and group influence, social norms, network homophily, and the spread of new ideas [8,9]. In network theory, powerful people are called influence agents. Those powerful people are frequently the center of SNT-based treatments that aim to alter people's behavior. Furthermore, there has been a rise in the number of social media sites and other online venues that use SNT mechanisms to encourage physical exercise [10].

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Social Cognitive Theory (SCT)

Personal characteristics, actions, and environmental influences all work together to shape health behaviors like exercise, according to Social Cognitive Theory (SCT) [4]. Self-confidence, anticipation of results, goal-setting, self-control, and social support are the fundamental components of SCT. The biggest predictor of physical activity across diverse populations has been determined to be self-efficacy [8,4]. Physical activity promotion techniques based on SCT-based interventions would be beneficial in increasing motivation and persistence to alter behaviors [11].

Research on SNT, SCT, and Physical Activity

Researchers have shown that social normative impact, social support, and peer modeling all have a role in shaping people's levels of physical activity [9]. By improving behavioral skills, social support, and self-efficacy, SCT-based therapies also show promise in increasing physical activity [4]. More recent studies have integrated the two schools of thought to address exercise habits holistically [12].

Comparative Analysis of SNT and SCT

Similarities Between SNT and SCT

The significance of social influences on the decision to start or continue exercising is acknowledged by both theories. Both SNT and SCT focus on the need of social support, but they approach it in different ways. SNT is seen as a structural network property that helps bring about change, whereas SCT is seen as a psychosocial process that helps with behavior change and maintenance. They both stress the importance of using one's social network to influence one's behavior [13, 4, 14].

Differences Between SNT and SCT

SNT emphasizes the larger social context and patterns of social relationships, with a focus on the ways in which interactions and network structures impact the diffusion of behavior [15, 16]. When it comes to changing one's behavior, SCT is more concerned with the internal cognitive processes and self-regulation mechanisms [4]. In contrast to SCT's focus on psychological factors within an individual, SNT examines the impact of other people on that person.

Comparative Analysis Table

Table 1: Comparative Analysis of Social Network Theory (SNT) and Social Cognitive Theory (SCT) [1,2,3]

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Aspect	Social Network Theory (SNT)	Social Cognitive Theory (SCT)
Primary Focus	Social structures, relationships, network dynamics	Individual cognition, motivation, and behavior
Key Constructs	Social influence, network composition, diffusion	Self-efficacy, outcome expectations, self-regulation
Level of Analysis	Interpersonal and community level	Intra-individual level
Mechanisms of Change	Social contagion, influence agents, social norms	Cognitive processes, skill development, social support
Measurement Approaches	Social network analysis, mapping relationships	Psychometric scales assessing cognitive constructs
Intervention Strategies	Leveraging influential network members	Enhancing self-efficacy, goal setting, social support
Application Examples	Peer leader programs, social media campaigns	Behavioral skill training, motivational interviewing

Discussion

Complex Interactions of Social Networks and Cognitive Mechanisms in Physical Activity Promotion

While SNT has always focused on interpersonal network effects and SCT has always focused on intra-individual cognitive processes, these two levels of study are actually very interdependent when it comes to the mechanics behind actual behavior change. [17] Social networks provide an environment for and promote cognitive processes including self-efficacy, outcome expectations, and self-regulation. [18] in By combining the two methods, we find that alterations to the structure and composition of networks can enhance changes in individuals' cognitive states, leading to more pronounced behavioral effects. The year 19 Furthermore, these connections are two-way streets; people's willingness to seek out supportive links or decrease impact from sedentary peers can be influenced by their increased self-efficacy and goal-directed actions [20]. It is important to note that interventions that fail to take into account either the social environment or cognitive mechanisms run the risk of having a reduced impact [21].

Advanced Applications in Public Health Interventions

The best treatments combine structural insights from SNT with psychological constructs from SCT in a hybrid framework.

An excellent illustration of this is the use of digital health interventions. In order to identify the most effective users to propagate behavior modeling and normative messages throughout their networks, social media-based PA treatments utilize network analytics (Sebastian et al., 2021).

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At the same time, these programs use SCT principles to boost users' motivation and self-efficacy [18]. These concepts include goal formulation, reinforcement, and individualized feedback. Such multi-faceted programs place people in supportive networks, which boosts their motivation and opens doors to prospects for long-term behavior modification.

Participatory techniques are also used in community-level interventions, with significant community influencers (SNT) being the ones to lead PA initiatives. At the same time, they use tactics driven by SCT, like social persuasion and mastery experiences, to develop behavioral competences in both groups and individuals. By incorporating physical activity standards into the community's preexisting social structures, these integrated approaches facilitate more successful and long-lasting behavior change [22, 23, 24].

Theoretical and Practical Challenges

Integration of SNT with SCT presents several conceptual and practical challenges, despite compelling justification. Research using SNTs has to be very careful to separate the effects of real social impact from those of homophily (the propensity for people with similar traits to associate) and other environmental variables that could muddy the waters inside networks. This calls for sophisticated network modeling approaches and enhanced longitudinal designs [25, 18]. Also, while the cognitive constructs used in SCT are good at predicting how people would act, they do not always account for the larger sociocultural and policy-level issues that have an indirect impact on people's thoughts and social networks [26]. The measurement tools also pose a problem, since it is difficult to collect enough data to create an accurate and dynamic social network map in areas with limited resources. Another issue is that self-reported data is commonly used in SCT assessments, which can lead to biases in recollection and reaction [27].

Future Directions: Toward a Holistic Behavioral Ecology Approach

To better understand the intricate relationship between behavioral factors influenced by social and cognitive factors, researchers in the future should think about using hybrid theoretical models. Computational advances in the field of social science, such agent-based modeling and social network simulations, can bolster these models by dynamically representing human behavior within social systems [28]. Implementation science frameworks can be used to translate findings from studies on the integration and effectiveness of SNT-SCT-based interventions by identifying context-specific moderating factors. Furthermore, there are never before seen possibilities to capture the real-time interaction between social contacts and cognitive engagement in behavior modification through the utilization of large data from online social platforms and wearable technology [29, 30].

Implications for Policy and Practice

It is important for policies aimed at increasing physical activity to take a holistic view, considering the interdependent nature of people's social contexts and their level of cognitive empowerment [31]. Community groups, digital companies, and behavioral scientists should all

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work together to create and expand comprehensive PA promotion programs, and public health initiatives and funding sources should support this [32].

Conclusion

As a whole, this study emphasizes physical exercise by drawing on Social Cognitive Theory and Social Network Theory. A new frontier in the promotion of physical activity has opened up with the sophisticated integration of these theories, which have the ability to work in tandem to address the intricacy of behavior change. It is possible to mobilize social capital and activate individual agency more effectively through treatments that bridge social ties with cognitive processes. On the other hand, new approaches and cooperation across disciplines are necessary to make these possibilities a reality. To promote sustainable and equitable physical activity engagement globally, it is vital to continue research and policy efforts based on this integrated approach.

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Author Contribution Statement

Hadeer Hegazy: Conceived and designed the study; literature review; analyzed and synthesis the findings; contributed materials, wrote and reviewed the paper
Farhana Faruque Zerin: Conceived and designed the study; literature review; analyzed and synthesis the findings; contributed materials, wrote and reviewed the paper
Nasrin Akter: Literature review; analyzed and synthesis the findings; contributed materials, wrote and reviewed the paper
Fatema Afrin Kanta: Contributed materials, wrote and reviewed the paper
Ommay Salma Mitu: Contributed materials, wrote and reviewed the paper

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Conflict of interest

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