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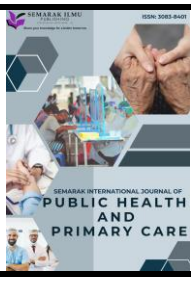

Exploring Implicit and Explicit Attitudes toward Physical Activity and Sedentary Behavior among Adolescents

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ABSTRACT

Despite a growing global emphasis on youth health promotion, physical inactivity among adolescents remains a critical and unresolved public health issue. Over the past two decades, evidence has consistently shown that many adolescents fail to meet the World Health Organization's recommended physical activity levels. Traditional health interventions have predominantly focused on cognitive, motivational, and informational strategies, assuming that adolescents will make rational decisions once equipped with the right knowledge. However, these strategies have produced limited long-term behavior change. Emerging research highlights the need to address deeper psychological mechanisms, particularly implicit attitudes which automatic, subconscious evaluations that shape behavior without deliberate reasoning. These attitudes are shaped through experience, emotional association, and social learning, and they often diverge from what individuals consciously believe or report. This narrative review synthesizes key literature on the role of implicit and explicit attitudes in influencing adolescent engagement in physical activity and sedentary behavior. The review explores theoretical models such as dual-process theories, habit formation, and evaluative conditioning, and draws on international empirical studies to illustrate how these mechanisms manifest across different cultural, social, and environmental contexts. Furthermore, it critically evaluates why current interventions fail to produce sustained results and outlines a roadmap for future research and psychologically grounded public health strategies that address implicit processes. By bringing attention to this often-overlooked dimension of behavior, the review contributes to a more holistic understanding of adolescent health and highlights pathways toward more effective and enduring interventions.

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1. Introduction

Adolescent physical inactivity has become one of the most persistent global health challenges. According to the World Health Organization (WHO), over 80% of adolescents aged 11–17 years worldwide do not meet the recommended 60 minutes of moderate to vigorous physical activity per day. Specifically, a 2016 study found that 81% of adolescents were insufficiently physically active, with a notable gender disparity: 85% of girls compared to 78% of boys did not achieve the recommended activity levels [1]. The consequences of this trend extend beyond physical health, contributing to rising rates of obesity, type 2 diabetes, cardiovascular disease, anxiety, and depression among youth [2].

Traditional health promotion interventions, particularly those grounded in information provision and motivational enhancement, have yielded inconsistent and often short-lived outcomes. These strategies typically rely on the assumption that adolescents make rational decisions about health behaviors based on cognitive evaluation and intention formation. However, a growing body of research from cognitive and health psychology has challenged this paradigm, suggesting that many health-related behaviors particularly those developed in adolescence are not the product of conscious deliberation alone, but are also governed by automatic, affect-driven, and habitual processes [3,4].

Among these subconscious drivers, implicit attitudes have garnered increasing attention. These are automatic, emotionally valenced associations that influence behavior in ways that may contradict an individual consciously held beliefs. In parallel, explicit attitudes which is the consciously endorsed beliefs and evaluations about physical activity also play a role in shaping behavioral intentions. For instance, adolescents may verbally express strong support for the health benefits of exercise, reflecting positive explicit attitudes, yet their actions may not align if negative implicit associations dominate. This misalignment between the two attitude systems can help explain the often observed gap between intention and behavior in adolescent health.

This review aims to synthesize theoretical and empirical research on the roles of both implicit and explicit attitudes in shaping adolescent engagement in physical activity and sedentary behavior. It also explores why conventional interventions often fail to address these underlying mechanisms and proposes evidence-informed strategies for more psychologically resonant public health initiatives.

2. Global Patterns of Physical Inactivity and Sedentary Behavior

Across diverse regions and populations, adolescence marks a period of significant behavioral transition regarding physical activity. While children often engage in unstructured play and organized sports, physical activity levels tend to decline sharply during adolescence. Factors contributing to this decline include academic pressure, increased screen time, urbanization, and reduced opportunities for outdoor play. Mateo-Orcajada *et al.,* [5] found that adolescents who lead sedentary lifestyles were also more likely to experience body dissatisfaction and reduced psychological well-being, further compounding the cycle of inactivity [5].

Sedentary behavior, defined as any waking activity characterized by low energy expenditure while sitting or reclining, has become deeply ingrained in adolescent routines. The pervasive use of digital devices such as smartphones, gaming consoles, and tablets has transformed leisure and even learning into screen-based, sedentary experiences. These technologies not only displace time that could be spent in physical activity but also promote environments where sedentary behavior is normalized and socially reinforced [6].

Compounding the problem is the fact that adolescents may not be fully aware of the behavioral and emotional cues that drive their activity preferences. For instance, an adolescent may consistently choose screen-based entertainment over physical activity without realizing that this preference has been conditioned through repeated exposure to pleasurable, low-effort sedentary activities [7]. This highlights the need to examine the psychological architecture that underpins these seemingly passive choices specifically, the role of implicit cognition.

3. Implicit Attitudes: Definition and Relevance to Adolescents

Implicit attitudes are subconscious evaluations that occur automatically and without the need for conscious reasoning. These attitudes are typically formed through associative learning and emotional conditioning and are shaped by both direct experiences and indirect socialization [4]. Unlike explicit attitudes, which are verbalized and accessible through introspection, implicit attitudes operate below conscious awareness, making them more resistant to change through traditional educational or motivational approaches.

The relevance of implicit attitudes to adolescent health behavior is grounded in their predictive validity. Research suggests that when there is a conflict between implicit and explicit attitudes, behavior tends to align more closely with the former, particularly under conditions of cognitive load, stress, or habitual decision-making [4]. This is particularly pertinent for adolescents, whose executive function and self-regulatory capacities are still under development.

Measurement tools such as the Implicit Association Test (IAT) have been adapted to assess youth attitudes toward physical activity and sedentary behavior. For instance, adolescents may complete a task that measures how quickly they associate images of exercise with positive or negative words. Studies using this methodology have shown that implicit preferences for sedentary behavior are significantly correlated with lower levels of physical activity, independent of self-reported attitudes [4,8].

4. Theoretical Foundations: Dual-Process Models and Behavior Formation

It is essential to consider dual-process models of cognition to understand the impact of implicit attitudes on behavior. These models distinguish between two systems of thought: System 1, which is automatic, fast, and emotionally driven, and System 2, which is slow, effortful, and reflective. System 1 governs most routine decisions, including those related to movement and inactivity, and is responsible for forming and acting upon implicit attitudes [3]. System 2 aligns more closely with explicit attitudes and deliberative intentions.

In adolescence, System 1 tends to dominate, not only because of biological development but also due to environmental conditioning. Adolescents often act based on habit, emotion, and peer norms rather than on long-term rational planning. The Theory of Planned Behavior (TPB) has been a dominant framework in physical activity research, asserting that behavior is influenced by intention, which is shaped by attitudes, subjective norms, and perceived behavioral control [9]. However, the TPB assumes that intention directly predicts behavior, a relationship that does not hold when automatic processes are involved.

Pearson *et al.,* [6] point out that adolescents frequently experience a gap between intention and action. An individual may intend to engage in physical activity after school, but when the moment arrives, they may default to a sedentary behavior due to pre-established cues and emotional comfort. This discrepancy is where the TPB falls short and why integrating dual-process perspectives can offer a more nuanced explanation of health behavior. The Reflective-Impulsive Model (RIM) further

elaborates on this by proposing that behavior results from the interplay between impulsive (implicit) and reflective (explicit) systems, with the former often dominating in time-constrained or emotionally charged situations [10].

5. Empirical Evidence: Implicit Attitudes in Action

A growing body of empirical research has investigated how implicit attitudes influence adolescent physical activity and sedentary preferences. In their study on self-concept and physical activity, Mamani-Ramos *et al.,* [8] found that adolescents who viewed themselves positively in terms of physical fitness and appearance were significantly more likely to engage in regular physical activity. This positive self-concept, while partly explicit, is reinforced by repeated emotional experiences that build subconscious associations between movement and self-worth.

Chadwick and Ken [4] in a qualitative and survey-based investigation, reported that adolescent girls often experience negative social feedback in physical education environments. These experiences include embarrassment, body shame, and social comparison, all of which contribute to negative implicit associations with physical activity. Despite these girls reporting an understanding of exercise's benefits, their behavior suggested avoidance, driven by emotionally charged memories and expectations.

A contrasting insight was offered by Mateo-Orcajada *et al.,* [5] who explored the "fat but fit" paradigm. Their study indicated that even among overweight adolescents, those who perceived activity positively (and who were encouraged to be active in inclusive settings) demonstrated stronger psychological resilience and fewer mental health complaints. This supports the idea that implicit attitudes can buffer or exacerbate the psychological consequences of body dissatisfaction and inactivity, depending on their valence.

Similarly, Pearson *et al.,* [6] synthesized findings across multiple contexts and found that habitual sedentary behaviors such as prolonged screen use or sitting during academic activities often become embedded in adolescents' routines. Over time, these patterns are no longer consciously chosen but are instead cued automatically by context and reinforced through emotional satisfaction or social validation.

These studies collectively reveal that adolescents' physical activity behaviors are not merely the product of willpower or knowledge, but are deeply influenced by unconscious associations shaped by environment, experience, and emotional context.

6. Social, Cultural, and Environmental Influences on Implicit Attitudes

Implicit attitudes toward physical activity are not developed in isolation; rather, they are significantly influenced by sociocultural contexts, including prevailing cultural norms, familial practices, peer dynamics, and media portrayals. Gender-based cultural expectations, in particular, may contribute to the internalization of beliefs among adolescent girls that categorize sports as inherently masculine, overly competitive, or incongruent with traditional notions of femininity [4]. Although such beliefs may not be overtly expressed, they often manifest behaviorally through a preference for sedentary or socially neutral pursuits, thereby reinforcing inactivity.

Family modeling is another critical factor. Adolescents who observe their parents engaging in regular physical activity are more likely to form positive implicit associations with exercise, even in the absence of direct encouragement [5]. Conversely, families that prioritize academic achievement over recreational activity may unintentionally foster sedentary habits. These cultural scripts can become embedded in adolescents' automatic responses to movement-related opportunities.

Peer dynamics further reinforce implicit preferences. Adolescents are acutely sensitive to social approval, and physical activity contexts particularly in school settings that often expose them to judgment, ridicule, or exclusion. Such experiences contribute to affective conditioning, wherein certain environments or activities become subconsciously linked to discomfort or social anxiety [8]. On the other hand, positive peer reinforcement such as group play, team bonding, or supportive coaching can associate movement with belonging and self-confidence.

Media exposure also plays a shaping role. The portrayal of physically active individuals in media often emphasizes athleticism, thinness, and competitiveness, which may alienate youth who do not identify with these images. At the same time, digital platforms that reward sedentary screen engagement such as video games or social media create pleasurable and rewarding environments that adolescents are drawn to repeatedly. This results in strong implicit associations between sedentary behavior and enjoyment, while movement becomes associated with effort, vulnerability, or boredom.

7. Why Traditional Interventions Often Fail

Many well-intentioned health promotion efforts targeting adolescent physical activity are built on the assumption that rational knowledge leads to behavioral change. This reflects the legacy of cognitive-behavioral models that emphasize awareness, intention formation, and decision-making as the primary levers of action. Unfortunately, these interventions often produce minimal long-term effects, particularly when applied uniformly across diverse student populations.

One of the most consistent limitations of traditional interventions is their failure to account for the emotional and automatic nature of behavior. For instance, physical education (PE) classes often focus on performance, grading, and comparison. This can trigger negative emotional responses especially among adolescents who are overweight, less coordinated, or socially marginalized [4]. These responses do not merely influence immediate choices but they can generate durable negative implicit attitudes toward physical activity.

Moreover, informational campaigns that highlight the long-term risks of inactivity such as obesity or heart disease tend to rely on fear appeals or delayed gratification. However, adolescents are more likely to respond to immediate social and emotional outcomes. A teenager is unlikely to go for a jog to prevent future illness if the activity is linked to embarrassment or peer exclusion in the present moment.

Pearson *et al.,* [6] emphasize that many behavior change programs overlook the role of habitual and affective processes. When interventions are framed solely around knowledge and intention, they may succeed in changing explicit attitudes but fail to alter implicit preferences that guide automatic behavior. For example, a student may understand the importance of physical activity and even express motivation to participate, yet still default to screen time after school due to entrenched subconscious associations between relaxation and sedentary behavior.

The context of delivery also matters. Interventions implemented in school environments that reinforce hierarchical or evaluative dynamics (e.g., picking teams, grading physical ability) may amplify negative emotional experiences for some students. These settings can inadvertently condition students to associate movement with discomfort or failure, thereby strengthening negative implicit attitudes.

8. Toward Psychologically Grounded Interventions

Given the limitations of traditional interventions, there is an urgent need for more psychologically informed approaches that engage both implicit and explicit systems of cognition. Emerging strategies such as evaluative conditioning, priming, and habit restructuring show promise in this regard.

Evaluative conditioning involves the repeated pairing of physical activity with positive emotional stimuli, such as music, social connection, or humor. This technique seeks to rewire subconscious associations by replacing negative affect with pleasurable reinforcement. For example, dance-based physical education classes accompanied by popular music can elicit enjoyment, which may help foster positive implicit associations with movement over time [3].

Priming is another strategy in which individuals are exposed to stimuli that activate favorable concepts before they engage in a behavior. In the context of physical activity, priming could involve showing students brief videos of relatable peers enjoying non-competitive exercise before a PE class begins. These subtle exposures can activate memory networks and shape anticipatory affect, increasing the likelihood that students will approach the activity with a more positive mindset [5].

Habit restructuring aims to modify environmental cues and routines to support automatic behavior change. Adolescents can be encouraged to embed small bouts of movement into daily life for example, take a short break during homework or stretching between classes. When these behaviors are linked to immediate social or emotional rewards (e.g., music, gamification, peer approval), they are more likely to be repeated and internalized as positive habits [11,12].

Inclusive school design also plays a critical role. PE programs should be structured to minimize comparison and maximize personal growth. Activities should be varied, culturally responsive, and framed around enjoyment rather than competition. Providing multiple options such as yoga, dance, martial arts, or non-competitive games can help students discover forms of movement that align with their identity and reduce the risk of negative affective conditioning [13].

Critically, interventions must also address the broader social context in which adolescents form their attitudes. Programs that include family engagement, peer-led activities, and media literacy can help adolescents navigate the implicit messages they receive from their environment. These programs should aim not only to change individual behavior but to shift the cultural norms that surround physical activity and inactivity [14,15].

9. Future Directions and Implications for Research, Policy, and Practice

Future research should explore how implicit attitudes interact with identity development, body image, and mental health. This includes the integration of IATs or other reaction-time based assessments with longitudinal tracking of behavior. Moreover, qualitative methods such as interviews and narrative analysis can provide deeper insight into the affective and contextual factors that shape adolescent decision-making.

Adolescence is a time of intense self-scrutiny, and physical activity contexts are often sites of social evaluation [14]. Understanding how shame, pride, belonging, or exclusion become embedded in attitudes toward movement will be crucial for developing more empathetic and effective interventions.

From a policy standpoint, it is crucial to reconsider how physical activity is positioned within school systems. Reducing the academic-over-sport dichotomy and reframing physical education as integral to cognitive, emotional, and social development may help elevate its status and attract greater investment.

In terms of practice, educators and health promoters must receive training in emotional intelligence, trauma-informed care, and behavior change psychology. Researchers and professionals also must understand how to create environments and experiences that reshape unconscious attitudes.

Cross-sector collaboration is essential. Public health campaigns, school curricula, family engagement, and digital media must work in harmony to create consistent and emotionally resonant messages. Interventions should be co-designed with adolescents to ensure that strategies are relevant, inclusive, and empowering.

Finally, implicit attitude research must extend into diverse cultural and socioeconomic contexts. Much of the existing literature is based on Western populations, and it is vital to examine how different norms, values, and constraints influence the development of implicit associations across global youth populations.

10. Conclusion

Adolescents' relationships with physical activity and sedentary behavior are shaped by far more than knowledge or intention. Implicit attitudes formed through experience, emotion, and environmental exposure play a crucial role in determining whether youth engage in or avoid movement. Traditional interventions that focus exclusively on cognitive persuasion will continue to fall short unless they address the subconscious mechanisms that guide daily decisions. This narrative review has highlighted the need for a paradigm shift in research, policy, and practice—one that embraces a dual-process understanding of behavior, targets implicit associations, and creates emotionally supportive spaces where adolescents can redefine their relationship with movement.

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