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**FACTORS INFLUENCING BEHAVIOUR TOWARD  
PARTICIPATION IN SUSTAINABLE GREEN EXERCISE:  
A CONCEPTUAL FRAMEWORK**

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**Abstract:**

Green exercise, defined as physical activities conducted in a natural environment, has attracted international interest due to its potential double benefits on human health and environmental well-being. In Malaysia, despite the rich natural resources and extensive efforts put forward by the government in encouraging active lifestyles among its people, participation in green exercises is reportedly low. The increasing rates of physical inactivity and non-communicable diseases press for an urgent need to understand the behavioural determinants that drive Malaysians to engage in outdoor physical activities. Drawing from the TPB, this research investigates how attitudes, subjective norms, perceived behavioural control, green knowledge, and intrinsic motivation influence behaviour in terms of participation in green exercise. Additionally, demographic factors will be tested as a moderator between green knowledge and behavioural participation. Accordingly, this paper aims to contribute theoretically to the existing TPB literature on green exercise and provide practical insights to policymakers, public health practitioners, and environmental planners. Results may inform targeted interventions, improved green infrastructure, and community-based programs for fostering healthier lifestyles and enhancing environmental stewardship among Malaysians.

This work is licensed under [CC BY 4.0](#)**Keywords:**

Theory of Planned Behaviour (TPB), Green Exercise, Health Consciousness, Environmental Awareness, Behavioural Intention

## Introduction

Green exercise is usually referred to as physical activity done in natural settings, and it has gained popularity due to its potential to provide physical, psychological, and environmental advantages. Various studies conducted globally indicate that physical activities conducted outdoors in places like parks, forests, beaches, and gardens result in better all-round well-being compared to indoor exercise alone (White et al., 2021). Green exercises in Malaysia, a country rich in biodiversity and natural beauty, reflect an especially significant yet underutilized opportunity to advance public health, enhance environmental awareness, and contribute toward sustainable development.

Over the past decades, Malaysia has undergone rapid urbanization, leading to an alteration in lifestyles that resulted in reduced contact with nature. Urban residents increasingly depend on sedentary habits as a result of busy working schedules, housing with limited spacing, and very technological-dependent lifestyles. These changes in lifestyle directly add to the increasing burden of NCDs faced by the country. For instance, the National Health and Morbidity Survey (NHMS 2021) reported that over 50% of Malaysians were overweight or obese, while 50.1% of adults were physically inactive.

The high prevalence rate indicates an urgent need for accessible and sustainable forms of physical activity that are easily incorporated into daily life. For instance, urban areas in Malaysia like Kuala Lumpur have to balance rapidly increasing development with providing adequate green infrastructure to support outdoor physical activities. While there are urban parks and recreational areas, many are very congested, poorly maintained, or perceived to be unsafe; thus, discouraging regular participation in green exercise. On the other hand, while rural areas might have natural spaces, they usually lack proper facilities, signage, safety measures, or even access that makes their use by residents for structured exercise difficult.

Realizing the health effects of sedentariness, the Malaysian government has initiated several national programs, including the National Strategic Plan for Active Living, the Healthy Malaysia Agenda, and Fit Malaysia. Such initiatives promote active living and easy access to green spaces to increase the population's involvement in physical activity. However, green exercise participation remains relatively low despite the efforts. The lack of awareness and environmental education, cultural norms, socio-economic inequalities, and competition with personal responsibilities mark the variation in perception and involvement of Malaysians in green exercise.

Cultural influences have a significant impact on exercise behaviour in Malaysia. Due to the country's multiethnic nature, traditions vary between communities regarding social expectations. For example, women may face additional constraints associated with safety, modesty, time availability, and societal expectations, which could affect their willingness to exercise outdoors (Hitchings et al., 2020). Family obligations and collectivist cultural values may also serve to place household and social responsibilities above the physical activity

intentions of individuals. Such cultural factors point toward the need for investigation into the behavioural, social, and psychological determinants shaping participation in green exercise.

Green exercise not only yields physical health benefits, such as improvement in cardiovascular function, weight management, and higher immune responses, but it also has other psychological benefits that include lessened stress, enhanced mood, and better cognitive functioning. Exposure to natural environments helps nurture environmental stewardship; individuals who take part in outdoor activities regularly show a greater appreciation for nature and take on more environmentally sustainable behaviours.

The promotion of green exercise also meets Malaysia's national sustainability goals. Initiatives by the government, such as the Malaysia Climate Action Council and the National Biodiversity Policy, show the importance of incorporating green spaces into urban planning and offering protection to the environment to enhance quality of life. DOE Malaysia, 2021. Encouraging green exercise addresses not only health concerns but also environmental sustainability and long-term community resilience.

Despite these recognized benefits, many Malaysians still do not make sufficient use of green spaces for exercise, mainly because of behavioural barriers such as low motivation, poor attitudes toward outdoor activity, lack of knowledge about environmental or health benefits, and perceived lack of control over participation due to weather, safety, or accessibility (Hansen et al., 2020). These above-mentioned behavioural determinants underscore the need for a theoretical framework explaining why individuals choose to participate-or fail to participate-in green exercise.

The theory developed by Ajzen, known as the Theory of Planned Behaviour (TPB), provides a complete model to understand how attitudes, subjective norms, and perceived behavioural control influence behavioural intentions and actual behaviour. TPB has been widely applied in the fields of health behaviour, exercise participation, and sustainability-related actions (Abdullah & Hashim, 2020). In green exercise, TPB assists in informing how personal beliefs, social influences, and perceived ability to conduct the behaviour influence Malaysians to engage themselves outdoors in physical activity. Yet, TPB is a very strong foundational model, while green knowledge and intrinsic motivation further shape behaviour.

Green knowledge refers to the individuals' understanding of the environment and health-related benefits of green exercise. Research proves that people who are more aware of environmental problems take part in nature-friendly activities, including green exercise (Lin et al., 2022). Intrinsic motivation, on the other hand, is defined by the Self-Determination Theory of Deci & Ryan (2000) as participation driven by enjoyment, interest, or meaningfulness. Research supports the fact that people who consider green exercise to be enjoyable or meaningful become regular green exercisers (Ahmad & Zulkifli, 2020). Demographic factors such as age, gender, education, and income also influence green exercise behaviour and may moderate the relationship between knowledge and participation.

Younger individuals, higher-income earners, and those with higher education levels often show greater participation due to more exposure, awareness, and access to green infrastructure (Ismail et al., 2021; Azmi et al., 2022). With the complexity of behavioural, environmental, and social factors affecting green exercise participation, a systematic investigation into how

such elements relate to one another has been conducted. This study has thus applied the extended Theory of Planned Behaviour to the examination of the relationships between attitude, subjective norms, perceived behaviour control, green knowledge, intrinsic motivation, and behaviour with respect to green exercise in Malaysia, adding demographic background as a moderating factor. The insights derived from this study will be useful in helping policymakers, community leaders, health practitioners, and urban planners to devise appropriate intervention strategies that could help promote green exercise and thus improve public health outcomes and aid national sustainability goals.

## Literature Review and Hypotheses Development

### ***Physical Activity Trends in Malaysia***

Physical inactivity is now a critical public health issue in Malaysia, as it fuels growing obesity, cardiovascular diseases, and diabetes. Data from the National Health and Morbidity Surveys (2019; 2021) indicate that a great proportion of adults in Malaysia fail to achieve the recommended amount of at least 150 minutes of moderate-intensity physical activity per week. There has been an increase in sedentary lifestyle practices amid rapid urbanization, long working hours, and increased dependence on screens. Physical activity levels also vary geographically and demographically; for instance, residents in urban settings have better access to parks and fitness facilities but often have no time to exercise, whereas rural populations may depend on manual labour yet are confronted with limited accessibility to structured exercise facilities (Ramli et al., 2020).

Gender disparities also limit women's participation due to cultural expectations, household duties, and concerns about safety (Khoo et al., 2020). Socioeconomic status also contributes, as higher-income people frequently participate in structured exercise, while lower-income groups face financial and accessibility barriers. Youth physical activity has decreased, mainly because of increased screen time and less outdoor playtime (Wong et al., 2020). However, while government efforts, such as the National Strategic Plan for Active Living and "Fit Malaysia," look to upgrade participation, challenges remain in frequent physical activity due to strained schedules, unfavourable weather conditions, safety, and lack of green infrastructure.

### ***Green Exercise and Its Benefits***

Green exercise, defined as physical activities conducted in natural environments, such as parks, forests, and gardens, offers numerous physical, psychological, social, and environmental advantages. The rich natural outdoors of Malaysia allows for plenty of green exercise activities, such as hiking, jogging, cycling, and nature walks. Research has also shown remarkably good mental health outcomes, with evidence suggesting that exposure to greenery is associated with reduced levels of stress, anxiety, and depression, while simultaneously improving mood and cognitive functioning (Teoh et al., 2021; Shamsudin et al., 2021). Green exercise has also made significant contributions to physical health through its support of cardiovascular fitness, weight management, and general body composition, wherein those exercising outdoors have healthier parameters than indoor exercisers (Noor et al., 2020).

Besides this, contact with natural environments might improve immune functioning (Tan et al., 2021). Another significant benefit of green exercise is the enhancement of environmental awareness and fostering better behaviors among individuals for more sustainability-sensitive lifestyles. In addition, it potentially develops a closer relationship with nature—an essential

consideration for Malaysia, given the current issues facing pollution and deforestation. Socially, green exercise facilitates bonding among the community through group activities that are essential in reinforcing social support systems towards a healthy lifestyle (Ho et al., 2021). However, participation in this type of exercise remains low in many parts of the country, given the inadequate facilities provided, overcrowding of urban parks, safety concerns for exercisers, and poor maintenance-issues most prevalent in rural areas. Despite these challenges, several government and NGO-driven initiatives still encourage public participation.

### ***Behavioural Models and Theories of Green Exercise***

A number of behavioural theories explain why people choose to engage in green exercise. The Theory of Planned Behaviour (TPB) postulates that attitude, subjective norms, and perceived behavioural control shape intention, which in turn drives behaviour (Ajzen, 1991), and has proven highly applicable in Malaysian exercise research (Abdullah & Hashim, 2020; Ahmad & Tan, 2021). Social Cognitive Theory espouses self-efficacy, observational learning, and environmental influence, suggesting that participation in outdoor exercise is more probable when people perceive others exercising outdoors and supportive environments.

Self-Determination Theory (Deci & Ryan, 2000) suggests that intrinsic motivation-for example, enjoyment and personal meaning-constitutes the critical driver of long-term participation, especially for green exercise, where enjoyment of nature is central. The Health Belief Model shows that participation can be explained by perceived threats to health as well as health benefits. Meanwhile, Ecological Models highlight structural factors such as the accessibility of parks, its infrastructure, and safety (Chia & Lim, 2021). The Transtheoretical Model outlines stages of behavioral change from precontemplation to maintenance and asserts that interventions are most effective when matched to individuals' stage of readiness. Nudge Theory and Social Norms Theory complement these with evidence that even small environmental cues like signage, the design of the park, and peer behavior can help rally participation. Together, these theories provide a comprehensive insight into the psychological, social, and environmental influences on participation in green exercise.

### ***Underpinning Theory: Theory of Planned Behavior (TPB)***

This study uses TPB as the underpinning framework for its robust applicability in health and exercise behaviors. According to TPB, intention to do a behavior is determined by attitude, subjective norms, and perceived behavioral control. Attitude reflects one's positive or negative assessment of green exercise, such as beliefs associated with its health, enjoyment, and environmental benefits. Subjective norms involve perceived social influences from family, friends, and community members, which is especially significant in the collectivist culture in Malaysia, where social approval from those around influences one's lifestyle (Kamarudin et al., 2020).

On the other hand, perceived behavioral control emanates from an individual's belief in capability engaging in green exercise due to accessibility of parks, safety, availability of time, and personal capability. The study expands TPB by adding green knowledge, intrinsic motivation, and demographic backgrounds as moderating variables. These three moderating variables provide a better explanation of green exercise behavior, recognizing that environmental awareness, enjoyment of exercising outdoors, and socio-demographic differences provide further insights into understanding green exercise behavior. Accordingly, TPB provides a structured and evidence-based approach for identifying both psychological and

contextual barriers to participation, thereby providing valuable insights into promoting healthier and more active lifestyles among Malaysians.

### ***Social Cognitive Theory (SCT)***

Social Cognitive Theory (Bandura, 1986) emphasizes the interaction between personal, behavioral, and environmental factors in shaping an individual's actions. SCT posits that self-efficacy, or the belief in one's ability to succeed in a particular behavior, plays a central role in motivating behavior. In the context of green exercise, individuals who perceive themselves as capable of performing physical activity in natural settings are more likely to engage in such activities. The environmental factor, such as the availability of green spaces, and the role of social modeling, such as seeing others participate in green exercise, are also important in influencing behavior. Research by Kamarudin et al. (2020) suggests that SCT can help explain how the availability of green spaces and social influences in Malaysia contribute to individuals' decisions to participate in green exercise.

### ***Self-Determination Theory (SDT)***

Self-Determination Theory (Deci & Ryan, 2000) focuses on the intrinsic and extrinsic motivations behind engaging in behaviors. According to SDT, individuals are more likely to engage in activities when they experience autonomy, competence, and relatedness. In green exercise, autonomy refers to the freedom to choose when and how to engage in outdoor physical activities, competence is the feeling of being capable of performing these activities, and relatedness refers to the social connections made through shared participation in outdoor exercise. Research by Ahmad and Tan (2021) found that individuals who experience a sense of autonomy and competence in green exercise settings are more likely to participate regularly. SDT highlights the importance of intrinsic motivation, such as enjoyment and personal satisfaction, as key drivers of behavior.

### ***Health Belief Model (HBM)***

The Health Belief Model (HBM) is another theoretical framework that can be applied to understand health-related behaviors. This model emphasizes the role of individual perceptions about health risks and benefits in determining behavior. In the context of green exercise, individuals are more likely to participate in outdoor physical activities if they perceive a significant health benefit (such as weight loss or mental well-being) and believe that the activity will reduce health risks (such as obesity or stress).

HBM also suggests that cues to action, such as public health campaigns or social support, can encourage individuals to engage in green exercise. Research by Ismail and Ali (2021) has shown that in Malaysia, individuals who perceive a high level of health benefit from green exercise are more likely to engage in these activities, particularly when supported by environmental cues like advertisements or group exercise events.

### ***Ecological Models of Behavior***

Ecological models of behavior emphasize the role of environmental and contextual factors in shaping behavior. These models propose that behavior is influenced not only by individual characteristics but also by broader social, community, and environmental contexts. In green exercise, ecological models highlight the importance of physical environments such as parks, trails, and natural areas, which can either encourage or discourage outdoor physical activity. According to Chia and Lim (2021), ecological models can be applied in the Malaysian context

to identify how urban infrastructure, such as parks and cycling paths, or community-based events, such as green exercise programs, can facilitate or hinder participation in green exercise.

### ***Transtheoretical Model (TTM)***

The Transtheoretical Model (Prochaska & DiClemente, 1983) provides a framework for understanding the stages individuals go through in adopting health behaviors. These stages include precontemplation, contemplation, preparation, action, and maintenance. In the case of green exercise, individuals may go through these stages before fully committing to outdoor physical activity. For example, someone in the precontemplation stage may not even consider engaging in green exercise, while someone in the contemplation stage may recognize the benefits but feel unsure about taking action. By applying TTM to green exercise, it becomes possible to identify strategies to move individuals through these stages, such as providing information, offering incentives, or creating social support networks. Studies by Tan and Lee (2020) suggest that interventions based on TTM can help increase green exercise participation by addressing barriers at each stage.

### ***Nudge Theory***

Nudge Theory (Thaler & Sunstein, 2008) suggests that behavior can be influenced by subtly altering the choice architecture without limiting options. In the context of green exercise, nudge interventions could include making outdoor exercise more convenient and appealing by improving access to green spaces, providing visible cues like signs or exercise stations in parks, and promoting the benefits of green exercise in a non-intrusive way. Research by Rahman et al. (2022) shows that simple nudges, such as encouraging signage or group fitness sessions in parks, have been effective in motivating individuals to participate in green exercise. Nudge interventions are particularly relevant in urban Malaysian settings, where lifestyle changes and environmental factors may discourage outdoor physical activity.

### ***Social Norms Theory***

Social Norms Theory (Cialdini, 2003) focuses on how social influences, such as group behavior and societal expectations, shape individual actions. In the context of green exercise, this theory posits that individuals are more likely to engage in outdoor physical activities when they perceive that others in their social circles or communities are doing the same. Social norms can be reinforced through media campaigns, social groups, and public events that normalize green exercise. In Malaysia, public initiatives like the promotion of community runs or outdoor fitness events have helped foster a positive social norm around green exercise, encouraging broader participation (Kamarudin et al., 2020).

### ***Integrating Multiple Theories for Green Exercise Participation***

While each of the aforementioned models provides valuable insights into behavior, integrating multiple theories can offer a more comprehensive understanding of green exercise participation. For example, combining the TPB with SCT or SDT can help explain both the social influences and intrinsic motivations driving outdoor physical activity. Similarly, integrating the Health Belief Model with ecological models allows for a better understanding of how both individual perceptions and environmental contexts interact to influence green exercise behavior. Studies by Rahman et al. (2022) suggest that an integrated approach that combines multiple theories can enhance intervention strategies and policy development aimed at promoting green exercise in Malaysia, fostering both individual motivation and social support for outdoor physical activities.

## Hypothesis Development

### ***Attitudes Toward Green Exercise and Participation Behavior***

Attitudes are critical in shaping individuals' behaviors, as they represent their positive or negative evaluation of a particular activity. In the Theory of Planned Behavior (TPB), attitudes directly influence behavioral intention, which is a strong predictor of actual behavior (Ajzen, 1991). For green exercise, attitudes towards its physical and mental health benefits, environmental conservation, and recreational aspects are pivotal. Research in Malaysia highlights that individuals with favorable attitudes toward these benefits are more inclined to participate in green exercise (Ismail et al., 2021). Hence, the hypothesis is:

H1: Positive attitudes significantly influence the intention to participate in green exercise.

### ***Subjective Norms and Participation Behavior***

Subjective norms refer to the perceived social pressure to engage in or abstain from a specific activity. In a collectivist culture like Malaysia, the influence of social groups such as family, peers, and community is profound (Kamarudin et al., 2021). For example, public campaigns promoting outdoor activities as socially desirable may motivate participation in green exercise. Evidence shows that individuals often align their behaviors with the expectations of significant others in their social environment (Ahmad & Tan, 2020). Thus, the hypothesis is:

H2: Subjective norms positively influence the intention to participate in green exercise.

### ***Perceived Behavioral Control (PBC) and Green Exercise Participation***

Perceived behavioral control reflects individuals' confidence in their ability to perform a behavior, considering both personal and situational factors. According to TPB, PBC influences both intention and behavior directly (Ajzen, 1991). In Malaysia, factors such as the accessibility of green spaces, safety, and time availability affect PBC for green exercise (Rahman et al., 2022). Research suggests that higher PBC correlates with increased participation in green exercise activities. Therefore:

H3: Perceived behavioral control positively influences the intention to participate in green exercise.

### ***Intrinsic Motivation and Green Exercise Behavior***

Intrinsic motivation, derived from Self-Determination Theory (SDT), refers to engagement in an activity for inherent satisfaction rather than external rewards (Deci & Ryan, 2000). For green exercise, individuals motivated by enjoyment, stress relief, and connection to nature are more likely to participate regularly (Ahmad & Zulkifli, 2020). Thus:

H4: Intrinsic motivation positively influences both the intention and participation in green exercise.

### ***Green Knowledge as a Determinant of Pro-Environmental Behavior***

Green knowledge, which encompasses understanding environmental issues and sustainable practices, is a crucial antecedent of pro-environmental behaviors, including participation in green exercise. According to environmental psychology theories, individuals who possess greater knowledge about environmental benefits are more likely to adopt behaviors aligned

with sustainability (Kollmuss & Agyeman, 2002). In Malaysia, green knowledge plays a significant role in motivating outdoor activities that merge health and environmental conservation, such as green exercise (Rahman et al., 2020).

H5: Green knowledge positively influences behavioural intention to participate in green exercise.

### ***Moderating Role of Demographics***

Demographic factors, such as age, education level, and income, can moderate the relationship between green knowledge and green exercise behavior. For instance, younger, more educated individuals in Malaysia are more likely to apply their green knowledge in activities like green exercise (Yusoff et al., 2021).

H6: The relationship between green knowledge and green exercise behavior is moderated by demographic factors.

### **Methodology**

This conceptual paper employs a theory-driven approach to develop a framework explaining the factors influencing participation in sustainable green exercise, grounded in the Theory of Planned Behavior (TPB). The methodology is based on an extensive and systematic review of existing literature related to green exercise, environmental sustainability, health behaviour, and TPB-based behavioural prediction models. Relevant empirical studies and conceptual papers focusing on publications from 2019 onward to ensure contemporary perspectives. The literature was reviewed, synthesised, and compared to identify key determinants namely attitude, subjective norm, and perceived behavioural control that are consistently shown to influence intention and behaviour in outdoor or environmentally oriented physical activities. The review also examines how environmental awareness and sustainability values shape behaviour within green exercise contexts. Insights from this synthesis were integrated to refine the conceptual relationships between TPB constructs and green exercise participation.

In developing the conceptual framework, theoretical assumptions from TPB were mapped against findings from the literature, allowing the identification of proposed pathways and potential mediating roles of behavioural intention. The framework does not involve empirical testing; rather, it provides a structured theoretical foundation that can guide future empirical research. Overall, the methodology emphasises conceptual development through theory integration, critical literature synthesis, and the logical alignment of constructs within TPB to explain sustainable green exercise behaviour.

### **Results And Discussion**

Since this study is conceptual in nature, the results are presented in the form of a theoretically derived framework that integrates the Theory of Planned Behavior (TPB) with contemporary literature on sustainable green exercise. The conceptual framework illustrates how attitude, subjective norm, and perceived behavioral control collectively shape behavioural intention, which subsequently influences individuals' participation in green exercise. Recent studies show that these three TPB antecedents are consistent and significant predictors of intention toward environmentally oriented physical activities (Chan et al., 2020; Mirata et al., 2022), with behavioural intention acting as the central mediator toward actual participation.

The review indicates that attitude toward sustainable green exercise plays a major role in determining willingness to participate. Individuals who perceive green exercise as enjoyable, health-enhancing, and aligned with sustainability values are more inclined to engage in such activities (Zhang & Lu, 2021; Sonnentag & Pundt, 2022). Positive attitudes increase when individuals see green exercise as beneficial for both personal health and the environment. Conceptually, this highlights attitude as a primary driver in shaping intention. Subjective norms also emerge as an important determinant, particularly among young adults who are greatly influenced by peers, family, and social media.

Social support and normative encouragement significantly enhance the intention to participate in outdoor and eco-friendly exercise (Huang et al., 2021; López-Mosquera, 2023). Supportive social environments such as friends who frequently jog in parks, communities that promote eco-friendly lifestyles, or university campaigns encouraging outdoor wellness can increase participation intentions. In cultures where collective influence is strong, normative pressure may further amplify participation in green exercise as a socially desirable behaviour.

Perceived behavioural control demonstrates a dual influence as it affects intention and may directly affect actual behaviour. Individuals who believe they have access to parks, safe environments, available time, and confidence to perform outdoor exercise are more likely to translate intention into action (Pérez-Ordás et al., 2021; Lin & Wang, 2022). The literature emphasises that perceived ease or difficulty determines whether the behaviour can be sustained long term, especially when environmental barriers such as weather, distance, or overcrowded spaces arise.

From a conceptual standpoint, behavioural intention serves as the key mediating construct. When attitudes are positive, social influences are strong, and perceived control is high, intention to engage in green exercise increases significantly (Ahmad et al., 2020; Kim & Kim, 2022). This intention subsequently drives behaviour, aligning with the core assumptions of TPB. The framework therefore predicts that enhancing intention through education, social support, and environmental facilitation will significantly increase participation in sustainable green exercise.

In the TPB framework, attitude, subjective norms, and perceived behavioural control (PBC) do not operate in isolation but are interconnected constructs that collectively shape behavioural intention. A favourable attitude towards a behaviour strengthens one's willingness to perform it, while subjective norms reinforce this attitude through perceived social pressure and approval from important referents (Fishbein & Ajzen, 2019). Simultaneously, PBC complements both attitude and subjective norms by determining how capable an individual feels in performing the behaviour, making the intention more actionable when self-efficacy and resource availability are high (Ajzen, 2020).

When these three determinants align positively evaluation of the behaviour, supportive social influence, and strong perceived control, they synergistically enhance intention, which then becomes the strongest predictor of the actual behaviour. Thus, attitude, subjective norms, and PBC are integrated and mutually reinforcing components that collectively guide intention and subsequent behaviour (Ajzen, 2020; Yzer, 2022).

Overall, the findings of this conceptual integration suggest that TPB effectively explains participation in sustainable green exercise. By understanding how psychological, social, and environmental factors interact within this model, future empirical studies can validate these conceptual assumptions and develop interventions to promote outdoor physical activity that supports both human health and environmental sustainability.

### Conclusion

This conceptual paper offers a comprehensive explanation of the factors influencing participation in sustainable green exercise by integrating the Theory of Planned Behaviour (TPB) with contemporary literature in health behaviour and environmental sustainability. The Theory of Planned Behaviour explains that attitude, subjective norms, and perceived behavioural control work together to shape behavioural intention. Positive attitude, supportive social expectations, and strong self-efficacy collectively strengthen intention and increase the likelihood of performing the behaviour, showing that these constructs interact rather than function independently. The conceptual framework developed in this paper contributes theoretically by extending TPB into the context of sustainable outdoor activity, highlighting how environmental values and behavioural determinants interact to promote environmentally responsible exercise practices.

While this study highlights the theoretical relevance of the proposed framework, empirical validation remains essential to confirm its applicability in real-world contexts. Future studies could employ longitudinal research designs to examine how behavioural intention and green exercise participation evolve over time, enabling assessment of the framework's predictive power. Additionally, comparative studies involving different age groups, socioeconomic backgrounds, and varying urban-rural environments would provide deeper insight into contextual influences on green behaviour. Researchers may also explore mixed method approaches or experimental interventions to evaluate behavioural change outcomes, further refining the framework's constructs and pathways.

Overall, this paper reinforces the relevance of TPB as a guiding theory to understand and encourage sustainable green exercise behaviour. By identifying key psychological and social determinants, the framework offers meaningful insights for researchers, policymakers, educators, and health practitioners seeking to promote physical activity that aligns with both human wellbeing and environmental sustainability.

### Contribution/Practical Implications

This study contributes to a better understanding of green exercise behaviour in Malaysia from both theoretical and practical standpoints. Theoretically, this study extends the Theory of Planned Behaviour by incorporating green knowledge, intrinsic motivation, and demographic moderation to provide a broader framework for predicting participation in green exercise. Such expansion offers a contribution to the limited Malaysian literature on green exercise by considering simultaneously the behavioural, psychological, and environmental determinants of outdoors physical activity-a more holistic approach toward identifying the elements that mold outdoor physical activity.

The findings highlight the need for practical strategies to encourage green exercise participation among the community. Community-based initiatives, such as weekend group hiking, cycling clubs, or neighbourhood fitness meet-ups, can foster social support and enhance

motivation to engage in outdoor physical activity. In addition, improving accessibility to green spaces including maintaining public parks, adding shaded walking trails, and ensuring safe open recreation areas may increase opportunities for regular participation. Universities, local councils and NGOs could also run social media campaigns using short videos, infographics, and peer-influencer promotions to increase awareness of green exercise benefits and build a positive social norm around outdoor activity. These targeted interventions not only translate the research findings into real-world practice but also support long-term engagement in active and sustainable lifestyles.

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