education sciences

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Review

Social-Cognitive Theories to Explain Physical Activity

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Abstract: Despite the widely recognized health benefits of physical activity, participation in regular physical activity falls far short of the Global Action Plan on Physical Activity 2018–2030. More than half of the population does not reach current recommendations, and around one-fourth is not sufficiently active at all. Understanding social-cognitive theories may aid in the creation of interventions to improve long-term physical activity maintenance. The current work covers theory and research on physical activity patterns. It specifically provides an overview of contemporary conceptualizations of motivational and cognitive theories, as well as reviews recent perspectives on how physical activity can be adopted and maintained. Key questions, such as whether physical activity can be executed purely based on cognitive functions, are also addressed. Furthermore, this review identifies possible and effective intervention strategies to promote physical activity.

Keywords: Self-Determination Theory; Theory of Planned Behavior; Transtheoretical Model; physical activity; behavior change

Citation: Rodrigues, F.; Figueiredo, N.; Jacinto, M.; Monteiro, D.; Morouço, P. Social-Cognitive Theories to Explain Physical Activity. *Educ. Sci.* **2023**, *13*, 122. https://doi.org/10.3390/educsci13020122

Academic Editor: James Albright

Received: 9 January 2023
Revised: 18 January 2023
Accepted: 23 January 2023
Published: 25 January 2023

1. Introduction

The science of behavioral change, particularly in the context of physical activity, is now an essential requirement for adopting more active and healthy lives [1]. In general, behavioral change can be described as any action that a person makes in reaction to internal or external conditions affecting present behavior that are regarded as harmful or unsafe to health. These acts can be apparent (i.e., motor or verbal) and directly quantifiable, or covert (i.e., non-visual activities involving voluntary muscles) and indirectly measurable. Behaviors are thus physical and/or mental events that occur in the body and are controlled by the brain [2]. However, behavioral change is a challenging process, particularly when it comes to physical activity because there are numerous barriers to physical activity and numerous factors that favor sedentary behaviors [3].

People's decisions to engage in physical exercise or to adopt a pattern of sedentary behavior (including physical inactivity) are impacted by a combination of personal, health, medical, social, psychological, motivational, and environmental factors. The dynamics of the aforementioned components shape each individual's aims and preferences, barriers, and, as a result, habits, which in turn affect lifestyles. Given the numerous influences on people's physical activity behaviors, these factors are not static. Thus, the development of behavioral skills is a neuralgic strategy in any program aiming to promote an active lifestyle. Schroé et al. [1] propose a more active and healthier lifestyle throughout the lifespan.

Exercise physiologists appear to feel more comfortable prescribing a preset dose–effect of exercise to individuals, pointing out what they should do to enhance their health and, in certain circumstances, how to control the symptoms of a given pathology [4]. However, the likelihood that people will follow a general exercise prescription is only high in those with strong motivations, and when they can simply follow the given schedule. Adherence

decreases, and people revert to previous physical inactivity patterns when this drive fades, takes on controlling components, or hinders the adoption of physical activity or healthy behaviors [5,6].

Physical inactivity has become one of the world's largest scourges, posing a significant public health hazard [7], and is thus ranked as the fourth highest death risk by the World Health Organization (WHO, Geneva, Switzerland) [8]. Following that, Lee et al. [9] not only verified the WHO [8] concerns, but also indicated that physical inactivity was increasing in various countries. This fact prompted the World Health Assembly (WHA) to adopt the new "Global Action Plan on Physical Activity 2018–2030" in 2018, which aims to reduce global levels of physical inactivity in adolescents and adults by 15% by 2030 [10]. In this regard, the WHO [10] issued new guidelines for encouraging physical activity and decreasing sedentary behavior in children, adults, and the elderly, as well as new specific recommendations for pregnant and postpartum women, as well as other special populations. Bull et al. [11] recommend that all people should engage in 150–300 min of moderate-level aerobic physical activity per week, or 75–150 min of high-intensity or a combination of moderate to vigorous-intensity physical activity. These new guidelines also encourage strength training for all age groups, as well as recommend the reduction of sedentary habits, albeit they do not specify the limit of sedentary behaviors. As a result, there is an urgent need to prioritize the investment in physical activity promotion programs to enhance health and to address other critical contexts [11].

Dominating social-cognitive and motivational theories have been adopted to explore the reasons and motivations underlying the inability of humans to engage in sufficient physical activity [12] through the lens of several theories. Empirical studies [13–16] have been using motivational theories and have displayed promising results in the physical activity context, explaining that autonomous motivation, perceived benefits, social support, and intentions are significant predictors of exercise adherence. Thus, the purpose of this narrative review is to present and explain the most current and contemporary theoretical models in the study of behavioral change in the context of physical activity through a wide analysis of the scientific literature. It is intended to highlight the need for a holistic intervention based on scientific evidence, to prompt exercise physiologists a critical examination of traditional exercise prescription and health-related actions.

2. Theory of Reasoned Action and Theory of Planned Behavior

Fishbein and Ajzen proposed the Theory of Reasoned Action in 1975 [17], intending to investigate and understand what determines the performance of a behavior. The Theories of Reasoned Action and Planned Behavior are among the most prominent theoretical models in predicting and interpreting purposeful behavior. People will do the behavior depending on their attitudes, subjective norms, and intentions, according to the Theory of Reasoned Action. The model assumes that most socially relevant behaviors (including physical activity) are under the volitional control of the individual and that a person's intention to perform a behavior is both the immediate determinant and the best predictor [17]. Thus, if people rate the suggested behavior as favorable (attitude) and believe that others want them to perform the behavior (subjective norms), they will have higher levels of intention, increasing the likelihood that the behavior will be carried out [18].

Attitudes represent positive or negative feelings regarding the behavior. In other words, attitudes are the building blocks of a favorable or negative judgment. People analyze the repercussions of positive sensations (e.g., "exercise is excellent for your health") against bad feelings (e.g., "I will be in pain tomorrow after exercising"), usually in the short term. A person who feels that engaging in a specific behavior would result in largely positive personal outcomes, for example, will have a more favorable attitude toward the behavior. In concrete terms, attitude is defined as the sum of a person's salient behavioral beliefs about the outcome of an action, with each belief weighted by the appraisal of that consequence. Subjective norms are pressures formed by the importance given by others (e.g., friends, colleagues, and family members), and are a

result of this important perception [17]. Thus, the expectations of key individuals for the individual who performs the behavior in issue, which they are aware of, can influence whether or not the behavior is performed. The individual considers the implications of engaging in the behavior (e.g., "If I start doing physical activity, my friends will like me more"). When an individual believes that significant others approve a behavior and believes that it is vital to act in conformity with others' perceptions, subjective norms favorable to the activity emerge. A person who believes that more significant peers believe they should engage in the behavior will experience social pressure to do so. In particular, the subjective norm is viewed as a function of the person's salient normative views about each individual in the person's closest circle, with each belief weighted by its motivation to comply with the referent action [18].

Intention, a motivational component that is regarded as the closest predictor of behavior, is the central construct in the Theory of Reasoned Action [17]. Intentions represent how likely an individual is to plan and commit effort in pursuing a specific behavior (e.g., "I want to start a physical exercise program in the coming month"). It is determined by the person's subjective views and beliefs toward a behavior. To put it simply, the more favorable views and subjective norms toward a given behavior, the stronger the individual's intention to engage in the behavior. According to Ajzen [19], the mental construction of behavior is divided into two extremes: easy and difficult behaviors. Easy behaviors are those that present little control challenges (e.g., walking down the street), while difficult behaviors need particular resources or talents (e.g., going to the gym five times per week).

Despite this theoretical model explaining rational and intentional activities within the control of the individual, the researchers identified significant shortcomings. First, many behaviors cannot be undertaken willingly; they require capacities, opportunities, resources, or cooperation to be carried out [20]. Quitting the use of private vehicles is frequently problematic, for example, at least when public transportation is non-existent or limited, taking into consideration the individual's needs. Second, those who have a low level of purpose tend to have a low level of efficacy or competence in regard to the behavior (e.g., "I can't run"). Third, this theoretical model posits that people only make systematic and rational judgments based on normative appraisals of behavior, ignoring irrational motivations (e.g., automatic habitual behaviors, affect). Finally, this theoretical model regards behavior as constant and unchangeable.

In response to criticism and limitations in the theoretical model, Ajzen [21] moved from the Theory of Reasoned Action to the Theory of Planned Behavior to account for behaviors that were not completely under the individual's control. The Theory of Planned Behavior focuses not only on cognitive antecedents of intention (attitudes and subjective norms), but also on the individual's perceived control over behavior. Perceived control relates to the perceived ease or difficulty of carrying out the behavior and is thought to reflect previous experience as well as anticipated impediments [18]. It is easy to see how this component might significantly improve the general application of the model, as many behaviors require specific talents or external resources. As a result, carrying out the activity might be made easier or more difficult depending on how the person uses material resources, opportunities, and/or abilities (e.g., being able to walk for 15 min continuously). It is considered that perceived control has a direct relationship with intention. When more control is seen over desirable and easy-to-perform activities, it is assumed that stronger intentions will follow [21]. Through two distinct methods, perceived control can also have a direct predictive effect on behavior. First, an individual with higher perceived control over behavior tends to attempt harder and to continue longer than an individual with less control. Second, people can accurately perceive their level of control over their actions. If the individual believes that they have the ability to carry out the behavior, intentions lose their dominance. In summary, the Theory of Planned Behavior posits that, in addition to the indirect effect that perceived control has on behavior via intention, there is a direct effect of perceived control that occurs only when activity control mirrors reality about the performance of the behavior [18].

3. Self-Determination Theory

Motivation is essential in any form of behavior's effort and achievement. Motivation is defined as the process by which goal-directed behaviors are launched and sustained [22]. Thus, we can define motivation as a behavioral energy that determines whether or not a behavior is performed. Self-Determination Theory, proposed by Deci and Ryan [23] and researched afterwards [24–27], holds that humans have a natural inclination to act in line with their motivational state in a given setting. This theoretical paradigm focuses on contextual circumstances, personality traits, and the causes and consequences of self-determined behavior. That is, Self-Determination Theory examines and explains how motivating drivers, such as interpersonal actions and environmental circumstances, can lead to positive or negative outcomes on an emotional, cognitive, and, most importantly, behavioral level [25]. This theoretical macro model considers intrinsic motivation to be the prototype of self-determined behavior, in which the individual participates voluntarily and without any sort of reward or external pressure. This type of motivation is still integrally linked to the feelings of pleasure and fun associated with the behavior in issue [25]. That is, the individual examines the world in which they are placed, manipulates the instruments and tools at their disposal, and engages in particular behaviors solely for the purpose of gaining a sense of personal fulfillment. In this view, when an individual experiences pleasure while or after engaging in a particular behavior (e.g., physical activity, fitness group classes, jogging), it is expected that they will engage in that behavior again in the future [23].

According to this theoretical framework, the quality (see the following section) of motivation is mediated by the fulfillment of "universal nutrients", which are innate in all human beings and are responsible for personal growth and development [28]. Following the assumptions of this theoretical model, there are three basic psychological needs that are innate in all human beings, regardless of race, ethnicity, gender, age, or other sociodemographic factors, and satisfying these needs represents a universal experience of physical and psychological well-being [24]. The degree to which the individual's psychological needs for autonomy (i.e., the ability to regulate their own actions), competence (i.e., the subject's effectiveness in interacting with involvement), and relatedness (i.e., the subject's ability to seek and develop connections and relationships) are met will influence the level of motivation and, as a result, the effort required to carry out the behavior. Interpersonal interactions will influence the level of motivation and, as a result, the effort required to carry out the behavior. Self-Determination Theory is a macro theory composed of six micro theories, each of which is related to the others. This review focuses on describing the four most researched and applied micro theories in the context of physical activity [29].

3.1. Organismic Integration Theory

Self-Determination Theory, in contrast to previous theoretical assumptions about the dichotomy of extrinsic and intrinsic motivation, came to revolutionize motivation as a motivational continuum, adjusting the quality of motivation depending on the degree of self-determination. Thus, motivation can present itself in six ways, ranging from more self-determined to less self-determined forms, and can be divided into intrinsic motivation, extrinsic motivation, and amotivation from a macro perspective [23].

The most self-determined manifestation of motivation is intrinsic motivation. As previously stated, people who engage in a particular behavior that is governed by intrinsic motivation experience pleasure, fun, and a sense of discovery, among other sensations inherent in the behavior itself [28]. Intrinsically driven individuals do not seek benefits by engaging in the behavior. Its execution is only an expression of the individual and their identity. Because the experience of the activity is rewarding, there is a taste or passion for performing it. Adults enjoying walking in a park are an excellent example of intrinsic motivation, as well as a child exploring the corners of the house, gardens and green spaces, the ocean, and other objects with no regard for time or potential repercussions. Therefore,

intrinsic motivation leads the person to self-determine the performance of a certain behavior, as long as it is stimulating for them.

Extrinsic motivation occurs as the motivational continuum shifts toward fewer self-determined regulations, characterizing instances in which behavior is performed with the goal of getting advantages other than the pleasure and fun derived from its performance. There are several forms to regulate extrinsic motivation along the motivational continuum. Integrated regulation is the most self-determined kind. The individual voluntarily integrates behavior that is very congruent with their beliefs and needs in this style of regulation [25]. However, the individual engages in the behavior to gain further rewards (e.g., I practice physical activity because I intend to improve my physical fitness). There is a sense of congruence in this form of control since it is in line with the person's other daily activities. When considering integrated regulation, the individual executing a behavior is at the highest self-determined position of extrinsic incentive.

Then comes the identified regulation, in which the subject realizes the significance of the behavior and acts driven by an appreciation of the outcomes and benefits of participating in that action [24], even if they do not want to perform the action or the behavior (e.g., the person goes to a group class because they identify with all the surroundings inherent to fitness). This regulation, which is sometimes misunderstood with integrated regulation [30–32], determines how the person identifies and evaluates the behavior. Unlike integrated regulation, in which the behavior is fully integrated into daily activities, identified regulation implies the person consciously accepting the conduct and so experiencing a relatively high degree of will or willingness to act.

Introjected regulation is conceptualized by internal forces, mainly feelings of guilt and fear, which lead to the performance of the activity in a less self-determined fashion, but nevertheless incorporated into external regulations [27]. In these circumstances, the individual recognizes the rationale for their conduct but does not identify with it nor internalize it (e.g., the person forces themselves to lose weight because they think they should). Guilt, concern, or shame are sources of motivation for a behavior based on introjected regulation. Thus, introjected regulation motivates an individual to engage in an activity not because they want to, but because they think that failing to do so may risk their representation among peers (i.e., a sense of social obligation).

A major portion of the research based on the Self-Determination Theory has focused on introjected regulation as a single element [25,32]. However, a more in-depth examination of the concept of introjected regulation suggests a distinction between an introjected approach component and an introjected avoidance component [33,34]. The avoidance component refers to the person's attempts to meet introjected patterns in order to prevent guilt, humiliation, or embarrassment (e.g., "I feel guilty when I don't exercise"). The approach component, on the other hand, consists of the individual's attempts to achieve standards to feel worthy and proud of themselves (e.g., "I diet so that other people would be impressed with me").

Finally, at the apex of extrinsic motivation, there is external regulation, which is regarded as the most regulated kind of regulation among the less self-determined regulations. In this regulation, the subject acts to satisfy external needs, which are occasionally tied to earning benefits (e.g., the individual practices sports as a means of obtaining prizes and monetary resources). This is the most tightly controlled regulation since the preservation of motivation and, as a result, behavior is dependent on the ongoing presence of monitoring and external stimuli [23].

Amotivation appears at the extreme end of the motivational spectrum and represents the less self-determined sort of motivation. In this scenario, there is a lack of regulation or lack of intention to do a specific behavior, resulting in the behavior being performed without intention or proactive thinking (e.g., the person no longer practices physical activity, or does not know whether they will still do so in the future). With a sense of ineptitude and lack of control, the individual no longer understands the significance of their activities. This lack of regulation or lack of purpose to act for a specific behavior implies that the

likelihood of giving up is significant and that its return may be jeopardized unless there is context support for change [25].

Several pieces of data, notably in the context of organized physical activity, have grouped the six regulations into two macro dimensions called autonomous motivation and controlled motivation [35,36]. Autonomous motivation assumes that the behavior is performed due to the positive values inherent in the behavior, while the person integrates the behavior into their daily lives, and includes identified regulation, integrated regulation, and intrinsic motivation, the three more self-determined forms of motivation present on the motivational continuum. This autonomous motivation is described as participating in conduct that is viewed as being congruent with intrinsic goals or outcomes and stems from the individual's identity. Individuals that engage in autonomous motivational actions have a sense of choice, interest, and satisfaction and, as a result, tend to persist in the behavior in issue. Individuals operating on autonomous motivation are more likely to initiate and maintain an activity in the absence of external reinforcement and/or enforced contingency [37]. Controlled motivation assumes that the performance of the behavior is adjacent to coercive or self-imposed assumptions, and it includes introjected regulation, external regulation, and in some instances, amotivation, the three least self-determined forms found on the motivational continuum. Individuals who participate in a controlled behavior feel a sense of obligation and pressure and tend to stick with the conduct only as long as the external or self-imposed contingency is present [27]. The action is likely to be abandoned if the stimulus is removed. Individuals who operate based on regulated incentives are thus less likely to be self-determined in the long run.

According to the Organismic Integration Theory, an individual can regulate their behavior based on the type of regulation next to the motivational continuum; however, this scenario is not finite or static [25]. The distinction between more and less self-determined regulations is a key feature of Ryan and Connell's [38] Organismic Integration Theory, which describes the process by which controlled regulations become internalized to self-determination, as well as the impact that these various regulations have on the individual's behavior [32]. The more an individual internalizes a regulation or value, the more autonomous conduct is experienced [38]. Faced with the internalization process, it is the social setting that encourages or prevents behavior internalization—that is, what causes people to oppose, partially adopt, or deeply internalize values, goals, or belief systems. The type of regulation that a person adopts regarding a behavior is decided by the satisfaction or frustration of three basic psychological needs, which are then handled with the same designation in the micro theory.

3.2. Basic Psychological Needs Theory

As noted earlier, autonomy, competence, and relationship are relevant to human behavior regardless of gender, ethnicity, or cultural repertoire, even considering that the means to satisfy them may vary, explaining the regulation of motivation [39]. The need for autonomy is defined by the individual's ability to regulate their own actions. The individual acts in accordance with the behavior because they value the goal. It is in accordance with the person's deepest inner values and does not aim at anything other than the performance of the behavior. Behavior is considered autonomous when interests, preferences, and desires guide the decision-making process about whether or not to engage in a particular activity.

Autonomy should not be confused with the concept of independence [25,40]. Self-Determination Theory makes a crucial distinction between autonomy and independence. According to this theoretical model, a person feels autonomous when they experience their behavior as a staged volunteer and accept full responsibility for their acts and the ideals they reflect. People are thus more independent when they act in accordance with their interests or ideals and wills [40]. Individual trust is used to describe dependency: a person is dependent if they are reliant on others for goods or advice. Given this description, humans can rationally choose to rely on others, becoming autonomously dependent, or

they can choose to be autonomously independent. Individuals may also feel dominated or pushed to rely on the leadership or guidance of others (for example, authoritative pressure from medical treatment) or, in some cases, the introjected need that they should be beneficial [41]. As a result, the opposite of autonomy is not dependence or interdependence, but rather being controlled or experiencing the frustration of the fundamental psychological need for autonomy, as will be explained below. This is being coerced or manipulated into thinking, feeling, or acting in a certain way. Another psychological need defined under the micromodel of self-determination is competence. Competence is the ability to interact effectively with the circumstances into which one is placed. Thus, the ability to deal with context-related obstacles, in order to attain better personal growth and development, is referred to as competence [25]. The individual's need to be able to use their abilities, master tasks at an ideal level, and receive positive feedback reflects the need for competence. Last but not least, the ability of an individual to seek and build connections and interpersonal interactions with other peers in the situation in which they are placed is regarded as a basic psychological need [23]. It also symbolizes a sense of intimate, emotional closeness, and concern for others. This shows that relatedness, or the need to feel connected to others, is critical for internalizing behavior [27]. Conceptually, the three basic psychological needs are distinct. Nonetheless, they are strongly connected and interdependent. As a result, the satisfaction of each of them encourages and strengthens the others, and it is the satisfaction of all that promotes personal development and well-being [39].

Contextual and social elements that promote competence support during the course of a behavior boost the sense of competence. Yet, the feeling of competence alone is insufficient to induce an increase in competence [25]. It is critical that it is accompanied by a sense of autonomy, that is, the situation should not stifle the subject's sense of individual freedom. The subject also needs to feel accompanied and connected to the other peers in the context of cooperation, where relationships are developed and affective relationships between individuals, which can facilitate the achievement of objectives, are created. The previous explanations of basic psychological requirements were covered in terms of satisfaction. That is, when the individual's three basic psychological needs are met, the individual tends to manage their behavior in more self-determined ways (i.e., integrated regulation, introjected regulation, and intrinsic motivation). This argument is supported by a large body of literature [26,27,27], which shows that satisfying autonomy, competence, and relatedness is crucial in internalizing and integrating behavior. However, there is evidence that autonomy, competence, and relationships can be frustrated due to societal and contextual factors that might prevent or influence the development of these needs [42].

When people lack control over their own activities, they experience autonomy frustration [25]. Individuals feel driven to conduct according to the values imposed by the setting in which they find themselves. As a result, any activity is performed in accordance with criteria that are neither voluntary nor person-guided. Competence frustration is characterized by feelings of failure and questions about one's own efficacy in the conduct under consideration. That is, competence frustration happens when an individual feels unable to function properly, accompanied by feelings of guilt and failure [43]. Feelings of isolation, loneliness, and social exclusion are all symptoms of relatedness frustration. The individual believes they are being excluded from the social group or "tribe" to which they wish to belong [42]. When autonomy, competence, and relatedness are undermined, behavior is governed by less self-determined forces (i.e., amotivation, external and introjected regulation). Thus, actions are not internalized, but rather influenced by external or self-imposed factors on the individual.

It should be noted that low levels of satisfaction with basic psychological needs are not indicative of high levels of autonomy, competence, or relational frustration [42], and that their consequences appear with varying intensity and length. Thus, poor need satisfaction does not always imply need frustration, but need frustration may be related to low need satisfaction in terms of orthogonal motivational factors [42]. In fact, low satisfaction of needs will have long-term negative consequences, but purposeful frustration of wants will hasten

this process. Environments that meet basic psychological needs do not explain low levels of need frustration, and vice versa [25]. That is, depending on the individual's viewpoint, the context in which they are put might actively provide high levels of satisfaction or frustration of requirements [44].

3.3. Cognitive Evaluation Theory

The context in which individuals are put might actively provide high levels of satisfaction or frustration of basic psychological needs [44]. This theoretical micromodel assumes that external events can either foster or weaken intrinsic drive [27]. Cognitive Evaluation Theory focuses on the impact of social environment on intrinsic motivation, specifically on how rewards, interpersonal restrictions, and imposed constraints can impair intrinsic motivation and interest in one's own activity. To put it another way, the absence of controlling pressure, the offer of optimal growth options and challenges, and interpersonal friendliness can all boost intrinsic motivation. Normative judgments, regulated monitoring, the presenting of excessively easy or tough tasks, and cold relationships, on the other hand, can weaken this form of motivation. This micromodel covers how a person cognitively evaluates all contextual aspects that can influence motivation regulation, with the assumption that contextual determinants can support the prototype of self-determined motivation, intrinsic motivation [23,25,26]. This paradigm arose primarily from the research of context-determined autonomy support and how this supportive behavior fosters satisfaction of the psychological needs for autonomy, competence, and relatedness. The individual's perception of peers, authoritative figures, family members, or other representative aspects in the context in which they are inserted, is represented by their support for autonomy. This interpersonal behavior includes the individual's ability to choose (e.g., "would you rather do exercise A or exercise B?"), communication that is centered on the person rather than imposed (e.g., "what do you want/would you like to do?"), and what obstacles the person faces, as well as the reasons that could change the current perspective. When exercise physiologists can put themselves in the shoes of the user, they can more successfully assist with behavioral change and the integration of long-term healthy behavior [25]. Behaviors that promote autonomy also consider promoting self-initiated new behaviors (e.g., "congratulations on starting jogging on your own"). When people are encouraged by their own activities and behaviors, this significantly reinforces the behavior's internalization [27].

Designing activities where mastery is the dominating experience is referred to as competence support. That is, the person believes that the social context is producing needing and challenging conditions for skill improvement, yet within a pattern of continual advancement. For example, a physical exercise program should be prescribed to match the person's needs as well as physical and mental capabilities, with an emphasis on growth so that the person feels challenged to advance, preferably always in a healthy way. Competence support also views feedback as positive and particular (e.g., "today you improved your squat technique significantly"), rather than normative and ambiguous (e.g., "today your training performance was lower compared to other clients in the gym"). Finally, in supporting behaviors, praise should be considered, especially when the action was initiated by the individual (e.g., "it has been two weeks since you started mountain biking. Congratulations!"), rather than praise for context-instilled behavior. Relatedness support entails courteous and transparent communication for the individual to feel valued and important. Empathy, attention, and connection with others are important factors (e.g., "I believe my coworkers support my diet"). When a person believes that the social context (e.g., friends, coaches, peers) gives a sense of affective connection, also known as "tribe", in which there is reciprocal concern in the social bosom, they believe that the context is expanding there is fulfillment of the psychological need for relatedness. Relatedness support behaviors, such as feelings of inclusion and affection (e.g., "my coach likes me"), are also important predictors of relationship pleasure. It is important to note that this refers to the individual's view of the context (e.g., "I feel that my coach likes me"), which is very different from the individual's opinion of the context (e.g., "I like my coach").

When the "motivator" is someone who cares about them, people feel more autonomously motivated [26,45]. Sometimes just being present and empathic is enough to make someone feel connected.

Frustration interpersonal behaviors, on the other hand, are related to how basic psychological needs are met [42]. Controlling and externally imposed behaviors (e.g., "you have to do this exercise because I tell you so"), a view of the context rather than the person (e.g., "I think you have to lose weight because you're too heavy"), and the use of controlling rewards (e.g., "If you do what I tell you, you'll win a fantastic prize!") are all factors that undermine autonomy. This form of action should be viewed as coercive and manipulative toward the person's own autonomy, rather than as the inverse of promoting autonomy. The individual feels governed by external factors and lacks guidelines for more independent regulation. Normative feedback based on normative contingencies is utilized in behaviors ranging from frustration to competence (e.g., "you are gaining weight and you are already heavier than my other clients"). This style of behavior denotes challenges or behaviors that exceed physical and psychological limits. People leading to a sense of ineffectiveness in the face of the context, in many cases due to the social context's insensitivity to adapt to the individual rather than the opposite (e.g., "my coach told me that I should run for an hour without stopping, but I' never ran in my life"), can lead to competence frustration. This type of behavior highlights weaknesses, inadequacy, and promotes insufficient adaptation, causing the individual to doubt their own abilities. As a result, it is logically expected that such action will frustrate the psychological need for competence. Finally, relatedness frustration behaviors occur when an individual thinks that the setting is actively aggravating the relationship's basic psychological need. Relationship frustration behaviors include cold, negligent, unfriendly, and indifferent behavior (e.g., "my coach doesn't care about me, nor is he/she interested in knowing my reality"). As a biosocial entity, it is expected that human connections in various situations are as dynamic and communicative as feasible in terms of mutual respect and admiration. However, the social context ignores and devalues social interactions, presuming emotionless, careless, and sloppy behavior.

People tend to feel that their basic psychological needs are being addressed when they observe behaviors that foster autonomy, competence, and relatedness. On the contrary, when individuals believe that their social environment is undermining or aggravating their three core psychological needs, they are likely to experience displeasure with their autonomy, competence, and relationship [42]. It should be stressed that need-support activities are not fundamental psychological needs in and of themselves. Interpersonal behaviors, whether supporting or thwarting, influence whether basic psychological needs are satisfied or frustrated [25]. As a result, it is strongly recommended that physical activity professionals promote and adopt behaviors that support people's basic psychological needs in order to improve the satisfaction of autonomy, competence, and relationship. It is also recommended that these professionals restrict or avoid thwarting behaviors and activities, recognizing that doing so will theoretically promote the frustration of basic psychological needs.

3.4. Goal Content Theory

This micromodel was established to comprehend how the goal content might result in diverse outcomes that affect behavior performance [24]. Indeed, some motivations that people follow are more likely to create happiness than others [46]. At this point, it should be recognized that motives and motivation are two distinct notions [25], although they are inextricably linked by the Self-Determination Theory. Deci and Ryan [24] stated that a motive is conceptually "what" a person expects to gain as a result of participating in a certain behavior (e.g., "I exercise to enhance my health"). Motivation regulation, on the other hand, is concerned with the "why" of the individual committing to execute the activity (e.g., "I exercise it because the doctor instructed me to"). The Goal Content Theory distinguishes between intrinsic and extrinsic motives theoretically.

Intrinsic motives are those that provide satisfaction at work or in the setting in which people work, and which strive to develop personal interests, values, and potential while being naturally enjoyable to do. Health, skill progress, fun, pleasure, or vitality are examples of intrinsic motivations. These motivations are internal, which is why they are actively pursued in personal growth [47]. Intrinsic motives are distinct from intrinsic motivation and autonomous motivation [25]. For example, an individual may act altruistically, an intrinsic objective, simply to impress a family member or friend, an extrinsic behavioral control. Thus, despite being more linked with intrinsic motivation and autonomous motivation, intrinsic reasons can also steer motivation toward extrinsic forces [48].

Extrinsic reasons, on the other hand, have an external nature and are oriented "outside" of the individual, and are thus sought after by external contingencies [24]. Extrinsic motivations such as money, fame, and social recognition are examples of extrinsic motivations that encourage individuals to guide their motivation through extrinsic regulations (e.g., external regulation and introjected regulation). These aspirations frequently obstruct the satisfaction of autonomy, competence, and relationship, which harms the individual's well-being and personal growth [25,49].

3.5. The Relationships between Theoretical Micromodels

There is theoretical and empirical evidence for a causal chain between the motivational variables indicated in micromodels at the emotional, cognitive, and behavioral levels [25]. In sum, the individual's social environment (Cognitive Evaluation Theory) or the reasons for engaging in a particular behavior (Goal Content Theory) can influence the degree of satisfaction or frustration of basic psychological needs (Basic Psychological Needs Theory), which in turn influences the type of motivational regulation (Organismic Integration Theory) that the person employs in the face of behavior [25,50]. This motivational sequence was presented by Vallerand [50] and amended by Vallerand and Ratelle [51], and it combines the key aspects of the Hierarchical Model of Extrinsic and Intrinsic Motivation, which is adjacent to the Self-Determination Theory. This paradigm contends that motivational control is a result of social or personality variables, which are mediated by basic psychological needs. In turn, how an individual governs their behavior determines the cognitive, affective, and behavioral effects, which can be classified into three categories: global (personality), contextual (various human activities), and situational (state).

At the vertical level, these three levels span from stable (at the top) to transient or state elements (at the bottom), from global to contextual to situational. The broadest level is the global level, which corresponds to a person's personality or regular manner of operational functioning [52]. At this level, motivation takes the form of broad dispositions to engage in activities in either an intrinsic or extrinsic manner. It can be thought of as the trait's level of motivation. The contextual level comes next in the hierarchy. This level represents distinct living situations such as leisure (e.g., physical activity), and professional interpersonal connections with peers. This level considers the possibility that individuals will have motivational orientations that differ according to the circumstances. For example, an individual may engage in more intrinsic leisure activities while also partaking in work-related tasks for extrinsic incentives. It could also be the opposite for another person. As a result, it is critical to consider the sort of activity in which the person is engaged in order to refine any linkages between motivation and conduct [50]. Finally, the situational degree of motivation is the most particular, referring to the "here and now" of motivation. It is the motivating state that an individual has when engaging in a specific behavior at a specific moment, such as a Sunday morning walk through the forest with intrinsic motivation.

At the horizontal level (autonomous vs. controlled) we have the result of how basic psychological needs are satisfied or frustrated, as a result of contextual circumstances and/or individual personality qualities [25]. In other words, how an individual perceives the interpersonal behaviors of others (for example, coaches, health professionals, and exercise physiologists) will determine how satisfied or frustrated their basic psychological needs are [25,42]. Thus, social factors can aid in the development of these basic psychological

needs. Agents functioning in controlling contexts, on the other hand, can directly affect and control the thoughts, feelings, and behaviors of those with whom they engage, employing external contingencies of pressure, manipulation, induction of guilt and shame, and need frustration [42]. In practice, the individual who considers the physical exercise coach as a support figure, exhibiting expertise, support, and positive feedback, is more likely to meet their basic psychological needs [15,53]. On the other hand, an individual who perceives interpersonal behaviors of frustration or impediment, that is, who identifies negligent behavior on the part of the physical exercise coach, is the target of negative feedback, or feels imposed pressure, may be experiencing autonomy, competence, and relationship frustration [54,55]. In this regard, Ryan and Deci [25] argue that, both conceptually and empirically, supporting and frustrated interpersonal actions are associated with needs satisfaction and dissatisfaction, respectively.

The following section of the motivational sequence shows how the satisfaction and/or frustration of basic psychological needs impacts behavior regulation. According to Vansteenkiste and Ryan [42], there is a positive and significant relationship between the satisfaction of basic psychological needs and autonomous motivation (i.e., the person identifies and integrates the behavior as being part of themselves), motivation composed of the identified, integrated, and integrated regulation. On the contrary, it is expected that frustration of autonomy, competence, and relationships has a positive and significant effect on the regulation of controlled motivation (i.e., the person engages in behavior due to internal and external pressures or in search of external rewards), motivation composed of introjected and external regulation, and, in some cases, amotivation [25]. This evidence has been supported by empirical studies in the context of physical activity, which have also confirmed a negative relationship between the satisfaction of basic psychological needs with controlled motivation and the frustration of autonomy, competence, and relationship with autonomous motivation [15,54,56]. The final section of Vallerand's [50] motivational sequence, which considers the motivational determinants identified by Ryan and Deci [25], illustrates how motivational regulation is related to cognitive, emotional, and behavioral responses. The literature indicates that autonomous motivation has a positive and significant relationship with emotional responses, such as enjoyment and regular physical activity [36], positive effects [57], and subjective vitality [25]. In addition, empirical evidence suggests a positive correlation between autonomous motivation and the intention to maintain the behavior in the future [35,53], as well as adherence to physical activity [15,58]. Autonomous motivation also explains several healthy behaviors such as diet, seat belt use, vegetable, and fruit consumption, among others, as described in many studies [37,59,60]. In contrast, research [25,42] shows that controlled motivation is related with negative emotional features such as negative affect [57]. Controlled motivation is also linked to lower levels of intention to engage in physical exercise [35,55] and a higher chance of quitting the behavior [15,58]. Controlled motivation has a negative impact on healthy behaviors, as it is positively connected to risk behaviors such as tobacco and alcohol intake, sedentary behavior, or the risk of transmission of sexually transmitted diseases, among others [37].

4. Transtheoretical Model

According to Prochaska and Velicer [61], changing people's behaviors that have been in place for a long period is extremely difficult. Thus, behavioral change occurs across time rather than in a single instance of life. The Transtheoretical Model [62] assumed that a given behavior's progression is determined by a sequence of stages of change. However, because some people are unsuccessful in their efforts to modify behavior, this process might be cyclical rather than linear, and not all behaviors must necessarily go through all stages before they become habitual behaviors in the person. The Transtheoretical Model is a theoretical model, developed by Prochaska and DiClemente [63], that analyzes the process of inducing behavioral change and how it can then be sustained across time. This model provides an integrative perspective of the framework of purposeful behavioral

management and can be evaluated based on behavioral management phases or levels. Following multiple investigations (1984, 1983, 1982), Prochaska et al. [62–64] discovered the existence of five phases or stages, and that behavioral change occurred throughout time as a result of them. In fact, and contrary to popular belief, Prochaska and DiClemente [63,64] transformed behavioral management theories by viewing behavior as a process rather than a rigid event.

Based on the time it took for one conduct to change into another, this paradigm shift prompted academics to delve deeper into the study of behavior. According to Prochaska and Norcross [65], each phase comprises a set of qualities that clearly specify the actions required to move to the next stage, in addition to a specific time period. The period of an individual's permanence in each stage varies, but the functions they must accomplish are presumed to be constant. The phases are the following:

Precontemplation. At this point, there is no intention of changing the behavior in the near future, which is commonly measured in six months. The individual may be at this stage because they are unaware of the effects of their acts and activities. It is also possible that individuals are feeling down about their ability to change because they have tried and failed countless times before. Prochaska et al. [66] identify the component of wanting to change as being distinct from properly considering and planning the change, akin to the intention gap behavior. These people tend to avoid discussing or reflecting on their actions.

Contemplation. Individuals at this stage are aware that there is a problem or a need for change and are serious about overcoming the situation but have not yet committed to acting accordingly [65]. It is critical to note that at this stage, people intend to change within the next six months. This is an important stage in habit change because people are more conscious of the benefits of change, but they are also more aware of microorganisms. This balancing of costs and rewards can lead to intense ambivalence and to what is sometimes referred to as persistent contemplation or behavioral procrastination [61]. In other words, the consideration of costs and effects in relation to behavioral control can, at this level, lock the individual in a mental limbo perpetually. The following examples of a person in the contemplation phase can be used: "I've already scheduled an appointment with my general practitioner to evaluate health indicators", "I've developed an action plan to begin practicing physical activity", "I've already received recipes that are healthier and more appropriate for my current lifestyle", and "I've purchased some fitness equipment to train at home".

Preparation. Individuals in this phase intend to act in the near future, which is commonly measured as the month following the confrontation with the behavior. Typically, these individuals have taken some action in the past, albeit without success, but with the purposeful intention of changing the existing reality. At this point, windows of opportunity for behavioral change occur, and professionals play a critical role. At this stage, individuals seek knowledge through numerous ways (e.g., the media, social networks), in pursuit of solutions that can aid in behavioral decisions in an attainable and appropriate manner [62]. At this point, there is a willingness to change and, in some cases, the implementation of minor alterations (e.g., using stairs instead of elevators).

Action. People in this phase made specific and apparent adjustments to their lifestyle over the previous six months. Individuals adjust their behavior in the action phase to overcome their existing behavior, based on their experiences and their environment. In fact, an action involves the most obvious behavioral changes and needs a reasonable time and energy investment from the individual. Changing behavior adjustments done during the action phase are more evident and obtain more social acknowledgment [65]. As previously stated, individuals are defined as being in the action phase if they have effectively modified their issue behavior for up to six months [65]. It should be noted, however, that the six-month period works as a reference, and not as an exact limit.

Maintenance. This is the final phase of the Transtheoretical Model, and it relates to the period in which people struggle to avoid relapse and solidify the gains made in the previous phase [66]. It is preferable to consider an individual in this phase capable of being

free of the problematic behavior and engaging in the new and incompatible activity for more than six months [62]. Individuals in this phase work to prevent relapse but do not use change processes as frequently as those in the action phase. They are less likely to relapse and more confident in their ability to stay on track. In sum, the five major phases mentioned in the Transtheoretical Model are as follows, in a logical order: behavior change begins with Pre-Contemplation, then proceeds on to Contemplation, Preparation, Action, and finally Maintenance. There is evidence, however, that identifies a sixth phase that assumes, in general, the terminal phase of behavioral change.

Finalization. This is the stage in which individuals have completed the process of change, and no longer need to work hard to avoid relapse. It refers to the person's complete confidence in keeping the new behavior in all high-risk situations, accompanied by no attempt to relapse [65]. That is, regardless of whether the person is unhappy, upset, alone, or stressed, they are convinced that they will not resort to their troublesome habits as a way of dealing with the circumstances [61]. When a person stays in this phase for five years, they tend to keep the new behavior-habit on a regular basis for the rest of their life, almost as a personality trait. At this point, the individual has a very low chance of returning to the previous behavior, so they will find a technique or strategy to retain the current behavior in most instances [63]. Individuals will not return to their prior behavior and act as if it never happened, regardless of future occurrences [61].

Behavior Change Process

The Transtheoretical Model covers and describes behavioral change processes in addition to the results or phases of change. People use cognitive, emotive, and evaluative processes to go through the stages of change [64,65]. Overall, there are ten change processes, with some processes being more important to a specific phase of change than others [67]. These processes result in techniques that assist the individual in making and, more importantly, maintaining long-term improvements. The first five steps are cognitive and affective processes, while the rest are behavioral processes:

Consciousness raising. Increase in the individual's awareness of the new/healthy activity. This technique implies that the individual has chosen to make behavioral change a priority in their life.

Dramatic relief. Current conduct has an impact on others, and modifying it is a compensating measure. That is, there is an emotional awakening regarding mental conduct, either through a positive or negative stimulus.

Self-reevaluation. A self-evaluation to recognize that healthy behavior is a part of one's identity. That is, the new conduct is an extension of who the person is and what they aspire to be.

Environmental reevaluation. Social reevaluation to understand how individual health-risk behavior affects others. In addition, social reevaluation considers how the behavioral change might affect others.

Social liberation. Contextual possibilities arise to demonstrate that society encourages healthy conduct.

Self-liberation. Believing in one's power to change and commit to action. That is, the individual makes a commitment to change behavior based on the assumption that the behavior may be achieved in a healthy manner.

Helping Relationships. Finding people who will support in individual behavioral transformation. It is critical that the individual associates with a community of people who can assist them in behavioral transformation, without risking the ecological prospect.

Counter-conditioning. Getting rid of bad habits and replacing them with good ones. Furthermore, an emphasis is placed on substituting ideas about good activities with thoughts about risk behaviors.

Reinforcement management. Rewarding good behavior while decreasing the benefits for dangerous behavior.

Stimuli control. Using pads and recommendations that encourage healthy behavior, instead of ones that encourage unsafe behavior. That is, reshaping the environment to include resources that support and encourage healthy behavior while eliminating those that promote harmful conduct.

5. Conclusions

Understanding social-cognitive theories may aid in the creation of interventions aiming to improve long-term physical activity maintenance. The present work covered theory and research on physical activity patterns. It specifically provides an overview of contemporary conceptualizations of motivational and cognitive theories, reviews recent perspectives on how physical activity can be adopted and maintained, addresses key questions such as whether or not physical activity can be executed purely based on cognitive functions, and identifies intervention strategies effective in promoting physical activity. Motivational determinants of physical activity are distinct behavioral reactions that are triggered by environmental stimuli or personal factors. Physical activity, for example, is encoded in associative memory and experienced as low effort and independent of objectives and intents. Motives and motivational interventions require the development of self-regulation abilities that allow for recurrent exposure to the activity, in conjunction with stable cues or contextual elements.

Author Contributions: Conceptualization, F.R, M.J., N.F. and D.M.; investigation, F.R.; resources, D.M.; writing—original draft preparation, F.R., N.F., P.M. and F.R.; writing—review and editing, F.R., D.M., N.F. and P.M.; visualization, P.M.; supervision, M.J. and D.M.; project administration, D.M. and M.J.; funding acquisition, F.R. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by national funds through the Portuguese Foundation for Science and Technology, I.P., grant number UID/04748/2020 and grant number UID04045/2020.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

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