

# Research advances in self-determination theory in the field of exercise and implications for its application

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**Abstract:** *Objective: To explore the research progress and application insights of self-questioning my decision theory in the field of movement. METHODS: A search of domestic and international literature on exercise and SDT was conducted between January 1, 2015 and December 31, 2020 using the China Knowledge Network full-text journal database, Web of Science and Baidu Academic, respectively. RESULTS: Social support has a facilitative effect on exercise behaviour through the social environment, parental peer relationships, and the basic psychological needs theory of relational needs, autonomy needs and competence needs between the social environment and physical and mental health. Targeting autonomous forms of motivation in interventions is an effective way to promote physical activity in children and adolescents. Autonomy environment and motivation have an impact on physical activity, physical learning enjoyment, participation, effort and willingness to continue to participate in physical activity in the future. Sdt-related theory can be used to predict the behaviour associated with assessing physical activity with positive predictive effects. CONCLUSION: SDT theory can promote individual motivation to engage in sport from promoting sport participation.*

**Keywords:** *self-determination, exercise, basic psychological needs, motivation*

## 1. Introduction

Zhang Xinghua's analysis of anthropometric data from 63,449 Chinese aged 18-97 years from 2002-2019 yielded an obesity rate of 54.0% in the total sample size for men and 27.2% for women based on body fat percentage typing. These figures fully illustrate the relatively high rates of overweight and obesity in the country. In the United States, it is estimated that by 2030: weight or normal weight <25, overweight 25 to <30, moderate obesity 30 to <35 and severe obesity  $\geq 35$ , obesity and severe obesity will continue to increase. Obesity rates in Cuba increased between 2001 and 2010, with a significant increase in overweight and obesity. Obesity has become a major public health problem worldwide. The increase in obesity rates due to sedentary behaviour and physical inactivity cannot be addressed solely through external conditions such as economic investment or policy development, but rather through the long-term effects of raising awareness and motivating people to exercise.

Table 1: Classification of SDT and related introduction

	Explanation of terms	Variables
Basic Needs Theory		Competence, autonomy, relationships
Cognitive evaluation theory	The influence of the social environment on internal motivational behaviour	External motivation, internal motivation
Organic integration theory	Intervention in internalised regulation of external motivation	External motivation: external regulation, introjected regulation, identity regulation, integrated regulation (autonomous motivation) and Internalization
Causal orientation theory	A descriptive explanation of internal resources	Self-directed, controlled directed, non-personal directed
Targeted content theory	Focusing on human passions and life goals, exploring the relationship between goal content and mental health	Intrinsic goals, extrinsic goals

Self-determination theory (SDT) is a theory of human motivation that emphasises the dynamic role of the self in the motivation process. It was developed by American psychologists such as Deci Edward L. and Ryan Richard M. in the 1980s and has been developed over the past 30 years into a theory of motivation with five sub-theories (basic needs theory, cognitive evaluation theory, organic integration

theory, causal orientation theory and goal content theory).

## **2. Research Methodology**

### ***2.1. Literature search and screening***

The literature on exercise and SDT from January 1, 2015 to December 31, 2020 was searched using the full-text database of Chinese journals, Web of Science and Baidu Academic. The search criteria were title or keywords, "self-determination theory", "self-determination", "basic needs", "external motivation", "internal motivation", "autonomous motivation" and "physical activity", "physical activity "physical activity", "physical activity", "physical activity", "exercise" and "exercise" were used as keywords, and "and" was used as the operator to search for a total of 107 articles, excluding duplicate articles. 31 articles.

## **3. Insights and reflections on the current state of research on SDT in the field of sport**

### ***3.1. Research on SDT in the field of exercise***

The SDT theory promotes individual participation in exercise and self-determined motivation is associated with sustained health promoting behaviours. max test (a sustainability test method for personal autonomy and self-determination) based on a 50% internal load sub-test of perceived exertion was highly correlated with the max test, in addition to cardiorespiratory assessment, supporting the use of self-behaviour as a calibrating mechanism for children.

Individual participation in sport is motivated by the importance of organic interaction between the individual learning and the social environment, i.e. with parents, teachers, peers and the classroom environment, where parents, teachers, peers act as role models and the individual is supported to meet his or her basic psychological needs. Parents, teachers, and peers have a mediating role in moderating this, and Dong Baolin's study concluded that parental autonomy support for adolescent physical activity can have a positive moderating effect on adolescents' adaptive perfectionism and autonomous motivation to exercise.

#### ***3.1.1. Social support for exercise***

Students' motivation to exercise is an internalisation process that is gradually shifted from external regulation to internal motivation under the influence of social support. The internalisation of motivation to exercise is not the result of the direct action of social support, but rather the result of a gradual internalisation and facilitation of exercise behaviour through the mediated transmission of the relational, autonomy and competence needs of basic psychological needs theory (relational, autonomy and competence needs lie between the social environment and physical and mental health).

Social support consists of the external environment, parents, and peer relationship support.

The external built environment contains destination accessibility, facility availability, safety and aesthetics, which can significantly influence adolescents' physical activity directly and indirectly through basic psychological needs, while street connectivity cannot significantly influence adolescents' basic psychological needs satisfaction and physical activity. Wang Fu Baihui's study pointed out that the school environment was not conducive to enhancing the physical activity of urban adolescents.

The results of Yang Jiapeng's study showed that parental support for physical activity was positively correlated with adolescent physical activity levels ( $p < 0.01$ ), the higher the level of parental support for adolescent participation in physical activity, the higher the child's level of physical activity, and parental support for physical activity promoted adolescent physical activity.

Social support from friends directly influences basic psychological needs, which are determined through intrinsic motivation and attitudinal volition. Sports friendship is an antecedent variable of adolescent exercise adherence, and all three have a significant direct effect on exercise adherence, with sports friendship having a greater effect on weekly frequency. The mediating effect of autonomous motivation was significant when sport friendship influenced adolescents' exercise persistence.

Zhu Jiao tested junior high school students (435 students) from two middle schools in Beijing on related scales (Exercise Atmosphere Scale, Exercise Psychological Needs Satisfaction Scale, Exercise Behaviour Modification Scale-2 and Exercise Activity Rating Scale) and found that the perception of exercise autonomy provided by physical education teachers, parents and peers could influence

adolescents' exercise behaviour by satisfying three basic psychological needs (competence, autonomy and relationship needs) Autonomy motivates and thus influences exercise behaviour. There was no significant difference in the effect of the sense of autonomy of significant others (parents, physical education teachers and peers) on exercise behaviour.

The interactive kiosk designed by Hahn et al. that allows for self-setting physical activity goals and access to socially supported exercise monitoring records assessed by a virtual agent, with children gradually reaching their goals over the six-month study, is a feasible interactive technique that is consistent with the SDT facilitated exercise transformation process.

### ***3.1.2. The role of autonomy support in the promotion of physical activity***

Autonomy support encompasses an autonomy-supportive environment, autonomous motivation, etc. Targeting autonomous forms of motivation in interventions is an effective way to promote physical activity in children and adolescents. Elisa investigated students' facilitation of motivation as well as physical activity and sports participation after school by applying measures of dialogic learning (promoting effective student-student and student-teacher communication) on the basis of autonomy support. The results show greater support for teacher-peer autonomy, satisfaction of basic psychological needs, conscious motivation in physical education classes and after school, greater perceived control, and increased student motivation and participation in actual physical activity. Autonomy motivation has an impact on children and adolescents' physical activity, enjoyment of physical learning, participation, effort and willingness to continue to participate in physical activity in the future.

Peng Chunzheng's study pointed out that an external environment for physical activity supported by autonomy, personality traits for autonomous participation in physical activity and the establishment of internal exercise goals are essential factors in promoting an autonomous and regular physical activity lifestyle among offshore workers. Wang Fu Baihui's study identified significant correlations between internal motivation, parental support and peer relationships and interest in participation. Integrating parents' desired value beliefs and the environment provided with adolescents' motivation to exercise achieves a link between the family, environmental level and individual psychological level to further promote exercise behaviour.

The tendency of college students to procrastinate is worrying, as procrastination does not have a moderating effect on motivation to exercise, but is negatively correlated and has a deterrent effect, with Wang Zhen's study indicating that all dimensions of procrastination are negatively correlated with self-efficacy and internal integration motivation, and positively correlated with externalising principle motivation and lack of motivation.

### ***3.1.3. SDT assessment model***

SDT-related theory can be used to predict behaviours associated with assessing physical activity, with positive predictive effects.

Based on self-determination theory with the Dualistic Model of Passion (DMAP) to test whether social media interventions can promote harmonious enthusiasm and positive emotions associated with exercise activity, interventions do not predict shifts in enthusiasm for activity, and by combining questionnaires with self-determination theoreticality to count baseline reported emotions, results suggest that digital platforms can be used to promote relevant physical activity through the facilitation of positive emotions associated with exercise.

Alan assessed three summary models of the relationship between school physical activity environments and physical activity-related outcomes and found that school physical activity environments positively predicted physical activity through partial basic psychological needs satisfaction (BPBS) and full (BPNS) mediated physical activity, highlighting the potential role of school environments in predicting health and fitness in Hispanic children and that facilities and culturally relevant activities should be provided to enhance Hispanic children's physical learning.

Ullenhag et al. studied an intervention model of a client-centred goal-directed approach in which participants set their own goals for leisure activities, which appeared to be effective in enhancing children's engagement in leisure activities, self-efficacy and activity performance.

## ***3.2. Insights and reflections on the current state of SDT research in the sport domain***

In the field of school sport, some schools do not even dare to carry out single or double pole jump rope and shot put in order to avoid accidents in physical education classes, or even "free" classes,

resulting in lower demand and students' disinterest in sport. In the field of mass sports, due to the change in lifestyle, the elderly do not need to work long hours and have more time to focus on themselves. In competitive sport, self-determination theory can predict fatigue, allocate training appropriately and prolong athletic careers. When athletes are motivated by autonomy support, their motivation is more autonomous (internalised and identified motivation) and they are able to stay in training longer, whereas unmotivation or external conditioning predicts that athletes are more likely to give up.

Since Deci et al. (1985) proposed the 'self-determined motivation theory' in the 1980s, many foreign scholars, represented by Ntoumanis, have conducted research on the effects of learning in sport based on the framework of self-determined motivation for nearly 20 years, and have achieved fruitful results. From the literature collected in this study, it is clear that 1) there are individual differences in external motivation, accompanied by self-recognition and choice. There are also cultural differences and 2) there is a paradoxical sense of support in the school environment for the promotion of sport, to be verified in subsequent studies.

#### 4. Summary

SDT theory can promote individual motivation to participate in sport, from promoting sport participation. It should be applied in the sporting arena with full awareness of individual needs and environmental information, whether it be learning and teachers, athletes and coaches, or the general public, to understand the psychological and behavioural characteristics at each stage, and that motivation is a gradual internalisation process and should not be rushed.

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