Motivation is a central construct that has been proved to enhance K-12 students’ learning. During the learning process, some students encounter difficulties and obstacles that may discourage them from putting forth maximum effort. It is only natural that students who understand how to motivate themselves may learn more effectively. From this perspective, the motivation process, itself, can be understood as a unique learning strategy (Chen, 2013; Wang, Chapter 41, this volume). I will begin this chapter with an overview of selected contemporary motivation constructs or theories that are widely studied and applied in education, such as goal theory, interest-based theory, and self-determination theory. In the second section, I will review and critique selected PE research examining motivational strategies related to student learning. Finally, I will discuss the future of PE motivation research with respect to student learning.

Historical overview

Learning

Historically, conceptualizations of learning have evolved from a behaviorist to a cognitive perspective. Originally derived from British empiricist notions of knowledge acquisition (Reynolds, Sinatra, & Jetton, 1996), behaviorists conceptualize learning as a process of behavioral conditioning and reconditioning (Alexander, 2005). Although modern behaviorist learning theory acknowledges learning as a process involving more than reinforced behavioral experiences, the theory leaves little room to explain mind functioning (Reynolds et al., 1996) or the role and function of active thinking and reasoning in behavior (Alexander, 2005). During the 1950s~1960s, psychologists worked to clarify and explain the nature of learning (Shuell, 1986), generating new theories, such as constructivism.

One of the most noticeable and influential constructivist learning theories is social constructivism (Vygotsky, 1978). Social constructivism claims “learning is a necessary and universal aspect of the process of developing culturally organized, specifically human psychological function” (Vygotsky, 1978, p. 90). In other words, learning occurs when the learner internalizes the social experience by interacting with others. Vygotsky’s concept of “Zone of Proximal Development (ZPD)” further emphasizes the role that knowledgeable and/or experienced others play in optimizing social interaction with novice learners to enhance learning.
Learning in physical education

Physical education is a unique discipline in education in that it concerns development of the psychomotor as well as the cognitive and affective domains (Rink, 2003). Learning theories in PE also have made the transition from behaviorism to cognitivism. Although curricula focus, in part, on motor learning, researchers agree that psychomotor learning is inseparable from the cognitive process (Jewett, Bain, & Ennis, 1995). In general, PE learning is defined as a relatively permanent behavioral change resulting from physical movement experiences associated with cognitive understandings of that movement (Rink, 2001). The concept of learning in physical education includes engagement in many physical tasks, cognitive understanding of the movements involved, and recognition of the importance of social interaction.

To further articulate PE learning, Ennis (2003) proposed a value-context model to describe relevant factors “directly affecting what, how, and how much students learn in physical education” (p. 114). In this model, student learning is central to schooling and directly influenced by the curriculum planning and teaching process. The planned curriculum and instruction inform the nature of the school context, which, in turn, influences student responses to the curriculum and instruction. This cycle emphasizes the process of curriculum decision-making and how curriculum determines and facilitates student learning in particular school and class environments. A curriculum and the context it creates, however, are influenced by the values and beliefs that are held by students, families, teachers, peer groups, and school administrators. These values and beliefs impact student learning directly. Lastly, the global and pervasive social environment in PE, defined as the societal climate of expectations and performance, ultimately determines specific learning outcomes. Evolution and changes to the U.S. National Standards in the past 20 years (National Association for Sport and Physical Education, 1995, 2004; Society of Health and Physical Education [SHAPE], 2014) have exemplified the tenets elaborated in the model. During the last two decades, societal expectation for health promotion and control of childhood obesity gradually has played a larger role in the standards shaping PE learning outcomes. This change, to a degree, has begun to redefine learning and the role of motivation in PE.

Motivation

Motivation is a mental process that energizes human beings to engage in activities and accomplish their goals (Pintrich & Schunk, 2002). Historically, motivation has played a different role in behaviorism and cognitivism. Behavioral theorists view motivation as a change in the frequency of a behavioral occurrence or response driven by stimuli external to the person. From the behavioristic viewpoint, motivation reflects a high possibility that an expected behavior will appear as people respond to external demands. In behaviorism individuals’ feelings and thoughts are considered of little relevance in this stimulus-response loop. Conversely, cognitive theorists view motivation as an internal process that directs behaviors based on active, conscientious interaction among beliefs, values, affects, attributions, goals, perceptions of competence, and social comparison (Pintrich & Schunk, 2002).

Through the years, motivation has been conceptualized as having three psychological functions: (a) energizing or activating behavior (e.g., what engages learners or turns them away from learning); (b) directing behavior (e.g., why one activity is chosen over another); and (c) regulating behavior sustainability (e.g., why one persists toward a goal) (Alderman, 2008).

In education, students’ motivation is characterized by their task choice, practice persistence, effort level when completing assignments, and demonstrated achievement (Wigfield & Eccles, 2000).
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2002). From the cognitive perspective, educational motivation research supports the assumption that these characteristics are based on students’ (a) achievement goal orientations (Nicholls, 1984), (b) interest in the content and environment (Renninger, Hidi, & Krapp, 1992), and (c) determination of behaviors (Deci & Ryan, 1985). In the past three decades, scholars have studied motivation theories involving these constructs or motivators in education and PE. In the following sections, I will briefly review theories integrally linked to learning knowledge and skills needed for active and healthful living.

Theoretical frameworks

Optimal learning occurs when students’ needs for knowledge acquisition, motivation, and other desired educational outcomes are satisfied (Alexander, 2005). Learning is optimized when learners possess motivation to learn. Therefore, motivation is one of the most critical and important necessities for learners. Researchers have developed a number of theoretical models in the past 30 years in an attempt to better understand and explain motivated learning behavior and process (e.g., Sansone & Harackiewicz, 2000; Wigfield & Eccles, 2002).

Achievement Goal Theory (AGT)

Since 1980, researchers have articulated contemporary conceptions of achievement goals as students’ goal orientations and goal structures within social environments that impact learning (Urdan, 1997). Research focuses on the nature of achievement goals including both a personal component (the goal that the student pursues) and a situational component (the goals students perceive as important in the environment such as learning objectives) that may orient students toward different achievement goals (Kaplan, Middleton, Urdan, & Midgley, 2002).

Goal orientation

Achievement goals emphasize the students’ meaning or purpose for engaging in an achievement behavior (Molden & Dweck, 2000; Nicholls, 1984). Ames (1992) defines achievement goals as integrated patterns that combine beliefs, affect, and attribution to influence individual behavior intentions. In general, the achievement goals can determine individuals’ ways to approach, participate in, and/or react to achievement related activities.

Achievement goals have been operationalized within a dual-goal structure featuring task/mastery and ego/performance-involved goals (Nicholls, 1984). More recently achievement goal researchers have extended the dual-goal theory to encompass a multiple goals construct. Elliot (1999) proposed that within mastery or performance goals, students take either an approaching or avoiding strategy to define and choose personally meaningful goals. Within the performance-approach goals strategy, students define achievement as demonstrating high ability in reference to peers’ achievement, while the performance-avoidance goals lead students to avoid demonstrating low ability or appearing stupid or dumb. When the approach-avoidance distinction is applied to mastery goals (Elliot, 1997; Pintrich, 2000), students with mastery-avoidance goals attempt to avoid misunderstanding or demonstrating inability to master the material (Pintrich, 2003). Although motivation function within multiple goal constructs is complex, researchers have shown that the 2×2 achievement goals matrix effectively predicts and explains most motivational processes and outcomes (e.g., effort, persistence, performance; see Elliot, 2005).
Goal structure

In addition to students’ personal goals, the achievement goal orientation also explores characteristics of learning environments that may influence students’ goal orientation. Ames (1992) emphasized that care be taken in learning task design, use of rewards, evaluation, or recognition, and distribution of authority or responsibility. She argues that tasks characterized by variety, diversity, and challenge are more likely to encourage learner interest in learning, promoting mastery goal orientation. Goal structures holistically define the motivational climate in a learning context (Treasure, 2001). Basically, a mastery-oriented learning environment is related to adaptive or positive cognition, motivation, and affect patterns.

Interest Theory

Interest has been conceptualized as both individual/personal and situational (Krapp, Hidi, & Renninger, 1992). Individual interest refers to a person’s psychological disposition in preference for an activity or action. Individual interest is a relatively stable and enduring disposition. Conversely, situational interest is defined as a psychological state elicited by aspects of the immediate environment, such as ways in which learning tasks are organized and presented.

Individual interest is specific to each individual. Renninger (2000) asserted that individual interest derives from stored knowledge and value. For individual interest to emerge, sufficient knowledge about the object is a necessary and sufficient condition. Students will be highly motivated and engaged in a learning task if they have high individual interest. From a practical educational perspective, however, Hidi and Anderson (1992) argue that using student individual interest as a primary motivational tool can be difficult because of the diverse nature of individual interest.

Situational interest, on the other hand, is characterized by spontaneity. A situationally interesting activity can immediately attract learners’ attention, involve them in the process, and provide instant, positive feelings toward the activity (Hidi & Harackiewicz, 2000). Given its spontaneity, situational interest is considered a motivator that the teacher can control to some extent (Schraw, Flowerday, & Lehman, 2001). In PE, Chen, Darst, and Pangrazi (1999) validated a situational interest model characterized by novelty, challenge, attention demand, exploration, and instant enjoyment.

Self-Determination Theory (SDT)

In SDT, needs for competence, autonomy, and relatedness serve as the cornerstones of human motivation (Deci & Ryan, 1985). These needs provide a fundamental source of mental energy for human behaviors manifested in person-activity interactions in an environment, such as a classroom, gymnasium, or playground. Specifically, the first need, competence, refers to satisfaction in one’s ability and feelings of effectiveness in ongoing activities. Perceptions of competence are positively related to intrinsic motivation. Deci and Ryan (1985) define autonomy, the second need, as the degree to which individuals perceive themselves as the origin or behavior source responsible for the initiation of the behavior. When experiencing autonomy, individuals regulate their behaviors by initiating and directing actions (Ryan & Powelson, 1991). Ryan and Deci (2000) define the third need, relatedness, as the extent to which individuals feel connected to others through activities and their sense of belonging both to their community and other individuals.
Deci and Ryan (e.g., 1985, 2000) conceptualized self-determination as a motivation process with three basic states, intrinsic motivation, extrinsic motivation, and amotivation. Intrinsic motivation refers to the fuel for action (Deci & Ryan, 1985). It derives from person-activity interaction that people find interesting, optimally challenging, or aesthetically pleasing (Ryan & Deci, 2002) and resides in people’s needs for autonomy, competence, and relatedness.

In reality, however, people often need to be motivated through means other than interest, challenge, or pleasant experiences. Motivation leading to enhanced performance in activities with inherently low interest, low challenge, and few pleasant experiences is referred to as extrinsic motivation (Deci & Ryan, 1985). Additionally, the absence of motivation or situations where an individual lacks the intention to act is described as amotivation (Ryan & Deci, 2000). An individual with amotivation feels incompetent, does not value what he/she does, does not expect a desired outcome, or feels lack of control in an environment (Deci & Ryan, 1985; Ryan & Deci, 2000).

Basic needs and the learning environment

Although self-determination is an individual-centered process, its development depends on a supportive environment, especially for school-age children. A hierarchical motivation model (Ryan & Deci, 2000; Vallerand & Losier, 1999; Vallerand & Rousseau, 2001) incorporating the fundamental SDT tenets delineates the sequential pattern of motivational processes. From this perspective, social environments lead to innate need satisfaction, which in turn leads to different types of motivational consequences. In general, a social environment can be autonomy-supportive or externally controlling, either facilitating or undermining intrinsic motivation. Therefore, school/classroom environments that satisfy students’ needs for autonomy will enhance or facilitate their intrinsic motivation, resulting in adaptive behavior or outcomes.

In summary, contemporary researchers in achievement motivation have focused on a few powerful theories to explain students’ learning-related motivation. It is clear that students can adopt different goals, interest, and regulations and adapt them to teacher-designed classroom climates or structures. The research forms a basis from which children’s and adolescents’ motivation to learn in PE can be studied and understood. In the next section, I will discuss current theoretically based research findings and their implications for learning.

Current trends, issues, and implications

Learning environments and climate research

Prominent motivation theories (e.g., STD, goal theory) are based on the assumption that teachers can create a motivating learning environment leading to positive/adaptive student behaviors and outcomes. For example, SDT researchers are studying social contexts that fulfill students’ innate psychological needs enhancing self-determined motivation. When studying AGT, Ames and Ames (1984) suggested that teachers share authority or responsibility with students to support their autonomy in the learning process. Ames (1992) recommended teachers create a learning-conducive mastery goal environment by placing high value on meaningful mastery tasks rather than on competition, instead emphasizing self-reference standards in evaluation and offering opportunities for self-directed learning.
To study SDT in PE learning contexts, researchers incorporated AGT to investigate students’ self-determined motivation and perceived learning climates (mastery, performance, and origin) (Ntoumanis, 2001, 2005; Standage, Duda, & Ntoumanis, 2005). More specifically, researchers hypothesized that a mastery environment characterized by cooperation, self-referenced improvement, and opportunities to make choice/decisions will help students satisfy needs for relatedness, competence, and autonomy, respectively. Consequently the mastery environment will lead to greater motivation and achievement. Research evidence has revealed strong relationships between mastery contexts and satisfaction of the three innate needs. The performance climate, on the other hand, was not related to student perceived autonomy or relatedness. Overall, research findings confirm that the autonomy-supportive environment contributed to student need satisfaction of autonomy, competence, and relatedness (Standage, Duda, & Ntoumanis, 2003). From a curricular perspective, findings support constructivist curricular approaches in which PE learners are actively constructing content meanings and understandings as they interact socially. In this environment students are likely to master knowledge and skills, learn to empower themselves to construct shared meanings, and identify the most meaningful learning processes to maximize learning (Pollard, Thiessen, & Filer, 1997).

Satisfying the three needs, however, may yield complex PE outcomes. In recent years the childhood obesity crisis has encouraged public health advocates to champion the role of PE in public health. Promoting and increasing moderate-to-vigorous physical activity (MVPA) in PE has become a curricular strategy to achieve this mission (Sallis et al., 2012). Pedagogy scholars, in turn, have examined a range of teaching strategies to determine the most effective SDT-based interventions strategies to meet this goal. For example, Lonsdale et al. (2013) randomly assigned teachers and students to one of four conditions: 1) explaining relevance – explaining activity rationale and importance as related to students’ lives; 2) providing choice – providing students with from two to four PA choices within the lesson; 3) complete free choice – providing students with needed equipment and limited teacher instructions; and 4) usual practice. Results revealed that, although students’ perception of autonomy increased during both choice-based interventions (#2 & 3 above), their self-determined motivation did not increase in any of the teaching strategy conditions. Free choice (#3) led to the greatest MVPA when compared with other conditions; but it did not foster motor skill development and health knowledge acquisition/mastery. Thus, preliminary evidence suggests that the role of SDT as a learning strategy needs additional empirical examination to understand its effect on learning.

Recently, researchers have cautioned that not all SDT tenets may be supported in empirical PE research. Gillison, Standage, and Skevington (2013) tested five different PE social contexts to examine the effect of intrinsic vs. extrinsic goals on outcomes, motivation, effort, enjoyment, and future intention to exercise on learner motivation and behavior outcomes. They compared the outcomes in the following different experimentally manipulated PE conditions: 1) autonomy supportive, intrinsic goal content; 2) controlling, intrinsic goal content; 3) autonomy supportive, extrinsic goal content; 4) controlling, extrinsic goal content; and 5) neutral climate, no goal content provided (control group). The intrinsic goal condition emphasized the goal of being physically fit and healthy, while the extrinsic goal emphasized looking good or outperforming others. Results showed that autonomy support and an intrinsic goal focus positively predicted measured outcomes, including motivation, effort, enjoyment, and future intention to exercise. The extrinsic goal focus, however, led students to the positive outcome of a greater appreciation for lesson values and stronger future exercise intention. Findings from these fitness and exercise-oriented lessons were contrary to theoretical SDT assumptions that typically apply
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in learning-oriented lessons. Scholars assume a negative relation (in learning-oriented lessons) between the controlling extrinsic goal and outcome. Although these findings were contrary to SDT tenets, they did not completely contradict previous findings (Gillison et al., 2013). Gillison et al. (2013) pointed out that these findings suggest that promoting extrinsic goals for an existing activity might have short-term positive effects on individuals’ behavior and perceptions. These findings also suggest that PE researchers consider evaluating the longer-term effects of ongoing extrinsic goals/pursuits in future SDT classroom research.

AGT research

Another important strand of research on environment is from the AGT perspective. PE researchers examining achievement goal climate have provided strong evidence that PE teachers can manipulate goal climate. Todorovich and Curtner-Smith (2003), for example, manipulated achievement goal climate when investigating the influence of mastery and performance goal climates on third grade students’ goal orientations (n = 80). Students were assigned to task or ego climate groups or a control group. The findings indicated that students in the task climate condition strengthened their task orientations, while those taught within an ego-involving climate strengthened their ego orientation. Interestingly, neither treatment impacted the other orientation.

Similar findings have been reported in a PE curriculum intervention study in which researchers created a task/mastery involved climate in 88 lessons (Digelidis, Papaioannou, Laparidis, & Christodoulidis, 2003). PE teachers taught junior high school students (n = 262) using a task-involving curriculum, while the control group (n = 521) was taught an unrelated curriculum. The students’ goal orientations and perception of motivational climate were measured before and after the intervention. Results showed that students in the task-involved curriculum reported a stronger task-involvement climate and weaker ego-involvement climate than did those in the control curriculum. The students in the task goal-oriented climate had higher post task goal orientation scores and lower post ego orientation scores. This research evidence suggests that PE teachers can create and control the achievement goal climates and that students adapt to the desired goal orientation.

Researchers have demonstrated a direct connection between motivational climate and student motivated learning behavior (Standage et al., 2003; Theodosiou & Papaioannou, 2006). It appears that a mastery/task-involvement climate leads to positive motivation and behavior in learning. Specifically, Standage et al. (2003) found that students in a mastery goal-oriented environment tend to achieve high satisfaction levels with the mastery learning process using relevant metacognitive strategies for learning. In another example, Theodosiou and Papaioannou (2006) conducted a study involving 182 elementary, 365 junior high, and 235 senior high school students. In this study, although the researchers observed moderate positive relationships between mastery/task goal orientation and metacognitive learning strategies, they found no meaningful relationships between the strategies and the performance/ego-goal orientation. They did find that PE students with high task goal orientation were intrinsically motivated, valued the process of learning, and were likely to adopt self-regulatory cognitions and behaviors.

Research has not provided conclusive evidence on the relationship between the goal orientations, student motivation, and learning behavior outcomes. Although Shen, Chen, Scrabis, and Tolley (2003) found that students’ goal orientations were not directly related to student in-class physical activity, other studies have indicated that mastery/task goal orientation strongly predicted students’ in-class participation in MVPA (Chen & Shen, 2004; Dempsey, Kimiecik, &
Horn, 1993). Mastery/task goal orientation was also found to predict positive motivational or behavioral outcomes in some studies. Sarrazin, Roberts, Curby, Biddle, and Famose (2002) found that mastery goal-oriented students in a climbing task exerted more effort and performed better than did performance goal-oriented students.

The goal orientation-learning relationship, however, has not been observed in other studies. For example, Solmon and Boone (1993) found there was no difference in skill improvement between students with different goal orientations. Their findings suggested that in PE achievement goal orientations were not predictive of skill achievement. Berlant and Weiss (1997) further confirmed that students’ motor skill acquisition was not associated with students’ achievement goal orientations. In addition, Shen and colleagues (Chen & Shen, 2004; Shen et al., 2003) indicated that students’ goal orientations were not directly related to skill and knowledge test outcomes. These results indicate it may be premature to conclude that the mastery/task goal orientation is superior to ego goal orientation with respect to inducing PE students’ learning. Moreover, PE research suggests that performance goals may not be as maladaptive as Pintrich (2003) asserted in the dual-goal theory. For example, Wang, Chatzisarantis, Spray, and Biddle (2002) found that PE students’ high performance/ego goal orientation predicted high levels of motivation toward leisure time physical activity (PA) participation when associated with high-perceived competence.

Researchers have examined motivational function within multiple goal constructs (approach and avoidance) on four goal profiles held by PE students: mastery, mastery avoidance, performance, and performance avoidance. Wang, Biddle, and Elliot (2007), for example, identified goal profiles through cluster analysis with a sample of Singapore adolescents (n = 995). Results revealed four distinct goal profiles: moderate, low, high, and mastery achievement goals. Each goal profile had a unique impact on PE students’ motivational outcomes. As Wang et al. (2007) illustrated, the high category, consisting of high scores on all four achievement goals, were linked to the highest perceived competence and relatedness, lowest amotivation, highest reported effort, highest participation, least boredom, and greatest enjoyment in PE activities. Similarly, Garn and Sun (2009) examined the integration of achievement and social goal profiles with a group of U.S. middle school students (n = 214). A cluster analysis resulted in three goal profiles: high goals, low achievement goals and moderate social goals, and low social goals. Students with high goals reported significantly higher effort than students in other goal profile groups. Learning/performance outcome results, however, did not indicate any differences in PE students’ goal profiles. Specifically, there were not statistically significant differences on students’ PACER test performance across the three goal-profile groups.

It is worth pointing out that in both the Wang et al. (2007) and Garn and Sun (2009) studies, high avoidance goals did not necessarily lead to negative consequences when co-existing with other goals. Although Elliot (1997) hypothesized that in PE avoidance goals were associated with maladaptive outcomes, these findings seem to suggest a more complex and multidimensional goal structure. More studies are needed to enhance our understandings of goal constructs’ motivational functions as related to PE learning.

**Interest Theory**

Researchers hypothesize that PE students’ individual interest could be a significant and positive predictor of student performance (Chen & Darst, 2001; Shen et al., 2003; Zhu, Chen, & Parrott, 2014). Likewise, they acknowledge that, although situational interest appears to explain only a small amount of variance in student performance (Zhu et al., 2009; Zhu et al., 2014) it may positively influence students’ learning strategy application. Shen and Chen (2006) found
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that situational interest was associated with PE students’ cognitive efforts during the learning process. Guided by the Model of Domain Learning (MDL; Alexander, 2005), Shen and Chen (2006) explored the interrelations among middle school PE students’ knowledge, interests, and use of learning strategies. They found a direct, significant relationship between situational interest and students’ use of learning strategies. The researchers further reported that the association was independent of students’ individual interest, suggesting that situational interest may have a significant impact on students’ application of learning strategies regardless of their individual interest in the content.

There is very limited evidence, however, to support the relationship between situational interest and students’ learning outcomes. In an earlier study, Shen et al. (2003) found no association between middle school students’ (n = 57) knowledge and skill acquisition and situational interest. Similarly, in a more recent study, Zhu et al. (2009) measured third-grade students’ (n = 670) situational interest, workbook problem solving performance, and knowledge gain and found that situational interest contributed little to students’ knowledge gain in cardio-respiratory fitness content and workbook performance.

Although situational interest might not directly impact PE learning outcomes, researchers have hypothesized that it may have practical meaning to PE students. In general, different activities elicit different levels of situational interest. For example, Sun (2012) compared elementary school students’ situational interest in an exergaming/active video game unit and a traditional fitness unit. The results showed that students’ situational interest in exergaming was significantly higher than in the fitness unit at the beginning and end of instruction. Consistent with interest theory, Sun’s studies (2012, 2013) revealed that students’ situational interest declines over time regardless of their initial interest. Therefore, it is important for PE teachers to carefully design learning tasks to sustain students’ situational interest.

Most PE learning tasks consist of both a physical movement component and an often neglected cognitive component (Schmidt & Lee, 2009). How a task is designed may offer different levels of situational interest to students. In a study examining the effects of different cognitive and physical learning task demands on situational interest, Chen and Darst (2001) found that cognitive demand in a physical activity greatly contributed to the level of situational interest. Middle school students in their sample (n = 242) considered tasks with high cognitive demand to be highly situationally interesting, regardless of the physical demands. Students judged tasks with both low cognitive and low physical demands particularly low in situational interest.

Recent studies examining cardiovascular tests also have provided evidence to help PE teachers choose appropriate activities. For instance, Zhu (2013) compared students’ perceived situational interest in the PACER and the One-mile Run. In this study, many students reported higher situational interest in PACER than in the One-mile Run. Recently, Zhu et al. (2014) examined relationships between students’ personal and situational interest and performance in the same two aerobic fitness tests. The results showed that, if adolescents perceive increased challenge, their performance in PACER and One-mile Run decreases. PE teachers can use these findings in task design and test administration to enhance students’ situational interest in these tasks.

Self-determined motivation and learning

Deci, Koestner, and Ryan (1999) revealed that intangible rewards (e.g., positive verbal feedback) enhanced intrinsic motivation, whereas tangible rewards undermined it. The exception to this finding occurred when tangible rewards were given unexpectedly (without students’ prior
Silverman, Tyson, and Krampitz (1992) investigated the relationship between PE teacher feedback and student achievement when learning the volleyball serve and forearm pass. Their findings suggest that both positive feedback (intangible rewards, praise, or reinforcement) and affective feedback (intended as motivation or to improve attitude) was significantly related to students' achievement. Silverman et al. (1992) proposed that positive or affective feedback might motivate students to continue practicing skills.

Koka and Hein's (2003) study conducted with 783 schoolchildren aged 12–15 in Estonia also examined the impact of teachers' feedback on students' intrinsic motivation. Results suggested that positive general feedback was a significant predictor for all observed dimensions of intrinsic motivation (i.e., enjoyment-interest, effort-importance, and competence), especially for perceived competence. In addition, they found a positive relationship between teachers' feedback directed toward knowledge and performance gains and students' perceived enjoyment-interest. Interestingly, the relationship between perceived positive specific feedback and intrinsic motivation as well as perceived competence was not evident in this study. Therefore, Koka and Hein (2003) suggested that PE teachers might need to provide positive general feedback or feedback concerning how to perform the skill to enhance both perceived competence and interest in activities as well as to facilitate intrinsic motivation. Moreover, they pointed out that when students are in the early learning stage, teachers might need to avoid using feedback that is too specific and precise, which might overload learners and interfere with the learning process.

In PE, intrinsic motivation is a predictor for many positive outcomes. These outcomes include concentration level (Ntoumanis, 2005; Standage et al., 2005), preference for attempting challenging tasks, positive affect (i.e., happy, satisfied, excited, and relaxed) (Standage et al., 2005), intention to be physically active after school (Ntoumanis, 2001, 2005; Standage et al., 2003), and effort (Ntoumanis, 2001). Not surprisingly, intrinsic motivation has a negative association with unpleasant feelings or emotions (e.g., feelings of disappointment, embarrassment) (Ntoumanis, 2005).

Despite theoretical hypotheses that external regulation would lead to maladaptive affective or undesirable cognitive consequences, no relationships have been established between external regulation and outcome measures, such as effort in class, intention for after-school physical activity (Ntoumanis, 2001), concentration level, and preferences for challenging tasks in PE (Standage et al., 2005). These PE findings suggest that, although external regulation may not yield adaptive or maladaptive outcomes, it does predict students' feeling of boredom (Ntoumanis, 2001), suggesting an association between strong teacher control and increased boredom in students.

When tangible learning outcomes were measured in SDT studies, the motivational function of self-determined motivation has remained unclear. Sun and Chen (2010) examined the relationship between sixth grade PE students' (n = 242) self-determined motivation and learning. Learning outcomes were students' health-related fitness knowledge and two motor skills (basketball control dribbling and badminton striking). Structural equation modeling results indicated that amotivation was negatively related to health-related fitness knowledge gain. Neither intrinsic nor extrinsic motivations impacted knowledge and skill achievement. Although students in this study reported high levels of self-determined motivation and low levels of amotivation, high motivation did not positively contribute to their learning achievement. The discrepancies in these studies may be due to different designs (i.e., correlational vs. experimental) or to the research setting where achievement in knowledge and skills may or may not have been the instructional focus. These inconsistent findings challenge researchers to continue their SDT studies to advance our understanding of the relationship between self-determined motivation and learning.
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Future directions

Extensive research examining motivation has provided evidence that teachers can manipulate achievement goal orientation climates to facilitate learning. Further, they can adjust the autonomy-supportive environment and enhance situational interest. In so doing, they can help learners align personal goals with learning goals, regulate their learning behaviors, and develop interest in PE. There is a need, however, for more and stronger evidence relating the teachers’ strategies and effort to student learning.

Rink (2001) defines learning as a relatively permanent behavioral change resulting from the experience of physical movement associated with cognitive understanding of the movement. Cognitive knowledge and motor skill acquisition are the central indicators defining student learning represented by student performance on knowledge and skill achievement tests (Chen & Ennis, 2004).

Student learning in PE has not been a central focus in research (Rovegno, 2006). In many studies reviewed in this chapter, researchers seldom included knowledge and skill acquisition as outcome measures. Instead, motivational correlates, such as students’ affection, effort, concentration, and intention toward after-school PA, have been the main outcome measures. Although understanding these outcomes is helpful, research that emphasizes content-centered competence outcomes, such as knowledge and skill attainment, will be useful and meaningful for PE curricula that serve the academic mission of schooling.

Motivation researchers in PE share the core elements of social-cognitive tradition emphasizing that perceptions developed through social interactions are the central motivation source (Bandura, 1986). These interactions either motivate or demotivate learners by creating a sense of competence, defining successes, and generating interests. Emerging research evidence appears to suggest the motivation sources can be content specific (Chen, Martin, Ennis, & Sun, 2008). Future research is needed to identify content-relevant motivation sources that facilitate student development of a range of learning strategies consistent with the specific knowledge and skills to be mastered.

Theories discussed in this chapter generally propose that motivation is a process that learners adapt to external environments. Motivation is an innate mental process residing within a person that can be called upon as a resource for learning strategy development (Hidi & Harackiewicz, 2000). Relying on these resources, students may develop learning strategies associated with either adaptive or maladaptive AGT learning goals. These may be advantageous when enhancing personally meaningful outcomes (task values or interests) or leveraging challenges from the learning environment (SDT self-regulations). Understanding student motivation as learning strategies enables researchers and teachers to comprehend how students engage in learning to address environmental influences. This integrated, multidimensional theoretical perspective may help clarify the relationship between PE students’ motivation and learning (Chen, Chen, & Zhu, 2012; Chen & Ennis, 2004; Pintrich, 2003). Well-designed descriptive studies using systematic or naturalistic observation tools will be needed in the near future to understand the internalization process as well as the interaction between motivation and learning (Shen, Chen, & Guan, 2007).

As a school subject, PE has emphasized the development of a healthy, physically active lifestyle. Accordingly, students must master a body of disciplinary knowledge that integrates biological-medical sciences, social-psychological sciences, and cultural humanities to achieve the goal of becoming physically literate (SHAPE, 2014). Because motivation plays important roles in students’ learning, from a learning-centered perspective, motivation should be “linked explicitly to ways of knowing, understanding, and constructing meaning” (Oldfather & Dahl,
To facilitate the internalization process for optimal motivation, the PE teachers should provide students with social support to enhance learning (Deci & Ryan, 1985; Ryan & Deci, 2000). Future studies are needed to identify strategies that will assist students to learn more effectively in externally (teacher) controlled social environments, permitting them to internalize healthy, active lifestyle-related values and behaviors. Intervention studies can be a viable approach to investigate complex interactions among learning environments, curriculum/task, motivation, and learning.

Summary of key findings

• The concept of learning is changing to reflect a deeper understanding of the relationship between cognition and behavior.
• Although PE learning often is behavioral, in-depth and relevant cognitive knowledge about the science of physical activity serves as a guide to students’ decision-making and physically active behavior.
• Research on achievement goal orientations indicates that a mastery-goal adaptive motivation process can be an effective learning strategy to enhance students’ focus on the learning processes.
• Research on the achievement goal climate demonstrates that teachers can successfully nurture a student’s mastery goal orientation by creating a mastery goal-oriented learning environment.
• Researchers have confirmed that teachers can manipulate situational interest in curriculum planning and task design. Clearly, situational interest is an effective teaching strategy to attract students immediately to situationally interesting tasks regardless of their personal interest. Research findings, however, have not confirmed its effectiveness as a learning strategy to enhance student achievement.
• SDT research has strong potential to help students develop autonomous learning strategies. Findings have shown that teacher support for the three basic needs for autonomy, competence, and relatedness is effective in enhancing students’ motivation to learn.
• Additionally, SDT research has demonstrated a possibility to develop self-regulated learning strategies to internalize the values of a desired behavior.
• Taken together, PE motivation researchers have built a substantial body of research supporting the hypothesis that PE students are motivated. However, the magnitude of each construct’s motivational function may vary based on the role and description of context in this research.
• Of most concern in research examining PE motivation is researchers’ outcome measure choices.
• Researchers have rarely studied learning variables, such as process measures (e.g., time on task, physical activity intensity) or achievement measures (e.g., knowledge or skill test, performance records). Thus researchers have assumed connections between students and achievement and have not adequately tested this relationship.
• Further, researchers have not explicitly and sufficiently studied students’ learning strategies in parallel with motivation strategies.
• Future researchers should focus not only on the motivational correlates (e.g., affection, effort, etc.) but also learning behavior correlates (e.g., time on task, physical intensity, completion of written assignments) and learning achievement to further understand learning strategies students may adopt as their motivation outcomes.
Reflective questions for discussion

1. What is the common theoretical basis for all achievement motivation theories? Discuss why this common basis is so important when studying achievement motivation in education, in general, and in PE in particular.

2. SDT is a comprehensive theory that encompasses the functions of other achievement motivation theories. One of the most important SDT tenets is to provide individuals the opportunity to be autonomous (to own the decision, action, etc.) in their settings. Given that schools reflect tightly controlled environments, what strategies would be most effective in promoting autonomy while still providing an orderly learning environment?

3. Researchers have observed the link between motivation levels and learning achievement in classroom-based research, but rarely in PE. What limits PE researchers from establishing this critical link to fully understand the power of student motivation? What suggestions can you make for future research?

4. Students' PE motivation and their motivation in after-school settings may require different mental processes. For example, the PE motivation process can derive and be dominated by perceived competence, whereas the motivation in an after-school setting can be driven completely by individual interest. To what extent do motivation mechanisms/strategies learned in PE transfer to outside school settings making physically active behavior sustainable? Use research evidence to support your conclusion.

References


Motivation as a learning strategy


