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Top 10 Research Questions Related to Children Physical Activity Motivation

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Abstract

Physical activity is critical to healthy development of children. It is well documented that helping children develop and sustain a physically active lifestyle requires children to become motivated. Many studies have been conducted in the past 2.5 decades on determinants and correlates for children and adolescents' physical activity motivation. The findings have informed researchers and practitioners about motivation sources for children and effective strategies to motivate children in given physical activity settings. Built on the extensive knowledge base and theoretical platforms formed by these research studies, the purpose of this article is to take a look at the current research landscape and provide subjective thoughts about what we still need to know about children's physical activity motivation. The product of this subjective thinking process rendered 10 potential questions for future research on children's physical activity motivation in both in-school and out-of-school settings. These topics encompass those focusing on children's physical activity motivation as a mental dispositional process, those conceptualizing the motivation as an outcome of person–environment interactions, and those attempting to dissect the motivation as an outcome of social–cultural influences and educational policies. It is hoped that the topics can serve researchers interested in children's physical activity motivation as starting blocks from which they can extend their conceptual thinking and identify research questions that are personally meaningful. It is also hoped that the list of potential questions can be helpful to researchers in accomplishing the imperative and significant mission to motivate children to be physically active in the 21st century and beyond.

Keywords

active lifestyle; behavior change; health promotion

Physical activity is critical to the healthy development of children. According to the recent youth behavior surveillance data (Centers for Disease Control & Prevention, 2012), only half of U.S. adolescents are able to meet the 60-min daily physical activity guideline, and about 14% do not participate in any physical activity at all. In this era of information explosion and fast information technology advancement, children have more "things" to do than their time can afford. But these things are mostly sedentary activities in nature. According to the Child and Adolescent Health Measurement Initiative (2007), about 51% of American children

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aged 6 to 17 years old spend more than 1 hr each day on sedentary screen-based activities including watching TV, playing video games, and surfing the Web. The data suggest that children are motivated to do something, but they may not be able to motivate themselves for participating in health-enhancing physical activities. Thus, it is imperative to understand their motivation and motivation sources for physical activity participation.

Motivation is a mental process that brings about and sustains goal-oriented actions (Pintrinch & Schunk, 2002). Conceptually, motivation is considered as consisting of energy that allows one to engage in physical or mental actions and in the direction/goal the action is expected to achieve. Research on children's motivation for physical activity in school and nonschool settings has made significant progress in the past two decades. Multiple theoretical frameworks have been used in the research including the achievement goal theory (Nicholls, 1984), the self-efficacy theory (Bandura, 1997), the expectancy-value theory (Eccles, 1983), the interest theory (Hidi, 1990), and the self-determination theory (Deci & Ryan, 1985). The research has yielded much-needed findings that have enriched our understanding about children and adolescents' motivation for physical activity in different settings. The findings, in many cases, have informed practitioners about effective ways to develop strategies to motivate children and adolescents to engage in physical activities.

One noticeable characteristic of the motivation research is that motivation is being conceptualized as an outcome from interaction between the individual and the physical and social environment. A typical example is the theoretical revision of the goal theory, where the task or ego goal—the motivators—is no longer viewed as a predetermined mental disposition; rather the motivators are conceptualized as being nurtured by the immediate environment that determines the nature of success and achievement (Ames, 1992; Epstein, 1989; Maehr & Midgley, 1996). Most studies on children's motivation for physical activity have been conducted in two settings: the school physical education setting (S. Chen, Chen, & Zhu, 2012) and the afterschool environment (Biddle, Whitehead, Donovan, & Nevill, 2005; Cox, Smith, & Williams, 2008). Most studies have been descriptive and have used survey methods and correlational and cross-sectional designs (Biddle et al., 2005; S. Chen et al., 2012).

In general, the motivation research has informed us that motivation sources for physical activity differ in the school physical education setting and outside-school environments despite some similarities that have been documented. Based on a review of 79 studies, S. Chen et al. (2012) reported that students in K–12 schools are most likely to be motivated by their expectancy beliefs. They suggested that a most likely motivation source in physical education is students' belief of being able to succeed (doing well) in physical education. Associated with this belief is their recognition of values in tasks/activities they experience in physical education. These values include attainment value (importance to life), utility value (useful to me), and intrinsic value (enjoyable for me). Comparable with the task values are task-goal orientation and the task-goal-oriented learning climate. Children in physical education consider these important motivation sources as well. S. Chen et al. also revealed that motivation sources identified in other theoretical perspectives such as interests (interest theory), needs for autonomy, competence, and relatedness (self-determination theory) lead to students' motivation in physical education.

In the afterschool environments, on the other hand, perceived physical competence (a belief of being able to perform physical activities such as sports) is identified as a powerful motivation determinant for children, especially girls (Biddle et al., 2005). Children who believe they are physically capable of participating in a sport or physical activity successfully are more likely to participate in that sport or physical activity during leisure times. Similar to physical education, interest/enjoyment (fun) and recognition of physical activity importance have been identified in adolescents as important motivation sources for physical activity participation (Butt, Weinberg, Breckon, & Claytor, 2011).

A recent development in the research on student motivation for physical activity participation in physical education is the findings about motivation specificity. Evidence from limited studies (A. Chen, Martin, Ennis, & Sun, 2008; Ding, Sun, & Chen, 2013) indicates that middle school students rely on different motivation sources (i.e., perceived competence, interest, or achievement goals) when being asked to engage in different types of physical activities (sports or fitness exercises). The emerging research evidence does suggest that children's motivation is dynamic in that, at least in the physical education setting, it relies on the immediate environment in which opportunities of specific physical activities are presented to them. In addition to motivation specificity, recent research on the motivational impact of active video games (exergaming) has revealed that interest and competence-based motivation can fluctuate in terms of time and duration of exposure to the games in both physical education (Sun, 2012, 2013) and in out-of-school settings (Gao, Zhang, & Stoden, 2013).

Taken together, the very brief overview of findings from research on children and adolescents' physical activity motivation has shown that most studies are descriptive in nature and are focused on describing children's physical activity motivation as a psychological state influenced by personal characteristics and the immediate physical activity environment. It is clear that children's motivation for physical activity is multifaceted. It is clear that children are readily motivated in physical education. It is clear that it may be difficult for those who have doubts about their physical competence to motivate themselves to start physical activity on their own during their leisure time. It is clear that adults (e.g., teachers, coaches, parents, afterschool program leaders) play a significant role in developing and helping sustain children's physical activity motivation. It is clear that motivation strategies in different settings should be context- and activity-specific and relevant to both the children and the activity (motivation specificity).

Helping children become motivated for physical activity requires researchers to take the issue beyond the current research paradigms. A recent report by the Institute of Medicine (IOM, 2013) reminds us that children's physical activity opportunities and motivation are, in large part, a policy and school curricular issue. School policy and curricula that support developing a physically active environment in school and in the community can help develop, sustain, and protect children's physical activity motivation and support their academic achievement (IOM, 2013). The research findings and scholarly consensus on policy and curriculum issues seem to have formed a platform for launching future research on children's physical activity motivation. Framed in this understanding, the purpose of this article is to take a look at the current research landscape to provide subjective thoughts about

what we still need to know about children's physical activity motivation. The 10 research questions listed in this article serve as a starting block for researchers in this area to extend their conceptual thinking in identifying possible research questions that are personally meaningful. The topics are equally important in addressing the issue of children's physical activity motivation. They are presented in order from 1 to 10 based on the extent to which a topic has been studied: The 1st represents a topic that has been studied extensively, and the 10th indicates a topic we know little about. The order, in a sense, may suggest a degree of urgency at the moment, with those at the top of the rank order (i.e., 10) needing more research attention than those at the bottom (i.e., 1). This arrangement is completely subjective. For that reason, the order should be considered with caution.

QUESTION 1. How Do Dispositional Factors and Situational Factors Interact to Generate Physical Activity Motivation?

It is clear that children's motivation relies on the interaction between a number of personal disposition variables such as self-concept, knowledge, and situational factors in their immediate environment such as community resources and school programs (A. Chen & Hancock, 2006). What is not clear is the compatibility between certain dispositional factors and situational factors that function together to promote physical activity motivation. Recent studies on children's motivation specificity in the physical education setting (A. Chen et al., 2008; Ding et al., 2013) have started this quest. To answer this question, studies are needed to extend this line of research in which various psychological constructs can be examined along with physical and social factors in the immediate environment where physical activity is taking place. The environments should include physical education, school-based noninstructional physical activity opportunities, community-based opportunities and programs, and home physical activity opportunities.

QUESTION 2. What Strategies in Instructional and Noninstructional Physical Activity Settings Are Effective to Increase Children's Motivation for Maximum Engagement?

It is clear that some traditional ways of instruction in instructional and/or noninstructional settings may alienate those students who are mostly female, less athletic, and/or less skilled (Cothran & Ennis, 2001; Ennis, 1999). These children are most vulnerable in environments in which their self-esteem is threatened, such as a competitive sport-centered physical activity setting. These children tend to feel insecure and quickly become demotivated in such a setting. It is also clear that certain strategies can increase all children's engagement in instructional physical education settings (Ennis & McCauley, 2002; Shen, Chen, Tolley, & Scrabis, 2003). Intervention research is needed to identify the strategies most relevant for creating nonthreatening physical activity opportunities and environments in both instructional and noninstructional settings to help children develop and sustain self-initiated physical activity motivation.

QUESTION 3. What Is the Extent to Which Children's Goal Orientations and Environment Goal Climate Contribute to or Impede Self-Initiated Motivation for Physical Activity?

It is clear that task- or ego-goal orientations (and their conceptual variations of approach/avoidance constructs) could lead to various motivation outcomes (Biddle, Wang, Kavussanu, & Spray, 2003). It is also clear that the task-goal orientation is associated with many positive motivation correlates such as effort, mastery goals, optimal perception of competence, positive attitudes, and other affects, while the ego-goal orientation is associated with a belief of status, competitive goals, and aggressive physical activity behavior (Biddle et al., 2003). Research on motivational function of the goal orientation climate in physical education has produced findings that support the positive impact of task-goal orientation on children's motivation (Standage, Duda, & Ntoumanis, 2003). Because behavior outcomes are inferred in most goal orientation studies through measure of intentions, it is not clear whether the intention-based motivation outcome will lead to motivated behavior eventually. To answer this question, goal orientations/climate need to be studied in direct connection to physical activity behavior change. This line of research has great potential to inform us about ways to create motivating physical activity environments that are meaningful for children and adolescents in both instructional and noninstructional settings.

QUESTION 4. Why Are Fitness-Developing Activities Not Motivating for Children/Adolescents, and How Can the Activities Be Changed From "Boring" and Demotivating to "Fun" and Motivating?

It is clear that children should not be considered miniature adults and be prescribed with adult-appropriate physical activities for fitness development or behavior change (Corbin, 2002). Obviously, some activities helpful for adults in developing fitness are not appropriate for children and are potentially detrimental to their motivation for continued participation in physical activity. Unfortunately, these activities are often incorporated and offered in both instructional and noninstructional programs for children. There is evidence that these activities could become liabilities because they are viewed as a cost to motivation later in life (A. Chen & Liu, 2009). Research has shown that it is possible to modify these physical activities to make them appealing for children. For example, an earlier study (A. Chen & Darst, 2001) on the relationship between activity design and situational interest showed that incorporating cognitive components in a physical activity can make the physical activity situationally interesting and motivating for middle school students. These previous studies imply that children and adolescents value and appreciate positive affect outcomes more than health benefits in their participation in physical activity. What we need to know more about is generalizable activity attributes that can be used to modify most adult-appropriate fitness activities. To answer this question, studies are needed to identify aspects of physical activity that motivate children. Understanding these aspects can help us develop effective programs for optimal engagement in physical activity. Associated with this is the need to turn useful tasks/activities perceived by children and adolescents as "boring" into exciting and interesting activities.

QUESTION 5. To What Extent Can a Situational Motivator Be Internalized Into Self-Initiated Motivation?

A recent trend in children's game world is the fast and accelerated development of video games. It is undeniable that video games have a powerful and instant motivating effect on children. All characteristics of a situationally interesting activity can be identified in video games, and their appealing effect in the physical activity domain has been documented in recent research on children exergaming experiences. It is clear that there are positive motivation outcomes from playing active video games in a physical activity setting. For example, exergaming is positively associated with children's perception of competence (Gao et al., 2013) and generates high initial situational interest for participation (Sun, 2012, 2013). It is hypothesized that for situationally induced motivation to be sustained, it has to be internalized. Particularly in the case of situational interest, the excitement and instant enjoyment from situationally interesting activities should be integrated into children's current cognitive process as well as their knowledge structure for personal interest and self-initiated motivation to develop (Hidi, 1990, 2000). To answer this question, studies are needed on the possibility and strategies for children to internalize situational motivation from the exergaming-like experiences into their own self-initiated motivation repertoire for not only continuing to play active video games but also developing a personal interest and motivation to participate in other health-enhancing physical activities.

QUESTION 6. How Can the Motivation Function of Expectancy Beliefs and Task Values Be Sustained?

It is clear that when facing an externally imposed task, children often, foremost, assess their chances of success in completing the task (Harter, 1982). The outcome of this assessment is a belief that they should or should not put forth effort. In a physical activity setting, especially in physical education, where activities are imposed by the teacher or other adults, children's expectancy beliefs for success are predictive of their performance. It is clear that perceived competence (a cousin construct of expectancy beliefs) is a strong predictor for children's physical activity motivation during leisure times (Biddle et al., 2003). The task values (perceived importance, usefulness, and enjoyment) are predictive for persistence and effort. Both expectancy beliefs and task values are contributing predictors for future physical activity intension (Xiang, McBride, & Bruene, 2006). Most research on expectancy beliefs and task values has been conducted in instructional physical education settings, and findings are positive in general. What is not clear is whether the positive development in expectancy beliefs and values can continue to develop beyond physical education. To answer the question, studies are needed to examine the extent to which the expectancy beliefs and task values for physical activity and their motivation functions can be developed and sustained in school-based noninstructional and home/leisure physical activity settings. In addition, it is necessary to examine the extent to which the expectancy value-based motivation in the noninstructional settings can be attributed to learning experiences in physical education. In this line of research, it is expected that when the expectancy value theory is used as the guiding framework, the cost component should be included in the research or be studied as an independent construct associated with the framework (Zhu & Chen, 2013).

QUESTION 7. Can Extrinsic Motivation and Its Regulation Process Enhance Physical Activity Motivation, and to What Extent?

It is clear and realistic to acknowledge that children and adolescents' behaviors usually are controlled by external forces, most likely by adults such as teachers, parents, coaches, and others who happen to be responsible for them during a portion of their day. Although children in a structured, controlling environment such as schools can be motivated intrinsically in pursuing their own interests, most often, their motivation is extrinsic in nature because the activity they are asked to do usually is not intrinsically motivating (Ryan & Deci, 2009). It has been observed in many studies that children are motivated when they expect to receive rewards they value; and they may become demotivated when the rewards they are expecting are withdrawn (Deci, Koestner, & Ryan, 1999). In this type of environment, externally initiated regulation processes can help children stay on course and become extrinsically motivated to achieve what is expected of them. In other words, in the school or in other settings where intrinsic motivation sources (e.g., interest) are not available, children's motivation relies on externally regulated processes. According to Deci and Ryan (1985), effective contingencies for extrinsic motivation include many types of rewards such as grades, praises from the teacher, or a tangible or symbolic award (e.g., a trophy, a smiley face sticker, etc.). In the physical activity domain, winning a scrimmage or losing weight can be extrinsic rewards, too. Sun and Chen (2010) argue that at a particular moment and in a particular setting in physical education, children should be and can be motivated through external regulation processes because all children are not intrinsically motivated to be physically active. It follows, then, that the critical aspect in regulating their physical activity behavior change is the structure of rewards. To answer the question, studies are needed to help understand the motivation function of controlling rewards and informational rewards in terms of physical activity behavior change. Pertinent to helping children develop and sustain motivation for self-initiated physical activity, it is particularly imperative to frame studies in the overjustification hypothesis (Lepper & Greene, 1978; Lepper & Henderlong, 2000), which states that providing extrinsic rewards to children for their intrinsic motivation (e.g., engaging in intrinsically motivating activities) is detrimental. These studies will improve our understanding of extrinsic rewards (e.g., winning, losing weight) and intrinsic motivation for physical activity, which will lead to effective interventions to help children internalize the value of physical activity for healthful living.

QUESTION 8. To What Extent Does School Policy Influence Children's Physical Activity Motivation?

Children spend most of their daytime in schools. By and large, their behaviors in school are determined, controlled, and modified by school policies. The influence of school policy on physical activity opportunities has been acknowledged as critical in terms of children's in-school physical activity behavior development and change (IOM, 2013). It is clear that schools in the United States operate mostly as independent institutions with decision-making authority in terms of curriculum choice and scheduling. It is also clear that all U.S. schools are not in compliance with the national guideline for offering physical education and noninstructional physical activity programs to all children (National Association for Sport

and Physical Education [NASPE] & American Heart Association [AHA], 2010). For example, most schools do not allocate physical education class time that meets the national guideline (minimum of 150 min/week for elementary schools and 225 min/week for secondary schools); most high schools allow waivers: Students can use participation in non-physical education activities to earn physical education credits. These school policies can potentially channel students' motivation away from physical education and health-enhancing physical activities. Hypothetically, students may become more motivated to pursue a band activity than a fitness activity because their motivation for band and their amotivation for fitness development are encouraged and supported by the waiver policy. This topic of research is relatively new. There is little evidence to affirmatively connect school policies to children's physical activity motivation. To answer the question, large-scale descriptive studies are needed to inform policy decisions.

QUESTION 9. What Can We Learn From Other Countries About Motivating Children to Be Physically Active and Healthy?

It has been documented that schools in the United States are willing to cut in-school physical activity opportunities (including physical education) in the name of improving student academic performance (NASPE & AHA, 2010). Since the publication of the *No Child Left Behind Act of 2001*, in-school physical activity opportunities have declined in most U.S. schools. It is known that U.S. K–12 students have been falling behind many other countries in performance in reading, math, and science (National Center for Educational Statistics, 2013). Academically, our students have not been able to perform at a comparable level to those students in countries such as Finland, China, Korea, or Singapore. Recent reports show that schools in these countries have instituted physical activity policies that encourage and motivate their children to be physically active (Ding, Chen, & Sun, 2012; Ding, Li, & Wu, in press; Yli-Piipari, Watt, Jaakkola, Liukkonen, & Nurmi, 2009). Similar to Question 8, this question is relatively new and little comparable evidence is available to inform us about what can be learned from these countries in terms of social, cultural, and educational policies and practices. To answer the question, it is necessary to form international research partnerships to focus on not only physical activity policies, but also educational and public health policies in relation to children's motivation to develop positive, healthy behavior.

QUESTION 10. How Can We Help Children Develop and Sustain a Motivational Mental Process That Leads to Positive Behavior Change?

Motivation is a mental process. As such, it is studied under the assumption that the process relies on mental activities influenced by personal dispositional factors such as knowledge, beliefs, and attitudes. It is also influenced by physical and social attributes in the environment in which a child lives. It is clear from educational research that children are capable of developing viable mental models that may facilitate or impede their learning behavior and achievement (Vosinadou, 1994). To change children's way of thinking and behavior, it is necessary to change their misconceptions about the behavior and factors associated with the behavior. The conceptual change process has been discussed in terms of physical education (Ennis, 2010). It can be postulated that children's perceptions and

knowledge about physical activity and health, as might be reflected in their mental models, determine their decision and behavior of being physically active. The role of motivation (both intrinsic and extrinsic) can be crucial in changing children's mental model development and change (Pintrich, Marx, & Boyle, 1993). Being called a "warm conceptualization," the motivated mental model change process is viewed as a necessary step to link the cognitive action of decision making to behavioral action (Pintrich et al., 1993). Understanding the role of motivation process in the "warm" conceptual change process leading to behavior change can help answer many questions regarding how to change children's motivation patterns from "what I have to do or need to do" to "what I want to do." To answer the question, a new paradigm of research on children motivation and physical activity needs to be conceptualized, variables need to be identified, and various hypotheses need to be formed and examined.

In conclusion, rich research evidence has been gathered in the past few decades and has informed us about children and adolescents' motivation for physical activity and physical inactivity in many settings. We have learned a great deal, but there is more to learn. Children in the United States have become increasingly sedentary due to challenges from academic work and attractions from unprecedented opportunities of sedentary entertainment. Finding effective ways to motivate them to be physically active has never been more urgent. It is hoped that this list of potential research topics can be a helpful starting point for us to accomplish this imperative and significant mission.

References

Ames, C. Achievement goals and the classroom motivational climate. In: Schunk, DH., Meece, J., editors. Student perceptions in the classroom. Hillsdale, NJ: Erlbaum; 1992. p. 327-348.

Bandura, A. Self-efficacy: The exercise of control. New York, NY: Freeman; 1997.

Biddle S, Wang CKJ, Kavussanu M, Spray C. Correlates of achievement goal orientations in physical activity: A systematic review of research. European Journal of Sport Science. 2003; 3(5):1–20. DOI: 10.1080/17461390300073504

Biddle S, Whitehead SH, O'Donovan TM, Nevill ME. Correlates of participation in physical activity for adolescent girls: A systematic review of recent literature. Journal of Physical Activity and Health. 2005; 2:423–434.

Butt J, Weinberg RS, Breckon JD, Claytor RP. Adolescent physical activity participation and motivational determinants across gender, age, and race. Journal of Physical Activity and Health. 2011; 8:1074–1083. [PubMed: 22039125]

Centers for Disease Control and Prevention. Youth risk behavior surveillance—United States, 2011. Morbidity and Mortality Weekly Report. 2012; 61(4):35–38.

Chen A, Darst PW. Situational interest in physical education: A function of learning task design. Research Quarterly for Exercise and Sport. 2001; 72:150–164. [PubMed: 11393878]

Chen A, Hancock GR. Conceptualizing a theoretical model for school-centered adolescent physical activity intervention research. Quest. 2006; 58:355–376.

Chen A, Liu X. Task values, cost, and choice decisions in physical education. Journal of Teaching in Physical Education. 2009; 28:192–213.

Chen A, Martin R, Ennis CD, Sun H. Content specificity of expectancy beliefs and task values in elementary physical education. Research Quarterly for Exercise and Sport. 2008; 79:195–208. [PubMed: 18664044]

Chen S, Chen A, Zhu X. Are K–12 students motivated in physical education? A meta-analysis. Research Quarterly for Exercise and Sport. 2012; 83:36–48. [PubMed: 22428410]

Child and Adolescent Health Measurement Initiative. The National Survey of Children's Health. 2007. Retrieved from http://childhealthdata.org/learn/NSCH

Corbin CB. Physical activity for everyone: What every physical educator should know about promoting lifelong physical activity. Journal of Teaching in Physical Education. 2002; 21:128–144.

Cothran DJ, Ennis CD. "Nobody said nothing about learning stuff": Students, teachers, and curricular change. Journal of Classroom Interaction. 2001; 36:1–5.

Cox AE, Smith AL, Williams L. Change in physical education motivation and physical activity behavior during middle school. Journal of Adolescent Health. 2008; 43:506–513. [PubMed: 18848680]

Deci EL, Koestner R, Ryan RM. A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. Psychology Bulletin. 1999; 125:627–668.

Deci, EL., Ryan, RM. Intrinsic motivation and self-determination in human behavior. New York, NY: Plenum; 1985.

Ding, H., Chen, A., Sun, H. The China report: Policy, curriculum, instruction, and learning in physical education. Paper presented at the 2012 American Alliance for Health, Physical Education, Recreation and Dance Convention; Boston, MA. 2012 Mar.

Ding H, Li Y, Wu X. A review of scholarly and research work in physical education in China during the first decade of the 21st century. Quest. in press.

Ding H, Sun H, Chen A. Expectancy-value and situational interest motivation specificity on engagement and achievement outcomes in physical education. Journal of Teaching in Physical Education. 2013; 32:253–269.

Eccles, J. Expectancies, values and academic behaviors. In: Spence, JT., editor. Achievement and achievement motives. San Francisco, CA: Freeman; 1983. p. 75-146.

Ennis CD. Creating a culturally relevant curriculum for disengaged girls. Sport, Education, and Society. 1999; 4:31–49.

Ennis CD. On their own: Preparing students for a lifetime. Journal of Physical Education, Recreation & Dance. 2010; 81(5):17–22. DOI: 10.1080/07303084.2010.10598475

Ennis CD, McCauley MT. Creating urban classroom communities worthy of trust. Journal of Curriculum Studies. 2002; 34:149–172.

Epstein, J. Family structures and student motivation: A developmental perspective. In: Ames, C., Ames, R., editors. Research on motivation in education. Vol. 3. San Diego, CA: Academic; 1989. p. 259-295.

Gao Z, Zhang T, Stoden D. Children's physical activity levels and psychological correlates in interactive dance versus aerobic dance. Journal of Sport and Health Science. 2013; 2:146–151.

Harter S. The Perceived Competence Scale for Children. Child Development. 1982; 53:87–97.

Hidi S. Interest and its contributions as a mental resource for learning. Review of Educational Research. 1990; 60:549–571.

Hidi, S. An interest researcher's perspective: The effects of extrinsic and intrinsic factors on motivation. In: Sansone, C., Harackiewicz, JM., editors. Intrinsic and extrinsic motivation: The search for optimal motivation and performance. San Diego, CA: Academic; 2000. p. 309-339.

Institute of Medicine. Educating the student body: Taking physical activity and physical education to school. Washington, DC: National Academies Press; 2013.

Lepper, MR., Greene, D. Overjustification research and beyond: Toward a means-ends analysis of intrinsic and extrinsic motivation. In: Lepper, MR., Greene, D., editors. The hidden costs of reward: New perspectives on the psychology of human motivation. Hillsdale, NJ: Erlbaum; 1978. p. 109-148.

Lepper, MR., Henderlong, J. Turning "play" into "work" and "work" into "play": 25 years of research on intrinsic versus extrinsic motivation. In: Sansone, C., Harackiewicz, J., editors. Intrinsic and extrinsic motivation: The search for optimal motivation and performance. San Diego, CA: Academic; 2000. p. 257-307.

Maehr, ML., Midgley, C. Transforming school cultures. Boulder, CO: Westview; 1996.

National Association for Sport and Physical Education & American Heart Association. 2010 shape of the nation report: Status of physical education in the USA. Reston, VA: National Association for Sport and Physical Education; 2010.

National Center for Educational Statistics. Program for International Student Assessment (PISA). Washington, DC: U.S. Department of Education Institute of Education Sciences; 2013. Retrieved from http://nces.ed.gov/surveys/pisa/

Nicholls J. Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. Psychological Review. 1984; 91:328–346.

No Child Left Behind (NCLB) Act of 2001, 20 U. S. C. A. § 6301 et seq. (West 2003).

Pintrich PR, Marx RW, Boyle RA. Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. Review of Educational Research. 1993; 63:167–199.

Pintrich, P., Schunk, D. Motivation in education: Theroy, research, and applications. 2. Upper Saddle River, NJ: Merrill Prentice Hall; 2002.

Ryan, RM., Deci, EL. Promoting self-determined school engagement: Motivation, learning, and well-being. In: Wentzel, K., Wigfield, A., editors. Handbook of motivation at school. New York, NY: Routledge; 2009. p. 171-195.

Shen B, Chen A, Tolley H, Scrabis KA. Gender and interest-based motivation in learning dance. Journal of Teaching in Physical Education. 2003; 22:396–409.

Standage M, Duda JL, Ntoumanis N. A model of contextual motivation in physical education: Using constructs from self-determination and achievement goal theories to predict physical activity intentions. Journal of Educational Psychology. 2003; 95:97–110. DOI: 10.1037/0022-0663.95.1.97

Sun H. Exergaming impact on physical activity and interest in elementary school children. Research Quarterly for Exercise and Sport. 2012; 83:212–220. [PubMed: 22808707]

Sun H. Impact of exergames on physical activity and motivation in elementary school students: A follow-up study. Journal of Sport and Health Science. 2013; 2:138–145.

Sun H, Chen A. A pedagogical understanding of the self-determination theory in physical education. Quest. 2010; 62:364–384.

Vosinadou S. Capturing and modeling the process of conceptual change. Learning and Instruction. 1994; 4:45–59.

Xiang P, McBride R, Bruene A. Fourth graders' motivational changes in a physical education running program. Research Quarterly for Exercise and Sport. 2006; 77:195–207. [PubMed: 16898276]

Yli-Piipari S, Watt A, Jaakkola T, Liukkonen J, Nurmi JE. Relationships between physical education students' motivational profiles, enjoyment, state anxiety, and self-reported physical activity. Journal of Sport Science and Medicine. 2009; 8:327–336.

Zhu X, Chen A. Motivational cost aspects of physical education in middle school students. Educational Psychology. 2013; 33:465–481. DOI: 10.1080/01443410.2013.785043