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## **The Relationship between Chinese High School Students’ Implicit Theories of Ability in Sports and Perceived Enjoyment in Physical Education**

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### **Abstract**

According to theory, students’ implicit theories of ability can affect their motivation and engagement in physical education (PE). Limited research has been conducted to examine the relationships between implicit theories of ability and motivation and engagement among K-12 students in PE. Our study examined the relationship between implicit theories of ability and perceived enjoyment in PE, and explored whether there were any gender differences in implicit theories of ability and perceived enjoyment in PE. A package of surveys was administered to 252 Chinese 12<sup>th</sup> graders. Data were analyzed using confirmatory factor analysis, correlations, and MANOVA. Chinese 12<sup>th</sup> grade participants endorsing higher incremental views in ability were likely to enjoy PE more. Male participants showed stronger beliefs in incremental views and enjoyed PE more than females. It was suggested that PE teachers may be able to enhance students’ enjoyment by focusing on incremental views. This is, ability in sports can be increased dramatically by effort and hardworking..

**Keywords:** *growth mindsets, motivation, ability beliefs*

### **Introduction**

Implicit theories of ability have emerged as an important theoretical framework to study student motivation in PE (Ommundsen, 2001; 2003) as well as in general education (Burnette, O’Boyle, VanEpps, Pollack, & Finkel, 2013; Dweck, 1999; 2002; Yeager & Dweck, 2012). According to implicit theories of ability (Dweck, 1999), an individual tends to view ability in a continuum from entity to incremental. Individuals endorsing an entity view believe that ability is fixed and cannot be changed too much by working hard. In contrast to this view, individuals holding an incremental view, which is also known as a growth mindset (Yeager & Dweck, 2012), believe that ability is malleable and can be changed a lot by effort.

Individuals embracing an incremental view of ability or a growth mindset tend to focus on skill learning and task mastery for self-improvement or acquiring new competencies (Dweck, 1999; 2002). These individuals would be more likely to display adaptive motivational, emotional, and behavioral responses such as high levels of self-efficacy, positive affect, and greater effort and persistence when encountering challenges and difficulties, which should result in better performances. In contrast, individuals endorsing an entity view tend to focus on being smarter or

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performing better than others, and would be more likely to show maladaptive motivational, emotional, and behavioral responses such as lower levels of self-efficacy and motivation, negative affect, and lower effort and persistence in the face of difficulties and challenges. Consequently, those individuals should experience performance decrements, especially when they have low levels of perceived competence (Dweck, 1999; 2002).

Students enter PE with numerous entry characteristics such as their ability beliefs systems and those beliefs systems can play an important role in determining their motivation and performance (Solmon & Lee, 1996). Several studies have been conducted to examine how students' implicit theories of ability in sports relate to their motivation in K-12 PE (Ommundsen, 2001; 2003). Students with growth mindsets used less self-handicapping strategies and more self-regulation strategies. These findings provided evidence supporting the importance of studying students' implicit theories of sports ability and how they are linked with motivational responses in PE.

Enjoyment in PE can underlie motivation to be engaged in PE (Hashim, Grove, & Whipp, 2008), and predict out-of-school physical activity participation among students (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999). Given the importance of enhancing students' enjoyment in PE, Prochaska, Sallis, Slymen, and McKenzie (2003) have called for more research to identify strategies to enhance their enjoyment in PE. No study has been conducted to examine the relationship between implicit theories of ability and perceived enjoyment among K-12 students in PE. An examination of the relationship between implicit theories of sports ability and perceived enjoyment can provide another strategy for teachers to enhance students' enjoyment in PE.

Individuals' implicit theories of ability are socially and individually constructed (Dweck, 2002). Due to differentiated socializing processes that boys and girls experience, they may endorse different views of intelligence or sports ability. It has been suggested that girls may exhibit more of entity ability views than boys do (Dweck, 1999; 2002). Previous research on gender differences in implicit theories of ability in sports has revealed an inconsistent pattern of results (e.g., Freedman-Doan, Wigfield, Eccles, Blumenfeld, Arbretton, & Harold, 2000; Li et al., 2004). Freedman-Doan et al., (2000) reported no gender differences in the endorsement of incremental and entity views of sports ability. Li et al. (2004) reported that there was no gender difference in the entity theory of ability in sports. However, female college participants endorsed weaker beliefs in an incremental theory of ability than males did. Given that there were a mixed pattern of results and few studies had been conducted in sports, a further examination of gender differences in students' implicit theories of ability in sports is needed.

Research on implicit theories of sports ability had mainly been conducted in U.S.A. (Li, Harrison, & Solmon, 2004; Li, Lee, & Solmon, 2008) and European countries (Ommundsen, 2001; 2003). Majority of the previous studies in U.S.A. focused on college students (e.g., Li et al., 2004; Li et al., 2008) while few studies in Europe focused K-12 students (Ommundsen, 2001; 2003). No study has been conducted to examine implicit theories of ability in sports and its relationship to motivational responses among K-12 Chinese students. The Chinese culture emphasizes the importance of education, interpersonal harmony, efficacy of effort, modesty, and collectivism, whereas western culture places more emphasis on individualism, competition, strength and power, and assertiveness (Bond, 1986; Chen & Uttal, 1988). It is important to study Chinese students' ability belief systems and its relationship to their motivational responses. The general public in China generally holds a stereotypic belief that sports are for boys, not for girls (Chen & Rao, 2011). As a result, girls have limited access to sports and lack experience in sports than boys do. This stereotypical beliefs may shape how boys and girls in China view their ability beliefs in sports. The purposes of this study, therefore, were to examine the relationship between implicit theories of ability in sports and perceived enjoyment and explore whether there were any gender differences in implicit theories of ability in sports and perceived enjoyment in PE among Chinese 12<sup>th</sup> grade students. The reason that we assessed sports-related ability conceptions because the PE curriculum in these high schools is sports-oriented, including volleyball, basketball, soccer, track and field, and

martial arts. It was hypothesized that participants with growth mindsets would report more enjoyment in PE. Based on the study by Li et al. (2004), we also hypothesized that female participants would endorse less of incremental views of ability in sports and more of entity views of ability in sports than males did. The establishment of these hypothesized links would help us provide another important teaching strategy for teachers to maximize students' enjoyment in PE.

## Methods

### Participants

Participants were a convenient sample of 252 12<sup>th</sup> grade students (122 boys and 130 females) from two classes at three high schools in a large city in southern China. Each of three high schools has 9-14 classes in grade 12. We were only able to recruit two classes from each of three high schools for the present study. The average class size was 45 students. The average age of participants was 17.3 with a range from 16 to 18 years old. All participants were enrolled in PE and were not student athletes at the time of this study. They volunteered to participate in this study. All PE classes were co-ed and were taught through traditional direct instructions by teachers with 12-20 years of teaching experience. This study obtained the institutional approval. In accordance with the institutional approval, we obtained consents from school principals, parents, and participants.

### Measures

**Demographic information.** The personal data sheet was designed to collect information about students' backgrounds. These questions were related to students' age, gender, athletic experience, grade in school, and schools where they were attending.

**Implicit theories of ability in sports.** Since school PE curricular focus was mainly sports-oriented, implicit theories of ability were assessed specifically with regards to sports rather than PE in the present study. Participants' beliefs about their ability in sports were assessed by using a six-item questionnaire called "Implicit Theories of Ability in Sports", which was adapted from those used by Dweck (1999). Three items assessed students' entity views in sports ability. An example item was "You have a certain amount of ability in sports, and you really can't do much to change it." Three other items assessed their incremental views in sports ability or growth mindsets. An example item was "No matter who you are, you can change your abilities in sports a lot." The response scale ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

**Perceived enjoyment.** Participants' enjoyment in PE was assessed by using a four-item subscale from Intrinsic Motivation Index (McAuley, Duncan & Tammen, 1989). An example item was "I enjoyed PE very much." The response scale ranged from 1 (*strongly disagree*) to 6 (*strongly agree*).

### Procedures

The questionnaires were translated into Chinese by the second author, who is fluent in both Chinese and English. The accuracy of translation was also evaluated by three other bilingual (Chinese/English) experts in achievement motivation in PE, who were not affiliated with the study. Only minor changes related to wordings were made based on these experts' feedback. The wording and language of translated Chinese version of the questionnaires were checked for age-appropriateness by Chinese classroom teachers. Back translation from Chinese to English was also done by the second author at a later time and found no deviations. The appropriateness and difficulty of language were checked by classroom teachers and a small sample of high school students.

Questionnaires were administered to intact classes in their classroom by the first investigator and trained assistants. Directions for completing the questions were provided. Students were asked to complete the questions as truthfully as they could. They were also encouraged to ask any questions if

they were unclear about the instructions or items in the questionnaires. It took approximately 15 minutes for participants to complete all questionnaires.

### Data Analyses

The negatively worded item in perceived enjoyment “My physical education classes do not hold my attention” was reverse coded before the data analysis. The aggregate scores were calculated by summing all responses for each subscale and dividing by the relevant number of items per subscale. A maximum likelihood confirmatory factor analysis using the SAS PROC CALIS procedure was conducted to validate the questionnaires: Implicit Theories of Ability in Sports and perceived enjoyment in PE, respectively. We obtained multiple fit indices (Hatcher, 1994) to evaluate how well the hypothesized model fit the observed data. The multiple fit indices included Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA; Steiger, 1990). Both NNFI and CFI range from 0 to 1 and values greater than 0.95 indicate a good fit between the observed data and the model (Hu & Bentler, 1999). For RMSEA, a value of 0.05 or less indicates a close fit; a value between 0.05 and 0.08 indicates a marginal fit; and a value of 0.10 or above is indicative of a poor fit of the model to the observed data (Browne & Cudeck, 1993; Hu & Bentler, 1999). A significant factor loading, with 0.4 or above standardized coefficient, suggests that the indicator variable provides a good measure of the underlying factor (Hatcher, 1994).

The Cronbach's (1951) coefficient alphas were obtained to assess the internal consistency reliability for all subscales from the Implicit Theories of Ability in Sports and perceived enjoyment in PE. Pearson correlations were used to examine the relationships between the two subscales of Implicit Theories of Ability in Sports and the perceived enjoyment subscale in PE. One-way MANOVA was conducted to examine whether there would be any gender differences in students' implicit theories of ability in sports and perceived enjoyment in PE.

### Results

The confirmatory factor analysis indicated that the hypothesized two-factor model for implicit theories of ability in sports provided a sufficiently good fit to the observed data ( $AGFI = .91$ ;  $NNFI = .92$ ;  $CFI = .95$ ;  $RMSEA = .09$ ). The factor loadings for the entity scale ranged from .69 to .91. The factor loadings for the incremental scale ranged from .53 to .82. The hypothesized single factor model for perceived enjoyment in PE also provided an excellent fit to the observed data ( $AGFI = .97$ ;  $NNFI = .997$ ;  $CFI = .999$ ;  $RMSEA = .03$ ). The factor loading for the enjoyment scale ranged from .49 to .94. All the subscales from the Implicit Theories of Ability in Sports and the perceived enjoyment scale demonstrated acceptable levels of internal consistency with Cronbach Coefficient Alphas of .71, .85, and .86 for an entity view, an incremental view, and perceived enjoyment, respectively (Cronbach, 1951). The results demonstrated that Implicit Theories of Ability in Sports and Perceived Enjoyment were valid and reliable measurements to assess Chinese high school students' ability beliefs and perceived enjoyment in PE. An inspection of the means of entity and incremental views in sports ability and perceived enjoyment indicated that participants reported slightly high scores on incremental views ( $M = 3.35$ ,  $SD = .87$ ) and slightly low scores on entity views ( $M = 2.82$ ,  $SD = .83$ ), and assigned high scores on perceived enjoyment in PE ( $M = 3.77$ ,  $SD = .79$ ) on a 5-point likert scale.

The correlational analysis indicated that an incremental theory of ability in sports was positively related to perceived enjoyment [ $r(251) = .20$ ,  $p < .001$ ]. An entity theory of ability in sports was not significantly related to perceived enjoyment [ $r(250) = .05$ ,  $p = .45$ ]. Participants who endorsed higher levels of incremental theories or growth mindsets were likely to enjoy PE more. The MANOVA analysis indicated an overall significant gender effect [ $F(3, 246) = 10.42$ ,  $p < .0001$ ]. The follow-up ANOVAs showed that there was a significant gender difference in an incremental theory

of ability in sports [ $F(1, 248) = 8.38, p < .004, \eta^2 = .03$ ], and perceived enjoyment in PE [ $F(1, 248) = 25.86, p < .0001, \eta^2 = .10$ ]. Male participants ( $M = 3.51, SD = .88$ ) showed stronger beliefs in incremental theories than females ( $M = 3.20, SD = .85$ ) did, and they reported more enjoyment in PE ( $M = 4.02, SD = .80$ ) than females did ( $M = 3.53, SD = .71$ ). No difference was found in an entity theory of ability between male ( $M = 2.91, SD = .91$ ) and female ( $M = 2.75, SD = .73$ ) participants [ $F(1, 248) = 2.27, p = .13$ ].

## Discussions and Conclusion

Students' implicit theories of ability in sports are one of important motivational variables that affect their learning in PE (Ommundsen, 2001; 2003). The results from the confirmatory factor analysis and Cronbach's Coefficient Alphas provided evidence supporting that Implicit Theories of Ability in Sports and Perceived Enjoyment in PE were valid and reliable measurements to assess Chinese high school students' ability belief systems and motivation. Our findings showed that Chinese 12<sup>th</sup> grade participants endorsing higher growth mindsets were likely to enjoy PE more, which supported our hypothesis. Consistent with the findings of previous studies in the U.S.A. and European countries (e.g., Li et al., 2008; Ommundsen, 2001; 2003), incremental theories of ability in sports are positively associated with higher level of enjoyment. It was suggested that PE teachers may be able to enhance students' enjoyment by focusing on incremental views.

Our hypothesis that female participants would endorse less of incremental views of ability in sports and more of entity views of ability in sports than males did, was partially supported. Consistent with the Li et al. study (2004), our finding showed that boys endorsed more of incremental theories than girls did, and both boys and girls endorsed entity theories equally. One explanation for boys holding more of incremental theories than girls is the stereotypic beliefs that they have received from parents and our society: Sports are for boys, not for girls. This gender stereotypic belief about sports is still widely held by the public in China (Chen & Rao, 2011). As a result, girls have limited access to sports and lack experience in sports than boys do, which may shape their ability beliefs in sports.

The findings showed that participants overall reported high levels of enjoyment in PE. However, Chinese 12<sup>th</sup> grade boys enjoyed PE more than girls did. Ten percent of change in perceived enjoyment could be accounted for by gender. The findings were consistent with what had been reported in the literature in U.S.A. (Vertinsky, 1992). One possible reason is the focus of Chinese PE curriculum on traditional competitive sports requiring skill, strength, and power, where boys are dominant. This curricular focus can reinforce the gender stereotypic beliefs held in the society (Chen & Rao, 2011). As a result, girls enjoyed PE less. It is suggested that activities that girls preferred (Pate et al., 2005) and strategies to engage girls in skill and games-oriented lessons (Ennis, 1999) be used to increase opportunities for girls to be more involved in PE.

The present study has several limitations: First, this was a correlational study with a convenient sample. It did not address a causal effect. Second, the unique 12<sup>th</sup> grade sample makes the study hard to generalize to different grade students. Third, this study was conducted only in China. The culture factor also limits generalizing the results to another culture. Lastly, all the measures were self-reported and focused on psycho-social domains. Future research should employ behavioral measurements to examine how manipulations of ability beliefs affect students' physical activity or skill performance. Additional scales/measurements can be used to determine implicit beliefs as well.

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