Individual and Situational Interest: The Role of Gender and Skill

By: Ang Chen and Paul W. Darst

Chen, A., & Darst, P. W. (2002). Individual and situational interest: The role of gender and skill. *Contemporary Educational Psychology, 27,* 250-269.

Abstract:
The purpose of this study was to examine individual and situational interests in learning motor skills as associated with gender and skill. Individual and situational interests and motor skill were measured in middle school girls (n = 109) and boys (n = 82). A correlation analysis for the entire sample showed a moderate correlation between skill and individual interest (r = .63) and weak relationships between individual and situational interest (r < .10) and between situational interest and skill (r < .18). A MANOVA analysis revealed a difference between the boys and girls in situational interest at a borderline significance level (p = .05). However, when individual interest, skill, and gender were compared between students with high or low situational interest in a hierarchical log linear model, it was found that both groups did not differ in number of boys and girls (p = .98). But the high situational interest group had more students with high skill (p = .001) and high individual interest (p = .02). The results suggest that discrepancies in acquired skill accounted for the gender difference and that acquired skill is associated with individual interest and high situational interest in learning motor skills.
Key Words: gender; interest; motivation; prior knowledge; physical education.

Article:
Learning can be conceptualized as acquisition of knowledge and skill in many domains of human activity. Learning motor skills in the physical activity domain has proven to be a process as complex as learning in academic domains such as reading, writing, and mathematics (Zimmerman & Kitsantas, 1997). During motor skill learning, the learner is involved in processing complex situational information. There is little doubt that interest, as a motivator, plays an important role in motor skill learning as it does in other learning settings.

Interest is defined as a psychological state characterized by a high level of attention, intensive effort, and prolonged engagement with an activity and accompanied by feelings of pleasure and a sense of achievement (Hidi, 2000; Renninger, 2000). In learning, this psychological state is assumed to derive from learner–content interaction. In educational research, interest has been conceptualized as individual and situational. According to Hidi (2000) and Renninger (2000) *individual interest* refers to an individual' psychological disposition associated with his/her preferences for activities/actions, while *situational interest* refers to the appealing effect of characteristics in an activity or object that triggers responses from an individual at the moment of person–activity interaction.

Both individual and situational interests have been found to have a significant influence on student motivation in learning (Hoffmann, Krapp, Renninger, & Baumert, 1998; Renninger, Hidi, & Krapp, 1992). High individual interest in a particular subject area is associated with high academic achievement and high-level enjoyment. Csikszentmihalyi (1990) has identified it as a "flow" state when an individual has completely merged with an activity. In this state, the person is completely motivated by his/her individual interest and has become inseparable from the activity. This motivation of individual interest can be seen when a scientist is engaged in an experiment, a dancer or an athlete in a performance, and a student in a meaningful assignment.

In school learning, motivational effects of individual interest have been documented in many subject areas. Based on a comprehensive meta-analysis, Schiefele, Krapp, and Winteler (1992) reported that individual interest has a significant average correlation coefficient of above .30 with achievement across all major school content areas. A number of researchers have demonstrated that individual interest leads to a high learner–task engagement that is required for a high level of achievement (Benton, Corkill, Sharp, Downey, & Khramtsova, 1995; Renninger, 1992; Schiefele, Krapp, & Winteler, 1992).

Individual interest is considered as evolving along with the development of knowledge and value systems (Renninger, 2000). It is considered to evolve slowly over time during an individual's constant and consistent interaction with an activity in a particular environment. Individual interest is based on "stored knowledge and stored value" (Renninger, 2000, p. 376), therefore, it tends to be relatively stable and difficult to change. Yet, because individuals vary in their knowledge and values, there are tremendous differences in individual interests (Hidi & Anderson, 1992). Hidi and Berndorff (1998) have argued that because learning in schools can be viewed as a form of externally controlled conditioning, situational interest can be elicited and may lead to a development of new individual interest in the content. It can be inferred from this perspective that situational interest may trigger students' motivation to engage in learning the knowledge and skills that they lack original individual interest in.

The effects of situational interest on academic achievement are studied mainly in reading, writing, mathematics, and science education. Most research has been focused on the role of certain text characteristics in text-based learning (e.g., Frick, 1992; Harp & Mayer, 1997; Hidi & Baird, 1986; Tobias, 1995; Wade, Buxton, & Kelly, 1999). In general, situationally interesting texts motivate learners to read, enhance their comprehension, and result in a higher level of achievement. However, the effects of situational interest on achievement rely on its relevance to the content. Harp and Mayer (1997) and others (e.g., Garner, Gillingham, & White, 1989) have demonstrated that interesting but irrelevant information (seductive text and illustrations in texts) might interfere with and jeopardize the learning of important information.

Situational interest primarily influences learning by inducing stronger attention to the learning material (Hidi, 1995) and by increasing persistence on the task (Tobias, 1995). The magnitude of the influence is determined by situational factors involved in the learning process and tasks. Mitchell (1993) demonstrated that situational interest in learning mathematics relies on learning process factors such as group work, learning tasks such as puzzle problems, and meaningfulness of the problems. Schraw, Bruning, and Svoboda (1995) identified six potential sources of situational interest for reading, including text coherence, ease of comprehension, emotiveness, vividness of text, extent of engagement of the learning process, and student prior knowledge. Chen, Darst, and Pangrazi (1999) found that novelty, challenge, attention demand, exploration intention of a learning task and instant enjoyment of learning determine the extent of situational interest in physical activities.

The findings have presented a challenge for educators in choosing interest-based motivation strategies. On one hand, individual interest students bring to school might motivate them to learn. On the other hand, their individual interests are so diverse that teachers may encounter enormous difficulties if they want to guide various individual interests into a unified direction toward learning a particular content. As situational interest is associated with variables that teachers may have control over such as task design and teaching methods, it may have a stronger potential than individual interest for teachers to use in motivating students to learn (Bergin, 1995; Hidi & Anderson, 1992; Schraw & Dennison, 1994).

The influence of interest on academic performance is often associated with gender and knowledge/skill. Individual interest begins to differentiate between boys and girls at a very young age (Renninger, 1998; Renninger & Leckrone, 1991). With socialization in various settings, including the school, individual interest can be viewed as gender-typical or gender-atypical by children (Hanson, 1996; Jacobs, Finken, Griffin, & Wright, 1998; Renninger, 1998). The impact of the gender–interest association on learning is limited to situations where both male and female students have low individual interests in the subject. For example, in an examination of the impact of individual interest on writing, Benton et al. (1995) found that the male students

performed better in a narrative writing task than their female counterparts when both had low individual interest in writing. The performance discrepancy disappeared between the male and female students who had high individual interest in writing.

Similarly, situational interest can be viewed as gender typical or atypical, which influences boys' and girls' learning performances. Anderson, Shirey, Wilson, and Fieldings (1987) found that in a sentence recall test boys and girls performed better in sentences that appealed to their own gender than in those appealing to the opposite gender. For gender-neutral sentences, it appeared that situational interest had a greater impact on boys' performance than on girls'. Häussler and Hoffmann (1998) analyzed a longitudinal data set of situational interest in middle school physics and revealed that factual information dealing with "hard-core" knowledge (p. 286) appealed to 80% of male students, while topics related to social relevance interested 72% of female students.

These findings have shown that both individual and situational interests are associated with gender and the gender–interest association has a differentiated impact on learning outcome for male and female learners. Although the literature has suggested that gender has a great impact on interest and learning outcome, its role can be mediated by acquired knowledge and skill (Hidi, Weiss, Berndorff, & Nolan, 1998; Tobias, 1994). Individual and situational interests operate on different cognitive bases. According to Renninger (2000), individual interest derives from and operates on knowledge and values that an individual has acquired. In this sense, individual interest influences learning behavior and outcome by providing an information surplus environment where learners tend to rely on their acquired knowledge to self-motivate and self-regulate learning. Situational interest, on the other hand, is triggered by situational conditions or information that elicit and, at times, maintain a focused attention and positive affective reaction to the content (Hidi, 2000). Situational interest, therefore, operates in a learning setting where learners rely on the characteristics of novelty, uniqueness, and surprises in learning tasks to motivate and regulate their learning.

Although the findings on interest and its effects on learning are informative and useful for educators, interest has been studied rarely, if at all, in the domain of learning motor skills. Learning motor skills is a unique process of knowledge acquisition that requires both cognitive and physical engagement (Zimmerman & Kitsantas, 1997). As demonstrated by Zimmerman and Kitsantas (1997), motor skill learning is dominated in large part by learners' cognitive and social mediation of the process and outcome goals. There is little doubt that individual and situational interests are associated with and may influence the process of learning motor skills. The purpose of this study was twofold: to examine the extent to which individual and situational interests were associated in learning motor skills and the extent to which the association differentiated between male and female and between high and low skilled middle school students. Specifically, we intended to answer the following questions: (a) How were individual interest, situational interests, and motor skill related? (b) Did individual and situational interests differ by gender and skill? (c) Were high or low situational interest associated with gender, skill, and individual interest?

METHODS

Content Domain for the Study

Basketball was chosen as the content in which individual and situational interests and skill were measured. We chose this content based on (a) it is a major component in the physical education curriculum from elementary to high school across the nation. In other words, it has high content representativeness. (b) It is a content with minimal gender discrepancy. Both boys and girls have a similar level of individual interest in it (Chen et al., 1999). (c) This content is also accompanied with well-established standardized tests with age- and gender-relevant national norms in all specific skill components [American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD), 1984]. This allowed us to obtain valid and reliable data on participants' skills and to adjust performances by age and gender.

Participants

The participants were 7th and 8th grade students (N = 191, 57% female, 43% male) from a junior high school in a major metropolitan area in the southwestern United States. The mean ages for the 7th and 8th graders were 12.76 (SD = .54) and 13.81 (SD = .58), respectively. The sample represented the socioeconomic and cultural characteristics of the student population in the area, as acknowledged by the school and district officials. Racial characteristics of the students in the sample were 3% African Americans, 2% Asian Americans, 61% white, 26% Mexican American, 5% Native American, and 3% from other ethnic backgrounds. They came from high middle- to low-income families. Parental consent approval and student consent forms were received prior to data collection. All the participants were informed the right to withdraw from the study if they wished to do so. The school offered daily physical education classes that were instructed by certified physical education teachers. The physical education curriculum centered on a variety of sports and fitness activities.

Variables and Measures

Individual interest. Participants' individual interest in basketball was measured in a survey where eight activities/sports that were most frequently offered in the physical education curriculum were listed for rating. The activities included basketball, flag football, soccer, step aerobics, tennis, weight training, and track and field. The participants rated their individual interest in those activities on a 7-point Likert-type scale (7 = *high* to 1 = *low*). Rating basketball along with other physical activities allowed the measure of individual interest to be obtained in reference to the other activities. Thus, the likelihood of determining high or low individual interest based on students' self-reference was reduced (Tobias, 1994).

Situational interest. Situational interest was measured using a 24-item Situational Interest Scale (Chen et al., 1999). This scale measures situational interest not only as participants' direct responses to the activity, but also as a relational construct associated with sources of novelty, challenge, attention demand, exploration intention, and instant enjoyment dimensions (Deci, 1992; Chen et al., 1999). Four items that assess overall situational interest (Total Interest) are "This activity is interesting," "The activity looks fun to me," "It is fun for me to try this activity," and "This is an interesting activity for me to do." In addition, five dimensional sources were represented by four items each. Examples of these items are as follows: "this activity is new to me" (novelty), "this activity is a demanding task" (challenge), "my attention was high" (attention demand), "I want to discover all the tricks in this activity" (exploration intention), and "this activity is exciting" (instant enjoyment). The 24 items were randomly placed in the scale and a 5-point Likert-type scale (5 = *strongly agree* to 1 = *strongly disagree*) was attached to each item. The rating scores on the four items in each dimension were summed for data analyses.

The construct validity of the scale was established using a factor analytical approach (Chen et al., 1999). In both exploratory and confirmatory factor analyses with multiple data sets, the multidimensionality of the dimensional and Total Interest measures had been observed constantly and consistently. The five source dimensions evolved in the factor solutions accounted for 53 and 67% of the total variance of situational interest when students responded to conceptual learning tasks (watching video, etc.) and motor tasks (e.g., basketball shooting drills), respectively. The internal consistency coefficients (Cronbach's α, 1951) are .78, .80, .90, .9 1, .90, and .95 for the respective dimensions of Novelty, Challenge, Attention Demand, Exploration Intention, Instant Enjoyment, and Total Interest. These results suggest that data collected using Situational Interest Scale are likely to be valid and reliable.

Physical skill. We selected the chest-pass skill test to evaluate participants' prior basketball skill. The chest-pass is the most basic skill of the sport and is used most frequently in both educational and competitive settings as instructional content and an evaluation item. It has high representiveness for the content. In addition, the skill is easy enough for almost every student to master. Yet, it is difficult to execute perfectly each time during standardized testing. Therefore, participants' skill levels can be identified accurately. In this study, the skill was assessed using the AAHPERD standardized basketball skill testing (1984).

In the test, the student was required to move (using shuffling footwork) along a 22-foot line and chest-pass a basketball into five target boxes at various heights on a wall 8 feet away from the line. Figure 1 describes the test graphically. Two points were awarded for a pass into a box, one for a pass between two boxes. Performance was evaluated in terms of the total points earned in two trials of 30 s each. The validity estimates using expert judgment ratings range from .65 to .95 for males and from .69 to .94 for females at elementary, middle, and high school levels. Reliability (test–retest) coefficients range from .88 to .96 for males and .82 to .91 for females at the same school levels.

Data Collection

Data were collected in three stages. In the first stage, an individual interest survey was conducted. In the second stage, the chest-pass skill test was administered. In the third stage, situational interest was measured.

Individual interest survey. The eight activities/sports were randomly placed in survey sheets that were distributed to the participants by the teachers in the classrooms. It was explained to the participants that the survey was not part of the lesson, that their responses would not affect their grades in any way, and that their true feelings about these activities were expected and appreciated. The test–retest reliability of the rating scores was established by having a small sample of randomly chosen participants (N = 21) rate the activity again after 1 week. The intraclass correlation (R) ranged from .66 to .87 for the eight activities, indicating the activity ratings were within the range of acceptable reliability. Demographic information was collected along with the survey.

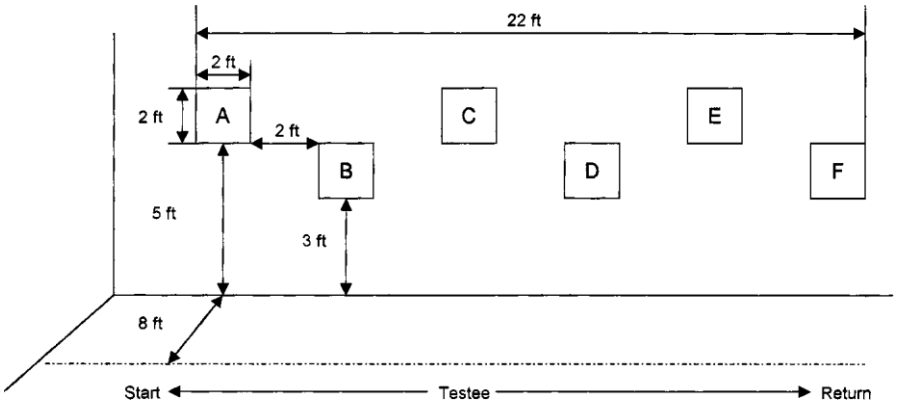

FIG. 1. Basketball Passing Test (AAHPERD, 1984).

Chest -pass skill test. The skill test took place in a gymnasium. The researchers and trained graduate assistants conducted the test in four stations simultaneously. The participants were randomly assigned to a testing site for testing during their scheduled physical education classes. They were given a practice trial before taking the test. Teachers assisted in the testing sessions (e.g., distributing score recording sheets and keeping nontesting students away from the testing sites). Scores were recorded and kept by the tester at each site. Intertester agreement ranged from 96 to 99%.

Situational interest. Situational interest was measured after two learning tasks were administered. The first learning task was the stationary chest-pass. It required a participant to pass the ball back and forth to a partner standing 15–20 feet away using the chest pass technique. The second learning task was pass-shoot. This task required students to focus on two balls' and two partners' movements simultaneously when completing dribbling, passing, and shooting tasks. Figure 2 graphically describes this learning task in detail. According to the teachers, the chest-pass task was used frequently in their instruction while the pass-shoot was never used.

The two tasks maintained the authenticity of actual learning tasks in physical education and were effective in eliciting valid responses of situational interest in middle school students. Students in Chen and Darst's (2001) multisample study rated the chest-pass low and pass-shoot high in situational interest. In this study, the two tasks were used to minimize the threat to the internal validity of the rating scores by contrasting high and low situational interest. The threat is very likely when situational interest is measured based on participants' self-referenced ratings rather than a common reference frame contrasting highs to lows (see Tobias, 1994).

Data were collected using a counterbalanced design. The two learning tasks were administered at two stations simultaneously. In each data collection session, approximately half of the participants were randomly assigned to experience the chest-pass, the other half to the pass-shoot. They completed the Situational Interest Scale immediately after experiencing their respective task. They experienced the second task after a week and completed the Situational Interest Scale a second time. The two tasks were instructed by the researchers and trained graduate assistants and took place in different areas of the gymnasium. Standardized instructional procedures were followed to maintain consistent instructions across all instructors.

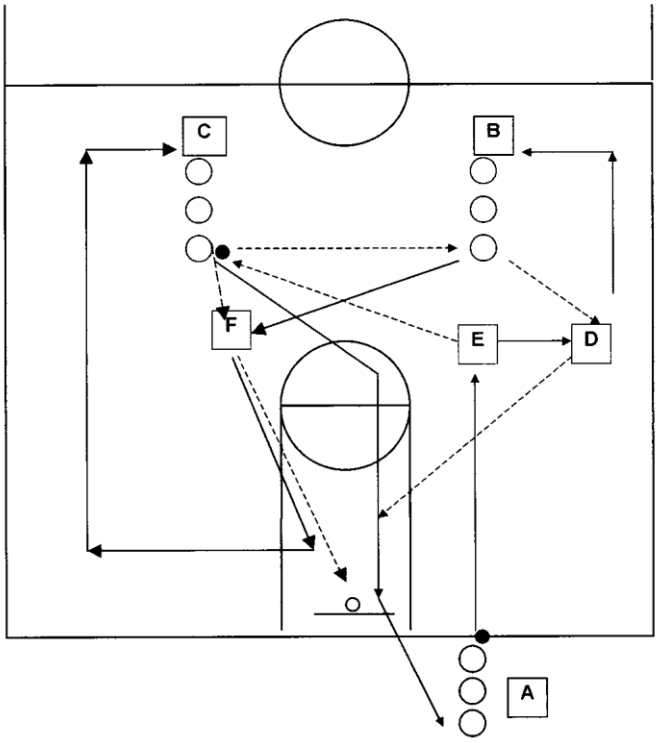

FIG. 2. Pass-Shoot Task: C passes to B, while at the same time A dribbles to E, passes to C, and then moves to D; B passes to D and then moves to F; C passes to F then starts cutting to basket; D passes to C for a lay-up then moves to end of B; C finishes lay-up, rebounds, and then moves to end of A, F makes a jump shoot, rebounds, and then moves to end of C.

Data Analysis

In data analysis, rating scores on basketball from the individual interest survey were used to represent their individual interest. Composite rating scores on Total Interest (4 items) were used to represent the level of situational interests (high and low) from the two learning tasks. Total points earned in two chest-pass test trials were used to represent skill levels.

Preliminary analyses. The effects of different task sequence on participants' responses to Situational Interest Scale were examined using Hotelling's Trace test. The purpose of this analysis was to determine the extent of possible confounding effects that might result from different sequence of measuring high and low situational interest. Then, Cohen's effect size ($d = (\mu_1 — \mu_2)/\sigma$, 1988) was computed to determine the differences between the means of responses to the chest-pass task and those to the pass-shoot task in all the dimensional measures. The purpose of this analysis was to validate the level of situational interest of the tasks with the current data. Cohen's criteria of .20 (low), .50 (medium), and .80 (high) were used to determine the validity of situational interest measures. The preliminary analyses were conducted on Total Interest measures and the five dimensional source measures: novelty, challenge, attention demand, exploration, and instant enjoyment. Measures of high and low situational interests were validated when the differences in all the dimensional measures between the two tasks were reasonably large.

Correlation and MAATOYA analyses. Pearson product–moment correlation coefficients were computed to examine the relationships among individual interest, pass-shoot situational interest, chest-pass situational

interest, and the skill test scores. MANOVA was used to determine the extent to which individual interest, low and high situational interest, differed in terms of gender and skill levels. In the MANOVA model, participants' rating scores on basketball in the activity survey and on Situational Interest Scale in the chest-pass and pass-shoot tasks were specified as dependent variables. Gender was used as the independent variable and the skill test scores were used as a covariate to control skill influence on participants' responses to individual interest survey and Situational Interest Scale.

Hierarchical log-linear modeling. Because the literature has indicated that situational interest might have greater motivational potential than individual interest, our last effort in the data analysis focused on finding the extent to which individual interest, skill, and gender were associated with differentiated situational interest ratings. In the analysis, we divided participants' responses to the high situational interest task into quartiles and examined the association of individual interest, prior skill level, and gender with top and bottom quartile situational interest responses. In all the statistical analyses, necessary assumptions were tested.

RESULTS AND DISCUSSION

In this study, we intended to examine (a) the relationship among individual and situational interests and acquired motor skill; (b) the difference in individual and situational interests in terms of gender and skill; and (c) the association of high or low situational interest with gender, skill, and individual interest. After the preliminary analyses for clarifying the internal validity of the data, each subsequent analysis was intended to answer one of the above questions. In this section, we provide the results of each analysis along with discussions that reflect our analytical considerations for the data analyses and interpretations of the data.

Preliminary Analyses

Effects of task sequence. Respectively, 97 participants responded to the Situational Interest Scale in chest-pass first (Sequence 1) and 94 in pass-shoot first (Sequence 2). The means and standard deviations of Total Interest ratings on the chest-pass task were 8.34 and 2.58 for the Sequence 1 group and 8.14 and 2.52 for the Sequence 2 group. Respectively, the means and standard deviations of Total Interest for the pass-shoot task were 12.99 and 4.68 for the Sequence 1 group 13.87 and 4.66 for the Sequence 2 group. A Hotelling's Trace test was performed on the data to compare the means from the two sequences, assuming there was possible difference caused by the different sequencing. Box's M was 100.68, $F(78, 112572) = 1.21$, $p = .11$, indicating the assumption of covariance equality for Hotelling's Trace test was not violated. The test yielded a Hotelling's Trace value of .08, $F(12, 178) = 1.25$, $p = .25$, suggesting that the data collection sequence had little effect on responses to Situational Interest Scale for each task. The data were subsequently pooled together for each learning task in the subsequent analyses.

TABLE 1
Calculated Cohen's d for Situational Interest Measures between the Two Tasks ($N = 191$)

Dimension	Pass-Shoot/Chest-Pass			
	Mean	*SD*	Pooled *SD*	d^a
Total interest	13.42/8.24	4.68/2.55	3.76	1.37
Novelty	12.34/8.58	4.37/3.55	3.98	.95
Challenge	12.21/7.78	4.30/3.11	3.75	1.18
Attention Demand	14.33/10.45	4.16/2.87	3.57	1.08
Instant Enjoyment	13.22/8.86	4.56/2.69	3.74	1.16
Exploration	13.46/9.11	4.75/3.32	4.10	1.06

[a] Estimate of $d = (\text{Mean}_1 - \text{Mean}_2)/\text{Pooled } SD$.

High and low situational interest. Tobias (1994) has pointed out that the validity of interest measures becomes questionable when levels of interest are determined merely according to students' self-reported highs or lows without a comparable reference. This self-referenced classification of interest levels potentially contributes to the discrepancies in research findings. In this study, we used a dual-comparison measurement environment in which high situational interest was determined in terms of the two tasks in reference to each other. In the analysis, we used Cohen's d (Cohen, 1988) as an indicator to determine internal validity of situation interest measures, which contrasted high situational interest from low.

Cohen's *d* was estimated using means and standard deviation from the data. Table 1 shows that the participants rated the pass-shoot task higher than the chest-pass in every dimension of situational interest measures. Cohen's *d*s exceeded high criterion of .80 in every dimension, indicating that the pass-shoot task was of higher situational interest than the chest-pass. The results suggested that in reference to the ratings of chess-pass, participants' ratings on the pass-shoot task represented their high situational interest. The results also indicated that the appealing effects of the two tasks were distinctive in Total Interest, Novelty, Challenge, Attention Demand, Exploration Opportunities, and Instant Enjoyment.

Relationship among Skill and Individual and Situational Interests

Table 2 reports the correlation coefficients among skill, individual interest, and situational interest for pass-shoot and chest-pass tasks. The correlation between individual interest and skill was strong. A weak but significant correlation was observed between pass-shoot situational interest and skill. None of the other correlations were meaningful. The participants' responses to the low situational interest task, chest-pass, were not related to any of the other variables. In addition, it is worth noting that individual interest was not correlated with high situational interest (pass-shoot ratings). This result supports the notion that individual and situational interests are independent motivational entities and may have distinctive motivational functions at a particular learning stage (Alexander, Jetton, & Kulikowich, 1995).

TABLE 2
Correlation Coefficients and Descriptives for the Four Variables (N = 191)

Variables	Individual interest	Pass-Shoot	Chest-Pass	Mean/*SD*
Skill Test Score	.63**	.18*	−.06	30.12/8.21
Individual Interest Rating		.10	.03	5.03/1.72
Pass-Shoot Rating			.03	13.42/4.68
Chest-Pass Rating				8.24/2.54

* $p < .01$ (two-tailed).
** $p < .05$ (two-tailed).

In different domains, research on the relationship among knowledge, individual interest, and situational interest has provided mixed results. Benton et al. (1995) found that knowledge was moderately correlated with both individual interest (r = .53) and situational interest (r = .48) in narrative writing. Alexander et al. (1995), however, observed a quite low correlation (r < .30) in the knowledge domain of immunology. A low correlation (r = .16) was also found in reading (Schraw et al., 1995). The inconsistence in these results may suggest that the relationship is likely to vary in terms of the knowledge specificity and situation involved in learning.

Our data indicated that in the movement domain, physical skill had a strong correlation (r = .63, p < .01) with individual interest. Two indications can be made from the results. First, the data have provided additional evidence to support Renninger's (2000) argument that individual interest is partly based on an individual's knowledge and values about the content. Children at a young age can develop strong individual interest. At the middle school ages, however, individual interest may shift. Early interest can be replaced by other activities. Shift of individual interest is often associated with their self-perceptions of competence (Hannover, 1998). With deepened understanding of the content and competence, adolescents tend to develop stable individual interests (Renninger, 2000).

Bergin (1999) and others (e.g., Todt, Drewes, & Heils, 1994) have argued, on the other hand, that the knowledge and values that stabilize individual interest are functions of the social environment in which knowledge and values are created and shaped by the influences from popular culture, family, school, and peers. It can be speculated, then, that given the social popularity of basketball in American society and its strong representation in the physical education curriculum across elementary and secondary schools, the participants had acquired relatively strong knowledge and values about basketball that had stabilized their individual interest in basketball.

Second, the results may indicate that the participants as a whole might be in a relatively advanced stage of learning. In articulating the relationship of interests with learning, researchers (Alexander et al., 1995; Hidi &

Anderson, 1992; Tobias, 1994) have suggested that situational interest may attract learners to initiate learning when their domain knowledge and skill are limited. With gradual accumulation of domain knowledge and skills, the original "catching" of situational interest might be transformed into a "holding" of situational interest (Mitchell, 1993). The transformed holding of interest will have a longer and stronger motivational effect on learning than the short-lived catching of situational interest. It may be assumed from the data that the participants, after having been learning the content of basketball since elementary school, were in a stage of learning where situational interest had been strengthened from a catching pattern to a relatively stable holding pattern. With growth of knowledge and skill in basketball through elementary and middle school years, the students had become competent learners. For them situational interest might begin to develop into individual interest (Alexander et al., 1995).

Gender Difference and the Role of Skill

Because interests covary with knowledge and skills (Tobias, 1994), the ratings on situational and individual interests were adjusted in terms of the skill test scores for the MANOVA. The calculated standard R coefficients used for the adjustment were .12, .15, and .02 for individual interest, pass-shoot situational interest, and chest-pass situational interest, respectively. In the MANOVA model, gender was designated as the independent variable, skill test scores as the covariate, and individual and situational interest ratings as the dependent variables. Table 3 reports the descriptive and adjusted means for individual interest, and situational interest of the pass-shoot task and the chest-pass task.

Computed Box's M was 57.13, $F = 1.28$, $p = .11$; indicating that the assumption of covariance homogeneity was not violated in the data. Bartlett's test of sphericity rejected the hypothesis that the covariance matrix was an identity matrix ($\chi^2 = 246.94$, $df = 5$, $p = .00$), indicating the warrant to apply MANOVA.

The results showed that male and female students differed on situational interest in the pass-shoot task [Wilks' $\lambda = .96$, $F(3, 184) = 2.73$, $p = .05$]. The borderline result was not surprising because the literature has been providing mixed findings. Gender differences of interest have been documented in most studies in science and mathematics (Baumert, 1998; Gardner, 1998), but not in other disciplines (Fölling-Albers & Haringer, 1998).

TABLE 3
Descriptive and Adjusted Means and Standard Deviations of the Dependent Variables by Gender

		Individual interest		Chest-Pass		Pass-Shoot	
	n	Descriptive *M/SD*	Adjusted *M/SE*[a]	Descriptive *M/SD*	Adjusted *M/SE*	Descriptive *M/SD*	Adjusted *M/SE*
Male	82	5.88/1.36	5.17/.17	7.78/2.84	7.65/.33	13.40/4.63	12.70/.58
Female	109	4.40/1.69	4.95/.15	8.59/2.25	8.53/.28	13.44/4.73	14.36/.49

[a] Standard error.

In describing the relationship of knowledge with individual and situational interests, Alexander et al. (1995) have suggested that learners rely on different interests at the three learning stages: accumulation, competency, and proficiency. At the accumulation stage when the individual has limited knowledge/skill, situational interest attracts him/her to acquire new knowledge/skill. At the competency stage, accumulated knowledge provides a basis for developing and enhancing individual interest. Individual interest starts to replace situational interest as a major motivator. At the proficiency stage, individual interest has become the sole motivator. Individuals engage in activities that are consistent with their individual interests.

Based on this model of learning, it is logical to reason that the female students were at a lower learning stage than their male peers. For the pass-shoot task, the female students' interest basically was situational. In other words, situational interest was their primary motivator to engage in the task. For the male students, the lower ratings on situational interest may reflect that, in comparison with their female counterparts, they might be at a higher learning stage where their reliance on situational interest had declined. An examination of the participants' skill test scores strongly supported this reasoning. The mean of skill test scores for the male

students (M = 35.67, SD = 6.59) was at the 50th percentile of the national norm for boys of the age, while the mean for the female students (M = 25.95, SD = 6.71) was at the 25th percentile for girls. It is clear that boys and girls in this sample differed considerably in their acquired skill.

It seems apparent in the standard β coefficients and the adjusted means for situational interests that discrepancies in skill accounted for the gender difference in interest measures. It is shown in Table 3 that when discrepancies in skill were controlled, the mean of the female students' scores on pass-shoot situational interest increased from 13.44 to 14.36, while the mean for the male students' scores decreased from 13.40 to 12.70. This led us to hypothesize that skill might account for the gender difference in situational interest.

Determinants of Situational Interest

Although the MANOVA results indicated that gender was found likely to be a significant determinant of situational interest (p = .05), it was premature to accept this result without taking into account the effects of skill and skill–gender interaction on high and low situational interest. To examine the hypothesis that skill accounted for the gender difference in situational interest, we conducted a hierarchical log-linear model analysis to determine the extent to which high and low situation situational interest were associated with skill and gender. For the analysis, the students' individual interest and skill test scores were coded into above- or below-average categories according to the means of the two measures adjusted for gender. Then, the number of students in the high and low quartiles of pass-shoot situational interest were counted and compared in individual interest, skill, and gender using a hierarchical log-linear modeling analysis. The cut scores for the low and high quartiles of situational interest ratings were 8 and 16, respectively. The participants with Total Interest ratings below 8 were classified in the low quartile and those with rating scores higher than 16 in the high quartile. The classification resulted in a high quartile of 51 participants and a low quartile of 48.

Table 4 reports the frequency distributions of students in skill, individual interest, and gender grouped in high or low quartiles of situational interest. Results in Table 5 shows that the frequency of student counts between the two groups differed in skill (p = .00) and individual interest (p = .02), but not in gender (p = .93). A goodness-of-fit test indicated that the hierarchical log linear model fit the data well (Likelihood Ratio χ^2 = 11.25, df = 24, p = .98).

TABLE 4
Gender, Individual Interest, and Skill Frequency Distributions by High and Low Situational Interest Ratings

Situational interest	Gender		Individual interest		Skill level		Total
	Male	Female	High	Low	High	Low	
High							
Freq.	22.0	29.0	28.0	23.0	33.0	18.0	51.0
Exp. Freq.	21.6	29.4	21.6	29.4	24.7	26.3	51.0
Low							
Freq.	20.0	28.0	14.0	34.0	15.0	33.0	48.0
Exp. Freq.	20.4	27.6	20.4	27.6	23.3	24.7	48.0
Total	42.0	57.0	42.0	57.0	48.0	51.0	99.0

TABLE 5
Results of Hierarchical Log-Linear Model Analysis

Level of interaction	Likelihood ratio χ^2	p	Pearson χ^2	p
Interaction effects				
Three-way	3.81	.96	4.00	.95
Two-way	24.11	.01	25.25	.01
Effect terms in two-way analysis				
Situational Interest × Gender			.01	.93
Situational Interest × Skill			8.58	.00
Situational Interest × Individual Interest			5.35	.02

Results of the hierarchical log-linear modeling confirmed that the gender difference in situational interest might be attributed to the inequality in skill. The students who demonstrated high or low situational interest could be distinguished by their skill levels and individual interest. Contrary to the results of correlation analysis, the hierarchical log-linear modeling showed that at a high skill level, high situational interest was associated with high individual interest. The result seems to suggest that the students with relatively high skill might be in the competent learning stage where situational interest was being internalized and transformed into individual interest (Alexander et al., 1995). It may be speculated that situational interest of the students with high skill might demonstrate a "holding" nature in that it was likely to be intertwined with individual interest. It might be possible that the students with high individual interest and high skill are more likely to be triggered by situational interest in learning motor skills.

Scholars in physical educations have argued that knowledge and skill difference between boys and girls are socially constructed. Most boys and girls learn physical skills in a highly stereotypical social environment that expects boys to develop superior skills in some activities and girls in others (Williamson, 1996). Griffin (1985), in her classic study on boys' and girls' participation patterns in physical education, reported that parents, teachers, and peer students explicitly showed very different expectations for boys and girls. As Williamson (1996) has summarized, in the society and in physical education classes, girls are expected to merely participate in activities, while boys are expected to improve the skill. Based on the literature and the data, we can argue that the gender discrepancy found in individual and situational interests is less likely a function of gender itself. Rather, it is accounted for by the knowledge and skills boys and girls have constructed while learning physical tasks in a stereotypical social environment.

CONCLUSION

In this study we attempted to examine the extent to which gender and acquired skill were associated with individual and situational interests in learning physical skills. We adopted a dual-measurement environment where the level of situational interest was determined by contrasting participants' responses to two learning tasks rather than by relying solely on self-reported high or low levels. We believe that these methodological approaches have enhanced the internal validity of the data.

The data analyzed in this study clarified the association of situational interest with skill and gender in learning motor skill. Boys and girls can be attracted equally to learning tasks of high situational interest. We found that individual interest and skill levels had a strong positive correlation. In general, individual interest and skill levels were not correlated with situational interest. However, the hierarchical log linear modeling revealed an association among high individual interest, high situational interest, and high skill. In addition, the model clarified that skill accounted for gender difference observed in the MANOVA results, indicating skill played a more important role than gender in situational interest. Taken together, the results have shown that skill played a critical role in determining both individual and situational interest in learning motor skills.

Our findings seem to support the notion delineated in Alexander et al.'s (1995) learning stage model that situational interest can assist the development of individual interest. From this theoretical perspective, results of this study suggest that both individual and situational interests may play a role in learning a physical movement task. But the effects are likely to be determined in large part by the initial skill levels students have acquired when beginning to engage in learning that task. To facilitate learning, physical movement tasks should be designed as situationally interesting as possible to motivate students in the initial learning process (Chen & Darst, 2001). The ultimate goal of triggering situational interest, however, should be to help students develop stabilized individual interest in the content.

In the domain of physical movement, gender has been viewed as having a significant role in males' and females' activity preference and participation patterns in learning (Griffin, 1985). Male and female students are stereotyped as suitable for certain physical activities that are "gender-appropriate" because of their biological characteristics (Williamson, 1996). Social impact on their different preferences of physical activity and learning patterns are largely overlooked. This has resulted in a stereotypical view about the role of gender in learning

physical movement skills and development of interest. Our data have provided a piece of evidence suggesting that differences in interest between male and female middle school students may be accounted for by their difference in acquired skills. In this sense, we deem the gender difference in interests to be a social issue rather than a biological one (Williamson, 1996).

To conclude, we situate our study in a context of "motivating the academically unmotivated" (Hidi & Harackiewicz, 2001, p. 151). Similar to the interest and motivation in academic content, children's interests in learning motor skills and health-enhancing physical activities deteriorate as they grow older (U.S. Department of Health and Human Services, 1996). As Hidi and Harackiewicz (2001) have suggested, the impact of interests on learning motor tasks is associated with other motivation concomitants such as their goals for learning, self perception of competence, and the social environment of learning. For students not interested in learning, such as those in the low quartile in this study, how intrinsic and extrinsic sources of motivation can be utilized to enhance their motivation should be the center of motivation and interest research (Chen, 2001; Hidi & Harackiewicz, 2001) regardless of the academic domain they are studying in.

REFERENCES

American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD). (1984). *AAHPERD skills test manual: Basketball for boys and girls.* Reston, VA: AAHPERD.

Alexander, P. A., Jetton, T. L., & Kulikowich, J. M. (1995). Interrelationship of knowledge, interest, and recall: Assessing a model of domain learning. *Journal of Educational Psychology,* 87, 559–575.

Anderson, R. C., Shirey, L. L., Wilson, P. T., & Fieldings, L. G. (1987). Interestingness of children's reading material. In R. E. Snow & M. J. Farr (Eds.), *Aptitude, learning and instruction: Vol. III. Cognitive and affective process analyses*. Hillsdale, NJ: Erlbaum.

Baumert, J. (1998). Learning math in school: Does interest really matter? In L. Hoffmann, A. Krapp, K. A. Renninger, & J. Baumert (Eds.), *Interest and learning* (pp. 327–336). Kiel, Germany: University of Kiel.

Benton, S. L., Corkill, A. J., Sharp, J. M., Downey, R. G., & Khramtsova, I. (1995). Knowledge, interest, and narrative writing. *Journal of Educational Psychology,* 87, 66–79.

Bergin, D. A. (1995). Effects of a mastery versus competitive motivation situation on learning. *Journal of Experimental Education,* 63, 303–314.

Bergin, D. A. (1999). Influences on classroom interest. *Educational Psychologist,* 34(2), 87– 98.

Chen, A. (2001). A theoretical conceptualization for motivation research in physical education: An integrated perspective. *Quest,* 53, 35–58.

Chen, A., & Darst, P. W. (2001). Situational interest in physical education: A function of learning task design. *Research Quarterly for Exercise and Sport,* 72, 150–164.

Chen, A., Darst, P. W., & Pangrazi, R. P. (1999). What constitutes situational interest? Validating a construct in physical education. *Measurement in Physical Education and Exercise Science,* 3, 157–180.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillside, NJ: Erbaum.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika,* 16,297–334.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper & Row.

Deci, E. L. (1992). The relation of interest to the motivation of behavior: A self-determination theory perspective. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 43-70). Hillsdale, NJ: Erlbaum.

Fölling-Albers, M., & Haringer, A. (1998). Interest of girls and boys in elementary school. In L. Hoffmann, A. Krapp, K. A. Renninger, & J. Baumert (Eds.) *Interest and learning* (pp. 175–183). Kiel, Germany: University of Kiel.

Frick, R. W. (1992). Interestingness. *British Journal of Psychology,* 83, 113–128.

Gardner, P. L. (1998). The development of males' and females' interest in science and technology. In L. Hoffmann, A. Krapp, K. A. Renninger, & J. Baumert (Eds.), *Interest and learning* (pp. 41–57). Kiel, Germany: University of Kiel.

Garner, R., Gillingham, M. G., & White, C. S. (1989). Effects of "seductive details" on macroprocessing and microprocessing in adults and children. *Cognition and Instruction,* 6,41–57.

Griffin, P. S. (1985). Teacher's perceptions of and responses to sex equity problems in a middle school physical education program. *Research Quarterly for Exercise and Sport,* 56, 103–110.
Hannover, B. (1998). The development of self-conception and interest. In L. Hoffmann, A. Krapp, K. A. Renninger, & J. Baumert (Eds.), *Interest and learning* (pp. 105–126). Kiel, Germany: University of Kiel.
Hanson, S. L. (1996). *Lost talent: Women in the science.* Philadelphia: Temple Univ. Press.
Harp, S. F., & Mayer, R. E. (1997). The role of interest in learning from scientific text and illustrations: On the distinction between emotional interest and cognitive interest. *Journal of Educational Psychology,* 89, 92–102.
Häussler, P., & Hoffmann, L. (1998). Qualitative differences in students' interest in physics, and the dependence on gender and age. In L. Hoffmann, A. Krapp, K. A. Renninger, &
J. Baumert (Eds.), *Interest and learning* (pp. 280–289). Kiel, Germany: University of Kiel.
Hidi, S. (1995). A reexamination of the role of attention in learning from text. *Educational Psychology Review,* 7, 323–350.
Hidi, S. (2000). An interest researcher's perspective: The effects of extrinsic and intrinsic factors on motivation. In C. Sansone & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 309–339). San Diego, CA: Academic Press.
Hidi, S., & Anderson, V. (1992). Situational interest and its impact on reading and expository writing. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 215–238). Hillsdale, NJ: Erlbaum.
Hidi, S., & Baird, W. (1986). Interestingness—A neglected variable in discourse processing. *Cognitive Science,* 10, 179–194.
Hidi, S., & Berndorff, D. (1998). Situational interest and learning. In L. Hoffmann, A. Krapp,
K. A. Renninger, & J. Baumert (Eds.), *Interest and learning* (pp. 74–90). Kiel, Germany: University of Kiel.
Hidi, S., & Harackiewicz, J. M. (2001). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research,* 70, 151–179.
Hidi, S., Weiss, J., Berndorff, D., & Nolan, J. (1998). The role of gender, instruction and a cooperative learning technique in science education across formal and informal settings. In L. Hoffmann, A. Krapp, K. A. Renninger, & J. Baumert (Eds.), *Interest and learning* (pp. 215–227). Kiel, Germany: University of Kiel.
Hoffmann, L., Krapp, A., Renninger, K. A., & Baumert, J. (Eds.). (1998). *Interest and learning* (pp. 215–227). Kiel, Germany: University of Kiel.
Jacobs, J. E., Finken, L. L., Griffin, N. L., & Wright, J. D. (1998). The career plans of science-talented rural adolescent girls. *American Educational Research Journal,* 35, 681-704. Mitchell, M. (1993). Situational interest: Its multifaceted structure in the secondary school mathematics classroom. *Journal of Educational Psychology,* 85, 424–436.
Renninger, K. A. (1992). Individual interest and development: Implications for theory and practice. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development*. Hillsdale, NJ: Erlbaum.
Renninger, K. A. (1998). The roles of individual interest(s) and gender in learning: An overview of research on preschool and elementary school-aged children/students. In L. Hoffmann, A. Krapp, K. A. Renninger, & J. Baumert (Eds.), *Interest and learning* (pp. 165– 175). Kiel, Germany: University of Kiel.
Renninger, K. A. (2000). Individual interest and its implications for understanding intrinsic motivation. In C. Sansone & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 373–404). San Diego, CA: Academic Press.
Renninger, K. A., & Leckrone, T. G. (1991). Continuity in young children's actions: A consideration of interest and temperament. In L. Oppenheimer & J. Valsiner (Eds.), *The origins of action: Interdisciplinary and international perspectives* (pp. 205–238). New York: Springer-Verlag.
Renninger, K. A., Hidi, S., & Krapp, A. (Eds.). (1992). *The role of interest in learning and development*. Hillsdale, NJ: Erlbaum.
Schiefele, U., Krapp, A., & Winteler, A. (1992). Interest as a predictor of academic achievement: A meta-analysis of research. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 183–212). Hillsdale, NJ: Erlbaum.
Schraw, G., & Dennison, R. S. (1994). The effect of reader purpose on interest and recall. *Journal of Reading Behavior,* 26, 1–18.

Schraw, G., Bruning, R., & Svoboda, C. (1995). Sources of situational interest. *Journal of Reading Behavior,* 27, 1–17.
Tobias, S. (1994). Interest, prior knowledge, and learning. *Review of Educational Research,* 64,37–54.
Tobias, S. (1995). Interest and metacognitive word knowledge. *Journal of Educational Psychology,* 87, 399–405.
Todt, E., Drewes, R., & Heils, S. (1994). The development of interests during adolescence: Social context, individual differences, and individual significance. In R. K. Silbereisen & E. Todt (Eds.), *Adolescence in context: The interplay of family, school, peers and work in adjustment* (pp. 82–95). New York: Springer-Verlag.
U. S. Department of Health and Human Services. (1996). *Physical activity and health: A report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.
Wade, S. E., Buxton, W. M., & Kelly, M. (1999). Using think-alouds to examine reader-test interest. *Reaching Research Quarterly,* 34, 194–216.
Williamson, K. M. (1996). Gender issues. In S. J. Silverman & C. D. Ennis (Eds.), *Student learning in physical education: Applying research to enhance instruction*. Champaign, IL: Human Kinetics.
Zemmerman, B. J., & Kitsantas, A. (1997). Developmental phases in self-regulation: Shifting from process goals to outcome goals. *Journal of Educational Psychology,* 89, 29–36.