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A Study of Factors That Influence the Swimming Performance of Hispanic High School Students

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The purpose of this study was to determine the relationship of swimming performance to six factors including swimming self-efficacy, fear of drowning, perceived swimming risk, previous swimming opportunities, body image, and perceived athletic skill among high school Hispanic/Latino males and females, ages 13–18. This research also compared differences for each of the variables based on gender. Participants in the study included 71 females and 73 males, ages 13–18, all of Hispanic/Latino ethnic background from one high school. Swimming performance was measured by a Swimming Performance Checklist and self-efficacy was measured by a Swimming Self-Efficacy Scale. Perceived swimming risk was determined by The Perception of Drowning Risk Survey. Body image, previous swimming opportunities, fear of drowning, and perceived athletic skill were assessed through additional survey questions. Analysis of variance determined if there were significant differences in the means of the seven tests based on gender. Males demonstrated significantly higher means for each variable. Relationships between swimming performance and the other variables were calculated using Pearson Product Moment Correlations. Swimming self-efficacy and swimming performance had the strongest positive correlation (+ 0.75). There was a moderate negative correlation between fear of drowning and swimming self-efficacy (–0.54). Early multilevel swimming programs for all children are strongly encouraged to help children overcome fear of the water, increase swimming efficacy, swimming performance, and ultimately, to increase the percentage of adults who can swim.

There are many benefits associated with the ability to swim proficiently. Individuals who can swim are more likely to be able to save themselves or others because they can perform basic swimming skills (Brenner, 2003; Irwin, Irwin, Ryan, & Drayer, 2009). Swimming also promotes excellent physiological fitness because it is a low-impact, aerobic activity, minimizing stress on the joints while exercising all of the major muscle groups of the body (Luebbers, 2009). Participation in aquatics-oriented activities can also foster social, emotional, and psychological well-being (Lepore, Gayle, & Stevens, 2007). At its most basic level, learning how to swim can provide a great sense of accomplishment and personal satisfaction and provide opportunities for social interaction (Irwin, Irwin, Ryan, & Drayer, 2009;

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Phillips, 2008). Having a minimum level of swimming competency can increase job opportunities, since aquatic professionals are always needed as lifeguards and swim instructors. Despite these benefits, a substantial percentage of American adults have limited to no swimming ability, with substantial differences related to both gender and ethnicity (Gilchrist, Sacks, & Branche, 2000).

The low percentage of youth who are proficient in swimming is disappointing since there are a variety of programs that encourage and promote swimming. For example, during the 20th century, national agencies such as the American Red Cross, the YMCA, and the Boy and Girl Scouts of America all have instituted and expanded learn-to-swim programs (American Red Cross, 2004). Further, the charter of the International Life Saving Federation publicizes and encourages implementation of effective drowning prevention measures (International Life Saving Federation, 2007). Despite these efforts, more than 400,000 people worldwide drown every year from a variety of causes, including swimming inability (Bierens, 2006; International Life Saving Federation, 2007).

Since learning to swim poses an individual challenge and is likely to provoke a certain degree of anxiety, self-efficacy may play an important role in success in the pool (Starek & McCullagh, 1999). Further, an individual's fear of drowning or anxiety induced by previous water activities may be directly related to her/his level of efficacy. Self-efficacy beliefs are an important aspect of motivation in youth sport and physical activity, due to their influence on task choice, effort, persistence, and resilience (Bandura, 1990, 1994). Children with higher self-efficacy are more likely to participate in physical activity than those with lower self-efficacy (Chase, 2001).

Swimming performance of older students appears to be strongly related to opportunities to learn to swim as a child and availability of swimming pools as a child. As a child and beginner, the more time an individual devotes to practicing a particular activity (e.g., swimming), the greater their level of achievement and the more comfortable they tend to be in the environment (e.g., swimming pools; Newell & Rosenbloom, 1981). Consequently, the fewer experiences in a swimming environment, the fewer opportunities children will have to practice their swimming skills, which may result in a decreased comfort level. Since previous performance experiences are an important factor in the development of swimming self-efficacy, the lack of opportunities to practice basic swim skills may contribute to a fear of drowning and result in a loss of swimming self-efficacy, particularly among females (Frank, 2001). Socioeconomic status has been shown to be a prime factor in swimming proficiency because children who grow up in middle and upper classes are more likely to have regular access to swimming facilities (Ponessa, 1992).

Gender has been noted as a factor in early swimming proficiency because some parents may be more directly involved in their son's sports opportunities as a child because they perceive that boys have more interest and ability in sports than girls (Harold, Eccles, Yoon, Aberbach, & Freedman-Doan, 1991). Such inequitable parental support for boys may play a role in fewer swimming opportunities for females and lower performance achievement.

Body image also appears to play a role in teen interest in swimming, especially among females. In 2005, the Women's Sports Foundation UK and the Amateur Swimming Association, in surveying women aged 25–34, found the more athletic women had fewer concerns over body exposure, particularly those who swam regularly. The less athletic women were concerned, not just about being exposed in

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front of men, but also in front of other women because of the potential for negative comparisons with other women who were using the same pool (Lillistone, 2006). While both women and men can suffer from body image dissatisfaction and experience similar impacts on their health and well-being, women are more likely to have a poor body image, particularly between the ages of 15 and 22 years (VicHealth, 2004). Body image dissatisfaction may also be associated with decreased healthy behaviors, such as unwillingness to participate in physical activities, including swimming (Main, 2009).

Nonaquatic athletic ability may have a positive impact on swimming efficacy and performance. Specifically, those who perceive themselves to be at least as athletic as their peers tend to have more energy, a more positive body image, are generally more confident about their future health, and are more athletically skillful than those who perceive their athletic ability to be lower than their peers (Ferron, Narring, Cauderay, & Michaud, 1999). Consequently, adolescents who are confident in their athletic abilities are more likely to want to engage in swimming (Shepard & Godin, 1988).

Parental and ethnic factors may impact a child's ability to swim. In a survey of 1,772 children, ages 6–16, that was conducted by the University of Memphis Department of Health and Sports Sciences for USA Swimming (Crary, 2008), the researchers reported that African-American and Hispanic/Latino children were six times more likely than Caucasians to be part of a family in which neither parent nor child could swim. In those families, 91% of African-American children had not learned to swim. Among Hispanic/Latino children, the percentage of nonswimmers was also high, 70%. Overall, only 13% of children who were from a nonswimming household learned to swim proficiently. Parents' financial circumstances also were studied, and children on a free or reduced lunch program were twice as likely to be nonswimmers.

While Starek and McCullagh (1999) examined the effects of two types of modeling on the swimming performance, swimming self-efficacy, and state anxiety of adults, no study has specifically examined the relationships between swimming proficiency and fear of drowning, body image, previous swimming opportunities, and perceived general athletic skill among adolescents. It appears important to investigate these relationships to determine how to better promote early swimming proficiency among children. Consequently, the purpose of this study was to determine which factors are most highly correlated with the swimming performance of adolescent Hispanic males and females.

Method

Participants

Participants in the study numbered 71 females and 73 males, ages 13–18 years. All participants were characterized as being Hispanic/Latino and more than 95% of the participants were enrolled in the free/reduced lunch program. All participants were enrolled in one of four required physical education swim classes at an urban high school in Los Angeles. All four classes were taught by the same physical education teacher, a certified aquatics specialist.

Instrumentation

Swimming performance was measured by a Swimming Performance Checklist, and self-efficacy was measured by a Swimming Self-Efficacy Scale similar to the Swimming Performance Checklist and Swimming Self-Efficacy Scale used by Starek and McCullagh (1999). The Swimming Performance Checklist was validated and shown to be reliable by a panel of judges (Starek & McCullagh, 1999). This battery of tests included specific skills from Levels 1–5 of the American Red Cross Learn to Swim Program (American Red Cross, 2004). The skills included (1 & 2) floating on front and back for five seconds, (3 & 4) swimming on front and back for 15 feet, (5 & 6) swimming on front and back for 25 yards, (7 & 8) swimming on front and back 50 yards, and (9 & 10) treading water in the deep end for 30 s and one minute. The participants were observed performing each of these skills, one at a time and received a score of one to three, for each skill, as determined by a Red Cross certified swimming instructor who was trained and had over ten years of administering these tests. Because only a single individual scored the tests, no measure of rater objectivity was available.

The testing was conducted during all four required physical education classes on the first day of a swimming unit. A score of 0 indicated that no attempt was made to perform the swimming skill. A score of one indicated that less than half of the distance or time was completed by the swimmer. A score of two indicated that more than half of the distance or time, but not full completion, was executed by the swimmer. A score of three indicated that the skill, distance, and time were entirely and satisfactorily completed by the swimmer. The total score for swimming performance was the sum of the ten skills performed by the swimmer. Therefore, the minimum score for a swimmer was zero (no attempt for any skills), and the maximum score was 30 (i.e., satisfactory completion of all skills).

The day after the swimming performance test, each participant was given a battery of surveys which included The Swimming Self-Efficacy Scale (Sterak & McCullagh, 1999), The Perception of Drowning Risk Survey (McCool, Moran, Ameratunga, & Robinson, 2008), as well as questions addressing fear of drowning, swimming opportunities, body image, and athletic skill. Participants completed the surveys one item at a time. The instructor read each item out loud and allowed all participants to complete that item before proceeding to the next item. Participants were encouraged to ask questions regarding the content of any survey item.

The Swimming Self-Efficacy Scale was developed and previously validated by Starak and McCullagh (1999) who used Bandura's Efficacy Scale (Bandura, 1977) as a guideline to rate participants' confidence to perform the ten swimming performance skills. The current authors assumed that the instrument maintained its validity and reliability for the current study. The scale ranged from one (*not at all confident*), to ten (*extremely confident*). The minimum score was 10 (*not at all confident in any of the ten swimming skills*), and the maximum score was 100 (*extremely confident in all of the swimming performance skills*).

The perception of drowning risk was assessed using a survey consisting of eight scenarios representing differing levels of danger to the swimmer. The survey included questions developed for a national survey on water safety of New Zealand youth (Moran, 2003). The Perception of Drowning Risk Survey had been assessed for content validity via a national peer-reviewed process and pilot studies (McCool

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et al., 2008). The survey's original reliability was not reported. Minor word editing was made and three items were added to make the scenarios relevant to adolescents in an urban environment in the United States, presumably to improve reliability. Participants were asked, "How much risk of drowning do you perceive in each of the following situations: chased toy into deep water at a local swimming pool, fell into deep water fully clothed while walking along the side of a deep swimming pool, caught in a rip current at a beach, recreation swimming in a pool that is 4 feet deep, falling out of a small boat in a calm lake wearing a lifejacket, having to swim one length of a pool without stopping or touching the bottom, getting a leg cramp while swimming in a pool that is 7 feet deep, falling off a large boat in the middle of the ocean without a lifejacket?" The Perception of Drowning Risk Survey provided a Likert Scale with five response categories ranging from *no risk* to *extreme risk*. *No risk* received a score of one and *extreme risk* scored a five. To determine a composite score, the scores for the eight perception of drowning risk scenarios were summed to determine high and low risk of drowning per participant (McCool et al., 2008). The minimum score for the participant in this assessment was 8 (*no perceived risk of drowning*), and the maximum score was 40 (*extreme perceived risk of drowning*). Authors presumed that the original instrument content validity still applied for the current study.

Fear of drowning and swimming opportunities (e.g., frequency of lessons or practice) were assessed using one-item questions included in the survey materials. With regard to fear of drowning, the question stated, "How much do you fear drowning?" There were five Likert Scale response categories ranging from *not at all afraid* (1) to *extremely afraid* (5). *Not at all afraid* received a score of one and *extremely afraid* received a score of five. With regard to the frequency of swimming opportunities, the question stated, "Throughout your life, how often have you had opportunities to swim outside of school?" There were five Likert Scale response categories for this item as well ranging from *never* to *very often. Never* received a score of one and *very often* received a score of five. The minimum score for this assessment item was 1 (*never any opportunities to swim outside of school*), and the maximum score was 5.

Body image and athletic skill were assessed using two questions each in the survey. In regard to body image, the questions stated, "How did you feel about your body as a child in comparison to other children?" and "How do you feel about your body now in comparison to others of the same age?" There were three response categories to each question asked which included, below average or less attractive than others, average or about the same attractiveness as others, and above average or more attractive than most. Below average or less attractive than others received a score of 1, average or about the same attractiveness as others received a score of 2, and above average or more attractive than most received a score of 3. The minimum score for these assessment items was 2 (participant's body image as a child and now are less attractive than others) and the maximum score was 6 (participant's body image as a child and now are more attractive than others). Summed scores for the two body image questions determined high or low body image per participant.

With regard to athletic skill the questions stated, "How do you rate your general athletic skill as a child in relation to others your age?" and "How do you rate your general athletic skill now in comparison to others your age?" There were three Likert Scale response categories for both of these questions: *below average*, *average*,

and *above average*. *Below average* received a score of 1, *average* received a score of 2, and *above average* received a score of 3. Similar to the body image questions, the minimum score for these assessment items was 2 (participant's perceived athletic skill as a child and now are below others) and the maximum score was 6 (participant's perceived athletic skill as a child and now are above others). Summed scores for the two perceived athletic skill questions determined high or low perceived athletic skill per participant. The survey also solicited demographic information, including age, gender, and ethnicity.

Analyses

To determine a minimum number of necessary participants, a statistical power analysis was performed using SPSS that established a power value of 0.8 and an effect size of 0.25 at a probability level of 0.01. Based on the analysis, it was determined that a total of at least 56 subjects would be needed for the study. The authors calculated analyses of variance (ANOVAs) to determine if there were significant differences in the means of the seven tests when comparisons were made by gender. To minimize the probability of Type I errors in comparing mean scores for males and females, the 0.01 confidence level was chosen. Pearson Product Moment Correlation coefficients were used to calculate the linear relationships among swimming performance and the other variables ($p < .01$). Data were entered into a Microsoft Excel spreadsheet, and then analyzed using SPSS 17.0.

Results

Gender Comparisons Between Variables

Means, standard deviations, confidence levels, and P values are provided for each of the seven variables in Table 1, with comparative data by gender. The mean ages were 15.82 years for females (SD = ± 1.42) and 16.14 years (SD = ± 1.52) for males. Results revealed significant differences between males and females for all seven variables. The mean for swimming performance was significantly higher in males (23.68 ± 6.94) than it was for females (18.35 ± 9.24). The mean for swimming self-efficacy was significantly higher in males (70.88 ± 25.46) than it was for females (52.77 ± 32.27). The mean of fear of drowning was significantly lower in males (2.16 ± 1.24) than females (2.86 ± 1.22). The mean for frequency of swimming opportunities was significantly higher in males (3.27 ± 1.00) than females (2.85 ± 0.92). The mean for perceived swimming risk was significantly lower for males (17.27 ± 6.40) than females (20.37 ± 7.00). The mean for body image was significantly higher for males (4.21 ± 0.67) than females (3.79 ± 0.83). The mean for perceived athletic skill was significantly higher for males (4.41 ± 0.85) than females (3.86 ± 0.85).

Correlations Between Variables

Results indicated ten significant correlations among the variables at the $p \leq .01$ level (see Table 2). The correlation between swimming self-efficacy and swimming performance was r = + 0.75. This finding demonstrated that for this

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Table 1 Comparison of Means and Standard Deviations for High School Hispanic Males and Females on Seven Swimming Related Variables

Variable	Males (*n* = 73)	Females (*n* = 71)	Total (*n* = 144)	P
Swimming Performance	23.68 (± 6.94)	18.35 (± 9.24)	20.06 (± 8.56)	0.000*
(0–30)	(21.54–23.68)	(15.45–21.26)	(19.19–22.91)	0.000*
Swimming Self-Efficacy	70.88 (± 25.46)	52.77 (± 32.27)	61.95 (± 30.31)	0.000*
(10–100)	(63.00–78.76)	(42.63–62.91)	(55.36–61.95)	
Fear of Drowning	2.16 (± 1.24)	2.86 (±1.22)	2.51 (± 1.27)	0.001*
(1–5)	(1.78–2.55)	(2.48–3.24)	(2.23–2.78)	
Swimming Opportunities	3.27 (± 1.00)	2.85 (± 0.92)	3.06 (± 0.98)	0.008*
(1–5)	(2.96–3.58)	(2.56–3.13)	(2.85–3.27)	
Perceived Swimming Risk	17.27 (± 6.40)	20.37 (±7.00)	18.80 (± 6.85)	0.006*
(8–40)	(15.29–19.26)	(18.16–22.56)	(17.31–20.29)	
Body Image	4.21 (± 0.67)	3.79 (± 0.83)	4.00 (± 0.78)	0.001*
(2–6)	(4.00–4.41)	(3.53–4.05)	(3.83–4.17)	
Perceived Athletic Skill	4.41 (± 0.85)	3.86 (± 0.85)	4.14 (± 0.89)	0.000*
(2–6)	(4.15–4.67)	(3.59–4.13)	(3.95–4.33)	

*Significant difference between groups: p < .01. ** 99% Confidence levels for range scores

sample, swimming performance and swimming self-efficacy had a strong, positive relationship. The relationship between fear of drowning and perceived risk was r = + 0.58, also positive and moderately strong. The moderate inverse relationship between fear of drowning and swimming self-efficacy was r = – 0.54. This finding indicated the lower the fear of drowning, the higher the swimming self-efficacy and vice versa, as one would expect because of the different directions of the two variables. The inverse correlation between perceived swimming risk and swimming self-efficacy was r = – 0.53, also moderate and negative. The correlation between swimming performance and fear of drowning was r = – 0.47. These relationships showed that swimming performance is negatively associated with perceived risk and fear of drowning. This was a similar direction to the negative relationship between swimming performance and perceived swimming risk, which was a weaker r = – 0.35. There was a negative but weak relationship between fear of drowning and perceived athletic skill of r = – 0.27. Between swimming performance and the frequency of swimming opportunities, there was a weak positive correlation of r = + 0.27. Between perceived athletic skill and perceived swimming risk, there was a weak, negative correlation of r = – 0.23.

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Table 2 Correlation Coefficient Matrix Between Swimming Variables for High School Hispanic Students (*N* = 144)

Variable	Swimming Performance (0–30)	Swimming Self- Efficacy (10–100)	Fear of Drowning (1–5)	Swimming Opportunities (1–5)	Perceived Swimming Risk (8–40)	Body Image (2–6)
Swimming Self-Efficacy (10–100)	0.75*					
Fear of Drowning (1–5)	–0.47*	–0.54*				
Swimming Opportunities (1–5)	0.27*	0.24*	–0.16			
Perceived Swimming Risk (8–40)	-0.35*	0.53*	0.58*	–0.16		
Body Image (2–6)	0.19	0.16	–0.11	0.11	–0.15	
Perceived Athletic Skill (2–6)	0.21	0.20	0.21	–0.27	0.02	–0.23*

* Pearson Product Moment Correlations that are significantly different from p £ 0.01.

Discussion

The results of the statistical tests demonstrated a number of gender differences as well as significant correlations among the variables. The males in this study scored significantly higher on the swimming performance test. Although speed and endurance were not the main focus of the swimming performance variable, this finding was not surprising because males have been historically faster and have demonstrated greater endurance in swimming competitions than females (FINA, 2009). Specifically, males have faster world record times in swimming competitions than do females, and the differences in time increases when longer distances (200 m or more) are executed. In addition, an average male possesses more muscle mass than the average female does, thereby generating greater potential total aerobic energy (McArdle, Katch, & Katch, 1996). Furthermore, significant differences have been found between men and women in body drag, mechanical efficiency, and net oxygen uptake during swimming (McArdle et al. 1996).

Males in this study were found to have a significantly lower mean than females on fear of drowning and perceived swimming risks, which is similar to what McCool et al. (2008) found in a survey of adults. These findings are also congruent with research that indicated that females, ages 8–16 years, reported significantly more overall fear than males, particularly with regard to distressing situations such as suffocation and drowning (King et al., 1985). This difference may also be because historically, some parents tend to be more directly involved in providing sports opportunities for their sons rather than for their daughters, especially at a young age (Harold et al., 1991). This disparity in support may lead to fewer swimming opportunities for females, which may contribute to lower swimming performance scores as observed in this study.

Males were found to have more positive body image scores than females in this study. This finding is consistent with previous research showing that women are more likely to have a less satisfactory image of their body than are males, particularly between the ages of 15 and 22 years (VicHealth, 2004), which was an older age group than the teenagers in the current study. Societal norms appear to have a strong impact on female self-body image (Davis & Cowles, 1991; Furnham, Badmin, & Sneade 2002; Paxton et al., 1991). Consequently, it is not surprising that this construct appears to carry over into swimming participation. Adolescent females appear to face two significant barriers to healthy body image in swimming: Not only do they have to contend with their own inadequacies of their body image, but they are more likely than boys to suffer external pressures from peers, parents, and the media (Fox, 1997).

The findings of this study indicated that self-efficacy was one of the stronger predictors of swimming performance. This is consistent with previous research that has shown that self-efficacy was generally a strong predictor of performance in physical activities in general (Treasure, Monson, & Lox, 1996). Hepler and Chase (2008) found similar results for softball throwing tasks, as did Yang (1995) for Chinese swimmers (ages 17–25).

The results of this study further indicated that fear associated with swimming (i.e., perceived danger) was negatively related to both swimming efficacy and swimming performance. Fear appeared to be a major psychological influence that negatively impacted the ability of swimmers to perform basic swimming tasks.

Tinetti, Richman, and Powell (1990) reported similar findings with elderly individuals, who indicated that those who avoided specific activities because of a fear of falling had lower self-efficacy or confidence scores, as compared with others not reporting a fear of falling.

It was interesting that significant correlations were not found between body image and either swimming efficacy or performance. This may be because a regular swimming workout can provide an obese individual a vigorous exercise session without the weight of one's body pounding with each move, mitigating the negative body image associated with weight bearing exercises (Luebbers, 2009). In addition, people who are overweight or obese may find that swimming has less impact on their joints than weight bearing activities and, thus, would be more amenable to more time in the pool. Furthermore, those who store more fat have better buoyancy than those who store less fat (Ambassa, 1987). Better buoyancy could mean obese swimmers can stay afloat easier in the deep portions of the pool and, subsequently, have a decreased fear of drowning and increased swimming self-efficacy.

Recommendations and Implications

Children should start swimming at a young age and be encouraged to have frequent, positive swimming opportunities so as to lower their fear of drowning, heighten their swimming performance, and increase their swimming self-efficacy (Brenner, 2003). This appears to be particularly important for females, since they reported a significantly lower mean of swimming experiences than males in this study. Since children living in lower socioeconomic homes and with parents who are nonswimmers are less likely to learn to swim, school districts and community aquatic centers should be proactive in providing early swimming instruction, particularly for lower SES individuals (Crary, 2008).

If possible, students should have the option of participating in a single gender swimming class if they feel uncomfortable wearing a swim suit in front of the opposite gender. This may be particularly true for females since they reported a significantly lower body image than the males in this study. A positive water experience for female beginner swimmers could increase the probability of future swimming opportunities.

Intervention programs should be provided for students who are either afraid of the water or who have had fear-induced episodes in the water. Individual attention and introductory instruction in shallow water may assist students to feel comfortable in the water, ease their fears, and improve performance and self-efficacy. Supportive instruction may include use of kickboards, goggles, fins, floatation devices, and underwater toys such as rings to develop both upper and lower body skills. For English language learners, bilingual instruction as well as visual aids could also facilitate initial instruction (Echevarria, Vogt, & Short, 2008).

Limitations

Since Hispanic/Latino students ages 13–18 years from an urban, low socioeconomic urban environment participated in this study, the results may not be generalizable to all adolescent groups or younger or older age groups, different ethnicities, or different environments. This study used a convenience sample of just 144 participants. The

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validity and reliability of the scores might have been enhanced by videotaping the performance test and using additional raters for the Swimming Proficiency Checklist (test). For the swimming opportunity item, a frequency description such as "six days a week or more" would have been more specific than the nonspecific "never" or "very often" ratings. The researchers made the assumption that participants' fear of drowning, swimming opportunities, body image, and athletic skill could be determined by having them listen to the questions read out loud by the researcher, one item at a time, while they wrote their answers on a hard copy survey. It also might have been helpful to add BMI as a variable to determine whether height and weight were positively or negatively correlated with body image, swimming efficacy, or performance.

This study should be replicated in rural communities, regions of high availability of swimming resources, differing age groups, or other ethnic or socioeconomic backgrounds. It might be helpful to conduct interviews or focus groups with children to determine specific reasons for fears associated with swimming. In addition, more research appears necessary to determine the optimal time to begin swimming participation for children since the level of previous swimming experience was found to be significantly related to swimming performance in this study.

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