

## RELATIONSHIP OF KNOWLEDGE OF STRENGTH TRAINING TO ADOLESCENT PERCEPTIONS OF APPROPRIATENESS AND ATTRACTIVENESS OF FEMALE MUSCULARITY

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According to the Theory of Reasoned Action people act according to intentions (Ajzen & Fishbein, 1980). An individual's perception of an activity influences intention to act, and can predict if a person will choose to engage in that activity. Although strength is identified as one of the five health-related fitness components (Corbin, Lindsey, & Welk, 2000), females often avoid the activity of strength training because of the assumed outcome: a large increase in muscle mass (Chepyator-Thomson & Ennis, 1997). It is clear that weight lifting is considered a male-appropriate activity (Csizma, Wittig, & Schurr, 1988; Koivula, 2001). Women are much less likely to identify strength training as an activity that would be self-descriptive (Harrison, Lee, & Belcher, 1999). Despite some negative attitudes, girls that have participated in strength training have not only improved physical strength, but have also shown significant increases in confidence about their bodies, self-efficacy in weight training, and overall self-esteem (Holloway, Beuter, & Duda, 1988).

Despite the overwhelming list of positive physical and psychological benefits that strength training can provide, there is cultural resistance to the concept of females developing strength or muscularity (Nelson, 1994; Shulze, 1990). Women who choose to develop muscularity must negotiate between their desires and mainstream culture's expectations for feminine attractiveness (Choi, 2003; Grogan, Evans, Wright, & Hunter, 2004). The following studies represent the wide range of research conducted to determine benefits strength development might have on physical and psychological health. Research indicates that strength and resistance training can have a positive effect on blood pressure (Fisher, 2001), help increase bone density to prevent osteoporosis (Heinrich, et al., 1990; Nelson, et al. 1994), help prevent injuries by strengthening tendons and ligaments around joints (Dinsmoor, 1994), and improve overall quality of life by preventing falls, and reducing the number of years an elderly individual may be considered frail (Jozsi, Campbell, Joseph, Davey, & Evans, 1999). It has also been shown beneficial in managing Type Two diabetes by helping to regulate blood glucose levels (Ishii, Yamakita, Sato, Tanaka, & Fujii, 1998). Physical activity and athletics have shown a multitude of positive psychological effects including higher global self-esteem (Brown & Harrison, 1986; Holloway et al., 1988), more positive attitude about body image (Miller & Levy, 1996; Snyder & Kivlin, 1975), increased feelings of satisfaction and achievement (Tucker, 1982a), a more positive self-concept (Marsh & Jackson, 1986), and more positive athletic self-concept (Miller & Levy, 1996).

Messages regarding strength and muscularity are confusing to both women and men within general society. Jacobi and Cash (1994) found that there was a desire for more muscularity by both males and females. In that study, 91% of male college students reported a desire for more muscularity, while 78% of females said they wanted to be more muscular. Confusion about cultural expectations for muscularity clearly affects both males and females. Adolescent girls struggle with media images of the ideally thin female, perceived attitudes toward female athletes, and fears of being rejected by their male peers because they may be too strong, muscular, or athletic (Botta, 1999; Duff, Hong, & Royce, 1999; Reimer & Feltz, 1995).

Culturally determined expectations for the way a woman should look have not included muscularity. It is unclear whether ideal feminine characteristics were simply preference or an attempt to encourage differentiation between the sexes. It was long believed that women could not develop muscle mass without taking anabolic steroids; therefore a woman who did develop muscularity must have gone against biology and nature (Ebben & Jensen, 1998). Muscular women threaten the status quo and blur the line that differentiates the sexes. As Shulze (1990) states, women who deliberately choose to increase muscularity disturb the dominant societal notions of gender and sexuality. Not surprisingly, female bodybuilders and muscular women are often considered a threat to male dominance in social power (Choi, 2003; Shulze, 1990).

In order to accurately determine why females avoid strength training, perceptions of muscularity must be analyzed. Therefore, the purpose of this study was to determine how gender, knowledge of physiological muscularity, and

physical self-concept are related to adolescents' perceptions of female muscularity. To measure adolescents' perceptions of muscularity in women, participants were shown three different pictures. Each picture portrayed a woman with a different level of muscle mass and definition: slender with no muscularity, average muscularity, and extreme muscularity. Adolescent participants were asked to evaluate personal characteristics, attractiveness and appropriateness of each female pictured. The guiding research questions were: a) *Does the perception of muscularity in women differ by gender?*; b) *Does an adolescent's knowledge of strength and muscularity affect perception of muscularity in women?*; and c) *What sub-parts of an adolescent's physical self-concept influence perceptions of muscularity in women?*

It was hypothesized that adolescent females would evaluate the no muscularity female more positively than either the average muscularity or extreme muscularity picture on all three dependent variables: personal characteristics, attractiveness, and appropriateness. Adolescent males were expected to evaluate the average muscularity female more positively than the no muscularity female or extremely muscular female, based on the results of Jacobi & Cash (1994). Finally, knowledge scores and self-concept subscale scores were hypothesized to be positive significant predictors of perceptions of the extremely muscular female for both males and females.

#### PARTICIPANTS

Participants were 89 eighth grade males and females enrolled in co-educational physical education classes in two junior high schools in Northwest Arkansas. The 43 males and 46 females were predominantly white (80%), with a mean age of 14.4 years. Permission was obtained from the cooperating school district and individual teachers. Informed consent was obtained from parents, and assent was attained from individual students.

#### INSTRUMENTS

*Knowledge of strength training.* Knowledge of strength training was measured by a 15 item true or false test. Questions related to physiological principles of strength development and the relationship of strength to health and disease prevention. Questions were based on 8<sup>th</sup> grade science, health and physical education according to the Arkansas Department of Education Curriculum Frameworks. Examples of true or false questions are as follows: a) *Females who increase muscular strength will become more masculine in looks and behavior*; b) *Males have more specifically identified and named muscle groups than females*; c) *People who develop muscular strength are less likely to get injured when playing sports or other activities*; d) *Strength training is helpful in preventing some diseases*; and e) *Muscular strength and muscular endurance are the same thing*.

*Physical self-concept.* The Physical Self-Perception Profile (Fox & Corbin, 1989) was used to measure physical self-concept of participants in the study. The PSPP has five subscales that measure separate areas of physical self-concept: sports competence (Sport), perceived body attractiveness (Body), perceived physical strength and muscular development (Strength), perceived level of physical condition (Condition), and physical self-worth (Global). Because the three subscales used for this study were treated as separate predictor variables, body, strength, and global, separate coefficient alphas for subscales ranged from .81 to .92 for both males and females.

*Pictures of female muscularity.* Three different pictures of female muscularity were presented: (1) slender with no noticeable muscle definition, (2) average build with some noticeable muscle definition, and (3) extreme muscle definition, representative of a body-builder. After several unsuccessful attempts to have appropriate pictures drawn by local artists, it was decided to obtain pictures from a variety of popular fitness and health magazines. Each of the three pictures showed a woman in aerobic shorts and sports bra type top. Faces were shown on all three; women were not shown with exercise equipment. The average and extremely muscular women were in very similar poses. The no muscularity woman was slightly further away and, although facing forward like the other two pictures, has arms up rather than down to the sides. Although there were some variations in the pictures, which might have affected participants perceptions, the salient feature of each picture was clearly the difference in muscularity.

#### DEPENDENT VARIABLES

*Evaluation of personal characteristics.* Participants were asked to evaluate personal characteristics of each female pictured through the use of semantic differential technique (Osgood, Suci, & Tannebaum, 1969). Polar opposite adjective pairs were intended to elicit an evaluative perception of personal characteristics of the woman pictured. Only pairs shown to have high loadings on an evaluative construct were chosen. All adjective pairs identified as evaluative loaded on that construct at or above .66. Adjective pairs used for the evaluative scale were healthy-sick,

pleasant-unpleasant, kind-cruel, happy-sad, beautiful-ugly, and brave-cowardly. Adjective pairs were placed at opposite ends with seven spaces between them. Participants place an "X" in the space closest to the adjective they felt most accurately described the picture (see Appendix A).

*Attractiveness of body image.* One question was designed to determine attractiveness of the female pictured. For females, the question was phrased, "I would be satisfied with my body if I looked like this woman." The question for males was, "I would find it attractive if my female friends had a body like this woman." In order to force a selection, the researcher allowed only four response choices on a 4-point Likert type scale ranging from "strongly agree" to "strongly disagree."

*Appropriateness of body image.* A second scale designed to rate the appropriateness of each body type for females asked participants to respond to the statement, "I believe a woman with this body type is . . ." Participants rated the appropriateness of each body type on a 7-point Likert type scale. Choices ranged from "totally appropriate," to "totally inappropriate." The seven-point scale was chosen to correspond with the seven possible positions on the semantic differential scale.

#### PROCEDURE

Questionnaires were administered during the regular physical education period. Testing situations were not the same for all classes. Most classes completed the questionnaires sitting around the gym floor. One class had access to a classroom with desks. The researcher distributed, explained, monitored the testing situation, and answered any questions posed by the participants. Public school teachers remained in the testing area to prevent students from talking.

Simple demographics of age, gender, and ethnicity were obtained. Demographics and the knowledge test were self-explanatory. The researcher explained the significance of the seven point adjective scale used to evaluate each picture. A demonstration and an example was provided so that participants understood they were to place the "X" in the space they felt was the correct distance between the two polar opposite adjectives. Each participant evaluated all three pictures in the same questionnaire. Participants viewed only one picture at a time and all questions regarding that picture were answered before turning the page to the next picture. Pictures were presented in different sequences to check for order effects. Instructions on answering the Physical Self-perception Profile were reviewed to ensure that only one box was checked per question.

#### ANALYSIS OF DATA

Two planned contrasts were used: (1) to determine if female participants' evaluation of personal characteristics of the no muscularity female was more positive than evaluations of the average and extremely muscular female, and (2) to determine if male participants evaluated personal characteristics of the average muscularity female higher than the no muscularity or the extremely muscular female. Additional analyses run were 2 (gender) x 3 (picture) ANOVAs on appropriateness and attractiveness. Step-wise multiple regression analyses were conducted separately for males and females to determine significant predictors of evaluation of personal characteristics, appropriateness and attractiveness of each body type pictured. Predictor variables were knowledge of muscular strength and three subscales from the PSPP: body perception, strength perception, and global self-worth.

#### RESULTS

Results of planned contrasts showed that, for female participants, there were significant differences between the no muscularity picture and the extremely muscular picture, on evaluation of personal characteristics,  $F(1, 42) = 7.29, p = .01$ . There was also a significant difference in female participants evaluation of personal characteristics between the no muscularity and the average muscularity picture,  $F(1, 42) = 14.51, p = .001$ . By examining the means of each of the three pictures, it was determined that personal characteristics of the average muscular female were evaluated higher (more positively) than either the no muscularity or the extremely muscular picture. In addition, personal characteristics of the extremely muscular female were also rated higher than the no muscularity female. These findings were not in the hypothesized direction, as presented in Table 1.

Contrasts to determine if adolescent males would evaluate personal characteristics of the average muscular female more positively than the no muscularity female and the extremely muscular female also revealed significant differences. Contrasts between the average muscularity picture and the no muscularity picture were significantly

different,  $F(1, 45) = 6.42, p = .01$ . Examination of the means revealed that males evaluated personal characteristics of the average muscularity picture significantly higher than the no muscularity picture, but not significantly higher than the extremely muscular picture. However, the means were in the hypothesized direction, as shown in Table 2.

#### REPEATED MEASURES ANOVA

Results of the 2 (gender) x 3 (picture) repeated measures ANOVA analysis on perceptions of appropriateness of the no muscularity, average and muscular image revealed a significant main effect for picture,  $F(1.775, 154.46) = 15.68, p < .01$ . Tukey post hoc analysis indicated that differences were between the perceived appropriateness of the no muscularity picture compared to the extremely muscular picture (see Table 3). Participants rated the no muscularity picture significantly more appropriate than the extremely muscular picture.

Analysis of the 2 (gender) x 3 (picture) ANOVA with repeated measures analysis for attractiveness showed a significant main effect for picture,  $F(1.8, 156.99) = 34.86, p < .01$ . Tukey post hoc tests indicated that significant differences existed between the attractiveness score of the no muscularity picture and the average muscularity picture, and between the no muscularity picture and the extremely muscular picture (see Table 4). Both female and male participants rated the no muscularity picture significantly more attractive than either the average muscularity or the extremely muscular.

#### REGRESSION ANALYSIS

Results of stepwise multiple regression performed separately for males and females, found only one predictor of perception of the extremely muscular female. For males, appropriateness of the extremely muscular picture was partially predicted by knowledge, which accounted for 7% of the variability,  $F(2,43) = 9.3, p < .01$ , adjusted  $R^2 = .07$ ; beta = .277,  $t = 2.2, p = .04$ . For females, attractiveness of the extreme muscularity picture was partially predicted by knowledge. Knowledge accounted for 7% to the total variability explained,  $F(2, 40) = 11.05, p < .01$ , adjusted  $R^2 = .068$ ; beta = .289,  $t = 2.26, p = .03$ , as shown in Table 5.

#### DISCUSSION

One of the most interesting outcomes of this study was the seemingly contradictory result between evaluative perceptions of personal characteristics, and perceptions of appropriateness and attractiveness. Both males and females placed the average muscularity female highest on the evaluative judgments of personal characteristics, which included kindness, beauty, pleasantness, happiness, bravery, and health. However, both males and females rated the no muscularity picture as significantly more appropriate than the extremely muscular body type, and significantly more attractive than both the average muscularity and the extremely muscular picture.

It is possible that because the no muscularity picture was considered a more appropriate body type, it was subsequently perceived as more attractive. As other studies have shown, body type does have a significant impact on perceived attractiveness (Portnoy, 1993). Furnham, Dias, and McClelland (1998) also found that slender figures were favored over heavier figures on attractiveness, although heavier figures were consistently judged to be more kind and understanding.

The fact that the no muscularity picture was perceived as more appropriate and more attractive indicates that despite evaluations of personal characteristics, adolescents continue to equate beauty and attractiveness with thinner body type. However, results of the current study showed that both females and males rated the average muscularity picture higher on evaluations of personal characteristics than the no muscularity picture. Support for this finding is evident in Singh's (1994) study that found average weight females were judged as having more desirable personal qualities than the thinner figures. By evaluating the average muscularity picture highest on personal characteristics, adolescents may be equating a female with average muscularity with more positive personal characteristics, including health and happiness, than either the no muscularity or the extremely muscular female. The fact that adolescent participants in the present study differentiated between the value of a female's personal characteristics and the appropriateness and attractiveness of her body type is a positive indication that they do not judge personal characteristics simply based on physical appearance. Similar to other studies, attractiveness does not always correspond to positive perception of personal characteristics (Henss, 1995; Singh, 1994).

It seems logical that most people identify with the average body type, since most people fall somewhere in the middle of the extremes in any situation. However, issues regarding body appropriateness and body attractiveness

are emotional and stressful for both males and females. Perhaps evaluating the average muscularity female higher was an unconscious attempt to validate the self, and devalue the difficult to attain ideal. If average muscularity is perceived as the normal body type among teenagers today, participants in this study may have rated the average muscular body type higher because it reflected characteristics they personally value and desire.

Interestingly, while not statistically significant, both females and males rated personal characteristics of the extremely muscular picture higher than the no muscularity picture. These factors indicate that adolescents may be beginning to equate muscularity with positive feelings of femininity and good health, a very positive sign for our culture. Males in this study did not perceive any difference in personal characteristics of the average muscularity and the extremely muscular female. This result may indicate acceptance of the muscular female body type as normal or desirable. Because males value physical strength and muscularity, it may be reasonable for adolescent males to take an egocentric view and assume that others would desire those same values.

The fact that males evaluated personal characteristics of the average muscularity female higher than the no muscularity female is of interest due to the assumed perception of many young women that males have an overall preference for a thinner female body (Jacobi & Cash, 1994). In this study adolescent males did not perceive the most slender, the no muscularity picture, to have the most positive personal characteristics.

It was hypothesized that knowledge of muscular strength would be a significant predictor of perceptions of the extremely muscular picture for both females and males. Knowledge did not predict the evaluation of personal characteristics of either female or male participants. However, for males, appropriateness of the extremely muscular picture was partially predicted by knowledge. Knowledge was also a predictor of attractiveness of the extremely muscular female for female participants. Although knowledge accounted for a small percentage of the variation, this result did support the assumption that adolescents who had more knowledge of muscular strength would have a better understanding of the benefits of strength training, therefore having a more positive perception of muscularity in women.

The most surprising finding was that physical self-perception did not mediate any of the ratings of the extremely muscular female for either females or males. Because muscular females seem to threaten the status quo in our society, it was presumed that participants with more negative body perceptions would feel more threatened by a muscular female, subsequently rating that picture more negatively. It was also expected that because participants with higher physical self-perceptions would feel less threatened, they would have more positive perceptions of the extremely muscular female.

#### IMPLICATIONS

These findings should provide some interesting observations for professionals currently in school or community sport settings. Improving knowledge of the value of strength training will improve perceptions of female muscularity. Educating students about the importance of health related strength and muscle mass should help eliminate disparaging verbal remarks about women with muscularity, or any other negative stereotypes about females and strength. Physical educators and sport program administrators can foster a safer, more equitable and encouraging environment for girls interested in developing strength. Professionals in sports media should also be more sensitive to issues regarding female athletes. Coverage of women's sporting activities is often infused with humor or insulting treatment of female athletes in general, often questioning the femininity of any muscular woman (Messner, Duncan & Cooky, 2003). All people, regardless of gender, should have the opportunity to enjoy the empowerment that results from developing a strong, healthy body.

Improving young people's knowledge of the physiological factors related to muscular strength and strength training can positively influence adolescent's perceptions of female muscularity, thereby reducing some of the negative stereotypes that have historically been associated with female strength and muscularity. Although knowledge was a significant predictor of two measures in this study, more information is needed on the relationship of knowledge of muscular strength to perceptions of muscularity. A research design focused solely on implementing a treatment to improve knowledge of muscular strength and strength-training principles might yield an important explanation of how knowledge mediates perceptions of muscularity.

Despite changes in opportunities for women, more role models in the media, and medical findings that support health related strength for women, adolescents are continuing to reproduce societal patterns of acceptance based on attractiveness and appropriateness of muscular females. These patterns of acceptance of female body types continue to be confusing and contradictory. However, this study does seem to be an indication that muscularity does not detract from the value of a female's personal characteristics. Although muscularity may not affect judgments of personal characteristics, extreme muscularity is still considered less appropriate and less attractive. A female may be accepted as having good personal characteristics, but still not perceived to be attractive or have an appropriate body type. Increasing education on the value of health related strength will improve perceptions of the muscular body type in women.

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Table 1

	M	SD
No Muscularity	30.35	5.20
Average Muscularity	33.49	5.43
Extreme Muscularity	32.63	4.17

Table 2

	M	SD
No Muscularity	29.98	5.34
Average Muscularity	32.72	4.82
Extreme Muscularity	31.70	5.89

Table 3

	No Muscularity		Average Muscularity		Extreme Muscularity	
Females	M	5.05	4.74	4.28		
	SD	1.29	1.00	1.30		
	N	43.00	43.00	43.00		
Males	M	5.30	4.78	4.30		
	SD	0.99	1.03	1.40		
	N	46.00	46.00	46.00		
Total	M	5.18	4.76	4.29		
	SD	1.14	1.01	1.34		
	N	89.00	89.00	89.00		

Table 4

	No Muscularity		Average Muscularity		Extreme Muscularity	
Females	M	3.09	2.33	2.07		
	SD	0.75	0.78	0.88		
	N	43.00	43.00	43.00		
Males	M	2.93	2.43	2.26		
	SD	0.77	0.89	0.88		
	N	46.00	46.00	46.00		
Total	M	3.01	2.38	2.17		
	SD	0.76	0.83	0.88		
	N	89.00	89.00	89.00		

Table 5

	df	Adj.R <sup>2</sup>	Beta	t	Sig.
Attractiveness					
Female	2,40	.068	.289	2.26	.03
Appropriateness					
Male	2,43	.07	.277	2.20	.04

Appendix A

Example of the Semantic Differential Scale

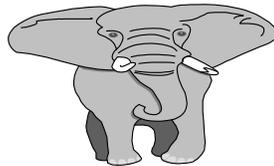
This EXAMPLE was included in the questionnaire as a demonstration of how participants should complete the scale.

**Directions:** Place an **X** in the space closest to the adjective that most accurately describes the object in the picture.

Example:



Big \_\_\_ : \_\_\_ : \_\_\_ : \_\_\_ : \_\_\_ : \_\_\_ : **X** Small



Big **X** : \_\_\_ : \_\_\_ : \_\_\_ : \_\_\_ : \_\_\_ : \_\_\_ Small



Big \_\_\_ : \_\_\_ : \_\_\_ : \_\_\_ : **X** : \_\_\_ : \_\_\_ Small