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PHYSICAL ACTIVITY

The Effect of Physical Education Teacher Physical Appearance on Student Physical Activity

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Abstract

This study examined how a physical educator's physical appearance affected student physical activity. Students (N = 142) from fourth- to sixth-grade physical education classes wore pedometers. Classes were assigned to a female teacher either wearing a fat suit or not wearing a fat suit. A 3 × 2 × 2 ANCOVA data analysis revealed a statistically significant Grade × Group interaction, $F(2, 129) = 6.48$, $p = 0.002$, $\eta^2 = 0.09$. Fourth-grade students displayed a higher number of steps per minute with the fit-appearing teacher ($p < 0.001$, $d = 0.39$), while sixth-grade students displayed a higher number of steps per minute with the teacher wearing a fat suit ($p < 0.001$, $d = 0.89$). The fourth graders performed a higher number of step per minute with the fit-appearing teacher and a lower number of steps per minute with the overweight-appearing teacher. Opposite results came with the sixth graders, who displayed a lower number of steps per minute with the fit-appearing teacher than with the overweight-appearing teacher.

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More than one third of adults in the United States are considered obese (Centers for Disease Control and Prevention [CDC], 2016), and in 2015, no U.S. state had a prevalence of obesity less than 20% (CDC, 2015). Not only is this problematic for obese adults, but it also has strong negative effects on children. The bodies and behaviors of adults may determine the academic and health futures of students (Schee & Gard, 2014). Adults are role models to youth in behavior and action. Role modeling is no different when it comes to physical health. Specifically, adult physical and health educators and coaches are role models of good health (Cardinal, 2001). According to Wilmore (1982), physical educators communicate more by who they are than by what they say. Therefore, the physical appearance of physical and health educators may play a role in youth learning and physical activity (PA). It is hard to expect students to care about fitness, active lifestyles, and skillful performance when the teaching is done by unfit, inactive, and low-skilled teachers (Mitchell, 2007). Teachers should emulate the characteristics that they teach and be healthy role models inclusive of a fit physical appearance.

Physical educators play an important role in youth PA (Gold, Petrella, Angel, Ennis, & Woolley, 2012). This article also states that physical educators should exhibit the behaviors and appearances consistent with the message they teach of healthy living (Gold et al., 2012). Evidence also displays the expectations for physical education (PE) teachers and what is necessary for a successful role model. For example, McCullick (2001) had practitioners share their perspectives on possible necessary characteristics for participants in a PE teacher education (PETE) program. The study mentions physical fitness as one characteristic that teachers should possess to be role models for students and that they should be able to perform adequately in sport-related activities. Body composition is one component of physical fitness and inherently incorporates physical appearance. The study also addressed student needs and explained that the teacher is similar to a salesperson for fitness. If students can tell that the teacher takes fitness seriously, they will be more inclined to do so as well (McCullick, 2001). Student inclination to perform healthy behaviors should be at the forefront for every physical educator and be visible in their physical appearance.

The rationale that physical educators often model behaviors that they want students to learn is helpful to this study and is found in social learning theory (Bandura, 1977). This theory explains the vital role that a significant person in one's life can play in the development of behaviors and attitudes. Bandura (1977) states that learning can occur vicariously through the observation of another person's behavior and that most of people's behaviors are learned, either deliberately or inadvertently, through the influence of example. This is fundamental for this study in that, according to Bandura (1986), the behavior and attitude of a teacher can affect the behavior and attitude of a student through modeling. This behavior includes, as mentioned, physical fitness and therefore includes body composition as one component. Cardina (1994) also mentions that social learning theory can be useful for educators because it addresses a broad collection of variables that influence behavior change and not just individual's motivation for behavior change.

Physical and health educators have a unique opportunity to have a positive effect on youth during the school day. Melville and Hammermeister (2006) mention that future PE teachers will be required to lead their schools and communities in the process of regular PA and better eating habits and to create a more positive ideology surrounding health as a whole. Wilmore (1982) discussed that those in the profession must make personal commitments to have their own levels of physical fitness in the healthy zone for the promotion of these healthy zones for students, the focus for this study being the component of body composition and physical appearance of such. Students will possibly be most successful when leaders in schools become role models to everyone around them by living healthy and practicing what they teach. Another article also reiterates that the accomplishment of academic achievement when the teachers are healthy can inspire good health among the children they teach (Schee & Gard, 2014). The link between academic achievement and healthy teachers further supports the importance of teachers' ability to inspire good health among their students, with physical appearance being one component and the focus of this study.

The effects of physical appearance have been studied with other groups such as medical residency applicants (Boor, Wartman, & Reuben, 1983), teacher education majors (Buck & Tiene, 1989),

hospital-based nurses (Zapka, Lemon, Magner, & Hale, 2009), physicians (Hash, Munna, Vogel, & Bason, 2003), sport psychology practitioners (Lubker, Visek, Watson, & Singpurwalla, 2012), and sports dietitians (Lovell, Parker, & Slater, 2013). Only a small amount of research has examined PE teachers' physical appearance and its effect on student outcomes for PA. The research covers the area of cognitive skills that students have and how physical appearance influences these cognitive skills or abilities (Conlin, 2010; Dean Adams, & Comeau, 2005; Melville & Maddalozzo, 1988; Thomson, 1996).

In one foundational study, Melville and Maddalozzo (1988) used the physical appearance of one male PE teacher to determine the effect of teaching success on the students. They used instructional videotapes of a PE teacher during a PE lesson. The lessons were identical, except that one lesson was taught by the instructor, who was seemingly fit, and the other lesson was taught by the same instructor wearing a fat suit, who was seemingly overweight. This study found that PE teachers' physical appearance had an effect on student success; more specifically, students performed lower on the exam with an overweight-appearing teacher (Melville & Maddalozzo, 1988).

Thomson (1996) completed a replication study of the Melville and Maddalozzo (1988) study, but instead of measuring student success on an exam, Thomson measured student success on a 15-item quiz. Results from this study supported the research and showed differences between a fit- and an unfit-appearing teacher on student success, with students performing higher on the quiz with a fit-appearing teacher.

Dean et al. (2005) examined how a female physical educator's physical appearance affected the cognitive performance of junior high students. This research used 6 weeks of teaching time, compared to the aforementioned studies, which lasted for only one PE class period. This study also supports the other studies, concluding that a teacher's obese physical appearance negatively affects junior high students' test scores on health-related fitness knowledge (Dean et al., 2005).

In a dissertation, Conlin (2010) investigated if student test scores changed when content knowledge was delivered by average-appearing female and male PE teachers compared to overweight-appearing

female and male PE teachers. The results were not the same, however, with no significant main effect for student test scores on fitness knowledge tests when students were taught by average-appearing PE teachers or overweight-appearing PE teachers. Conlin speculated that the students may not have been exposed to healthy-weight adults and may have an altered view of what a healthy role model should appear to be in general, especially based on physical appearance alone, and would not have had a negative association with teachers who appear overweight. This research contradicts the previous results, but is also 10 years advanced, and the overweight and obesity prevalence has since changed. Research needs to address this issue, contradicting results or not, to stop this obesity trend and create healthy role models for students today.

However, in an area of study focused on PA the majority of the time, no research has examined how the physical appearance of a PE teacher affects the PA levels of students. This study measured student PA levels rather than exam and quiz performance, as previous studies have done. Additionally, it used the measure of weight bias, the inclination to form judgments that are unreasonable because of a person's weight (Washington, 2011), to add to the literature. Student activity levels were measured with pedometers, which kept track of step counts for each student. This study measured the weight bias of students to assess whether a preconceived weight bias would affect student PA levels. Findings from Andreyeva, Puhl, and Brownell (2008) showed that weight/height discrimination has increased and the prevalence is comparatively close to reported rates of race and age discrimination. The reduction of weight bias is needed for the protection of obese and overweight individuals at all age levels. If weight bias in students is measured, the effects of the bias on PA behaviors could be analyzed. This weight bias in students might also be why physical educators' appearance might influence PA, possibly answering why students would have a poorer attitude toward teachers who are overweight.

It is apparent that more evidence is needed so that it can be determined whether a PE teacher's appearance can influence student PA levels. Therefore, this study examined how the perception of a physical educator's physical appearance affected student PA levels, as measured with pedometers. Within a social-cognitive theoretical

framework, it was hypothesized that students with the fit-appearing teacher would have higher step counts than students with the overweight-appearing teacher. The results of this study could help future educators prepare to teach and be successful with students by teaching them to be a role model in their own physical appearance.

Method

Participants

Participants (students) were recruited from an elementary school in the Salt Lake Valley and participated in the study, which took place in their PE class. Students were recruited via a convenience sampling procedure from fourth-, fifth-, and sixth-grade classes and ranged in age from 9 to 13 years old. This took place during the school day, and all students in the aforementioned parameters were included (151 students). Institutional review board approval and district approval were obtained prior to data collection, and parental/guardian permission forms for the students, which explained the study and the data to be collected, were given out at school and sent home with the students. This allowed parents/guardians and students to choose if the student wanted to opt out of participating in the study. Consent forms informing them of study procedures and protocol were also given to parents/guardians, administrators, and teachers.

One female teacher participated in the study as the PE class teacher. The teacher was chosen based on her seemingly fit appearance with a weight of 170 lb and a height of 6 ft tall. These dimensions equated to a normal weight body mass index (23.1). The guest teacher taught a Zumba fitness lesson to the PE classes involved. The lesson incorporated dance, plyometric cardio, rhythm, and stretching with accompanying music. Half of the classes ($n = 3$) saw her as her true fit-appearing self, and the other half ($n = 3$) saw her as an overweight-appearing educator, through the use of a fat suit worn underneath her clothing (see Figures 1 and 2). The fat suit was a padded garment that added pseudo-fat tissue to the torso region of the body. Measurements for the teacher were taken in her fit state and overweight state. The results of this were a 35-in. chest, 32-in. waist, 38-in. hips, 22-in. thighs (left and right), and 12-in. arms (left and right) for the fit-appearing teacher. For the overweight-appearing teacher, the measurements were a 35-in. chest, 38-in. waist, 40-in.

hips, 22-in. thighs (right and left), and 12-in. arms (right and left). Her lessons were structured the same and her mannerisms and teaching style remained the same for each class. This ensured that all the students received the same opportunity to be physically active and that the only changing variable was the teacher's appearance. She also wore a pedometer throughout the data collection to ensure that her own PA levels remained the same throughout all the lessons, fat suit or no fat suit.

Figure 1. Fit-appearing female teacher.

Figure 2. Overweight-appearing teacher.

Instrumentation

A student attitude and behavioral intention questionnaire (Melville & Maddalozzo, 1988) assessed student attitudes toward the physical educator. This questionnaire was based on a 5-point Likert scale with eight items. This instrument was created and used by Melville and Maddalozzo (1988), as well as in other studies (Conlin, 2010; Dean et al., 2005). The questions used for this study included (1) I think I would like having Coach T. as a PE

teacher, (2) Coach T. knows a lot about PE, (3) a PE teacher should be physically fit, (4) Coach T. appears physically fit, (5) I will try to use the information Coach T. talked about to improve my own physical fitness, (6) I believe Coach T. leads a healthy lifestyle, (7) I think Coach T. exercises regularly, and (8) Coach T. motivates me to exercise and lead a healthy lifestyle. The scale for these questions was 1 = *strongly disagree*, 2 = *disagree*, 3 = *don't know or uncertain*, 4 = *agree*, or 5 = *strongly agree*.

Pedometers (CW-701 Yamax Digiwalker) measured step counts through ambulatory movement of students. These provided a valid and reliable assessment tool for measuring ambulatory activities (Welk, 2002). The pedometer was worn near the thigh midline of the waist/hip area of each student and connected to a belt or clothing. Behrens, Hawkins, and Dinger (2005) mention that this brand is one of the most accurate pedometers for collecting step count data.

An adapted version of the Figure Rating Scale (Stunkard, Sorenson, & Schulsinger, 1983) assessed weight bias that students might have had before they saw the PE teacher in this study. The students rated two figures, one fit appearing and one overweight appearing, and answered the question, "How good of a PE teacher do you think each of these people would be?" This was done similarly in the study by Tiggemann and Wilson-Barrett (1998). The two figures were not pictures of real people, but rather were drawn depictions of cartoon people. The scale used was 1 = *very bad*, 2 = *bad*, 3 = *neither bad or good*, 4 = *good*, or 5 = *very good*. Change score was used, which can be interpreted as the difference score. Therefore, a higher change score equated to higher weight bias due to students choosing higher and lower scale scores for each figure.

Procedures

During the week of data collection, students were given a pedometer as they came into their PE class in the gymnasium. They were then instructed to wear the pedometer for the entire class time and not to mishandle or misuse it in any way. Steps were recorded by the students after the PE class lesson was finished, and then the difference in step counts and activity levels between a fit-appearing teacher and an overweight-appearing teacher was examined. Pedometers were collected at the end of the class time.

A preliminary Figure Rating Scale questionnaire was given to students before the week of data collection. Their responses to the questionnaire provided the author with a measure of weight bias for the study and allowed her to see what they thought a PE teacher should look like as a role model. The author then used these data to see the influence of weight bias on the students and their perceptions of their teacher. The scale questions were given to students in a separate PE class time, not during pedometer data collection.

During the week of data collection, a questionnaire of how they thought and felt about their teacher was given to students at the end of their PE class time, with questions based on the Likert scale. The students also recorded step counts on the same questionnaire through self-report.

The guest PE instructor wore a fat suit during one class of one grade and then did not wear the fat suit with the other class of the same grade. This was done for each grade level of classes, which totaled six lessons. Lessons were taught the same by the guest instructor and monitored by the teacher's pedometer, and the lesson topic was on Zumba fitness, giving students a higher opportunity to move and be physically active. The teacher was a certified Zumba instructor and used the same routine and music for each lesson.

Data Analysis

Means for total PE class step counts were computed. To control for pedometer wear time, the author computed step rate by dividing mean steps by PE lesson wear time in minutes. A complete or valid day required the child to wear his or her pedometer the entire class period without taking it off. Data were screened for outliers through boxplots and influential cases through Cook's distance and checked for Gaussian distributions through k-density plots. A quasi-experimental design was employed, and therefore, there was no random assignment due to class scheduling.

A $3 \times 2 \times 2$ analysis of covariance (ANCOVA) examined the effect of grade level (fourth, fifth, and sixth grades), sex (male and female), and condition of PE teacher (fat suit or no fat suit) on PE lesson step rate, controlling for the effect of weight bias, which was used as a covariate. The Figure Rating Scale (weight bias measure) score was calculated as the change score, or the difference between

the two scores. The higher the change score, the higher the weight bias. The mean scores for the student attitude questionnaire were also used as a covariate. The assumption of homogeneity of regression slopes were examined and the validity of the use of weight bias as a covariate was determined. A Bonferroni post hoc test was not employed, because a grade main effect was not found.

The potential findings were partially explained through additional exploratory analyses. A one-way analysis of variance (ANOVA) examined the effect of Figure Rating Scale change score (difference score) on grade level (fourth, fifth, and sixth grades). An additional one-way ANOVA examined the effect of the Figure Rating Scale change score on sex (male and female). A one sample *t* test compared the scores of the Figure Rating Scale for the overweight-appearing teacher and the fit-appearing teacher. The Student Attitude Questionnaire scores were analyzed by group, grade, and sex through one-way ANOVA analyses. All analyses used an initial alpha level of $p \leq 0.05$ and SPSS 23.0 (Armonk, NY, USA).

Results

Of the 151 students in all six classes combined, 142 had complete, usable data (94%). All data were retained due to the lack of extreme and influential cases within the data set. Assumption issues were attenuated due to the relatively large sample size. There were more female students ($n = 78$) than male students ($n = 64$). The participants were mostly in the fifth grade ($n = 54$), followed by fourth grade ($n = 48$), and least in sixth grade ($n = 40$). The number of students with an overweight-appearing teacher was almost identical to the group with a fit-appearing teacher ($n = 72$, $n = 70$). Table 1 shows the descriptive statistics results (see also Figure 3).

Table 1
Descriptive Statistics for Each Group Steps per Minute by Sex

Sex	Group	*M*	*SD*	*n*
Female	Fit	60.69	26.13	39
	Overweight	68.45	19.04	39
Male	Fit	60.68	20.70	31
	Overweight	62.10	27.40	33

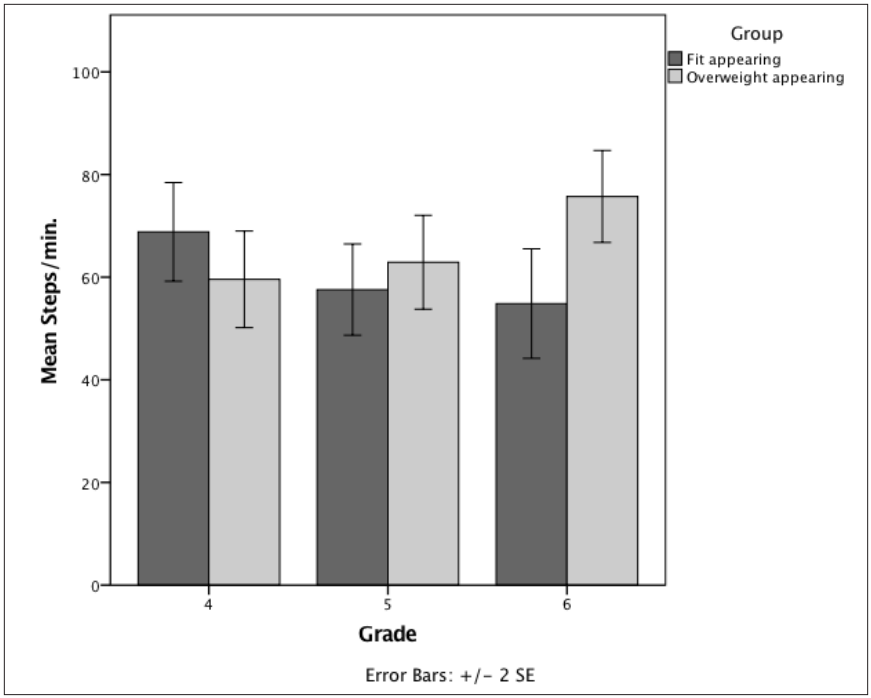

Figure 3. Mean steps per minute by grade and experimental group.

Results for the ANCOVA revealed that the covariate Student Attitude Questionnaire showed statistical significance, $F(1, 129) = 9.23$, $p = 0.003$, $\eta^2 = 0.07$. Table 2 shows the results. The covariate significantly predicted steps per minute. Therefore, the step counts per minute were influenced by the Student Attitude Questionnaire averages. The corrected model and the intercept were also statistically significant; however, no other main effects were statistically significant. The second covariate, Figure Rating Scale change score, was also tested for significance, but was not statistically significant ($p = 0.759$).

There was a statistically significant Grade × Group interaction, $F(2, 129) = 6.48$, $p = 0.002$, $\eta^2 = .09$. The fourth graders had a higher number of steps per minute in the group with the fit-appearing teacher and lower number of steps per minute in the group with the overweight-appearing teacher. However, it was the opposite with the sixth graders in that the group with the fit-appearing teacher had a lower number of steps per minute. Table 3 shows the results for the

interactions. The effect size of the interaction of grade on group was 9%, taken from the partial eta squared. This explains the proportion of variance that the variable explains that is not explained by other variables in the analysis. The pairwise comparisons for fourth grade yielded a medium effect size with Cohen's $d = 0.39$ and for sixth grade yielded a large effect size with Cohen's $d = 0.89$. Levene's test of equality of error variances was not significant ($p = 0.966$), meaning that the group variances were equal and the assumption of homogeneity of variance was met.

Table 2
Tests of Between-Subjects Effects (Main Effects)

Source	Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial η^2
Corrected Model	16708.116	12	1392.34	2.92	.001	.21
Intercept	2016.869	1	2016.86	4.23	.042	.03
SAQAVG	4399.559	1	4399.55	9.23	.003	.06
Sex	19.045	1	19.04	0.04	.842	.00
Grade	725.316	2	362.65	0.76	.469	.01
Group	1044.605	1	1044.60	2.19	.141	.01

Note. SAQAVG = Student Attitude Questionnaire averages.

Table 3
Tests of Between-Subjects Effects (Interactions)

Source	Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial η^2
Sex*Grade	1146.849	2	573.425	1.20	.304	.018
Sex*Group	505.854	1	505.854	1.06	.305	.008
Grade*Group	6179.403	2	3089.702	6.48	.002	.091
Sex*Grade*Group	2106.165	2	1053.083	2.21	.114	.033
Error	61480.321	129	476.592			
Total	644470.642	142				
Corrected Total	78188.437	141				

This study used the teacher's steps from the pedometer to control for the teacher's activity levels. The teacher's step counts were divided by the time that the pedometer was worn. This resulted in a difference of 86.91 steps/min for the fit-appearing teacher and 82.22 steps/min for the overweight-appearing teacher. Results for the one-way ANOVA tests examining Figure Rating Scale difference scores showed a statistically significant difference between groups (weight bias and grade) as determined by the ANOVA, $F(2, 141) = 6.85$, $p = .001$. A Bonferroni post hoc test revealed that the change score was statistically significantly higher for fourth graders (2.06 ± 1.31, $p = .001$) compared to fifth graders (1.35 ± 1.98) and sixth graders (0.78 ± 1.46). There was no statistically significant difference between the fifth- and sixth-grade groups ($p = 0.280$) and between the fourth- and fifth-grade groups ($p = 0.091$). The one-way ANOVA for change score and sex did not show statistical significance ($p = 0.217$). The results of the t tests showed a statistically significant ($p < 0.001$) difference in change score, and these scores were higher for the overweight-appearing teacher ($M = 4.01$, $SD = 0.91$) compared to the fit-appearing teacher ($M = 2.58$, $SD = 1.16$).

Results for the one-way ANOVA examining Student Attitude Questionnaire scores showed statistical significance by group for Questions 1, "I think I would like having Coach T. as a physical education teacher" ($p = 0.034$); 4, "Coach T. appears physically fit" ($p < 0.001$); and 5, "I will try to use the information Coach T. talked about to improve my own physical fitness" ($p = 0.027$). Statistical significance was found by grade for Question 2, "Coach T. knows a lot about physical education" ($p = 0.011$). For sex, statistical significance was found for Questions 1 ($p < 0.001$); 2 ($p = 0.028$); 4 ($p = 0.019$); 5 ($p = 0.001$); 6, "I believe Coach T. leads a healthy lifestyle" ($p = 0.041$); and 8, "Coach T. motivates me to exercise and lead a healthy lifestyle" ($p = 0.009$). Finally, for weight bias, statistical significance was found for Question 3, "A physical education teacher should be physically fit" ($p < 0.001$).

Discussion

This study examined how perceptions of a physical educator's physical appearance affected student PA levels, as measured with pedometers. It was hypothesized that students with the fit-appearing teacher would have higher step counts than students with the

overweight-appearing teacher. The results showed that the fourth graders had a higher number of steps per minute in the group with the fit-appearing teacher and a lower number of steps per minute in the group with the overweight-appearing teacher. However, it was the opposite with the sixth graders in that the group with the fit-appearing teacher had a lower number of steps per minute than the group with the overweight-appearing teacher. The fifth graders did not significantly change. These results for the fourth graders are congruent with the results in the Melville and Maddalozzo (1988), Thomson (1996), and Dean et al. (2005) studies in that they have more favorable results with the fit-appearing teacher. However, outcomes from this study might prove that physical appearance taken by itself is not as important as teacher behavior, such as stated by Spencer (1998), who noted that physical educators can model behavior patterns for their students for personal health and fitness.

The results indicated differences between fourth and sixth grades. This could be in conjunction with the theory of cognitive development (Piaget, 1936), which explains how children develop mentally with the increase of age. According to this theory, the formal operational stage begins at the age of 11 or 12 years old and initiates the ability to think about abstract concepts and show change in cognitive capacity (Inhelder & Piaget, 1958). This could explain why the results of this study show that the fourth graders (aged 9–10) were more negatively affected than the fifth (aged 10–12) and sixth (aged 11–13) graders by the overweight-appearing teacher. The abstract concept in the case of this study could have been the overweight-appearing teacher looking unnatural and students beginning to question the authenticity of the fat suit more as student age increased. Alternatively, this could have also explained the cognitive capacity of the students and the lack of need to base individual behavior on a trait of another person as student age increased.

For the scope of the study, focus was placed on Student Attitude Questionnaire Questions 1, the likability of the teacher, and 4, the appearance of the teacher. This study produced an interesting difference in Question 1, which asked students to agree or disagree with the statement "I think I would like having Coach T. as a physical education teacher" and then circle a corresponding number. The group with the fit-appearing teacher averaged a 3.81 score (all three

grades collectively) and the group with the overweight-appearing teacher averaged a 4.22 score (all three grades collectively), with the results from the one-way ANOVA showing statistical significance ($p = .034$). This result was not congruent with the hypothesis and with previous literature (Conlin, 2010; Dean et al., 2005; Melville & Maddalozzo, 1988) stating that an overweight-appearing teacher would have a lower score on this question. These results show that a fit physical appearance does not make a teacher more likable.

On the contrary, the study also produced an interesting difference on Question 4 of the Student Attitude Questionnaire, which asked students to agree or disagree with the statement "Coach T. appears physically fit." The group with the fit-appearing teacher averaged a 4.49 score on that question (all three grades collectively), and the group with the overweight-appearing teacher averaged a 3.82 score (all three grades collectively), with the results from the one-way ANOVA showing statistical significance ($p < .001$). This result was congruent with the hypothesis and with previous literature (Conlin, 2010; Dean et al., 2005; Melville & Maddalozzo, 1988) stating that an overweight-appearing teacher would have a lower score on this question.

Although the Figure Rating Scale change score was not statistically significant in predicting steps per minute, the change score produced noteworthy differences in weight bias scores for the question, "How good of a PE teacher do you think this person would be?" The averages for all grade levels and for both groups combined collectively resulted in a 4.01 score for the fit-appearing cartoon figure and a 2.61 score for the overweight-appearing cartoon figure. These results were similar to those in a study suggesting that the overweight-appearing cartoon figure would be less favorable (Tiggemann & Wilson-Barrett, 1998). The ANOVA results showed that the fourth graders had the greatest change score, which interprets as a higher weight bias. Therefore, the higher weight biased fourth graders had a lower number of steps per minute with the overweight-appearing teacher, compared to the sixth graders, who had low weight bias and a higher number of steps minute with the overweight-appearing teacher.

Although there was a trend favoring the fit-appearing teacher, according to the ANCOVA analysis the weight bias was not a

predictor of step counts per minute for the total sample, which was the focus of this study. The results of the Figure Rating Scale in this study were also congruent with results from the Lovell et al. (2013) study, in which athletes rated sport dietitians, and non-obese sport dietitians were rated more positively than obese sport dietitians. These results show that weight bias exists in this population, but that the weight bias varies by grade level and does not always affect the PA behaviors of students, which also aligns with the theory of cognitive development (Piaget, 1936), which states cognitive development increases with age.

Weight bias had an opposite effect in sixth graders, and this could be due to the teacher appearance not being the only variable that affected PA levels in older children. This possibility aligns with social learning theory (Bandura, 1977) in that teacher behavior and all related variables may have a greater influence on PA levels than physical appearance by itself. Applying these results could mean that PE teachers who have fourth-grade students (and possibly younger) would be able to have higher PA levels among their students if they were fit appearing. The fourth-grade group also had higher weight bias, which creates an opportunity for teachers to reduce this weight bias through school programs (Irving, 2000; Puhl & Brownell, 2003).

The results could also apply to PETE programs that prepare teachers to teach fourth-grade (and possibly younger) students at any point in their career. Some West Coast universities have had requirements for their PETE program majors in regard to physical fitness (Melville & Cardinal, 1988). These universities required certain fitness testing for students either to graduate from the program or to be accepted into the program. These physical requirements, that possibly lead to having fit physical educators, could be revisited and benefit some students, according to the results of this study and others.

Besides being a benefit to students taught by fit-appearing teachers, the results of this study could also be applied to the hiring process for physical educators. Administrators who know that fit-appearing educators tend to bring more favorable results with students, whether it be for PA levels or cognitive skills, would then be able to make proper, professional judgments when hiring new PE teachers onto their team (Jenkins, Caputo, & Farley, 2005; Melville

& Cardinal, 1997). However, it could be challenging for administrators to avoid blatant discrimination based on appearance. Instead, an administrator could request fitness testing be done before the hiring process begins and could be given recommendations from PETE programs.

Limitations, Application, and Conclusion

This study had limitations that could have influenced or changed some of the results. One limitation was that the study was done at an elementary school in Utah and therefore generalizability cannot be assumed for other populations or age groups. Future research should include different age groups and student populations to incorporate the generalizability factor. Another limitation was that the students' current physical state was not measured or used as part of the study. This could have been beneficial and informative as to why student step counts and/or attitudes presented themselves, as was the case in other literature (Tiggemann & Wilson-Barrett, 1998).

Another limitation was that this study could not use repeated measures and randomization of participants. Repeated measures did not occur, because the teacher could not teach the same students twice, once as overweight appearing and again as fit appearing. The option for overcoming this was having two teachers (similarly done in separate data collections by Conlin, 2010), but teacher behavior and/or teaching style would have been difficult to control for and could have changed the results (Buck & Tiene, 1989). Therefore, teacher lesson similarity was controlled for through measuring the teacher's step counts with the pedometer. The teacher mentioned that wearing the fat suit hindered her more from moving as much, made her feel hot faster, made her adjust her shirt more to make sure the fat suit was not showing, and made her more tired, which could have changed student attitudes regarding behavior. According to Field (2013), randomization would have increased the internal validity of this study and eliminated more of the systematic variations through random grouping of participants.

This study could have had dissimilar results if the teacher had been male. Some studies suggest that females have different results for physical appearance rankings and evaluations than do males (Boor et al., 1983; Buck & Tiene, 1989). Hash et al. (2003) stated that gender in their study with physicians' physical appearance could

have been a source of bias. The present study wanted to give students the perception that the teacher was overweight; however, because she was female she could have been thought of as pregnant by some students. This would not have been relevant if the teacher had been male and would have altered student attitudes toward the teacher and her appearance.

Future research in this area needs to employ a randomized experimental design and somehow perfect the overweight perception for students by using more natural-looking fat suits. In addition, teacher activity level could also be used as a predictor. By doing so, the literature could successfully conclude the effect of PE teacher physical appearance on student PA. Researchers should include different age groups such as middle school and high school and possibly adapt for younger elementary-age students, to create a generalizability option. Future studies should also try to use a male teacher to dispose of the perception that a female teacher might be pregnant as opposed to overweight.

This research should also be tested with different lesson topics because curriculum can be a crucial determinant of attitudes for students in PE class (Luke & Sinclair, 1991) and sometimes students only feel successful when they are doing activities they already know how to do (Portman, 1995). Additionally, other factors and variables can be used in this area of research, such as student ethnicity or student fitness level. It would be interesting to see what these other circumstances could bring to the research realm. To gain more of a general consensus of the weight bias and student perceptions, future research should include open-ended questions on questionnaires and surveys of why students chose particular answers.

Although still applicable to this study because body composition is one component of physical fitness, social learning theory is behavior based and, therefore, should be examined in future studies that incorporate differences in activity level. An example of this is found in Bandura's idea of reciprocal determinism, where an individual's thoughts, behaviors, and environmental factors are conceptualized as a continuous interaction (Thompson, 2013). Future studies could apply this idea using physical appearance of a teacher as an environmental factor and a student's thought on the teacher's appearance, and possibly students could reflect on the teacher's

behavior. Future research could benefit from allowing subjects to voice their thoughts on the teacher's appearance, but this might also require being deferential to the hypercritical task of commenting on another's appearance.

In conclusion, combatting obesity in children and adolescents can begin at school and more specifically can happen during PE classes. This study, in congruence with previous research, concludes for some grade levels that the most ideal circumstances would bring a fit-appearing PE teacher in as a successful candidate and a role model for physical appearance. However, it also suggests that physical appearance for other grade levels is not the most important characteristic in regard to increased PA. More research needs to bridge this gap between conflicting results according to grade levels. More specifically, additional research needs to examine the PA levels of students as related to teacher appearance. This novel idea requires more empirical evidence that will create a stronger foundational framework in the area of PE teacher physical appearance.

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