

PEDAGOGY

Investigating the Effects of Federal Funding on Students' Attitudes Toward Physical Education

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Abstract

Students' attitudes toward physical education (PE) affect decisions to be physically active, are affected by the teacher and the curriculum, and become less positive as children get older. Federal funding has been granted to improve physical education programs, yet it is unknown how this funding affects attitudes and decisions to remain active. Attitudes toward PE of students from three schools that received large federal grants ($n = 2,962$) were compared to attitudes of students from two schools that did not receive funding ($n = 3,252$) for 3 years. Federal funding does not appear to slow decreases in students' attitudes. Significant differences between groups only appeared in fourth and fifth grade, with small effect sizes. Though funding added equipment, curricula, professional development, and technology to PE programs, more than funding—instead a focus on teaching and implementation—is likely needed to improve students' attitudes toward PE.

For several years, the U.S. Department of Education provided competitive funding to local education agencies and community-based organizations to support implementation of programs that improve the physical activity (PA) levels and nutrition habits of

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students, through the Carol M. White Physical Education Program (PEP) grants. Part of the rationale for the funding included research that suggested PA was connected to academic success (Howie & Pate, 2012) and research that showed a relationship between PA and increased cognitive function (Hillman et al., 2014; Sardinha et al., 2016). Another part of the rationale was to combat problems associated with a sedentary lifestyle. PA levels have been shown to decrease over time with school-aged children (Nadar, Bradley, Houts, McRitchie, & O'Brien, 2008), which is a concern because physical inactivity over the life span is a primary cause of several chronic diseases, including obesity, diabetes, hypertension, and stroke (Booth, Roberts, & Laye, 2014). Clearly, developing habits for a healthy lifestyle, especially at an early age, is a worthwhile investment of public funds. Though PEP grant funding recently expired, the Every Student Succeeds Act (2015) provides evidence of ongoing federally funded education reform efforts that include physical education (PE).

PE-based U.S. federal grants, such as PEP grants, have focused on the fitness levels, PA levels, and nutritional habits of students. Concerns exist regarding the appropriateness of these outcome measures to measure the effectiveness of grant funding. Changes in fitness levels or PA may or may not be attributable to grant-related programming, as observed changes could be temporary in nature (i.e., training effect) or a result of natural maturation of students and thus unrelated to grant-sponsored activities. In addition, there have been reported concerns about training teachers to collect accurate data and about the reliability and validity of the instrumentation (pedometers and self-report measures) related to PEP grants (Dauenhauer, Keating, & Lambdin, 2018). It seems that asking PE teachers to undergo the time-consuming process of training for data collection procedures and then take class time to complete the data collection process may not yield meaningful data. It also seems that measuring (possibly inaccurately) short-term behavior changes (i.e., fitness or PA levels) may not provide the best indication of a successfully funded PE grant aimed at helping children lead healthy, physically active lives—a commonly stated goal of PE programs (Society of Health and Physical Educators, n.d.).

Conversely, the effects of grant-supported PE programs on the attitudes of students toward PE may be a more important indicator

of the success of a grant project; positive attitudes have been identified as a factor in students deciding to remain active outside of school (Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003) and into adulthood (Kohl & Hobbs, 1998)—a goal for PE programs. Research on attitudes toward PE has highlighted the appropriateness of continuing to investigate this construct (see Silverman, 2017, or Subramaniam & Mercier, 2017). Because attitudes may be important indicators of current and future PA, several PE-based studies have focused on investigating attitudes. Similar to the observed decreases in children's PA levels, attitudes toward PE become less positive over time. Attitudes toward PE have been shown to be highly positive for fourth- to fifth-grade students and to decrease from sixth to eighth grade (Mercier, Donovan, Gibbone, & Rozga, 2017; Phillips & Silverman, 2015; Subramaniam & Silverman, 2007). With attitudes affecting future PA and funding efforts striving to promote PA, it would be appropriate to study the effects of funding on the attitudes of students.

The effect of federal funding of PE programs on the attitudes of students, however, remains unexplored. Funding is often spent on curricular enhancements (e.g., new curricula, new equipment, new technology) or teacher training (e.g., professional development). Because the teacher and the curriculum have been shown to affect attitudes (Phillips & Silverman, 2015; Silverman, 2017; Subramaniam & Silverman, 2007), funding to support these areas could affect students' attitudes. Theoretically, money spent on PE program improvements will positively affect the attitudes of students toward PE, leading to increases in future PA. To date, however, no empirical results support or refute this claim. Past PE-based federal grants required the collection of several outcome measures (i.e., fitness levels, PA levels, nutrition habits) but no process or fidelity measures (i.e., teaching, instruction, curricula implementation). It remains unknown if funding PE programs in the areas of teaching and curriculum—areas shown to affect students' attitudes—affects students' attitudes and if the current funding of PE programs is money well spent. Therefore, this study investigated the attitudes of fourth- to eighth-grade students in schools that received a large federal grant (PEP), compared to students' attitudes in schools that did not receive

such funding—helping to identify if money was spent in a meaningful way to promote lifelong PA.

The dual-component view of attitude (affect and cognition) is favored by researchers who have explored attitudes within PE (Silverman, 2017). Within this framework, cognition (the usefulness or importance of an attitude object) and affect (how fun or enjoyable the attitude object is) affect the formation and development of attitudes. This preferred view of measuring attitude is highlighted by investigations on teachers' and students' attitudes toward PE and fitness testing, which have used instruments that employ the dual-component model (Donovan, Mercier, & Phillips, 2015; Keating, Guan, Ferguson, Chen, & Bridges, 2008; Mercier et al., 2017; Mercier & Silverman, 2014; Phillips & Silverman, 2015; Subramaniam & Silverman, 2007). Attitudes are not fixed and may change over time on a two-way continuum of favorable to less favorable (Albarracin & Shavitt, 2018) or from positive to negative (Fishbein & Ajzen, 2010).

These studies have allowed for an understanding of students' attitudes toward PE—showing that attitudes become less positive over time, the curriculum and the teacher affect attitudes, and cognition and affect play a role in overall attitudes. However, few of these studies have been longitudinal (Silverman, 2017). The majority of studies on attitudes in PE present results from one-time data collection samples (Donovan et al., 2015; Keating et al., 2008; Mercier & Silverman, 2014; Phillips & Silverman, 2015; Subramaniam & Silverman, 2007). Results from only one longitudinal study exist, with data collected at one site for 3 years (Mercier et al., 2017). This study sought to further understanding of students' attitudes, building upon previous studies by collecting data from multiple sites (five school districts) for multiple years (3 years at each school). The multisite, longitudinal study design with proper psychometrically developed and validated instrumentation for the specific (large) sample group allowed for meaningful data on students' attitudes to be collected, analyzed, and discussed confidently. In addition to providing a clearer picture of students' attitudes, this study allowed for an investigation on funding of PE program grants and their effects on attitudes. Thus, a secondary purpose of this study was to support or refute previous findings through a stronger study design than the one-time data

sampling studies and the one longitudinal (one site) study that used this validated instrument.

Method

Students from five suburban Eastern U.S. school districts participated in a voluntary survey measuring attitude, which was completed and collected during PE classes. Three school districts had been awarded PEP grants, which ranged in amount from approximately \$850,000 to \$1,300,000 and ran for 3 consecutive years (District A: 2011–2014, Districts B and C: 2012–2015). These districts will be referred to as the funded group. District A had an average population of 3,554 students; District B, 5,745 students; and District C, 6,743 students. Two comparison districts were involved in data collection from 2012 to 2015. The average student population for District D was 4,892 and for District E was 5,996. These two districts were purposefully selected because they had similar types of racial and socioeconomic diversity as their funded cohorts. District B closely resembles the characteristics of District D, and District C is comparable to District E. Table 1 shows a more complete list of the demographic composition by district.

Table 1
District Demographics

District	Number of students	%					Free/reduced lunch
		Caucasian	Hispanic	Black	Asian		
Funded							
A	3,554	78	11	6	–	9	
B	5,745	84	5	–	6	4	
C	6,743	8	63	26	–	60	
Unfunded							
D	4,892	77	5	–	16	4	
E	5,996	47	36	8	–	36	

From each district, students were randomly sampled from each grade in each year, in accordance with federally approved random sampling procedures. Informed parental opt-out and child assent forms were completed in accordance with institutional review board and school district protocols. A total of 6,214 participants completed usable surveys (2,962 from PEP grant schools and 3,252 from unfunded schools). Table 2 shows the results by grade level.

Table 2
Participant Characteristics

Group	Gender	Grade					Total
		4	5	6	7	8	
Funded	Boys	161	303	607	337	116	1,524
	Girls	141	308	564	317	108	1,438
	Total	302	611	1171	654	224	2,962
Unfunded	Boys	177	363	571	406	215	1,732
	Girls	162	331	526	340	161	1,520
	Total	339	694	1097	746	376	3,252
Total		641	1305	2268	1400	600	6,214

Data for this study were collected via validated instruments designed to measure students' attitudes toward PE. Instrument development showed that the teacher and the curriculum affected affective and cognitive aspects of attitudes in different and meaningful ways. Both instruments covered the same four factors, affective curriculum, affective teacher, cognitive curriculum, and cognitive teacher, which, when combined, provide an overall attitude score. Fourth- and fifth-grade students completed a 16-item scale (Phillips & Silverman, 2015; Cronbach's alpha = .91), while sixth, seventh, and eighth graders completed a 20-item scale (Subramaniam & Silverman, 2007; Cronbach's alpha = .95). A study investigating the use of the two instruments, with participants from this sample, showed the appropriateness of using these two instruments to measure and compare students' attitudes toward PE over time (Donovan et al., 2015). Participants responded to each instrument item by circling their chosen rating on a 5-point Likert-type scale that ranged from 1 = *no way! / strongly disagree* to 5 = *definitely! / strongly agree*.

Data Sources, Evidence

The three districts that received grants used their funding in similar ways. They acquired significant amounts of new equipment, including fitness machines, rock walls, and other gymnasium supplies. Further, they purchased and provided PE teachers (K–12) professional development to enhance PE curricula, such as YES!, HOPSports, and SPARK. These districts also purchase technologies such as tablet computers for teachers, heart rate and/or activity monitors for students, and interactive gaming/movement products. In addition to professional development, teachers from all three PEP grant districts experienced a large increase in professional conference attendance, as funding was allocated for teachers to participate. Funded program additions for all three schools could be categorized as aiming to improve teaching or the curriculum, aspects shown to affect students' attitudes. All funded schools received training on evaluation measures including how to collect and record data, including FitnessGram assessments, PA recall measures, pedometer/accelerometer results, nutrition surveys, and attitude surveys. Neither of the two unfunded school districts experienced changes in equipment or curriculum; they did not add any significant technologies, increase professional development opportunities, or increase conference attendance. No teaching or curricular enhancements occurred in these districts. Unfunded schools' teachers did receive training on how to administer the attitude survey. Multiple classroom observations within each district (funded and unfunded) each year, collection of artifacts such as yearly activity charts, and several conversations with each district's PE administrator confirmed these characteristics within each program.

Results

Before the MANOVA, we reviewed a number of assumptions to determine that the MANOVA would be a valid analysis for the dataset. A number of outliers were removed from the large dataset, and the final sample included data for 6,214 students (funded group, $n = 2,962$; unfunded group, $n = 3,252$). The Mahalanobis distance (maximum value = 5.23) was less than a critical value of 13.82 for two independent variables, indicating that there were no multivariate outliers that would skew the analysis. Additionally, the bivariate

correlations between each dependent variable ranged from .735 to .805, indicating that the variables were correctly related, but did not show indications of multicollinearity (correlations were less than .90). Two assumptions that were not satisfied included Levene's test of homogeneity of variance and the Shapiro-Wilk test of normality, which are common sources of error for large datasets, especially when the group sizes are not equal (Glass & Hopkins, 1996). To help address these issues, we transformed the data to standard normal (z scores) and reviewed the quartile-quartile plots of the data, comparing the distribution of the data for the funded and unfunded groups. The data for each dependent variable (total attitude and the four attitude subcomponents) fell close to the reference line, indicating the data for each group came from populations with the same distribution of data (NIST/SEMATECH, 2012). Additionally, to account for these limitations, we selected Pillai's trace as the criterion of choice (Tabachnick & Fidell, 2012).

We performed a 2×5 between-subjects MANOVA for the two independent variables of funded (funded vs. unfunded) and grade (4–8) on the four attitude subscales (affective curriculum, affective teacher, cognitive curriculum, and cognitive teacher). Results of the two-way MANOVA with two independent variables (funded and grade) on the four subcomponents of attitude revealed a significant Grade \times Funded interaction, $F(20, 24812) = 2.41, p < .001$, partial $\eta^2 = .002$, such that the PEP grant appears to have had a greater effect in lower than upper grade levels (Figure 1); however, the association was small, as indicated by the small value of the partial eta squared. Further, the multivariate results showed that the main effect of funding was not significant, $F(5, 6200) = 1.15, p = .33$, providing additional information about the lack of effect of funding. The main effect of grade was significant, $F(20, 24812) = 59.05, p < .001$, partial $\eta^2 = .045$. This result is in line with prior research.

To examine the interaction further, we used between-subject tests that showed that the Grade \times Funded interaction was significant for affective curriculum, $F(4, 6204) = 6.07, p < .001, \eta^2 = .004$; affective teacher, $F(4, 6204) = 2.47, p < .042, \eta^2 = .002$; and cognitive curriculum, $F(4, 6204) = 4.37, p = .002, \eta^2 = .003$. A review of the means by Grade \times Funded schools (Table 3) showed that the scores for the funded schools were higher in fourth and fifth grade for these

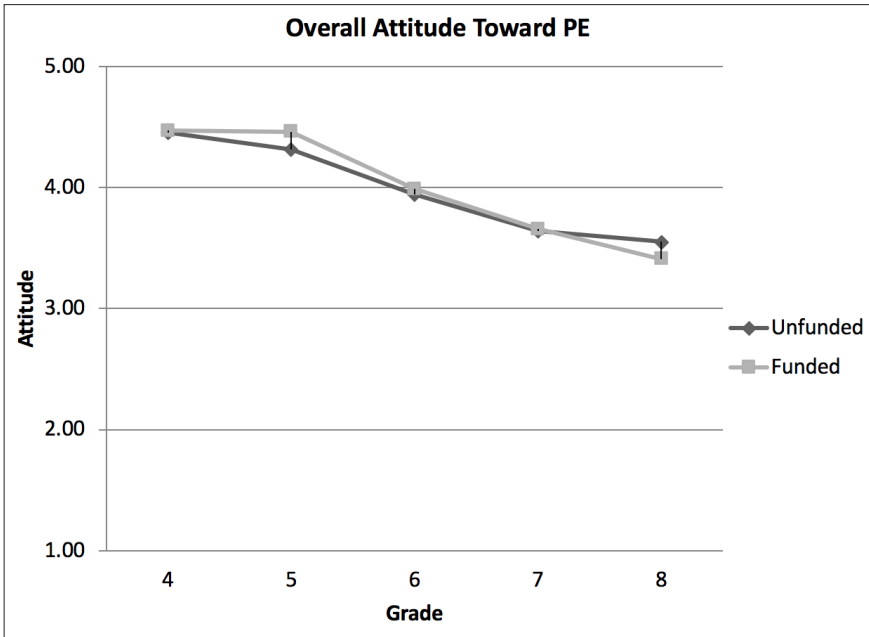


Figure 1. Overall attitude toward physical education by grade and funded group.

three subcomponents of attitude, both affective components (curriculum and teacher), and the cognitive curriculum subcomponent. However, the partial eta squares were small and thus there was a question about the importance of this interaction effect.

In line with findings from prior research, there was a significant effect of student grade level on attitudes for all students, regardless of funding. Students' attitudes tended to decrease (i.e., become less positive) in higher grade levels. The multivariate test was significant (reported above), as were the univariate tests for each subattitude component. Overall attitudes dropped from a mean of 4.46 in Grade 4 to a mean of 3.44 in Grade 8. This effect was found for all four subscales: affective curriculum, $F(4, 6204) = 204.81, p < .001, \eta^2 = .117$; affective teacher, $F(4, 6204) = 266.17, p < .001, \eta^2 = .146$; cognitive curriculum, $F(4, 6204) = 285.10, p < .001, \eta^2 = .155$; and cognitive teacher, $F(4, 6204) = 223.29, p < .001, \eta^2 = .126$.

Least significant difference (LSD) post hoc analyses of grade-level statistics revealed a consistent and statistically significant drop

Table 3
Overall and Subscale Attitude Descriptive Statistics by Grade and Funded Group

Grade	Group	<i>n</i>	Overall attitude		Affective				Cognitive			
			<i>M</i>	<i>SD</i>	Curriculum		Teacher		Curriculum		Teacher	
					<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
4	Funded	302	4.47	(.53)	4.42	(.68)	4.63	(.61)	4.39	(.66)	4.46	(.64)
	Unfunded	339	4.45	(.56)	4.41	(.70)	4.59	(.58)	4.36	(.74)	4.45	(.66)
5	Funded	611	4.46	(.64)	4.45	(.74)	4.56	(.71)	4.39	(.77)	4.44	(.72)
	Unfunded	694	4.31	(.70)	4.25	(.81)	4.41	(.81)	4.27	(.83)	4.31	(.78)
6	Funded	1,171	3.99	(.75)	4.03	(.81)	4.07	(.82)	3.84	(.87)	3.99	(.80)
	Unfunded	1,097	3.94	(.74)	4.01	(.81)	4.00	(.85)	3.78	(.91)	3.97	(.76)
7	Funded	654	3.66	(.73)	3.69	(.82)	3.75	(.81)	3.48	(.87)	3.71	(.78)
	Unfunded	746	3.64	(.84)	3.68	(.89)	3.73	(.91)	3.44	(1.02)	3.71	(.86)
8	Funded	224	3.41	(.76)	3.41	(.88)	3.54	(.81)	3.16	(.94)	3.53	(.77)
	Unfunded	376	3.55	(.84)	3.59	(.95)	3.63	(.92)	3.39	(.97)	3.58	(.86)

Note. Scale range is 1–5, where 5 indicates more positive attitudes.

in overall attitudes for each grade level transition from Grade 4 ($M = 4.46$) to Grade 5 ($M = 4.38$, $p = .019$) to Grade 6 ($M = 3.96$, $p < .001$) to Grade 7 ($M = 3.62$, $p < .001$) to Grade 8 ($M = 3.44$, $p < .001$). This pattern also held for both affective subscales through all grades and for both curriculum subscales beginning with the transition to sixth grade.

Post Hoc Analysis

Upon further examination of the results, one additional descriptive statistic became apparent. While the mean attitude scores for students from funded and unfunded schools dropped from about fifth grade and continued through to eighth grade, the variances of these scores seemed to increase. Table 3 shows more details on the standard deviations of attitude scores and Figure 2 shows a visual display of this trend. This pattern seems to hold for each attitude subscore for the funded and unfunded groups.

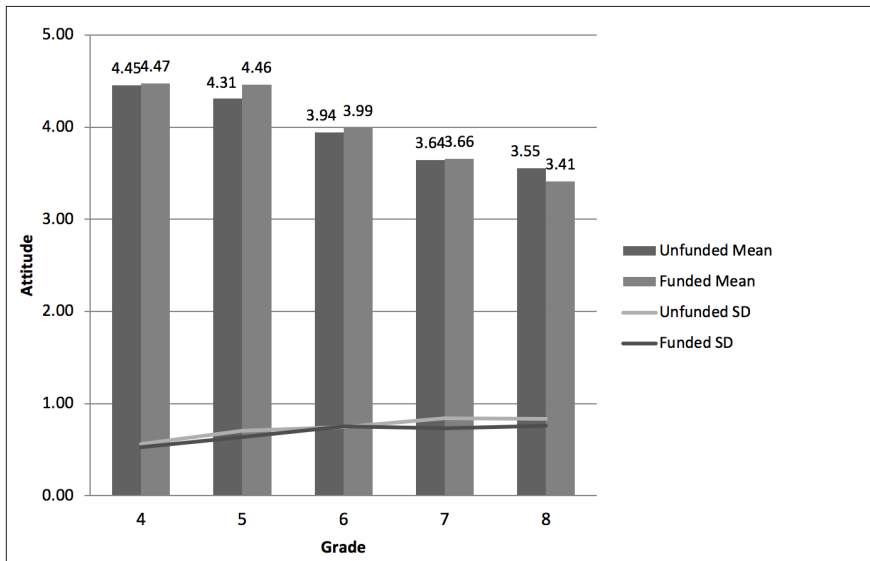


Figure 2. Means of overall attitude by grade and funded with standard deviations.

One final post hoc analysis examined the means by school district to see if attitudes differed by district in some discernible pattern. Because this study and past studies identified that grade had an effect on attitudes, we tested a combination of grade and

district on attitudes to determine if both of them had an effect on overall attitude. Using SPSS, we found the standard regression equation yielded a model indicating that both grade and district had an effect on attitudes, with $R = .40$ and $R^2 = .157$, suggesting that 15.7% of the variance of attitudes was predicted by grade and district: $F(2, 6211) = 579.99, p < .001$. The standardized coefficients for the regression equation are $-.03$ for district and $-.39$ for grade, with $p < .01$ for each independent variable, indicating that for every 1 standard deviation change in attitude, there is a $-.03$ change per district and a $-.39$ change by grade.

Discussion

Studies examining students' attitudes toward PE have identified that attitudes toward PE become less positive as students get older (Mercier et al., 2017; Phillips & Silverman, 2015; Subramaniam & Silverman, 2007). The major finding from this study is that federal funding aimed at improving PE programs does not appear to have contributed to slowing the decrease in positive attitudes toward PE. Over 3 years, in five school districts, with over 6,200 data points, students' attitudes toward PE decreased each year, regardless of whether students attended a grant-funded or an unfunded school. It appears that the ways federal funding was spent (i.e., technology, professional development, curricula, and equipment) did not promote positive attitudes that could lead to increased lifelong PA.

The only significant difference between students in funded (PEP grant) and unfunded schools occurred in fourth and fifth grades. Though students' attitudes still decreased from fourth and fifth grade, students' attitudes were more positive in funded schools than unfunded schools during this time. Students in funded schools appear to have enjoyed the curriculum (affect curriculum) and their teacher (affect teacher) more than their counterparts in unfunded schools did during these grade levels. These students also found the curriculum to be more useful (cognitive curriculum). These results support that affect and cognition affect attitude (Silverman, 2017). It could be that the SPARK curriculum and related professional development contributed to the more positive attitudes observed within the fourth and fifth graders and that this curriculum was more effective at affecting attitudes at these grade levels. The small effect size with a large sample size suggests that these results should be

discussed with some caution and that replication or additional studies are needed for the results to be discussed with more confidence.

It is disappointing that large federal funding in three schools for 3 years did not slow the observed decrease in positive attitudes of students in Grades 6 to 8 when compared to students in two unfunded schools over the same period. Other work has identified this period as the onset of decreasing positive attitudes (Mercier et al., 2017; Subramaniam & Silverman, 2007), and it was hypothesized that significant funding spent on expanding gymnasium equipment, increased technology, teacher professional development, and curricular enhancements would contribute positively to differences in students' attitudes. It has been reported that middle school students do not hold very positive attitudes toward school (Moon & Callahan, 1999), and most Internet searches will likely show a decrease in attitudes among early adolescents toward most constructs. Because of the reported effect of attitudes on outside-of-school PA (Hagger et al., 2003) and the need to promote PA, PE teachers should continue to look for ways to promote positive attitudes among students. It may be unrealistic to think that attitudinal scores will increase over time (grade level), and it could be that an appropriate goal would be to attempt to slow the decrease in positive attitudes, helping more children remain physically active for longer periods.

Another interesting finding was that as overall mean attitude scores dropped, the related standard deviations increased. From a data perspective, this indicates that the scores tended to have greater dispersion or variability as the students aged. The results suggest that as grade level increased, the sample consisted of more students with both highly positive attitudes and highly negative attitudes as compared to the younger grade levels, where students seemed to have more similar attitudes to each other. It seems that students have stronger, more developed attitudes over time. This is important because, though attitudes are not fixed (Albarracín & Shavitt, 2018) and can change over time (Mercier et al., 2017), it may be more challenging to affect more developed attitudes in older children. Targeting younger children (fourth to sixth grade), who have less varied and more positive attitudes than older students, may yield the most beneficial results.

Districts were purposefully selected to have similar types of racial and socioeconomic diversity in funded and unfunded cohorts. We were interested in the roles of race and socioeconomic status and their relationship to attitudes, especially as a result of funding. While district was significant in this equation, the effect was small, thus indicating that grade continues to be the primary predictor of attitudes for this sample. This supports prior findings that as students increase in grade, their attitudes toward PE begin to decline. It is also of note that students from the two low-socioeconomic status, more diverse schools (one funded and one unfunded) had overall mean averages that consistently ranked in the middle of the five schools' overall averages. This suggests that race and socioeconomic status did not play a large role in changing students' attitudes as a result of funding. Figure 3 shows a Means \times Grade \times District breakdown.

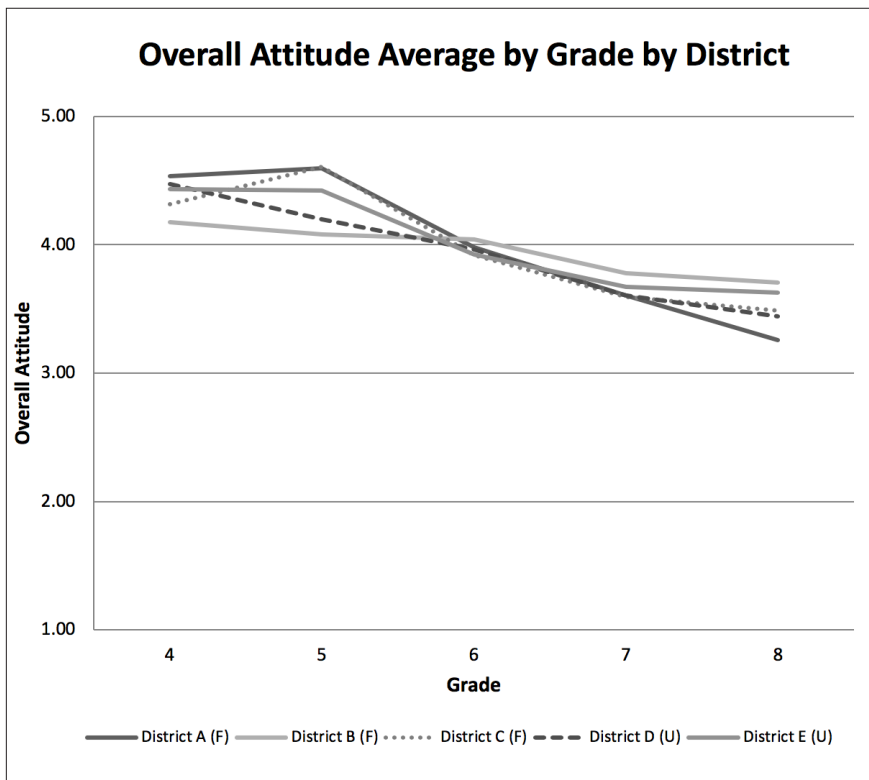


Figure 3. Overall attitude average by grade by district. (F) = funded district; (U) = unfunded district.

While money was spent on aspects of teaching (i.e., professional development) and curriculum (i.e., SPARK) in funded districts, aspects shown to affect students' attitudes, few differences were seen between students in funded and unfunded schools. One explanation for this could be the lack of process measures included in the formal evaluation of the funding programs. Without a focus on teaching and implementation, an important step in evaluation is missing. It is unknown how teachers used SPARK, tablet computers, or knowledge from teacher workshops in their planning and instruction. Research has indicated the one-time teacher professional development sessions are often unsuccessful (Patton & Parker, 2015; Sears, Edgington, & Hynes, 2014). It could be that teachers gained knowledge through attending conferences or school-sponsored workshops, but without continued support, they were unable to implement this information on a regular basis. Technology, equipment, and curricula may have sat unused and unable to aid teachers in promoting the development of positive attitudes. Simply purchasing curricular resources and equipment and funding teacher development opportunities without focusing on teaching does not appear to lead to PE goals such as improved positive attitudes.

The lack of process variables or focus on teaching should be included in meaningful program evaluation. The reported problems with data collection (Dauenhauer et al., 2018) suggest a need to be concerned with the accuracy of results from other PEP grant data sources. The Dauenhauer et al. (2018) study and this study serve to start (or continue) the conversation on how government agencies can best aid in supporting PE programs by critically evaluating the most recent attempt by the U.S. government to support PE. It may be of benefit for SHAPE America and PE teacher education leaders to work with the federal government to develop programs that would be of the greatest benefit to students.

A limitation of this study is that it is unknown how curriculum, technology, and knowledge gained through professional development were specifically implemented in PE classes and, in turn, the effects of these curricular and teaching decisions on attitudes. While it was beyond the scope of this study to investigate implementation at the lesson level, the study allowed us to identify that simply spending money on teaching and the curriculum does not lead to increases

in students' attitudes. Future research could use interventions developed specifically to improve affective and/or cognitive components of attitude. Those studies may be smaller in scope and could include fidelity measures ensuring compliance with the intervention.

A strength of the study is that given the density of this investigation—following thousands of students, in multiple schools within five school districts, and over 3 years—the design allowed for the investigation of a large sample and for comparisons between districts. The results align with those of studies on students' attitudes toward PE (Donovan et al., 2015; Keating et al., 2008; Mercier et al., 2017; Mercier & Silverman, 2014; Phillips & Silverman, 2015; Subramaniam & Silverman, 2007), yet were determined through a multisite longitudinal design. This large-scale study from five sites, over 3 years, with over 6,200 data points addressed the secondary purpose of the investigation and furthered understanding of attitudes, confirmed previous results, and allowed for the findings to be presented and discussed with confidence.

Conclusion

Significant differences in attitudes between funded and unfunded groups were only observed in Grades 4 to 5, with very small effect sizes, even after programmatic changes were implemented in areas shown to contribute to decreases in students' attitudes (i.e., the teacher and the curriculum). Teaching, learning, and formation of attitudes are complex processes. It appears that simply adding equipment, curricula, and technological enhancements with some form of professional development does not contribute in major ways to slowing decreases in positive attitudes. How lessons with new equipment, curricula, and technology were implemented and how knowledge gained from professional development was applied were not variables of interest in this study, but these questions need to be considered in future work because they likely can help identify the reasons for continued decreases in attitude.

The results of this study show that simply spending money on PE programs will not lead to changes in attitudes. In need of consideration, however, is the process of evaluating federal grants for the benefits they provide to children. We suggest that grant evaluations, such as the Every Student Succeeds Act grants, focus on process variables, such as the quality of teaching or fidelity measures assessing

the use of curricula and equipment. Such variables, compared to outcome measures that are hard to reliably assess such as self-reported PA levels or large-scale fitness assessments, would lead to more effective and long-term programmatic changes. These changes could address identified concerns associated with decreasing student attitudes, leading to increases in PA. While every district will not be able to receive a large federal grant, finding ways to improve curriculum, add equipment, and provide meaningful professional development can contribute to positive attitudes and to physically active children—goals well worth an investment of time and resources.

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