

Heart Rates of Elementary Physical Education Students During Dancing Classrooms Activities (Summary/Results)

Larry P. Nelson, Ph.D.
Department of Kinesiology
College of Education
University of Texas at Arlington
817.272.1102
lnelson@uta.edu

Previous research on Dancing Classrooms has reported a significant impact on social development values with youth, such as establishing mutual respect among peers and feeling as though the students play a significant role in the physical education environment (Nelson, 2009). However, there has been no research examining the physiological response to participation in Dancing Classrooms. By using heart rate telemetry, this study measures the cardiovascular response to the participation in Dancing Classrooms as it compares to results of other heart rate activities previously reported in the literature. The underlying hypothesis is that Dancing Classrooms will meet the Healthy People 2010 guideline that 50% of the class time was spent in the moderate to vigorous physical activity range (MVPA). Research questions include: does Dancing Classrooms elicit the same cardiovascular response between genders? Which dances in the program elicit the most cardiovascular response? Do heart rate standard deviations associated with Dancing Classrooms look differently than other physical education activities due to the fixed sequencing and uniformity of the curriculum? In recognition of the limited amount of time the average student participates in physical activity, it is imperative for physical education curricula to concentrate on activities that maximize caloric expenditure. Where Dancing Classrooms clearly benefit students in the area of social development, potential benefits of cardiovascular conditioning of students would also have added value in the curriculum.

Results

The average physical activity time for a class using the Dancing Classrooms curriculum was 37 minutes. Heart rate scores ranged from 73-185 bpm, and the mean heart rate for the total lesson was 124.41 bpm (± 17.03), which is just above the ACSM recommended 60% maximum heart rate reserve. The mean resting heart rate for the total sample was 77.82 (± 9.68). Overall, females (127.51 bpm) achieved significantly higher mean heart rates ($p = .0131$) than the males (121.20 bpm), averaging 6.31 bpm more per lesson (see Table 1).

With regard to specific dance activity, there were no significant heart rate differences between the Fox Trot, Rumba, Tango, and Waltz (Table 2). However, there were significant heart rate differences for each of the three remaining dances of Meringue, Swing, and Fun Dance as reported in Table 3. Fox Trot and Rumba ($p = .7983$) demonstrated significant gender heart rate differences (Table 4).

The Fox Trot, Rumba, Tango, and Waltz did not record average heart rates above the 60% maximum heart rate threshold as recommended by ACSM. These four dances recorded very similar cardiovascular response readings ranging from 118.18 bpm (Waltz) to 119.92 (Tango). On the other hand, the Meringue, Swing, and Fun Dance did achieve mean heart rates above the 60% heart rate threshold. Further analyses between dance activities indicate that the Swing dance heart rates (143.43 bpm) were significantly higher ($p = .000$) than all other dance heart rates (Figure 2). If comparing the Swing dance heart rates (143.43 bpm) to other activities previously reported in the literature (Figure 3), we would find that the swing dance measures up closely to Aquatics activities (141 bpm) and Cardiolab activities (148 bpm) as reported by Laurson et al. (2008).

Another focus of the study was to evaluate whether Dancing Classrooms met the healthy People 2010 guideline that 50% of class time was being spent in the MVPA range. Results indicate that only 47% of dancing classrooms time (or an average of 17.39 minutes) was spent above the 60% maximum heart rate reserve criterion set by ACSM. However, if evaluating the program on a slightly lower threshold of 50% maximum heart rate reserve, as did Laurson et al. (2008), then 89.7% of the dancing classrooms lesson (or 33.19 minutes) would qualify for the “lowered” MVPA range (see Figure 4). Additionally, if you compare the heart rates of Dancing Classrooms with some of the other activities reported in Laurson’s et al. (2008) study, we find that Dancing Classrooms (89.7%) is comparable to Cross-country running (90.6%) when it comes to spending time in % zone. Interestingly enough, Cross country running was the second highest % time in Zone activity reported out of 16 total activities reported in Laurson’s study.

The mean BMI for the total sample was 21.59 (\pm 4.65) and there were no significant main effects between BMI and gender ($p = .194$), resting heart rate ($p = .544$), or type of dance such as Meringue, Fox Trot, etc. ($p = .349$). None of the participants recorded an “underweight” score below the 5th percentile (because of this only 3 categories were then used in the statistical analyses). Most participants (46.7%) had BMI scores in the “healthy” range (5th percentile to 85th percentile). Almost a third of the participants (31.4%) fell within the “overweight” 85th to 95th percentile, and the remaining participants (20.8%) were considered obese situated above the 95th percentile.

Table 1. Heart rates for Dancing Classrooms activities

Dance	n	Min. HR	Max HR	Mean HR	SD	Mean Diff.	% HRR
Meringue	96	77	175	122.11	14.51		36%
Boys	46	77	169	119.58	15.54		
Girls	50	80	175	124.50	13.04	+4.92	
Fox Trot	96	78	155	118.66	12.74		33%
Boys	46	78	152	116.30	13.91		
Girls	50	81	155	120.84	11.14	+4.54	
Rumba	96	76	162	119.24	13.13		34%
Boys	46	76	158	116.03	13.11		
Girls	50	82	162	122.19	12.44	+6.16	
Tango	96	78	161	119.92	13.09		34%
Boys	46	78	158	117.94	13.22		
Girls	50	83	161	121.76	12.71	+3.82	
Swing	96	99	185	143.43	17.77		54%
Boys	46	99	177	136.95	16.95		
Girls	50	105	185	149.40	16.38	+12.45	
Waltz	96	81	159	118.18	11.70		33%
Boys	46	81	157	115.31	11.13		
Girls	50	85	159	121.45	11.50	+6.14	
Fun Dance	96	73	185	128.30	18.42		41%
Boys	46	73	172	125.74	20.13		
Girls	50	82	185	131.11	15.90	+5.37	
Total	96	73	185	124.41	17.03		38%
Boys	46	73	177	121.20	16.73		
Girls	50	80	185	127.51	16.75	+6.31	

Note. SD = standard deviation; Mean Diff. = mean gender difference; %HRR = percent utilization of heart rate reserve

Table 2. Dances with no significant heart rate differences

Dance 1	Dance 2	Mean Difference	Std. Error	Significance
Fox Trot	Rumba	-.573	.602	.964
	Tango	-1.261	.602	.356
	Waltz	.487	.691	.992
Rumba	Tango	-.688	.602	.915
	Waltz	1.060	.691	.724
Tango	Waltz	1.748	.691	.149

Note: A positive mean difference value = Dance 1 had a higher heart rate average; A negative mean difference value = Dance 2 had a higher heart rate average.

Table 3. Dances with significant heart rate differences

Dance 1	Dance 2	Mean Difference	Std. Error	Significance
Meringue	Fox Trot	3.450	.604	.000
	Rumba	2.877	.604	.000
	Tango	2.189	.604	.005
	Swing	-21.316	.604	.000
	Waltz	3.937	.692	.000
	Fun Dance	-6.183	.682	.000
Swing	Fox Trot	24.766	.602	.000
	Rumba	24.193	.602	.000
	Tango	23.505	.602	.000
	Waltz	25.253	.691	.000
	Fun Dance	15.133	.681	.000
Fun Dance	Fox Trot	9.633	.681	.000
	Rumba	9.060	.681	.000
	Tango	8.372	.681	.000
	Waltz	10.120	.761	.000

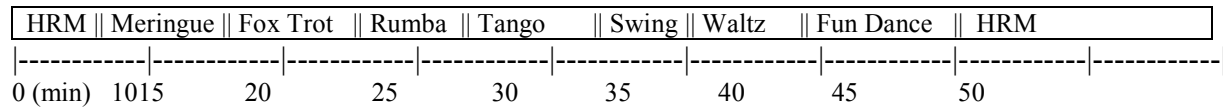
Note: A positive mean difference value = Dance 1 had a higher heart rate average; A negative mean difference value = Dance 2 had a higher heart rate average.

Table 4. Dances with significant heart rate gender differences

Dance 1	Dance 2	Mean Difference	Std. Error	Significance
Meringue	Fox Trot	3.9481	.4201	.0001
Meringue	Rumba	3.8411	.4201	.0001
Meringue	Tango	2.9481	.4201	.0001
Meringue	Swing	-19.0936	.4201	.0001
Meringue	Waltz	5.3479	.4888	.0001
Meringue	Fun Dance	-5.6497	.4721	.0001
Fox Trot	Rumba	-.1070	.4183	.7983
Fox Trot	Tango	-1.0000	.4183	.0173
Fox Trot	Swing	-23.0417	.4183	.0001
Fox Trot	Waltz	1.3998	.4879	.0043
Fox Trot	Fun Dance	-9.5978	.4711	.0001
Rumba	Tango	-0.8930	.4183	.0334
Rumba	Swing	-22.9347	.4183	.0001
Rumba	Waltz	1.5067	.4879	.0022
Rumba	Fun Dance	-9.4908	.4711	.0001
Tango	Swing	-22.0417	.4183	.0001
Tango	Waltz	2.3998	.4879	.0001
Tango	Fun Dance	-8.5978	.4711	.0001
Swing	Waltz	24.4414	.4879	.0001
Swing	Fun Dance	13.4439	.4711	.0001
Waltz	Fun Dance	-10.9975	.5241	.0001

Note. A positive mean difference value = Boys had a higher heart rate value; A negative mean difference = Girls had a higher heart rate value. The Fox Trot and Rumba dances were the only two that had no significant gender difference.

Figure 1. Timeline of the Dancing Classrooms data collection



Note. Each lesson timeline varied slightly between instructors. HRM = Approximate time spent putting on and taking off the heart rate monitors.

Figure 2. Mean heart rates of Dancing Classrooms activities

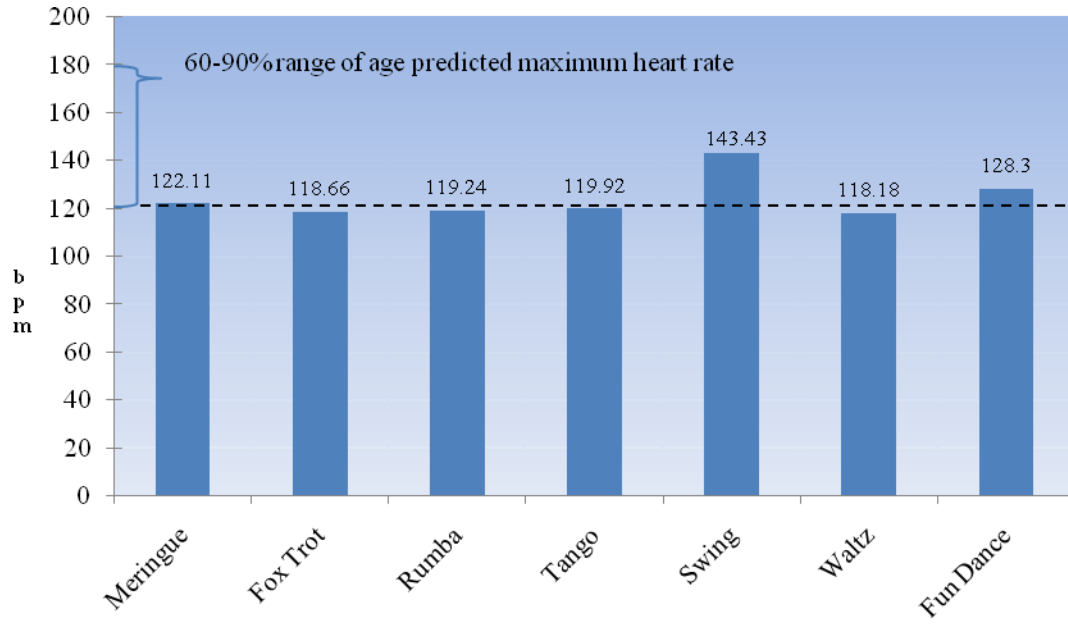


Figure 3. Mean heart rates and standard deviations of Dancing Classrooms compared to activities reported by Laurson, Brown, Cullen, & Dennis (2008)

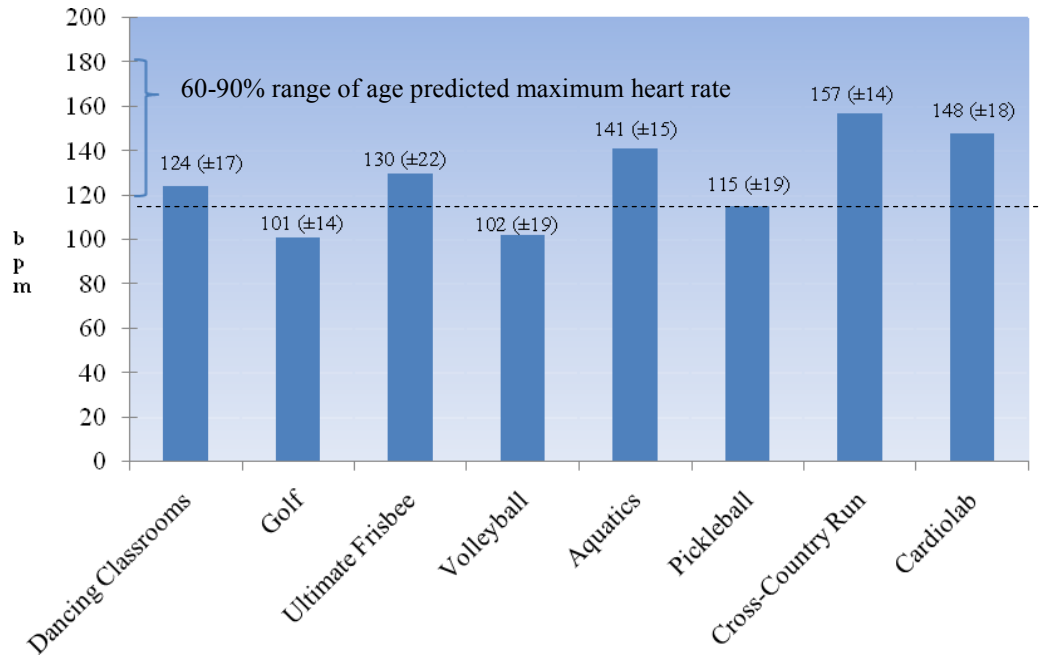


Figure 4. Percentage of class time Dancing Classrooms spent above a 50% maximum heart rate threshold compared with activities reported by Laurson, Brown, Cullen, & Dennis (2008)

