

# The Effects of Children's Choice of Exercise on a 2-mile Run Bout

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**Abstract:** *Obesity and overweight status continue to be important public health concerns across the globe. According to the World Health Organization (2021), more than 340 million children ages 5-19 years are either overweight or obese. As suggested by the CDC (2021), one way to combat overweight and obesity is to engage in 60 minutes of physical activity per day, which could include running. The purpose of this study was to assess the effects of children's choice of exercise on a 2-mile run bout. Seven children chose either the "choice" group or "running" group. They spent 60 minutes, twice a week for 10 weeks engaged in their activity choice. Data showed that while there was some fluctuation between groups with regard to the number of steps taken across the study period, both groups improved their 2-mile run times at the end of 10 weeks. Results suggest that children need to be in a structured physical activity program in order to increase levels of physical activity. Ensuring children have at least 60 minutes of time to engage in physical activity and giving children choices of activities, may help them to increase their participation in physical activity and maintain a healthy weight.*

**Keywords:** children, physical activity, run, obesity, overweight

## 1. Introduction and Literature Survey

Globally, childhood obesity continues to be a serious public health concern. With over 380 million children between the ages of 6-17 classified as either overweight or obese, researchers must aim to find new and innovative tools to help children maintain a healthy weight (Hu & Staiano, 2022). It is well known that being overweight or obese during childhood is associated with a myriad of physical and emotional/social challenges. These include high blood pressure and high cholesterol, insulin resistance/type 2 diabetes; asthma, sleep apnea, joint troubles, and fatty liver disease as noted by Bacha & Gidding, 2016; Cote et al., 2013; Lloyd et al., 2012; Mohanan et al., 2014; Narang & Mathew, 2012; and Pollock, 2015). As cited in numerous studies (Beck, 2016; Halfon et al., 2013; Morrison et al., 2015), socially and emotionally, overweight and obesity may be associated with anxiety and depression, low self-esteem, and bullying and stigma. Rundle et al. (2020) has shown that children who have obesity as a child are extremely likely to have obesity throughout adulthood. Although there are several ways to combat obesity, participating physical activity regularly has shown to be very effective (Schwarzfischer et al., 2017). Regular physical activity participation has numerous health benefits in both children and adults. Physical activity can improve a child's academic performance by improving one's attention and memory and brain health by reducing depressive levels (Wick & Granacher, 2018). It can enhance muscular fitness by building muscular strength and endurance (Smith et al., 2019), and cardiovascular health by maintaining normal blood sugar levels (Kateryna et al., 2020; Marshall et al., 2021). For adults, physical activity can improve sleep quality, reduce anxiety levels, reduce cardiovascular risks and prevent certain types of

cancers (Banerjee et al., 2021; Kim, et al., 2020; Liu & Wang, 2022; Murawski, et al., 2020).

Physical activity is defined as "any bodily movement produced by skeletal a muscle that requires energy expenditure" (World Health Organization [WHO], 2021). It is important to note that this can be in any form at any intensity. While physical activity is mostly viewed as a structured activity program, it can also come as unstructured play or by a person's own choice. To be most beneficial, most children and adolescents should participate in at least 60 minutes of physical activity per day (US Department of Health and Human Services [USDHHS], 2018). More specifically, physical activity should be of moderate-to-vigorous intensity. The majority of activities should be "aerobic" in nature and include activities like walking, running, or games / sports that increase heart rate. Youth should participate in vigorous-intensity activities at least 3 days per week, and muscle-strengthening activities like climbing or doing push-ups, at least 3 days per week (USDHHS, 2018). However, despite these recommendations, children and adults fall short of these activity levels (Anna et al., 2015; Nigg & Vaeth (2010). Therefore, the purpose of this project was to assess the effects of children's choice of exercise on a 2-mile run when they chose either a "choice" group or "running" group in which to participate.

## 2. Methodology

During the fall of 2019 seven children between the ages of 7 and 14 years attending a school in southeastern Louisiana, were recruited and enrolled in an after-school exercise program located at a local university laboratory. Aside from age, and participation in the after-school exercise program, there were

no additional criteria for sampling. Informed consent/assent was obtained by both the children and their legal guardians prior to the commencement of study-related activities. The variables that were recorded and observed for the purpose of analysis included demographic information and total steps. Total steps were calculated by use of a pedometer.

For 10 weeks, participants attended the Interactive Physical Activity Lab (I-PAL) or met on an indoor running track twice a

week for one hour each session. Before the study session began, the children chose to attend the “free choice” group or the “running” group. The “free choice” group were able to use treadmills, elliptical trainers, exercise bikes, wall climb, or play interactive video games such as bowling, tennis, and dance in the I-PAL. The “running” group engaged in a structured running program designed for children (Table 1).

**Table 1: Session Overview**

	Weekly Progression Activity
Week 1 (9/18)	:30 run/1:00 walk (20:00 total movement)
Week 2 (9/25)	:30 run/1:00 walk (20:00 total movement)
Week 3 (10/2)	1:00 run/1:00 walk (20:00 total movement)
Week 4 (10/9)	1:00 run/1:00 walk (20:00 total movement)
Week 5 (10/16)	1:30 run/1:00 walk (20:00 total movement)
Week 6 (10/23)	1:30 run/1:00 walk (20:00 total movement)
Week 7 (10/30)	2:00 run/1:00 walk (25:00 total movement)
Week 8 (11/6)	2:00 run/1:00 walk (25:00 total movement)
Week 9 (11/13)	2:30 run/1:00 walk (25:00 total movement)
Week 10 (11/20)	2-mile "Fun" Run

Each activity was facilitated by graduate students enrolled in a health and human sciences program. A total of three graduate students helped run the lab and collected data, with supervision by the principal investigators. Prior to commencing with any research activities, the students completed an extensive training, which included obtaining a Collaborative Institutional Training Initiative certification and learning lab protocol. The study was approved by the university’s Institutional Review Board.

Participants came to the lab Tuesday and Thursday of each week for 10 weeks. They all participated in a 15 minute warm up activity and placed the pedometer on their wrists. The “free

choice” group remained in the lab and continued with their activities. The “running” group continued their activities at the indoor track. After 30 minutes of activity, both groups engaged in a 15 minute cool down and stretching activity. The children’s steps were recorded at the end of each session.

### 3. Results/ Discussion

As depicted in Table 2, of the 14 sets of pairs analyzed by way of a paired samples t-test, 9 of the pairs boasted significant results.

**Table 2: T-test Results**

Pairs	M	SD	Mean Difference	t
Week 1 Choice group and Running group	2323, 2263	593.27, 65.13	60	0.18
<b>Week 2 Choice group and Running group</b>	<b>943, 5150</b>	<b>257.90, 312.34</b>	<b>-4,207</b>	<b>-28.59***</b>
<b>Week 3 Choice group and Running group</b>	<b>1727, 5095</b>	<b>482.49, 46.80</b>	<b>-3,368</b>	<b>-11.83*</b>
<b>Week 4 Choice group and Running group</b>	<b>981, 4,476</b>	<b>188.04, 546.78</b>	<b>-3,495</b>	<b>-9.74**</b>
<b>Week 5 Choice group and Running group</b>	<b>1,699, 4,170</b>	<b>308.03, 432.78</b>	<b>-2,471</b>	<b>-9.77**</b>
<b>Week 6 Choice group and Running group</b>	<b>1,284, 4,169</b>	<b>404.58, 556.14</b>	<b>-2,885</b>	<b>-15.47**</b>
Week 7 Choice group and Running group	2,814, 4,737	1335.72, 448.31	-1,923	-3.07
<b>Week 8 Choice group and Running group</b>	<b>872, 4,554</b>	<b>772.83, 780.79</b>	<b>-3,682</b>	<b>-51.31***</b>
<b>Week 9 Choice group and Running group</b>	<b>1,283, 4,516</b>	<b>624.22, 887.56</b>	<b>-3,233</b>	<b>-4.89*</b>
Week 10 Choice group and Running group	2,015, 4,342	1,983, 933.36	-2,327	-3.56*
Week 1 and Week 10 Choice group	2,269, 1,983	496.52, 1,620.38	286	0.29
<b>Week 1 and Week 10 Running group</b>	<b>2,263, 4,342</b>	<b>65.13, 933.36</b>	<b>-2,079</b>	<b>-3.99*</b>
Week 1 Choice group and Week 10 Running group	2,323, 4,342	593.27, 933.36	-2,019	-2.64*
Week 1 Running group and Week 10 Choice group	2,263, 2015	65.13, 1,983.03	248	0.22

Notes: \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ ; Week 1 = Baseline/Pretest; Week 10 = Posttest

Interestingly, significant mean differences were found between the *choice group* and the *running group* in weeks 2, 3, 4, 5, 6, 8, 9, and 10 respectively. Moreover, significant mean differences were found between the *running group’s* scores on

weeks 1 and 10. Lastly, significant mean differences were found between week 1 *choice group* scores and week 10 *running group* scores. Results indicate that while both free choice and structured running have the potential to increase

physical activity participation, the structured running group saw significantly more improvement in total number of steps taken per session than the free choice group. Depending on the overall goal of a program, having a set amount of time set aside for any physical activity (free choice or structured) is much more beneficial for children than giving choices which might include sedentary activity (i.e. study hall) versus physical activity (i.e. recess or after school sports). Children and youth continue to need support, prompting, and external motivation to meet the recommended physical activity participation goals.

#### 4. Conclusion

Participants in this study chose which exercise group they were going to participate. Each time a participant came to the intervention session, participants engaged in their chosen activity for the appropriate amount of time at their chosen effort level. As dictated by their exercise choice, participants may have had a higher level of motivation and therefore gave maximum effort when participating in their activity. This behavior may result in better outcomes when addressing overweight and obesity reduction measures. If participants choose a structured running program to participate, they will likely engage in greater levels of activity and produce better health outcomes. Running is an activity that requires very little equipment (mostly just comfortable shoes), can be done anywhere (no special facility or membership is needed), and can be social or not (solo runs as well as large group runs). Therefore, the choice of running may be appealing to the masses.

These results showed a more structured running program consistently increased the number of steps across the weeks, and, therefore, an increase in the level of movement. This may display the need for organized exercise programs to motivate and inspire individuals to move. It is accurate to postulate that creating a supportive environment of activity choice, but then regimenting the activity progression, would encourage children to engage in a physical activity of their liking and increase levels of physical activity. This is significant as choosing an enjoyable activity to participate in and remain committed to is an important notion to engage when addressing overall health and wellness, physical education, as well as general physical activity as has been noted by Teixeira et al., 2012 and Kilpatrick et al., 2002). Being physically active for the recommended daily amounts could therefore lower overweight and obesity levels.

#### 5. Future Scope

There are some suggestions for future research. Though the results of giving children choices of physical activity were significant, this study had a small sample size ( $n=7$ ) which limits the findings to be generalized to the population at-large. Including a larger sample size, future research would allow better generalizability of the findings and possibly generate a significant effect size. Observational data was not recorded in this study. This is important as it may have given insight as to

why there was such a significant difference ( $t=-51.31$ ) between the choice group and the running group. The data presented here represents a first attempt at determining the incidence of increased physical activity in children when given choice for physical activity. This displays a promising future direction for health and physical activity advocates when addressing youth activity levels.

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