TACSM Abstract

Accuracy of Fitbit Surge and Smartphone Apps at Measuring Cycling Distance and Speed

JOSÉ L. GÁMEZ, IVÁN A. FIGUEROA, MERRILL D. FUNK.

Exercise Science Lab; Department of Health and Human Performance; University of Texas Rio Grande Valley; Brownsville, TX

Category: Masters

Advisor / Mentor: Funk, Merrill (Merrill.Funk@utrgv.edu)

ABSTRACT

There are many smartphone apps that measure distance and speed in cycling, however, there is no research in accuracy of this cycling apps. **PURPOSE:** To determine the accuracy of Fitbit Surge and two smartphone applications at measuring distance and speed while cycling outside. **METHODS:** Thirteen college-aged students (Mean±SD; BMI: 25.2±3.0kg/m^2; 10 males, 3 females) consented to participate in one measurement session. A 0.75 mile trail along a sidewalk around the university campus was used for 3 separate trials using a mountain bike, Android smartphone running Google-Fit (G-Fit) and S-Health (SH), and Fitbit (FB) provided to each participant. The first lap consisted of walking 0.25 miles, cycling 0.15 miles at a slow speed, cycling 0.20 miles at a fast speed, and cycling 0.15 miles at a moderate speed. The second lap consisted of 1 lap at a moderate speed. The third lap consisted in 1 lap at a slow speed. After every lap a researcher recorded the data from the phone and the Fitbit. Mean bias and mean absolute percent error (MAPE) were calculated to describe speeds and distances recorded on each device compared to the cycle computer. **RESULTS**: Only eleven participants were included in the analysis due to the malfunction of the smartphone. Results are as follows:

Trial 1	FB Mean Bias±SD	FB MAPE	G-Fit Mean Bias±SD	G-Fit MAPE	SH Mean Bias±SD	SH MAPE
Distance (miles)	0.02±0.01	2.5	0.03±0.06	7.7	0.02±0.01	2.75
Average Speed (mph)	0.41±0.27	6.1	0.93±0.6	13.2	0.63±0.4	0.1
Max Speed (mph)	0.83±0.53	6.5	4.17±0.6	33.0	1.65±1.36	14.1
Trial 2						
Distance (miles)	0.02±0.02	4.9	0.02±0.06	7.0	0.02±0.02	3.5
Average Speed (mph)	0.45±0.2	4.8	1.31±0.82	13.6	0.53±1.36	14.1
Max Speed (mph)	5.98±1.19	41.5	4.43±1.0	29.2	0.44±2.03	11.5
Trial 3						
Distance (miles)	0.02±0.01	3.1	0.02±0.04	5.4	0.04±0.04	5.3
Average Speed (mph)	0.29±0.26	5.0	0.43±0.32	7.4	-1.37±2.07	23.7
Max Speed (mph)	1.51±0.57	9.2	6.59±2.14	37.4	1.44±0.59	8.6

CONCLUSION: The Fitbit Surge was most accurate at measuring speed and distance for cycling followed by the S-Health app and lastly the Google-Fit app.