

Wii Fit Or Just A Wee Bit?



By Alexa Carroll, M.S.,
John Porcari, Ph.D.,
and Carl Foster, Ph.D.,
with Mark Anders

Last Christmas, Chris Lee and his wife Julie bought a Nintendo Wii video game system as a gift for their three kids, ages 4 to 9. It was an immediate hit with the family, and soon after, they also purchased Wii Fit, an exer-game for the Wii that focuses on strength training, aerobics, yoga and balance games performed using a small white balance board that looks similar to a household body-weight scale.

"It sounded like a fun way to get the kids to exercise and become aware of fitness without being draconian or burdensome," recalls Chris. "My oldest daughter took to it right away. My wife and I came around a bit more slowly after watching and helping the kids."

For the past nine months, the Lees have used Wii Fit at least a few times a week, doing yoga, weighing in, charting their fitness progress, and having family challenges in ski jumping and on the rope course balance games.

"I love that we are competing in a fun way while getting in shape," he says. "I'd say the board has kept me motivated, and for my kids, they're getting exercise without even knowing it."

Judging by sales data of Nintendo's Wii Fit, families like the Lees are not alone. Since its launch in late 2007, Wii Fit has sold well over 21 million units and is now the third best-selling video game

of all time. These stats are encouraging, given the well-publicized epidemic of childhood obesity in our country and the fact that obesity and its complications cause as many as 300,000 premature deaths each year, second only to cigarette smoking as a cause of death.

Now, assuming folks are using the Wii Fit exer-game as a substitute for their normally sedentary screen-time, these numbers are good news. But just how good? To give the public perspective on what sort of workout they can really expect from using Wii Fit, the American Council on Exercise enlisted the help of the research experts at the University of Wisconsin La Crosse Exercise and Health Program.

The Study

A team of researchers led by John Porcari, Ph.D., and Alexa Carroll, M.S., recruited 16 volun-



Exclusive ACE research tests the efficacy of Nintendo's Wii Fit exer-game

teers, male and female, ages 20 to 24 years to help test the efficacy of Wii Fit.

Prior to beginning the actual study, each volunteer was given a maximal exercise test on a treadmill while oxygen consumption and heart rate were constantly monitored. Next, they surveyed each subject and obtained their ratings of perceived exertion (RPE) for the treadmill test.

Once a fitness baseline was established, each participant was given a demonstration on how to properly use Wii Fit. For the purpose of the study, researchers chose to focus on the six most aerobically challenging activities featured in

the game: Free Run, Island Run, Free Step, Advanced Step, Super Hula Hoop, and Rhythm Boxing. Participants were given the opportunity to practice these activities until they could demonstrate proficiency in each.

Then, on a separate day, each subject performed six-minute bouts of each of the six activities, chosen in random order. Meanwhile researchers continuously monitored the subjects' oxygen uptake ($\dot{V}O_2$ max), heart rate (HRmax), and RPE.

The Results

Of the six Wii Fit activities tested, Island Run and Free Run yielded the highest energy expenditures at 60% HRmax, 38% $\dot{V}O_2$ max, and 5.5 kcal per minute. However, neither was sufficient enough to maintain or improve cardiorespiratory endurance as defined by the American College of Sports Medicine (ACSM).

As for Free Step, Advanced Step, Super Hula Hoop and Rhythm Boxing, all showed

statistically similar energy expenditures, yet all fell below ACSM's recommended fitness guidelines.

With regards to caloric expenditure, Free Step burned 3.3 kcal/min, Advanced Step burned 3.6 kcal/min, Super Hula Hoop came in at 3.7 kcal/min, and Rhythm Boxing rounded it out with 3.8 kcal/min. When played for 30 minutes, performing the Free

Step is estimated to burn an average of 99 calories, the Advanced Step would burn an average of 108 calories, the Super Hula Hoop would burn an average of 111 calories, the Rhythm Boxing would burn an average of 114 calories, the Free

Run and Island Run would burn an average of 165 calories (see Table 1 for a full report on the physiologic responses of each activity).

In all cases, including Island Run and Free Run which both yielded 5.5 kcal/min, researchers found that performing the actual activity (vs. the virtual one on Wii Fit) has a significantly higher caloric expenditure. One specific example of this is with conventional step aerobics versus Free Step and Advanced Step. The normal activity burns 11.8 kcal/min while Wii Fit's step programs burn much less.

"Step aerobics is a very good workout," says John Porcari, Ph.D., "but you typically step up onto a 6-inch high bench. In Wii Fit you step up onto the 1- or 1.5-inch balance pad so you're burning far fewer calories than you would in an actual step aerobics class."

Similarly, Rhythm Boxing burns just one-third of the kcal/min of traditional boxing.

This is due in part to mandatory instruction

Continued on page 8



A Wii Bit Fitter?

Nintendo Wii system, \$200; www.wii.com; Wii Fit Plus with Balance Board, \$99; www.wiifit.com

In October, Nintendo launched Wii Fit Plus, a replacement/upgrade of the original Wii Fit. The new Wii Fit features 15 new balance board games, including juggling and skateboarding, plus three new yoga poses and three additional strength-training exercises. Most importantly, the new software allows for greater workout customization, so users can "drag and drop" their favorite moves to create one workout or pick a pre-programmed workout based on their current mode or energy level.

Continued from page 7

given by the computer prior to each boxing move, which has the user standing in place for up to 15 seconds at a time and effectively killing the overall calorie burn.

The same follows for Super Hula Hoop and Free Run and Island Run—there's nothing like the real thing when it comes to energy expenditure.

The Bottom Line

"I guess anything is better than nothing, but we were a little bit underwhelmed with the exercise intensity of some of the exercises," says Porcari. "The Wii Fit is a very, very mild workout."

Okay, first let's put this into perspective. As Porcari suggests, choosing Wii Fit over typically sedentary video games is a good decision. According to this study one would burn double the calories by playing Wii Fit. But users need to keep in mind that Wii Fit itself is no panacea.

"Since using the Wii Fit alone may not produce results that meet recommended physical activity, guidelines" notes study author Alexa Carroll, M.S., "it is important that individuals participate in additional exercises to effectively reach these guidelines."

In other words, Wii Fit shouldn't be your only workout. And in fact, if you're going to spend time in front of a game system, Porcari's past research (published in the July/August 2008 issue of *ACE FitnessMatters*, and available online at <http://www.acefitness.org/getfit/studies/WiiStudy.pdf>) suggests that Wii Sports, the Wii's suite of exer-games that includes tennis, boxing, golf and bowling, would be a better option and more capable of helping you meet minimum intensity guidelines for exercise.

"You're better off doing Wii Sports than Wii Fit," he says. "In Wii Sports there's more jumping around, and you're not constrained by having to stand on the balance pad. I just think there's much more freedom of movement and you get a better workout."

Now, keep in mind, the researchers did not study the potential benefits of Wii Fit's balance exercises, but Porcari concedes users can indeed expect improved balance from regularly playing those games. And with regards to the strength-training moves and yoga workout that Wii Fit includes, the research team did not study those movements either because they should be roughly equivalent to those same exercises performed traditionally. What might make Wii Fit more appealing and useful, though, is the notion that exercise adherence may be boosted by users who are motivated by interaction with the Wii.

"Personally, I like the discipline and tracking," says Chris, who pairs Wii Fit yoga workouts with regular bike and treadmill workouts. "I also like the messages the Wii provides when you've missed a few workouts. It chides you to show up more often."

So is Wii Fit a great workout? That is still up for debate, but in the end, I'm reminded of the words of a wise personal trainer friend of mine who says, "The best workout is the one you'll actually do and stick with." 

MARK ANDERS is an award-winning journalist who has covered a wide range of topics, from rock star profiles to surfing river waves in Africa. His work has appeared in more than 20 magazines and books.



TABLE 1
Physiologic Responses to
each of the Wii Fit Activities (N=16)

		MEAN ± SD	RANGE
Free Step	HR (bpm)	93 ± 16.1	58–136
	% HRmax	50 ± 8.6	34–73
	$\dot{V}O_2$ (ml/kg/min)	11.5 ± 1.0	9.3–12.9
	% $\dot{V}O_2$ max	23 ± 4.7	15–34
	Kcal/min	3.3 ± 0.3	2.7–3.7
	RPE	8.1 ± 1.2	7–10
Advanced Step	HR (bpm)	96 ± 17.7	56–142
	% HRmax	49 ± 15.7	33–77
	$\dot{V}O_2$ (ml/kg/min)	12.2 ± 1.8	8.5–16.4
	% $\dot{V}O_2$ max	25 ± 5.9	14–38
	Kcal/min	3.6 ± 0.5	2.5–4.8
	RPE	9.1 ± 1.5 ^a	7–12
Super Hula Hoop	HR (bpm)	102 ± 21.0 ^a	60–157
	% HRmax	55 ± 11.1	35–85
	$\dot{V}O_2$ (ml/kg/min)	12.8 ± 3.2	8.2–19.3
	% $\dot{V}O_2$ max	26 ± 8.6	13–40
	Kcal/min	3.7 ± 0.9	2.4–5.6
	RPE	9.6 ± 1.7 ^a	7–13
Rhythm Boxing	HR (bpm)	103 ± 20.6 ^a	62–159
	% HRmax	54 ± 10.9	36–86
	$\dot{V}O_2$ (ml/kg/min)	12.9 ± 2.5	9.4–18.0
	% $\dot{V}O_2$ max	26 ± 5.9	15–35
	Kcal/min	3.8 ± 0.7	2.7–5.2
	RPE	9.1 ± 1.4 ^a	7–11
Free Run	HR (bpm)	112 ± 22.1 ^{abcd}	62–162
	% HRmax	60 ± 12.2 ^{ab}	36–88
	$\dot{V}O_2$ (ml/kg/min)	18.8 ± 4.6 ^{abcd}	10.8–26.5
	% $\dot{V}O_2$ max	38 ± 10.3 ^{abcd}	17–54
	Kcal/min	5.5 ± 9.8 ^{abcd}	3.1–7.7
	RPE	9.8 ± 1.5 ^a	7–12
Island Run	HR (bpm)	113 ± 22.5 ^{abcd}	66–168
	% HRmax	60 ± 12.4 ^{ab}	38–91
	$\dot{V}O_2$ (ml/kg/min)	19.0 ± 5.6 ^{abcd}	9.4–32.1
	% $\dot{V}O_2$ max	38 ± 11.3 ^{abcd}	15–60
	Kcal/min	5.5 ± 1.6 ^{abcd}	2.7–9.3
	RPE	10.1 ± 1.6 ^{acd}	7–13

a = Significantly greater than Free Step (p<0.05)

b = Significantly greater than Advanced Step (p<0.05)

c = Significantly greater than Super Hula Hoop (p<0.05)

d = Significantly greater than Rhythm Boxing (p<0.05)

This study was funded solely by the American Council on Exercise.