Technology used to be something external, we traveled to the office to use it – you sat at your computer. Then technology became something we carried around – our cellphones, our laptops. Wearable tech used to be something of sci-fi and comic books – but now it is the norm. Among the most popular form of wearable technology is the Fitbit.
is the fitness tracker. The old-school pedometer seems like an obsolete dinosaur next to the Jawbone, Fitbit, Nike Fuel Band and soon-to-arrive Apple Watch, which all sync data to your computer or phone, and give real-time measurements of steps taken, miles walked and calories burned.

Among fitness products, Fitbit is well in the lead for sales and hype – accounting for over 50% of the three million plus sales of wearable fitness devices across a one-year period in 2013 and 2014, and sales increasing at a breakneck speed. I can count myself among one of those sales, when I strapped the Fitbit Flex onto my wrist back in June of 2013. I was intrigued by the promise that the Fitbit would monitor my sleep and motivate me to exercise more.

Fitbit’s mantra is to make fitness part of your daily routine, allowing you to track your own data and use social media to “challenge” friends to meet their exercise goals. Fitbit has tapped into our need to be constantly connected by giving you live data – on your wrist – of how much you have walked each day. When you meet your daily goal, the Fitbit lets you know with a strong vibrating buzz. Not knowing exactly when that buzz is coming is like the variable reinforcement schedule that makes gambling so powerful.

From my own experience (and the testimonials of many others on the internet), the Fitbit can inspire you to exercise more to meet your daily goals (the default is 10,000 steps per day, but you can increase or decrease that amount if you choose). I know there have been times that I have marched in place before bedtime (apparently I am not alone), or walked somewhere instead of biking to tally some steps and get that rewarding buzz telling me, “goal achieved.”

Can fitness trackers increase activity levels? Photo via Wikimedia Commons/Kyle Cassidy.

But is this a trend that will last? Sixteen months later, I still love my Fitbit. But are these
fitness devices actually helpful for the (perhaps less exercise-obsessed) general public? By being aware of how much (or how little) you are exercising, can the Fitbit motivate you exercise more? And perhaps more importantly, how well do fitness trackers work? Is the information (steps, distance, calories) even accurate?

As relatively new devices, there has not been a huge amount of scientific (published) research on many of these fitness trackers, but there a few recent studies exist (particularly on some of Fitbit’s older models, such as the One and the Zip). Let’s see what the science says about the reliability and efficacy of the Fitbit.

First of all, are they accurate? Do Fitbits measure what they claim to? Research suggests that for some measures, yes. All models of Fitbits tested showed high accuracy when it came to the number of steps taken. One study had folks wear a Fitbit and a research-grade accelerometer, the Acti-Graph, while walking on a treadmill. The Fitbit showed high correlation with steps recorded by the ActiGraph. A comparison with the Yamax, the “Gold Standard” pedometer, also showed high accuracy of the Fitbit even when people took just 20 steps. Another study found a high validity, with resulting step count by the Fitbit being within 9% of the actual steps taken, unless the accelerometer was placed in a pocket, in which case accuracy was significantly decreased. This decrease in accuracy in the pocket was especially strong at high running speeds (greater than 8 km/hour).

Fitbit’s accuracy for distance travelled was not as impressive. In general, Fitbit output did not match treadmill output, but this effect was also dependent on speed. One study found that the faster the walking speed, the greater the error for the distance measure. This may be in part due to the fact that unless you specify a stride length in your Fitbit account, Fitbit picks a default for you based on your height.

For measuring overall activity level, Fitbit is also a little shaky. In order to measure calories burned, participants are typically hooked up to a metabolic analyzer, a device
Personalized feedback is highly motivating. That has a mouthpiece and accurately determines how many calories you are burning by measuring the oxygen you are consuming. While the Fitbit doesn’t think you’re doing much when you’re not doing anything physical (e.g. riding in a car), the device did tend to underestimate the amount of energy expended (EE) during certain activities, such as cycling and doing laundry, and overestimated energy expended for others (apparently carrying groceries is a real Fitbit-fooler). Another study found that the Fitbit underestimated EE during brisk walking, but was more accurate at slow speeds. Yet another study, of folks in their 60s, also found that the Fitbit underestimated calories burned. That said the two models of the Fitbit had a lower error rate compared to both the Jawbone Up and Nike Fuel Band when it came to measuring caloric expenditures.

So when it comes to accurately measuring your activity, it appears that Fitbit is good for counting steps, might need some help when it comes to measuring distance, and is not particularly reliable for counting calories burned. But for the Fitbit to be useful, accuracy isn’t enough. You have to actually use it. Do people stick with their Fitbit? And does the Fitbit motivate them to exercise more?

While there are plenty of online testimonials of a loving, long-term relationship between an owner and their Fitbit, there are few studies, especially longitudinal studies, to examine whether people who start using a fitness tracker stick with it. One study determined that “success” was dependent on the level of self-monitoring and engagement with the Fitbit website (which suggests that maybe people who are more likely to use a Fitbit in the first place are already more motivated to track their activity). A longitudinal study found that 28% of participants lost their Fitbits, and another 32% reported technical difficulties with the Fitbit or website that made it difficult to collect complete data.

A recent study of how technology can motivate people to increase fitness suggests that some features of the Fitbit may be more motivating than others. Reasonable goal-setting was critical to engagement, including allowing primary goals (such as steps per day) and secondary goals (steps per week). Participants who received reminders to exercise reported being more likely to follow through, but the reminders had to be specific to the individual’s goals, not just “hey, exercise more today!” Receiving virtual rewards (such as ribbons and badges) was not motivating, and participants found them gimmicky. People were also hesitant to share their exercise reports via social networks due to embarrassment or fear of boring people with posts about their exercise goals.

Encouraging people to maintain healthy habits is a challenge that pre-dates...
technology. Fitness trackers allow people to track progress in the form of short-term goals (such as number of steps walked per day) before they reach some longer, more difficult goals (such as weight loss); achieving short-term goals might help people stick to their exercise routines. The live-time feedback from devices like the Fitbit allows individualized feedback, which may be key to motivation. But will we become a Fitbit nation or continue down a path toward nationwide obesity? We probably need a few more years to find out.

References:


Sasaki, J. E., Hickey, A., Mavilia, M., Tedesco, J., John, D., Kozey, K. S., & Freedson, P.
