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# “Does It Know I’m Not Maintaining Good Posture?”: An In-Home Play Study of Wii Fit

**Lindsay Reynolds**

Cornell University  
205 Kennedy Hall  
Ithaca, NY 14850 USA  
llr48@cornell.edu

**Steven Ibara**

Cornell University  
301 College Ave.  
Ithaca, NY 14853 USA  
ssi9@cornell.edu

**Victoria Schwanda**

Cornell University  
301 College Ave.  
Ithaca, NY 14853 USA  
vls48@cornell.edu

**Dan Cosley**

Cornell University  
301 College Ave.  
Ithaca, NY 14853 USA  
drc44@cornell.edu

**Abstract**

Persuasive technologies designed to improve the health and fitness of users are becoming increasingly popular. One example is Nintendo's Wii Fit, which has achieved commercial success. Despite this success, many people ultimately abandon this technology. Past work explored reasons for leaving, but retroactively. This study examines the reactions of first-time users of Wii Fit, through a one-time interview pilot study as well as an in-depth, month-long study in which participants used Wii Fit in their homes. We briefly present themes from the pilot study, as well as case studies from two month-long study participants, which shows how opinions and behaviors changed over time.

**Keywords**

Persuasive technology, health behavior change, Wii Fit, user perceptions.

**ACM Classification Keywords**

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

**General Terms**

Design, Human Factors

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## Introduction and Background

A growing number of commercial products and academic research are investigating how persuasive technologies can tackle the problem of poor diet and fitness. For example, Nintendo's Wii Fit encourages maintaining a healthy weight and active lifestyle while Nike's Nike+ promotes frequent running for fitness. In academia, the Mindless Eating project is designed to improve eating habits in children [3] and UbiFit Garden uses on-body sensing to encourage exercise [1].

There is evidence that these systems are popular: Nintendo has sold over 22.5 million copies of their system, making it the third most popular non-bundled console video game in history<sup>1</sup>. However, our prior study on attitudes toward the system revealed that all 16 interview participants had either stopped using or drastically decreased their use of Wii Fit [4].

In [4], users were interviewed from several months to two years after they stopped using Wii Fit. We were therefore limited to asking participants to recall past feelings about the system and the circumstances surrounding their abandonment of Wii Fit. Furthermore, we were unable to see how their attitudes toward the system changed or remained stable over their period of use and the reasons for these patterns.

Here we present a pilot study exploring the reactions people have to Wii Fit immediately after their first experience with the system and early findings, in the form of case studies, from a month-long, in-home play study of people who are new to the system. By better understanding why people continue to use or abandon

the system, we can more effectively design persuasive technologies that have the real-world impact of improving diet and exercise behavior.

## Method

To address limitations in [4], we observed and conducted semi-structured pilot interviews of five participants (two female, three male; ages 23-24) who had not previously played Wii Fit. Following the pilot interviews, we began a month-long, in-home study of users who had no prior experience with Wii Fit. To date, two participants (both male, ages 24 and 36) have completed all phases of the month-long study. For both the pilot and month-long studies, participants volunteered their time and were video recorded during the observed play sessions and interviews.

We follow the same procedure for both the pilot interviews and the first interview with month-long play study participants except for location: pilot participants were interviewed in the lab and month-long participants are being interviewed in their homes. At the beginning of the initial interview, participants are asked to explore the game as they wish (usually between 20 and 40 minutes) while we observe them. This observation period provides us with their initial reactions to the system. Participants are first required by the game to select an avatar and complete a Body Test in which they are asked to enter their age and height, are weighed, and complete a balance test. During this process they are presented with their Body Mass Index (BMI), weight category (underweight, normal, overweight or obese), and Wii Fit Age. Participants then have the opportunity to set a weight change goal in the system. After completing the Body Test and setting a goal they are asked to explore the Training portion of

<sup>1</sup> <http://www.nintendo.co.jp/ir/pdf/2010/100507e.pdf#page=6>

**Wii Fit Daily Play Survey**

How did you feel physically before playing Wii Fit?  
1 2 3 4 5  
Bad      Good

How do you feel physically after playing Wii Fit?  
1 2 3 4 5  
Bad      Good

Why did you give yourself those ratings?  
Describe the ratings you gave yourself - explain in more detail, etc.

How did you feel emotionally before playing?  
1 2 3 4 5  
Bad      Good

How do you feel emotionally after playing?  
1 2 3 4 5  
Bad      Good

Why did you give yourself those ratings?  
Describe the ratings you gave yourself - explain in more detail, etc.

Did you play with others?  
 Yes  
 No

Were there other non-players with you while you were playing?  
 Yes  
 No

**Figure 1.** Daily play survey.

the game, which offers a variety of mini-games in five categories: Training Plus, Yoga, Strength, Aerobics and Balance Games. During this phase, they receive feedback after each mini-game consisting of a score based on performance, a rating on a five-star scale and an associated label such as “Yoga Novice”, and are ranked on leaderboards that situate users with respect to other local users' scores on the same mini-game.

After the exploration, we interview participants about their overall reactions to the system as well as their reactions to specific parts of the system such as the Body Test and the system's feedback on their performance. We also ask about their diet and fitness goals and the types of fitness activities they engage in.

Interaction with pilot study participants ended after this initial interview, but play study participants keep the Wii Fit system in their home for one month to use as they like. We gather data about how participants use the system by accessing their saved game data and via surveys they complete after each use of Wii Fit. The game data allows us to see the types of activities that participants engage in, the date and time they play, and their Body Test results. The surveys ask about their play experience and their emotional and physical state before and after using Wii Fit (see Figure 1 for complete survey). These surveys are intended to gauge how participants felt about their play experience.

After one month of system use, we conduct another in-home observation and interview very similar to the initial interview. Participants are again observed in their homes using Wii Fit as they would during a typical play session, and we interview them about their experiences with the system over the month and about their current

reactions to the system and its features, to observe the ways in which participants' reactions may have changed over the course of the study.

We analyzed pilot and play study interviews using inductive qualitative methods drawn from grounded theory [2]. First, we reviewed each interview and independently took notes about key ideas. We then used affinity diagrams to organize these ideas into the themes we discuss below. We also looked at the play data and survey data for play study participants and used these to help describe our two case studies.

### Themes

Three key themes emerged from the pilot interviews: reactions to feedback about the user and their performance, Wii Fit as a game vs. a fitness tool, and social comparison and observation. The first two themes are discussed only briefly here; as they are similar to themes presented in [4].

#### *Feedback about me vs. about my performance*

Wii Fit provides many types of feedback during use, and the intensity of participants' reactions to it varied by whether the feedback was perceived to be about themselves and their fitness or about their performance on a given exercise. Participants had strong reactions, both negative and positive, to feedback about themselves. Some were very happy to get a Wii Fit age around their actual age whereas others were visibly embarrassed by being labeled as overweight. When receiving feedback about their game play, participants' positive and negative reactions tended to be less intense.

Additionally, when presented with feedback they did not understand, many participants appeared confused or expressed skepticism about certain game features. Skepticism often arose during the Body Test when the feedback seemed to conflict with participants' self-image. In particular, many participants were skeptical about their Wii Fit Age, mostly due to lack of clarity about how it was calculated. Participants did not believe that an accurate measure of their fitness level could be produced with only their BMI and performance on a balance test.

While the Body Test often caused skepticism, the training phase of the game just caused confusion. Participants were confused by feedback provided after they completed a game or exercise; while they did not understand how their scores were calculated after a game, they did not question the scoring mechanism.

#### *Wii Fit as fun vs. fitness*

When asked what they thought of Wii Fit, almost all of our participants mentioned that the games were fun. Participants thought of Wii Fit as just that: a game. They also questioned whether the system could actually help a user achieve their fitness goals.

One potential explanation for this reaction is that every participant played at least one game from the Balance Games category and many participants exclusively played Balance Games, ignoring more fitness-oriented categories such as Strength Training.

However despite this common initial reaction, two participants also mentioned that they could see features of Wii Fit – particularly the ability to see a graph of progress over time – being useful for long-

term fitness or for fitness in users who have little experience with exercise.

#### *Social comparison vs. social observation*

Like other persuasive systems, Wii Fit leverages social comparison to provide motivating feedback, such as the leaderboards described above. Participants did desire social comparison, mentioning that leaderboards could be a very effective feature if they knew other people on the leaderboard (which they did not in this study). Some participants also expressed a desire to play with friends in the same room; they wanted to either play simultaneously or trade off after completing a game. One participant who regularly works out at a gym contrasted Wii Fit with group fitness classes. She noted in group fitness classes social comparison can be motivating because you can push yourself to perform as well as the top of the class, but when you're not performing well, there are others at your same level.

However, despite Wii being described as “*about playing with people, it's all about the community experience,*” participants were in general uncomfortable with others in the room and there was a clear tension between this desire for social comparison and the discomfort resulting from social observation. One individual refused to tell a researcher (who was behind the TV) her Wii Fit age after it was displayed (two researchers could see the screen). Participants often described the experience of completing the Body Test and engaging in the activities in front of others as “humiliating”.

#### **Case Studies**

Next, we discuss the experiences of two participants from our month-long play study. Drawing on the initial and final observations and interviews, as well as the

daily surveys and Wii Fit play data, we present initial findings about how these participants' feelings about Wii Fit changed over time.

*Participant 1 – Wii Fit as a game, but not a great one*  
Participant 1 is a 24 year old graduate student who has been consistently physically active his entire life. He participated in the study because he had never before used a Wii system and wanted to try it. He played the game every day for the first few days of the month, and then tapered off to playing only once every several days. Overall, this participant saw Wii Fit as a game rather than a fitness tool, and used it as such. During his first observation session, he frequently chose balance games or other game-like activities (such as the golf driving range). He tried one strength training activity, but abandoned that category, noting that he disliked that there was no game involved and saying, "I want to get something out of it other than my health." His game data revealed that he spent 96% of his time playing game-like activities. In the final interview, he acknowledged his disinterest in the fitness oriented activities, calling them "boring as hell." Although this participant noted in several daily surveys that he felt physically tired after using Wii Fit, in his final interview he described Wii Fit as a game, and could not imagine serious fitness benefits from using it.

This perception of Wii Fit as a game shaped his experience with the system. For example, although he noted that Wii Fit could be "judgmental" at times about personal characteristics, he seemed far more focused on feedback relevant to his game performance, such as the number of stars he received. He also found game mechanics such as leaderboards very motivating, even when playing alone.

Additionally, during the initial interview, he was impressed by how interactive the game was, calling it "cleverly designed." Over the month, however, he became bored with Wii Fit, largely because he felt it was missing a quality essential to a captivating game: a strong story line. Wii Fit, he argued, was instead simply a series of mini-games and this was not sufficient for long-term play. This view is similar to that expressed by participants in [4], in that Wii Fit falls somewhere between a game and a fitness tool, and as a result does neither particularly well. In this case, however, we see how a participant changed from lauding Wii Fit's design to finding that design lacking critical features.

*Participant 2 – Wii Fit as a Fitness Tool*  
Participant 2 is a 36 year old retail manager who was physically active when younger, but has been less so since having children 10 years ago. He participated because he thought the Wii Fit seemed like an easy way to work out in the privacy of his home. Other than the observation sessions, this participant played only once over the course of the month. Overall, this participant saw Wii Fit as primarily a fitness tool rather than a game, and used it as such. Each time he played, he selected at least one activity from each of the main categories; he explained that this was a deliberate effort to get a "complete workout." He noted differences in the categories, calling the balance and aerobic exercises more fun than the others, but that did not affect which activities he chose.

Viewing Wii Fit as a fitness tool shaped his use of the system. For instance, both participants 1 and 2 live in second story apartments, and tried not to disturb their neighbors with noisy Wii Fit usage. Participant 1, who saw Wii Fit as a game, simply chose activities that were

less likely to be noisy when his neighbors were home. Participant 2, however, chose not to play when his neighbors were home because he wanted a balanced workout, which he interpreted as including all of the categories – including the noisy ones.

Participant 2's perception of Wii Fit as a fitness tool also impacted the ways in which his opinion of the system changed over time. One example of this was that in the initial interview, he stated that he liked that Wii Fit "gives you information and helps you along" and made no mention of negative language. In the final interview however, he expressed surprise that a system designed to encourage people to exercise used critical and "degrading" language, and that he believed that using positive reinforcement would be more effective.

Additionally, this participant developed skepticism about the system's accuracy. Initially, he said that he believed "[his BMI] is accurate" and "I assume the information that's put into the game is accurate." At the month's end, however, he questioned the accuracy of the system, based on significant weight fluctuations it had reported. The skepticism about these fluctuations was worsened by the negative language used by the system when weight gains were reported. He stated that if Wii Fit has measurement errors, the system should be less critical of small weight changes.

### Discussion

These findings support and supplement the findings from [4]. Participants report emotional reactions as well as skepticism and confusion to feedback given by the system, a variety of opinions on whether Wii Fit is primarily a game or a fitness tool, and that playing with or around others may change the experience.

These early findings expand on previous work by examining the way participants' feelings about Wii Fit change over time, and whether these feelings have an impact on how they use the system. We believe that understanding initial motivations for using Wii Fit and how impressions change over time can shed light on the reasons why users abandon or persist in their use of persuasive health systems.

### Limitations and Future Work

Currently, only two participants have completed the month-long play study. As more participants complete the entire study, we will have more data from which to make broader claims. While recruiting we will also focus on including participants from a variety of backgrounds.

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