



Smile-Encouraging Digital Appliances

Hitomi Tsujita and Jun Rekimoto

American philosopher and psychologist William James once said, “We don’t laugh because we’re happy—we’re happy because we laugh.”¹ James, as well as Carl Lange, argued that life experiences produce a direct physiological response via the human autonomic nervous system, including increased muscle tone and heart rate, perspiration, and dryness of the mouth. This idea, known as the James-Lange theory of emotion, suggests that emotions occur because of these physiological changes, rather than being their cause.

Silvan Tomkins similarly argued that facial movement can influence our emotional experience,^{2,3} suggesting, for example, that an individual who feels compelled to smile during a social event will find the event more enjoyable. In the late 1990s, Chris L. Kleinke, Thomas R. Peterson, and Thomas R. Rutledge tested this theory, conducting an experiment to see whether facial expressions can influence mood.⁴ Study participants reported having a more positive experience while exhibiting positive facial expressions and a less positive experience while exhibiting negative facial expressions—even when they were merely mimicking the expressions. Furthermore, the effects were enhanced when participants viewed themselves in a mirror.

These findings are interesting, especially given that there are more than 31 million one-person households in the US (roughly 27 percent of all

households).⁵ For a variety of reasons, many people live alone—perhaps because of their social situation or age, or because of a disease, such as autism or depression. Such people might find it difficult to recognize when they’re in low spirits, and without positive rein-

If users don’t smile regularly, the system displays a “sad” icon. Such feedback can help users better understand their feelings.

forcement, this could lead to more serious mental health problems. We argue that technology can influence people’s mood, so we developed the HappinessCounter—a series of digital appliances that encourage people to smile more in their daily lives.⁶

THE HAPPINESSCOUNTER

The HappinessCounter provides feedback to users about their smile in

combination with other tools, promoting a more positive mood for users. Moreover, the benefits can extend to family members living together, because the system can help improve relationships with other family members by improving their mood and enhancing communication.

The HappinessCounter, integrated into an everyday object such as a mirror, detects a user’s smile, counts the number of smiles while interacting with the device, and guesses the user’s mental state. After detecting a smile, the system displays visual feedback in the form of a “smile” icon in the corner of a mirror (see Figure 1). If users don’t smile regularly, the system displays a “sad” icon. Such feedback can help users better understand their feelings, as they start to realize what’s making them feel good or bad based on their smile response.

By incorporating the tools that most people use on a daily basis, such as a vanity mirror, we establish an environment in which the system can be used in a natural and sustained manner.

EDITOR’S INTRO

When I first heard about the idea of making people smile before letting them open their refrigerator door, I thought it was a joke. However, after learning more about Hitomi Tsujita and Jun Rekimoto’s work, I’m impressed by the basic idea of inducing emotion through the design of products and user interfaces. Here, Tsujita and Rekimoto describe different ideas and prototypes for motivating people to smile, which they argue will make people happier. Their work is an exciting first step toward products that induce emotions. I’m already practicing smiling at my fridge—just in case this technology becomes ubiquitous.

— Albrecht Schmidt

INNOVATIONS IN UBICOMP PRODUCTS



Figure 1. The HappinessCounter encourages users to smile in their daily lives by providing feedback about their smile. The system detects a user's smile using the smile-recognition engine, and it displays the smile icon as visual feedback in the corner of a mirror.



Figure 2. A refrigerator that won't open unless the user smiles. If the smile isn't wide enough, the door will be harder to open.

DESIGNED OBSTACLES IN APPLIANCES

For many users, visual feedback might not be sufficient to encourage

a user to smile. In some situations, requiring the user to smile to avoid an inconvenient situation might prove more effective.


As an example of this approach, we introduce a refrigerator that won't open unless the user is in front of it smiles (see Figure 2). Furthermore, if the user doesn't smile (wide) enough, the HappinessCounter system makes the refrigerator door harder to open using an electric magnet, which holds down the door. Another example is an alarm clock that requires the user to smile to turn off the alarm (see Figure 3).

These approaches are unconventional from the standpoint of traditional user interface design. They don't eliminate operations or improve efficiency; rather, they require users to act (smile) to do something (open the refrigerator's door or turn off the alarm).

FIELD TEST

We conducted a user study for 10 days with two senior participants (a 64-year-old male and a 62-year-old female) to determine whether the HappinessCounter system, installed on their fridge, could encourage them to have a more natural smile (see Figure 4). The results of the user experience survey were quite positive. In this sense, HappinessCounter is a design for embedding a small amount of inconveniences into daily life in an effort to improve our mental state.

Using this concept, we hope to create various kinds of smile-inducing appliances, including phones that require the user to smile before placing a call, or email systems that won't let the user send a message unless he or she smiles (or the system might delete incoming messages if the user doesn't smile wide enough). This type of feedback system might also prove useful in the workplace. For example, workers might need to smile to gain access to a meeting room, thereby enhancing the staff's mood prior to a meeting to increase communication and cooperation.

Ideally, using inconvenience as new principle for interaction design would lead to long-term benefits, such as prolonged health, improved self-awareness, and better mental states. We plan to continue testing this theory and designing related applications. 

REFERENCES

1. W. James, *The Principles of Psychology*, vol. 2, Dover Publications, 1950.
2. S.S. Tomkins, *Affect, Imagery, Consciousness: Vol. 1. The Positive Affects*, Springer, 1962.
3. S.S. Tomkins, *Affect, Imagery, Consciousness: Vol. 2. The Negative Affects*, Springer, 1963.
4. C.L. Kleinke, T.R. Peterson, and T.R. Rutledge, "Effects of Self-Generated Facial Expressions on Mood," *J. Personality and Social Psychology*, vol. 74, no. 1, 1998, pp. 272–279.
5. "America's Families and Living Arrangements," US Census Bureau, 2007; <http://www.census.gov/population/www/socdemo/hh-fam/cps2007.html>.
6. H. Tsujita and J. Rekimoto, "Smiling Makes Us Happier: Enhancing Positive Mood and Communication with Smile-Encouraging Digital Appliances," *Proc. 13th Int'l Conf. Ubiquitous Computing (UbiComp 11)*, ACM, 2011, pp. 1–10.

Hitomi Tsujita is a post-doctoral fellow at the University of Tokyo. Contact him at tsujita@acm.org.



Jun Rekimoto is a professor at the University of Tokyo. Contact him at rekimoto@acm.org.



Selected CS articles and columns are also available for free at <http://ComputingNow.computer.org>.



Figure 3. An alarm clock that won't shut off until the user smiles.



Figure 4. A photo of a study participant (a) at the start of the 10-day study and (b) toward the end of the study. At first, the participant's smile was forced, but after using the system, his smile became more natural.

NEXT ISSUE

pervasive
COMPUTING
MOBILE AND UBIQUITOUS SYSTEMS

January–March 2014

*Managing Attention in
Pervasive Environments*
computer.org/pervasive