

# Persuasive Technology

Using Computers to Change What We Think and Do

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## *Using Computers to Change What We Think and Do*

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# **Increasing Persuasion through Mobility and Connectivity**

## **Intervening at the Right Time and Place**

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**Networking and mobile technologies create new potential to persuade at the right time and place.**

As noted in the discussion of suggestion technology in Chapter 3, when it comes to influencing attitudes and behaviors, timing and context are critical. New computing capabilities, most notably networking and mobile technologies, create additional potential for persuading people at the optimal time and place. For example, networked and mobile technology could allow commercial offers to be made at the moment people have a need and can act on the offers, or safe driving could be promoted while the driver is on the road, as part of an in-car system.

Intervening at the right time and place via networked, mobile technology increases the chances of getting results. As you read the following hypothetical examples of Study Buddy and HydroTech, think about how connectivity and mobility enhance the products' ability to motivate and persuade.

### **The Study Buddy**

Someday in the future, a first-year student named Pamela sits in a college library and removes an electronic device from her purse. It's just smaller than a deck of cards, easily carried around, and serves as Pamela's mobile phone, information portal, entertainment platform, and personal organizer. She takes

this device almost everywhere and feels a bit lost without it. Because she's serious about school, Pamela runs an application on her device called Study Buddy.

Here's what the application does: As Pamela begins her evening study session, she launches the Study Buddy system and views the display. Study Buddy congratulates her for studying for the third time that day, meeting the goal she set at the beginning of the academic quarter. The device suggests that Pamela start her study session with a five-minute review of her biology vocabulary words, then read the two chapters assigned for tomorrow's sociology lecture.

As Pamela reviews biology, the Study Buddy screen shows a cluster of shapes, which represent her classmates who are currently studying. This motivates her to continue studying.

Later that evening, as Pamela wraps up her work, she's curious about her mentor, Jean, so she turns to Study Buddy for information. Jean also subscribes to the Study Buddy system and has invited Pamela into her "awareness group."<sup>1</sup> Pamela sees a symbol on the display that indicates Jean is currently in one of the campus libraries. Jean is a good role model; she's a senior who was recently admitted to a top graduate school. Being a study mentor means that Jean has agreed to let Pamela remotely view Jean's studying habits. Using Study Buddy, Jean can send simple sounds and tactile cues such as vibration patterns to Pamela, to encourage her to study.

## HydroTech

For the last eight months of 2010, Phil has been training for the New York City Marathon. He's made good progress, guided by his coach, Michael. The marathon is six weeks away, and Phil has increased his training level to about 50 miles per week in preparation. He's right on track. However, Michael suspects that Phil isn't drinking enough fluids to get the most out of his training runs, especially the two 20-mile runs he'll be doing over the next four weeks.

Based on Michael's recommendation, Phil gets a tiny device implanted just under the skin of his forearm. The device measures Phil's hydration level and transmits the data for display on Phil's running watch, which contains an embedded sensor and tracking software. Because the watch is aware of when Phil has planned his workout, it can also cue him to drink the right amount of water and sports drinks every day, and especially in the day before each long training run.

Phil knows his hydration data gets transmitted to his coach's mobile phone in real time, throughout the day and during his workouts, via the HydroTech



system. This motivates Phil even more to stay on track with his water intake. He doesn't want to disappoint his coach.

## **An Emerging Frontier for Persuasive Technology**

Although the preceding examples may never become actual products, the scenarios illustrate how the mobile and connected qualities of the technologies depicted boost the potential for persuasion. The persuasive products described in the examples would be much less effective if they were designed to run only on a desktop computer.

The fact that the products are connected also creates new pathways to persuasion. The precise networking technology doesn't matter; it could be the Internet, the cellular phone network, or another network. What's important is that the device can exchange data with remote people and devices.

Mobility and networking represent an emerging frontier for persuasive technology. This chapter will explore how and why mobile and connected devices can be so effective in persuading people to change their attitudes and behavior.

Although mobility and connectivity work well together, they don't always go hand in hand. To make my points about each quality clear, I'll address each area separately. First, I'll discuss persuasive technology products that are mobile; then I'll describe how and why connected, or networked, products increase the potential for persuasion.

## **Persuasion through Mobile Technology**

In the last few years, the idea of mobile commerce has been a darling of technology companies, marketing agencies, and the news media. Some forms of mobile commerce are taking shape in Asia and Europe while the U.S. lags behind. One vision for mobile commerce is to provide people with opportunities to buy things conveniently and when the need arises. (Is it starting to rain unexpectedly? Your mobile device can tell you where to pick up the closest umbrella.) My vision for mobile persuasion goes beyond using mobile devices to promote products and services. I believe mobile systems can and will be

used to promote health, safety, community involvement, personal improvement, and more.

When you pack a mobile persuasive technology with you, you pack a source of influence. At any time (ideally, at the appropriate time), the device can suggest, encourage, and reward; it can track your performance or lead you through a process; or it can provide compelling factual evidence or insightful simulations.

As I write this chapter, my Stanford lab is working under a grant to study the potential of mobile persuasion. Our goal is to create insight into how mobile devices, specifically mobile phones, PDAs, and specialized devices such as pedometers, can play a role in motivating and influencing people. As part of this research, we are conducting experiments, conceptualizing new mobile persuasion products, and analyzing existing products. We still have much left to discover, but part of what we've learned so far can be shared here.<sup>2</sup>

### **Examining Mobile Health Applications**

In the fall of 2001, two researchers in my Stanford lab, Cathy Soohoo and Katherine Woo, investigated the state of the art in mobile health applications, specifically applications created for PDAs, mobile phones, or pagers. They identified 72 different mobile health applications, almost all for PDAs. When they examined the applications, they were surprised to discover that although most were designed to motivate people to change their health behaviors, the products failed to incorporate influence strategies effectively. (We repeated this research in late 2002 and found essentially the same thing.) Three fairly mundane strategies were widely used, with little creativity in any of the 72 applications. The researchers found that 46 of the 72 applications used some form of tracking: the program helped people keep a log of health behavior, such as what they ate or how much they exercised. Of the 72 applications, 33 offered some form of analysis, such as calculations of blood alcohol level or calories burned during an exercise program. In addition, 26 of the 72 applications provided reference material: health information, definitions, charts, and other such items.

One conclusion from this research was that mobile health applications have a strong tendency to use similar approaches: providing tracking, analysis, and reference material. Our lab group concluded that a significant opportunity exists to make mobile health applications more motivating and persuasive.



### **The United States Lags in the Wireless Domain**

While it's relatively easy to create applications for stand-alone mobile products, such as Palm OS handheld computers and Microsoft's Pocket PC devices, it's challenging to create applications that run on mobile phones in the United States. While Asia and Europe are moving forward with their own relatively coherent wireless standards and network carriers, the U.S. mobile phone landscape is a mess. We have multiple mobile phone standards (CDMA, TDMA, GSM, iDEN), different platforms for phones (Symbian, Microsoft's PPC Mobile Edition, Palm OS, J2ME, and others), and too many phones with different screen sizes and input capabilities. Trying to create a single application that will work across all these variables is difficult.<sup>3</sup>

Given these challenges in the United States, Asia, and Europe are likely to roll out innovative applications for mobile phones before the United States and the rest of the world. (For example, in Japan today people can purchase items from vending machines using their mobile phones.) However, because the market for mobile applications is large, it's a safe bet to say these near-term problems will be resolved, making it easier to create a mobile persuasion application that can be used worldwide.

As discussed throughout this book, there are many ways to influence and motivate people. To help people achieve their goals, mobile health applications could leverage a wider range of influence strategies, from offering simulations that give insight to establishing a system of digital rewards to motivate users.

Mobile devices offer unique opportunities for persuasion. The most obvious and compelling is that the devices can travel with users throughout the day. As a constant companion, these devices are in a unique position to persuade. This persistent presence creates two factors that contribute to persuasion opportunities. I call these the "kairos factor" and the "convenience factor."

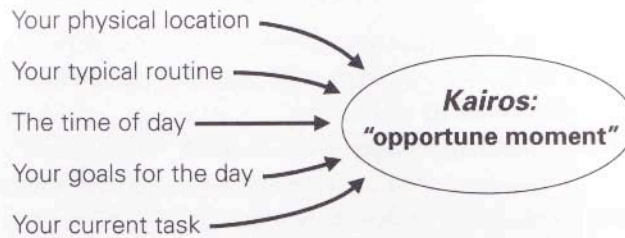
### **The Kairos Factor**

As noted in Chapter 3, kairos is the principle of presenting your message at the opportune moment. The biggest advantage that mobile devices have in persuasion is the ability to leverage the kairos principle. Mobile technology makes

Figure 8.1

Leveraging the kairos principle.

### Future mobile technology can determine



it easy to intervene at the opportune moment for persuasion, as the technology can travel with users wherever they go (Figure 8.1).

### Principle of Kairos

Mobile devices are ideally suited to leverage the principle of kairos—offering suggestions at opportune moments—to increase the potential to persuade.

The mobile systems of the future will be able to identify opportune moments for influence more effectively than they do today. By knowing a user's goals, routine, current location, and current task, these mobile systems will be able to determine when the user would be most open to persuasion in the form of a reminder, suggestion, or simulated experience. (Ideally, the system would also consider the social context, intervening only when this would not be a distraction to people in close proximity to the user.) It may sense when the user has a need and step in to provide a solution.

Contrast this vision of graceful interactions and proactive interruptions with the way desktop systems work today. (At least my own computer always seems to interrupt important work to run a backup or have me renew my authenticated login.)

For an extreme example, imagine how eBay.com might develop its recommendation engine to such a degree that as you lingered in a museum to admire sculptures by Auguste Rodin, the site could identify your interest in this artist and send you a special offer to buy prints of Rodin's work, if you have opted to receive such information.

## The Convenience Factor

Applying the kairos principle, a mobile device proactively inserts itself into the user's world, initiating the interaction at an opportune moment, enhancing the potential to persuade. Mobile technology also makes it easier for the user to



**Principle of Convenience**

Interactive experiences that are easy to access (ideally, just a click away on a mobile device) have greater opportunity to persuade.

initiate an interaction, furthering the potential for persuasion. The device is always available (it's near the user) and responsive (it's instantly on—almost no delay to boot up or load). I refer to this as the “convenience factor.”

Even the busiest of people have moments of downtime—riding the train, standing in line, waiting for the doctor. If a person doesn't want to meditate or simply enjoy the mental white space, he or she can turn to mobile technology to fill the void. For some people I know, this is one reason they pack their mobile devices with them everywhere. It gives them a sense of control over situations in which they must wait for others or are otherwise unable to get things done. These empty gaps in schedules are times when people may be open to interactive experiences that influence them. Even the simplest activity can seem interesting when you're in a state I call “trapped in silence” (waiting at the airport or riding the bus home from work).

One of my student teams developed a good example of providing a persuasive activity for these moments of downtime, in the form of a conceptual design called Tetrash (Figure 8.2).<sup>4</sup> In this game, the user sorts trash into recycling bins as the trash—virtual bottles, cans, and newspapers—moves down the screen of the mobile phone. The challenge is to sort the objects correctly. Every so often during the game, a garbage truck drives across the screen with messages of congratulations or quirky facts about recycling.

From a persuasion standpoint, Tetrash helps people rehearse recycling behavior, making it an activity they are more likely to think about—and ideally, perform—in the real world. The positive reinforcement and the facts about recycling also contribute to the persuasive experience.

**Figure 8.2**

A concept for mobile platforms, the Tetrash game challenges people to sort recyclables.



If Tetrash were a game for Playstation or PC, it's unlikely that people would play it because there are better alternatives. But as a game on a mobile device, Tetrash is compelling enough to occupy time when standing in line or riding in a taxi. People might then choose to learn about and practice recycling. That's the power of the convenience factor.

Another example of leveraging the convenience factor can be found in a game by Astraware called Bejeweled. An adaptation of the popular game Diamond Mine, a trial version of Bejeweled comes preinstalled on some PDAs. The game itself has nothing to do with persuasion. But the makers have made the game compelling enough (and it's so readily available, right there on your PDA) that a large number of users are seduced into parting with \$14.95 to "register" the game. This strategy of leveraging convenience, then weaving in persuasion, seems to work. According to Handango.com, a leading source for handheld software, Bejeweled was the #2 selling software in 2002 in all categories for the Palm OS (right after Vindigo).<sup>5</sup>

### **Simplifying Mobile Devices to Increase Persuasion Power**

While mobile devices have some distinct advantages, as noted above, they also have some drawbacks. The main drawback in using mobile devices is their limited input and output capabilities. When working with these products, you encounter challenges some call "baby faces"<sup>6</sup>—the screen sizes are small—and "baby fingers"—it's hard to enter information into the devices. These are real limitations, but they don't rule out the potential to use the devices for persuasive ends.

In my lab's research on mobile persuasion, we've examined what makes some of the more popular mobile persuasion devices effective. For two products, at least, the key to success seems to lie in their simplicity, in overcoming the limitations of the devices' input and output capabilities.

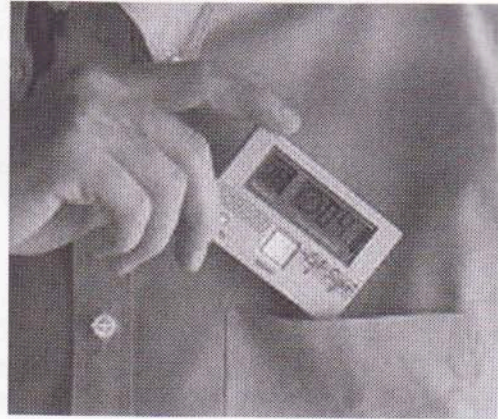
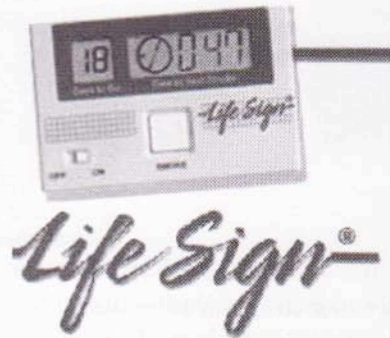
LifeSign is a mobile device designed to help people stop smoking (Figure 8.3). A tunneling technology, the device steps users through the process of quitting smoking. For the first week, you simply push the big button on the device each time you smoke. After the week is over, you then smoke only when the device signals it is time. These periods become farther and farther apart. In this way, the device gradually weans you from your nicotine addiction.

Notice how simple the input and the output is on this device. Yet it helps people to gradually decrease their need to smoke. In one six-week program involving adolescent smokers who used the device, 29% of program partici-



**Figure 8.3**

A mobile device, LifeSign is simple to operate.



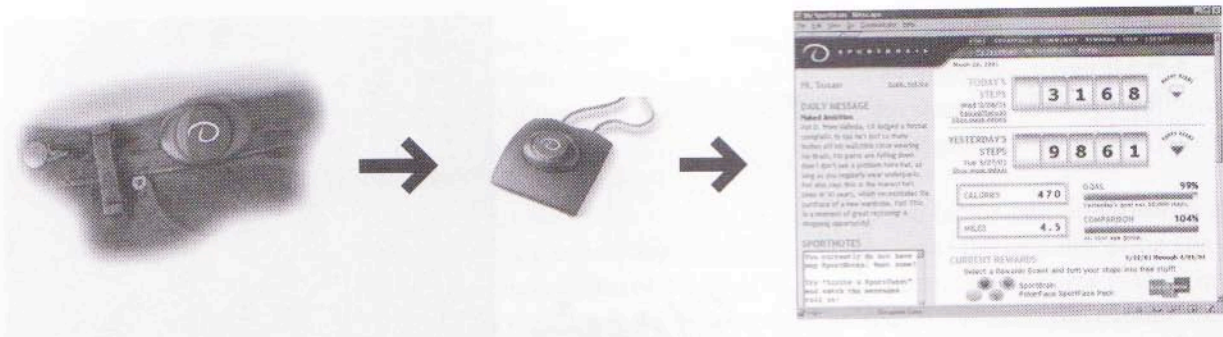
pants were no longer smoking at the end of the program, 59% had reduced their smoking by more than 50%, and 71% had reduced their smoking by more than 35%.<sup>7</sup>

Sportbrain (Figure 8.4) provides an even simpler experience. At the most basic level, it tracks how many steps you take each day. But it's more than a simple pedometer. It's designed so that when you snap the device into a cradle that plugs into your phone line, the cradle automatically uploads your data over the Internet to your personalized Sportbrain Web page (unfortunately for the many enthusiastic supporters of the product, as I write this the company is in the process of restructuring and attempting to reopen under new ownership). It's on the Sportbrain Web page where you see how many steps you've taken and gather other useful information to help you in your quest to increase your physical activity. There is no input or output on the device; you simply carry it with you. The technology inside the device records your movements and stamps the time on them. Even if you don't put your device in the cradle for days, the device remembers your movements from previous days.

As a pedometer, Sportbrain uses the strategy of tracking performance to motivate people. But the Web site was designed to include even more elements to motivate. It enabled users to set goals and compare their progress with how their friends are doing (I know two high-tech executives who were competing enthusiastically with each other through the Sportbrain system). Under the original owners, the company also offered baseball caps and other paraphernalia to users who reached certain goals.

### Principle of Mobile Simplicity

Mobile applications that are easy to use will have greater potential to persuade.



**Figure 8.4** Sportbrain is a simple mobile device that moves complexity to the Web.

As an overall system, Sportbrain is notable for skillfully migrating any complexity to the desktop. It's on the Web site where you do the setup, personalization, goal setting, feedback, social interactions, and more. Designers of other mobile systems would do well to follow Sportbrain's approach of moving complex interactions from the mobile device to the desktop.

## Wedded to Mobile Technology

As I see it, people don't adopt mobile devices; they *marry* them. Some people spend more time with these devices than with any person in their lives, including their spouses. In Finland, which is ahead of the United States in the design and use of mobile systems, the younger generation has a special term for their mobile phones: *känny*. The term means "extension of the hand."

In my research lab, we've debated how people view their mobile devices (Figure 8.5). Are they simply a tool? Are they like a faithful companion? Or, as the Finnish term suggests, do owners view their mobile devices as appendages, as part of themselves?

If indeed people view their mobile phones as extensions of themselves—as an integral part of who they are and what they can do—those who create persuasion experiences for mobile devices need to take particular care. The experiences likely to be appreciated are those that help people

### Principle of Mobile Loyalty

Mobile applications that are perceived to serve the needs and wishes of the owner first, rather than those of an outside party, will have greater persuasive powers.



Figure 8.5

How do people view their mobile devices?

Good outcome in mobile persuasion

**User never feels alone**

Mobile device seen as a companion or a helpful tool

vs.

Bad outcome in mobile persuasion

**User can never escape**

Mobile device seen as a constant nag or an irritant

accomplish their *own* goals. Experiences that work against a person's goals or intrude into their lives may be viewed as a betrayal.

The media and some futurists have proclaimed the coming day when advertisers will push context-relevant messages to our mobile phones: as we walk by the Gap, we'll be offered 10% off on khaki slacks, or as we near the bakery, we'll get a message that cinnamon rolls are fresh out of the oven. My lab members and I are skeptical of this vision. Will people accept such intrusions into their mobile devices? We suspect not, unless the person gives permission to receive such information from specific sources.

At least in the United States, it seems there must be a compelling reason (such as a subsidy in service costs) for people to give up control of their most personal technology—their mobile devices—and let outside players intrude in this domain. The territoriality people may feel toward their mobile devices was nicely captured in a phrase one of my students recorded during a user study: “If my mobile phone ever did that, it would be a goner!”

### Motivating Users to Achieve Their Own Goals

In contrast, mobile products that help motivate people to achieve their own goals are likely to be welcomed. For example, my students and I often discuss how mobile phones can influence users to stay in touch better with the people who are close to them. Specifically, the mobile phone can motivate users to place calls to people according to a schedule they have predetermined.

My student teams have prototyped various ways that mobile phones could help users set preferences for phone calls (essentially, these are goals for enhancing relationships), for showing how long it's been since the user last placed a call to a person, and to prompt the user to make a call at a designated time

(birthdays and anniversaries, for example) and—finally—to reward the person for making the call (reaching the goal). On the one hand, this seems quite mechanical—having a computer run your social agenda for phone conversations. On the other hand, many people, especially those with hectic lives, seem to welcome this form of self-persuasion. The key point is that this persuasive technology concept is about helping people change behavior in ways that *they* choose.

Another example of a mobile technology helping people achieve their own goals, rather than someone else's, is the pedometer, or step counter. The Japanese have been pedometer enthusiasts for more than 30 years, and the adoption rate is remarkable: 3.2 pedometers per Japanese family.<sup>8</sup> Many people wear pedometers all day, every day. (I've talked to researchers who say that some people even wear pedometers to bed.) Most devices that count steps include simple computers (in the same way that digital watches and calculators are a type of computing product). The step counters can track your steps and calculate the distance walked and the calories you've burned in the process. Some can track your activity over the course of seven days and allow you to click back through the days to see the activity level. Pedometers can motivate people through self-monitoring (a principle discussed in Chapter 3); these devices make it easy for people to see if they are achieving their activity goals and boost their activity level if they are not (the widely recommended level is 10,000 steps each day).

## The Importance of Experience Design

### Principle of Mobile Marriage

Mobile applications designed to persuade should support an intensive, positive relationship (many interactions or interactions over a long time period) between the user and the product.

While mobility can leverage the *kairos* (opportune moment) and convenience factors, it also opens the door to a bad relationship with mobile devices, if applications are not designed well. More than anything else, interactions created for mobile devices should support an intensive, positive relationship between user and product. Otherwise, the relationship is likely to be terminated, as the device becomes “a goner.” If you viewed a mobile device as part of you, you would expect it to serve you; serving someone else would be a type of betrayal—your device sold you out.

To create successful mobile persuasion experiences, designers need to design interactions that will weather well, like a long-standing, comfortable friendship.



## **Persuasion through Connected Technology**

Just as mobile technologies open doors to persuasion, technologies that are networked or connected create opportunities to use influence effectively. A connected device is one that it is capable of exchanging data with remote devices and people through the Internet or another communication infrastructure.

Networked computing products can be more persuasive than those that aren't connected because they can provide better information, can leverage social influence strategies, and can tap into group-level intrinsic motivators. The remainder of this chapter will focus on these three attributes of connected devices, and how and why they can enhance persuasion.

### **Leveraging Current, Contingent, and Coordinated Information**

In terms of information quality, connected devices have three advantages over nonnetworked devices: they can provide current, contingent, and coordinated information. These information characteristics enable experiences that can motivate and persuade.

Connected devices are able to gather and report the most current—and therefore the most persuasive—information. eBay leverages the power of current information to motivate and influence people bidding on an eBay item. With the introduction of its wireless notification service, eBay can send a message to your mobile phone, pager, or connected handheld device to inform you that you have been outbid. By providing this current information, eBay extends the excitement and competition of an online auction beyond the Web browser to bidders wherever they happen to be. This updated information keeps bidders interested, reminds them of items they've bid on that might have slipped their minds, and eliminates the need to check the eBay site over and over to ensure they still have the leading bid.

When eBay customers have the latest information delivered to them, connecting them to their auction wherever they are, this changes the eBay customer's experience. With this current information, bidders are invited back to the virtual auction and prompted to respond to being outbid. The currency of the information seduces people back into the eBay world, even when they're

away from their Web browsers. Of course, this service of providing the latest information ultimately benefits eBay by stimulating higher prices on items sold and by increasing the customer's engagement with eBay.

On the U.S. TV show *Will & Grace*, actor Sean Hayes portrays how motivating it can be to receive the latest information from eBay on a mobile device. As part of the comedy, he becomes obsessed about winning eBay auctions for a Ricky Martin scooter and Britney Spears platform shoes.<sup>9</sup> His character announces: "Guess what I just got off eBay? . . . I got this scooter, which happens to be autographed by Ricky Martin. But the best part is, I outbid my archrival, Dr. Dangerous, to get it."

Connected products also are more persuasive because they can provide contingent information—that is, information that takes into account variables that are relevant to users, their goals, and their contexts. Think of a product designed to promote smart commuting. It could account for immediate personal needs ("I've got to get to work by 9 a.m. today, and I don't need to run errands during lunch"), enduring preferences ("I like the idea of taking public transportation"), passing constraints ("This morning I have only four dollars to spend"), and environmental variables (the weather and traffic conditions). With these variables taken into account, the connected product can be more persuasive in proposing what commute option would be best for that day.

In addition to current and contingent information, connected products can coordinate information among various people and devices, further enhancing the products' potential to persuade. Suppose a 55-year-old man sets a goal of exercising 30 minutes each day and has enlisted the help of a connected device—a personal activity monitor—to help him achieve his fitness goal. By coordinating information among people and equipment, the technology can give the man considerable flexibility in how he achieves his goal. When he decides to take a rigorous lunchtime walk through the city, his personal activity monitor informs the fitness system at his health club. Later that evening, when he arrives at his health club for his usual workout, the system already knows he's had cardiovascular exercise for the day, so it suggests a different type of workout, perhaps focusing on strength or flexibility. The adaptability that comes with coordinated information can make the intervention more effective, and it would likely increase a person's confidence in the persuasive technology.

### Principle of Information Quality

Computing technology that delivers current, relevant, and well-coordinated information has greater potential to create attitude or behavior change.



## Connected Products: Leveraging Social Influence

Why do people join support groups, aerobics classes, or study groups? One reason is that other people play a key role in motivation and persuasion. People can generally achieve a greater degree of attitude and behavior change working together than working alone.<sup>10</sup> That's the power of social influence.

Because of their networking capability, connected products can create many opportunities for social influence from both peers and experts. This gives connected products another important advantage when it comes to persuasion.

The study of social influence includes many theories and perspectives. In the next sections I'll touch on four prominent theories—social facilitation, social comparison, conformity, and social learning theory—and show how they can be applied to connected persuasive technologies.

### Persuading through Social Facilitation

When I'm training for a big swim meet, I join a master's swim club and train as part of a team. I can work out fine alone, but when I'm swimming with a team, I find that my workouts are much better and I progress faster. I'm not alone. Since the late 1800s, sport psychologists have observed this same phenomenon: Most people exercise more effectively when they are with other people.<sup>11</sup>

The principle of social facilitation suggests that people perform better—more, longer, harder—when other people are present, participating, or observing.<sup>12</sup> Connected products can leverage this principle by creating new opportunities to generate social facilitation effects.

Because connected products can allow other people to be virtually present, the products can be used to motivate better performance by creating a virtual social group.<sup>13</sup> If a person is performing a well-learned activity—such as running on a treadmill—he or she will likely perform better if a connected product shows that other people are virtually present, performing the same activity.<sup>14</sup> You could even envision a completely virtual fitness facility: You work out at home, but through connected technology you can see others doing the same thing, and you know they can see you.<sup>15</sup> This virtual presence would likely produce some of the same beneficial social facilitation effects of working out at a regular gym. This approach might also be used to inspire better performance from workers in remote locations, motivate students as they prepare for college entrance exams, or encourage higher bidding in online auctions.

#### Principle of Social Facilitation

People are more likely to perform a well-learned target behavior if they know they are being observed via computing technology, or if they can discern via technology that others are performing the behavior along with them.

To generate social facilitation effects, the representation of others doesn't need to be realistic at all.<sup>16</sup> Simple avatars could represent other people. Abstract shapes would probably work in some cases, as I described earlier in the Study Buddy scenario at the start of this chapter. Even bar graphs might effectively represent the presence and performance of others.

Although computer scientists and game designers have created various ways to represent other people's presence and performance,<sup>17</sup> no one has yet performed a controlled study that documents how virtual representations of other people lead to social facilitation effects. But the research that exists suggests that the effect is real.<sup>18</sup>

## The Power of Social Comparison

### Principle of Social Comparison

People will have greater motivation to perform a target behavior if they are given information, via computing technology, about how their performance compares with the performance of others, especially others who are similar to themselves.

Connected products also can change behaviors and attitudes through a phenomenon known as social comparison. Social comparison theory holds that people seek to know the attitudes and behaviors of others in forming their own attitudes and behaviors. (This is not the same as peer pressure, which I'll discuss later in this chapter.) According to social comparison theory,<sup>19</sup> people seek information about others to determine how they compare and what they should be thinking or doing. In essence, we use people as a comparison point or a reality check.

To attract and involve readers, certain magazines engage people's natural drive for social comparison. The magazines offer surveys on health, safety, relationships, and other topics, each with a title like "How do you measure up?" or "What's your safety IQ?" Such quizzes enable people to compare their knowledge, attitudes, or behavior against what the editors say is normal or desirable. Social comparison is all about benchmarking your performance, reactions, attitudes, or behaviors against those of others.

Social comparison has many practical applications. One study demonstrates that people experiencing pain benefited from social comparison.<sup>20</sup> When patients could compare their pain reaction to that of others who were coping well with pain, the perception of their own pain decreased. Information about another person's pain response not only caused patients to report feeling less pain, but physiological measures indicated that the patients actually experienced less pain. Social comparison is so powerful it sometimes can change physiological responses.

This principle can be applied to connected products. Suppose a cancer patient is going through painful treatment. A connected computing system



could link this patient to other patients who are coping well with pain. In theory, this would reduce the perception of pain and the need for pain medication.

The Study Buddy application uses social comparison as one of its strategies to promote better study habits. The connected device lets the student know when her classmates are studying. The point of this information isn't to put peer pressure on the user; instead, it's providing information about similar others—information that helps shape decisions and behaviors.

The social comparison effect is strengthened when it allows people to compare themselves with *similar* others. In other words, the motivation people feel from social comparison is stronger when they can compare themselves to those who are similar to themselves in terms of age, ability, ethnicity, or another key attribute.<sup>21</sup>

### Leveraging Conformity—and Resistance

Social comparison leverages the persuasive power of information about what others are thinking or doing. *Normative influence* works through a different process, exploiting peer pressure, or what psychologists refer to as “pressures to conform.” Research on conformity shows that people tend to change attitudes and behaviors to match the expectations, attitudes, and behaviors of classmates, a team, a family, a work group, or other groups.<sup>22</sup> The psychology literature refers to these as “in-groups.”

Sometimes the pressure to conform is explicit: people badger or belittle those who don't fit in with the rest of the group. In other cases the pressure is more subtle, such as not inviting “unfashionable” people to a party, failing to greet people as they walk by, or ignoring their contributions to a conversation. Even when not consciously aware of the pressure to conform, people tend to change their attitudes and behaviors to match the expectations of their in-group.<sup>23</sup>

Connected products can create situations that leverage normative influence to change people's attitudes and behavior. A product simply has to track a person's behavior and, in some form, share the results with the person's in-group.

A product could track and share how promptly you return phone calls or emails. Or, a product could monitor seat belt use or recycling habits, and share the results among community members. If you're below the norm for your in-group, you may feel pressure to reply faster, use your seat belt, or do more recycling. Making people's behavior visible to their in-groups will affect what they do.

The examples above produce benign behavioral outcomes: returning phone calls, wearing seatbelts, and recycling. Other uses of technology to leverage peer pressure might not be so benign. A technology to motivate online filing of taxes would seem quite dark if it leverages peer pressure. A product to promote quality time with your children would seem unethical and intrusive if it gained its persuasive power from peer pressure.

In addition to leveraging peer pressure, connected products can be used to undermine it, to help people resist the pressure to conform. People are more capable of resisting group conformity influence when at least one person defies the group. In other words, one “deviant” (the term used in the research) will make it easier for others to resist the pressure to conform.<sup>24</sup> The deviant doesn’t even have to be physically present; just the knowledge that someone else is not following the group helps other people to dissent as well.

What does this mean for connected persuasive technologies? Suppose a teen were facing pressure to conform with her group norm of smoking cigarettes. If a technology could convincingly show her that at least one other person in her in-group had successfully resisted the pressure to start smoking—maybe someone she doesn’t even know well—she would be less likely to give in to group pressure.

Continuing the example, a health organization could set up a system that allows people to share their views on smoking with one other. Even if this sharing were anonymous, a teen who wants to resist pressures to smoke would find support and comfort in a message or a real-time chat with someone she perceives as a member of her in-group. She may find that her impression about teen smoking—that everyone who is cool does it—is biased. The networked technology would allow her to expand her horizon and safely go outside her immediate circle of friends.

Another example (although not a networked product) is Alcohol 101, which uses social comparison to promote saner drinking practices among college students. Described in the Introduction, Alcohol 101 is an interactive CD-ROM game that simulates a college party and provides college students with data about how much their peers actually drink. A large percentage of students who play the game find the actual statistics on drinking to be lower than they expected, and this has a positive impact on their attitudes toward drinking.<sup>25</sup>

In sum, while connected technologies can leverage conformity dynamics, they also can undermine the pressure to conform by providing potential non-

### Principle of Normative Influence

Computing technology can leverage normative influence (peer pressure) to increase the likelihood that a person will adopt or will avoid performing a target behavior.



**Principle of Social Learning**

A person will be more motivated to perform a target behavior if he or she can use computing technology to observe others performing the behavior and being rewarded for it.

conformists with an awareness of others who have resisted this pressure. This is a liberating use of persuasive technology, helping people choose what they want to choose—not what a peer group chooses for them.

**Applying Social Learning Theory**

The final theory I want to introduce represents one of the most popular and effective ways for changing attitudes and behaviors: social learning theory.<sup>26</sup> Developed by psychologist Albert Bandura,<sup>27</sup> the theory is broad in scope, but one aspect is especially relevant to connected technologies: the power of modeling.<sup>28</sup>

Research on social learning theory has shown that people learn new attitudes and behaviors by observing others' actions and then noting the consequences of those actions. If an observer notices someone is being rewarded for his or her behavior, the observer is much more likely to perform that behavior. People tend to observe and learn most when behavior is modeled by others who are similar to themselves but somewhat older or more experienced.<sup>29</sup>

***Modeling Behavior at QuitNet.com***

QuitNet.com (Figure 8.6), a site devoted to helping people stop smoking, taps into the power of social learning theory by celebrating people who are quitting successfully. As you go into the site, one of the most prominent (and reportedly well-used) areas of the site is the "Community" area. Here you will find a celebration of quit-date anniversaries, with links to people who have stopped smoking for two days, seven days, on up to years.

As you continue inside QuitNet.com, you'll find "Forums," "Clubs," "Buddies," and more. While the strong focus on community brings the power of social support to the difficult task of quitting smoking, the site seems specifically designed to highlight successes, and it rewards people who are succeeding, thus setting up the social learning dynamic: people who see others being rewarded for a behavior are more likely to perform that behavior.

The rewards on this site seem compelling. In the QuitNet Forum area, quitters have threaded discussions all about one person who is succeeding in quitting, usually on an anniversary date. For example, one of the community members sees that Julie has a four-month anniversary, so he starts the thread with a note of congratulations (sometimes the person starts the thread herself,

Figure 8.6

QuitNet.com is a stop-smoking site that effectively leverages elements of social learning theory.

QUITNET  
DON'T QUIT ALONE

MY QUIT COMMUNITY RESOURCES EXPERT SUPPORT QUIT MED SUPPORT

Q Mail Buddies

COMMUNITY

- Forums
- Clubs
- Chat
- Q-Mail
- My Buddies
- User Directory
- Anniversaries
- Quitticisms

MY NEXT STEPS

- My Profile
- Anniversary Emails
- Forums

STATS

Who's online right now?

232 People  
144 Members  
1360 Anniversaries today

Help  
Site Map  
Privacy Policy  
Acceptable Use Policy  
About QuitNet  
Logout

Anniversaries

CONGRATULATIONS to everyone celebrating their anniversary today! GREAT JOB!

Note: only active QuitNet users are being shown (anyone who has logged-in within the last 30 days). To show all users, [click here](#).

Quit Date	welslhfvr	LeonaPK
arabella4	suzH	Jessika
lanella0	Helena253	twinkles
vsm	msmith3	john1981c
sahara	easyquit	owen143
sammigr1	corywmc	Julie1960NC
ConBar7	tarah56	KrazyG
wave	terbite	MissPeta
ioy2b		

2 days

angel24	iacolorave	Tam614
nutmegs	smokefree2000	quinn4701
WillowJoy	way2far1	msquit
Dragonfly5	nobuttsmlady	yankeerebel
JordanaC	AmyJoy	HeatherPrice
decesses	Franc1	Maya109
Norieqaic	NZGal	tk075702
sunnvarey		

Hell Week (7 days)

logans_dad	wireless_to	scremer2
No Smoking	harvyanne	PrincessRoly
elise31014	Gladiola	qgre1164

Upgrade Membership Now!

PREMIUM Membership  
Start your own personal support program with complete access to all QuitNet features and services.  
SIGN ME UP!

FIND MEMBER

Show me QuitNet members:

- whose member name begins with:
- 
- my buddies online

60

QUITTICISM

Quit-limerick  
Silly rhyme composed in honor of a quit-bud's anniversary.

MEMBER QUOTE

I am addicted to sickaretttes. I will always have to keep my guard up. But I can do it, because I have faith in myself.

Q&A



Figure 8.6  
(Continued)

Welcome back, bob415!  
You've been Quit 66 days, \$204.93 and 9 days,  
3 hours of your life saved!  
[Open Q-Gadget](#) for details.

**QUITNET**  
DON'T QUIT ALONE

MY QUIT COMMUNITY RESOURCES EXPERT SUPPORT QUIT MED SUPPORT

Mail Buddies

**COMMUNITY**

- Forums
- Clubs
- Chat
- Q-Mail
- My Buddies
- User Directory
- Anniversaries
- Quitticisms

**MY NEXT STEPS**

- My Profile
- Anniversary Emails
- Forums

**STATS**  
Who's online right now?

230 People  
140 Members  
1255 Anniversaries today

Help  
Site Map  
Privacy Policy

**QuitNet Forums**  
Quitting Milestones

[ [Search Messages](#) | [Personal Library](#) ]  
[ [Post New Message](#) | [Latest Messages](#) ]  
[ [Active Discussions](#) ]

Subject	Started By	When
<a href="#">littlemitch celebrates one month!</a> (1 replies, last reply at 12:04:04 PM today.)	bonafidevirgo	11:12:56 AM
<a href="#">Mez makes four months!!</a> (3 replies, last reply at 1:00:28 PM today.)	bonafidevirgo	11:06:26 AM
<a href="#">bill jon has two months quit</a>	bonafidevirgo	11:00:07 AM
<a href="#">3 Months Today!!</a> (1 replies, last reply at 10:51:32 AM today.)	Annie215	10:46:22 AM
<a href="#">Hell Week Bragging Rights</a> (3 replies, last reply at 9:50:08 AM today.)	elise31014	7:52:04 AM
<a href="#">sKatt has 14 days smoke free!! YAHHHOOOOO!</a>	clemrules	6:19:30 AM
<a href="#">&gt;(* (* (USCHI) *) *) Reaches Elderhood today....</a>	Wattzhername	5:56:36 AM
<a href="#">JeffreyB is 1000 Days Quit And Thats Not All!</a> (9 replies, last reply at 12:28:21 PM today.)	nidess	12:32:59 AM

unself-consciously proclaiming “Hooray for me!”). Other community members chime in, adding to the thread and offering their own words of encouragement and praise.

This kind of warm response and attention would be rewarding for anyone, but these public messages provide motivation to the outside reader by making the modeled behavior seem achievable and by showing the rewards that will follow.

As QuitNet.com makes clear, the ability to see how others succeed, to watch their progress over time, and even interact with them, is now quite easy thanks to connected technologies. When people are connected, even in a time-shifted medium such as threaded discussions, social influence dynamics come into play in ways that are not possible with stand-alone technologies or via traditional media, such as books or television.

### *Modeling at epinions.com*

Some Web sites rely on contributions from outsiders for their very existence. eBay is perhaps the most prominent example. Another site that depends on outside contributions is epinions.com, which relies on users to review products and services—the main purpose of the site. Persuading users to post quality content on the site is essential to the success of epinions.

Modeling is one method the site uses to motivate people to contribute high-quality content. The site rewards those who contribute good reviews and makes these rewards public, setting up the dynamics of social learning theory. As you click on a reviewer's name, you are taken to a list of all their reviews. This page includes the dates the reviewer posted the content, the topic, and the rating of how much others liked this review, among other things. People who contribute at least 100 opinions that are well regarded by others (users rate the reviews) receive a "Top Reviewer" designation, which appears next to their name at all their reviews. These reviews also are listed at the top of the page, ahead of reviewers who have not done as well.

Being designated as a top reviewer is a status symbol, akin to being a media pundit (albeit at a less prestigious level). Reviewers also can receive the "Advisor" designation, which means they have a particular area of expertise, such as musical instruments. Other designations: "Editor," "Featured Member," and "Most Popular Reviewers." (Note: These designations are not just about status. Valued reviewers also receive a share of royalties from the epinions site. So there is a profit motive as well as a social status reward.)

By observing this system of rewards, observers will be more likely to contribute high-quality content to epinions.com. This is a good example of how social learning theory can be leveraged to change people's attitudes and behavior in cyberspace.

## **Persuading through Intrinsic Motivation**

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■ **The three group-level intrinsic motivators are competition, cooperation, and recognition.**

In addition to extending the power of social influence principles, connected products can leverage the power of intrinsic motivation, a type of energizing force that arises directly from an activity or situation. Certain activities—playing the guitar, writing poetry, swimming at a lake—are inherently rewarding. Many people don't need external pressure or rewards to do these things; the rewards are built in, or intrinsic.



**Principle of Competition**

Computing technology can motivate users to adopt a target attitude or behavior by leveraging human beings' natural drive to compete.

**Principle of Cooperation**

Computing technology can motivate users to adopt a target attitude or behavior by leveraging human beings' natural drive to cooperate.

**Principle of Recognition**

By offering public recognition (individual or group), computing technology can increase the likelihood that a person or group will adopt a target attitude or behavior.

MIT's Tom Malone and Stanford's Mark Lepper have outlined seven types of intrinsic motivators.<sup>30</sup> Three of these motivators—competition, cooperation, and recognition—involve interaction among people; they are group-level intrinsic motivators. Because connected products can link people together over time and space, they can leverage group-level intrinsic motivators to influence users.

Competition is perhaps the most powerful group-level intrinsic motivator. When you set up a competition, people become energized. They invest time and effort. They care about the outcome. You don't even need to offer a prize (an extrinsic motivator) to the winner. Not everyone is competitive by nature, but in many situations and for most people, competition is energizing and motivating.

Cooperation is another motivator, one that seems to be built into human nature. When people belong to a work group, most of them cooperate. Whenever there is a pressing need, a call for cooperation will naturally motivate most people to help out.

Finally, people are intrinsically motivated by recognition. Many organizations leverage the power of recognition. Employers create "employee of the month" awards, blood banks give out "I've donated" stickers for people to wear, and top students get listed on the honor roll. These and many other programs leverage the motivating power of recognition.

Recognition can motivate groups as well as individuals. High school students who know their artwork will be on display will work longer and harder to create something they can be proud of. A hometown baseball league that prints scores in the newspaper is likely to develop players and teams that are more motivated to achieve.

Because networked products can connect people over space and time, they can also create group situations that leverage group-level intrinsic motivators. To show how these intrinsic motivators might work in connected persuasive technologies, I'll describe a hypothetical system named *AlternaTV* that could use one or any combination of the intrinsic motivators.

**AlternaTV: Leveraging Group-Level Intrinsic Motivators**

Televisions in the future are likely to become not just passive boxes that receive signals but interactive devices that send out data over a network and run applications above and beyond broadcast programming.

If individuals and organizations can somehow decide what kind of interactive experiences happen through TV (as opposed to the broadcast giants controlling this decision), it's not hard to imagine that future software for interactive TVs might be created to motivate people, especially school kids, to watch less TV. This type of connected persuasive technology could leverage the power of group-level intrinsic motivators—competition, cooperation, and recognition—to persuade kids to spend less time in front of the television.

Here's how it might work: In the AlternaTV program, school kids are encouraged to watch less than five hours of TV per week during the school year. That's the behavioral objective. To motivate kids to comply with the program, each participating household becomes an "AlternaTV family." This means they agree that the number of hours they watch TV gets recorded and reported to a central database.

The first intrinsic motivator in the AlternaTV system is competition. The competition takes place on various levels. School districts compete against other school districts to see who watches the least TV. Schools compete against other schools. Classrooms compete against other classrooms. Having a technology that simply provides a way for this competition to happen would increase the motivation of the kids to watch less TV. In this scenario there doesn't need to be a prize; there doesn't need to be any external incentive. Simply having a competition may be sufficiently motivating for many people.

The next intrinsic motivator would be cooperation. The AlternaTV system would advocate that kids in one classroom cooperate with each other to reach their goals of watching less TV. Perhaps the system would allow one student to send a message to the TV screen of another who is watching a lot of TV, asking that person to watch less to help out the entire class. This type of cooperation could also take place on other levels, such as cooperation within an entire school.

Recognition would be the third intrinsic motivator integrated into the AlternaTV system. At the simplest level, the winning classroom, school, or district would be listed on the screen of all the AlternaTVs in the program (or perhaps in a special window on all the school's computer monitors). Another type of recognition would be to simply list all the AlternaTV households who are reaching their goal of less than five hours of TV each week. In this way, each household can be motivated by the idea of recognition, even if other students in their class or school are not curbing their TV watching.



The intrinsic motivators work nicely together in the AlternaTV system. Of course, each of the intrinsic motivators would have an effect alone, independent of the other two. However, in this example, the system is more interesting, compelling, and persuasive with the intrinsic motivators working together.

The AlternaTV system could be effective using only the three intrinsic motivators as persuasion strategies. But other influence strategies could be incorporated into the system: AlternaTV could suggest other activities kids could do; it could require physical effort (such as pedaling a stationary bike) in order to watch TV; or it could quiz kids on their homework, allowing access to broadcast TV only when they pass the material.

There's significant potential in using the principles of intrinsic motivation in connected products to change attitudes and behaviors for positive purposes (unfortunately, as with all persuasive technology, psychological principles can be leveraged for negative or unethical purposes as well). When interactive technologies are networked, they can be designed to use competition, cooperation, and recognition as motivating forces. In this way, connected computing products gain power to persuade.

## **The Future of Mobile and Connected Persuasive Technology**

Today, products that are both mobile and connected are few, and the products that do exist are limited in what applications they run. But this will change. In the future we're likely to see a wide range of devices and applications, including those designed to motivate and persuade.

Although examples of mobile persuasion are few today, many will emerge in the coming years, especially as mobile phone systems allow people and companies to easily create and deploy applications. While mobile persuasion in the service of mobile commerce will receive lots of attention and funding, a clear win for individuals is using mobile technology to help people achieve their own goals. The kairos and convenience factors make mobile persuasion one of the most promising frontiers in persuasive technology.

## Notes and References

For updates on the topics presented in this chapter, visit [www.persuasivetech.info](http://www.persuasivetech.info).

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2. It's frustrating to write this section on mobile persuasion while a number of lab studies are in process. I considered hypothesizing about what we'll find in these studies but decided it's better to wait rather than speculate. By the time you read this chapter, it's likely you'll be able to find pointers to our latest mobile persuasion research at [www.captology.org](http://www.captology.org).
3. *Handspring Treo Design and the Challenges of Becoming a Wireless Company*. Presentation given by Peter Skillman, Director of Product Design, Handspring, Inc. at American Center for Design's Wireless Seminar, April 5, 2002, Berkeley, California.
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13. For more about how social influence dynamics can play out virtually, see the work of U.C. Santa Barbara's James Blascovich. One of his most recent publications is J. Blascovich, Social influence within immersive virtual environments, in R. Schroeder (ed.), *The Social Life of Avatars* (New York: Springer-Verlag, 2002), pp. 127–145.

Web presence: <http://www.psych.ucsb.edu/fac/blasc98.htm>.

14. For activities that are not well learned, the presence of others will *decrease* performance. In other words, you will do worse when learning a new skill if you know that others are observing you.
15. Although not directed toward fitness, researchers at IBM have been working on how to use computer technology to virtually represent co-workers who are in a remote location but also working. See

Thomas Erickson, Christine Halverson, Wendy A. Kellogg, Mark Laff, and Tracee Wolf, *Social Translucence: Designing Social Infrastructures That Make Collective Activity Visible*, *Communications of the ACM*, 45(4): 40–44 (April 2002).

16. The IBM researchers use simple circles to represent people in their system. Ibid.
17. M. Ackerman and B. Starr, *Proceedings of the ACM Symposium on User Interface Software and Technology*, [www.ics.uci.edu/~ackerman/docs/uist95/uist95](http://www.ics.uci.edu/~ackerman/docs/uist95/uist95) (1995).
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