

Design for Socially Responsible Behavior: A Classification of Influence Based on Intended User Experience

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Introduction

Whether a result of the financial crisis, the public perception of massive overconsumption, or global climate change, designers are increasingly motivated “to do good for society.” This interest seems to manifest itself primarily in two ways. First, designers and design companies are behaving in more socially responsible ways in their product development. A focus on the use of recyclable materials, the rejection of child labor, and the use of sheltered workshops are possible consequences of such an attitude. Second, designers are using their design skills to tackle social problems. In these cases, designers apply design thinking and design methodologies to social issues to create innovative solutions. With this interest, education, safety, and health care have become domains for designers.¹

Because many, if not all, social issues involve behaviors that play a crucial role in initiating a desired change, the power of design as a deliberate means to change behavior has garnered increased interest. This interest is currently and prominently present in the field of sustainable design. The conventional goal of sustainable design initially was to design products that require the least energy to be produced and used and that could be recycled. Currently, the idea is growing that to really effect change, sustainable design must be capable of changing user behavior. For example, there is simply little to be optimized in our kettle’s heating system, but if the amount of unnecessary water we repeatedly boil could be reduced, a substantial reduction in energy loss could be achieved. This notion of the significance of user behavior in terms of environmental implications has led to design for what is called “sustainable behavior.”²

While our knowledge about how design can change behavior is rapidly expanding, the way a user might potentially experience this influence is rarely discussed. However, the user’s experience of that influence does play an important role in the effectiveness of the design intervention. When a person tries to persuade another to act differently, attitude, tone of voice and expressions affect the experience of the one being persuaded and, thus, his or her motivation to act. In this article, we propose a classification of

- 1 Tim Brown, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation* (New York: HarperCollins Publishers, 2009), but see also: Colin Burns, Hilary Cottam, Chris Vanstone, and Jennie Winhall, “Transformation Design,” *RED Paper Design Council* (London, UK: 2006); Caroline L. Davey, Rachel Cooper, Mike Press, Andrew B. Wootton and Eric Olson, “Design against Crime,” paper presented at *Design Management Institute Conference* (Boston, USA: June 10–12, 2002)
- 2 See for instance: Debra Lilley, Vicky Lofthouse, and Tracy Bhamra, “Towards Instinctive Sustainable Product Use,” paper presented at *Sustainability Creating The Culture* (Aberdeen, Scotland: November 2–4, 2005); Dan Lockton, David Harrison, and Neville A. Stanton, “Making the User More Efficient: Design for Sustainable Behaviour,” *International Journal of Sustainable Engineering*, 1:1 (2008), 3–8.; Renee Wever, Jasper Van Kuijk, and Casper Boks, “User-Centred Design for Sustainable Behaviour,” *International Journal of Sustainable Engineering*, 1:1 (2008), 9–20.

influence based on user experience. On the basis of two dimensions (i.e., salience and force), we classify four different types of influence: coercive, persuasive, seductive, and decisive influence. Each type of influence is accompanied by a set of strategies. To clarify when and why to apply a particular strategy, we present a framework that explains the relationship between the product, human behavior, and the implication of this behavior. The extent to which a user considers the implication as personally beneficial defines what type of influence is possible or most appropriate. In this consideration, the relationship between individual and collective concerns plays a prominent role.

Products Influence Behavior

The observation that products affect social behavior and thereby have implications for society is not breaking news. Both philosophers and sociologists have repeatedly laid bare the often unintended effects that products have on behavior and society. An often-mentioned example in this context is the overpasses over the parkways on Long Island, New York, as reflected upon by Winner.³ These overpasses are extraordinarily low to deliberately obstruct public transit by buses. As a result, they implicitly restrict access to Jones Beach for those who depend on public transportation (i.e., often lower socioeconomic groups), making the park accessible only for car-owning people. The bridges were thus designed to wield political power. Winner gives several examples that show how design can have and has had implications that go far beyond the immediate use and function of the design.⁴

Latour approached the implications of things for society in terms of their role in influencing behavior. The concept of script had been introduced by Akrich⁵ to describe the “implicit manuals” that products embody, and Latour elaborated on this concept to clarify the specific relations between designer, product, and user. In his work, Latour⁶ distinguishes “inscriptions,” which refer to the effects on user’s actions intended by the designer, from “prescriptions,” which concern the actions a product *allows* the user (resembling Gibson’s concept of affordance⁷), and “subscriptions,” which explain how users interpret these prescriptions. One of Latour’s elegant examples of designs that deliberately aims to alter behavior is the speed bump. Designers inscribe such objects with a message of “drive slowly to be responsible.” This inscription possibly leads to a prescription, such as “slow down,” and can lead to a subscription, like “slow down to avoid damaging the car.” In this particular example, the behavior of slowing down connects collective concerns of safety with individual concerns about the car. This example shows how products can comply with collective concerns and can mediate the corresponding desired behavior by addressing individual concerns in product use. As we show, this is a powerful aspect of design when designing for social issues.

- 3 Langdon Winner, “Do Artifacts Have Politics?,” *Daedalus*, 109:1 (1980), 121–36.
- 4 A couple of years ago, Winner’s example was subject to critical discussion. It turns out, for example, that the overpasses in question probably have never been an obstacle for buses, as can be shown with the help of timetables. See Bernward Joerges, “Do Politics Have Artefacts?,” *Social Studies of Science*, 29:3 (1999), 411–31; Steve Woolgar and Geoff Cooper, “Do Artefacts Have Ambivalence? Moses’ Bridges, Winner’s Bridges and Other Urban Legends in S&Ts,” *Social Studies of Science*, 29:3 (1999), 433–49. This does not take away the value and importance of Winner’s argument, though. Even as a mere thought experiment, the example shows how deeply intertwined human politics and nonhuman technological artifacts are.
- 5 Madeleine Akrich, “The De-Description of Technical Objects,” in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, ed. W. E. Bijker and J. Laws (Cambridge, MA: MIT Press, 1992).
- 6 Bruno Latour, “Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts,” in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, ed. W. E. Bijker and J. Laws (Cambridge, MA: MIT Press, 1992).
- 7 James J. Gibson, *The Ecological Approach to Visual Perception* (Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1979).

Although both Winner and Latour also reflect on the unintended implications of design,⁸ the bridges and the speed bump represent designs with an intentional implication. Verbeek⁹ uses the example of the microwave to show that design can also implicitly and unintentionally influence behavior patterns. Because the microwave oven has made it so easy to quickly heat up an individual meal, families nowadays join together for fewer dinners than they did before. This example shows that products can mediate certain behavior without determining it. After all, families might still hold on to their former eating patterns. Verbeek explains that a product is not a neutral intermediary, but a mediator that actively mediates the relation between a user and his or her environment. These three examples show different ways in which design affects behavior and thereby has implications for society, both intended and unintended.

Design as an Active Attempt to Change Behavior

Although design has proven to be an influential factor in behavior, only for a few years have design researchers tried to gain adequate knowledge that would allow designers to deliberately and effectively affect behavior. Fogg in 2003 introduced the term “persuasive technology” in relation to software-based design that aims to alter behavior and attitudes through persuasion.¹⁰ Since 2006, a range of international conferences regarding this subject has contributed to our understanding of designing persuasion by means of technology.¹¹ As a result of this wide interest in the subject, we can more clearly see how to match target behavior to relevant theories and techniques,¹² how technology offers a means to create a person’s persuasion profile,¹³ and how different forms of feedback relate to effective behavioral change.¹⁴

Although the field is progress in understanding the act and success of persuasive technology, it lacks two important aspects. First, there is little understanding about when to apply what type of behavior-changing strategies. This knowledge is important because particular ways of influencing are more appropriate than others in particular situations. And although this consideration touches upon ethics, which certainly is highly relevant to discuss as a topic on its own,¹⁵ it too has implications for the effectiveness of strategies used to influence behavior. Second, the consideration of how a user might experience persuasive technologies is little discussed.¹⁶ Again, this consideration carries both a moral and an effectiveness argument.

Working from the idea that persuasive strategies that work in one domain might be of value to another, Lockton, Harrison, and Stanton¹⁷ have developed a Design with Intent Toolkit based on insights from various research disciplines. This set of cards provides an excellent overview of strategies that can be used to change behavior by means of design. However, similar to the work in the field of persuasive technology, this toolkit gives little guidance

8 Winner (Ibid.), for instance, elaborates on the example of the introduction of the tomato harvesting machine, which unintentionally implied the disappearance of smaller tomato plants, and the introduction of less tasty tomatoes because these were the only ones the machine could process. Latour, in his article from 2004: “Which Politics for Which Artifacts?,” *Domus*, http://www.bruno-latour.fr/presse/presse_art/GB-06%20DOMUS%2006-04.html, (accessed April 2011) explains how the political dimension of artifacts changes over time because the artifacts enter into new relations with new entities, as a result of which they continually develop new implications.

9 Peter-Paul Verbeek, *What Things Do: Philosophical Reflections on Technology, Agency, and Design* (University Park, PA: The Pennsylvania State University Press, 2005).

10 B. J. Fogg, *Persuasive Technology: Using Computers to Change What We Think and Do* (San Francisco: Morgan Kaufman Publishers, 2003).

11 The first international conference on Persuasive Technology was held in 2006 in Eindhoven, The Netherlands. Since then, the conference is organized annually.

12 B. J. Fogg and Jason Hreha, “Behavior Wizard: A Method for Matching Target Behaviors with Solutions,” in *Persuasive 2010* (Berlin, Heidelberg: Springer-Verlag, 2010).

13 Maurits Kaptein and Dean Eckles, “Selecting Effective Means to Any End: Futures and Ethics of Persuasion Profiling,” in *Persuasive 2010* (Berlin, Heidelberg: Springer-Verlag, 2010).

14 Jaap Ham and Cees Midden, “Ambient Persuasive Technology Needs Little Cognitive Effort: The Differential Effects of Cognitive Load on Lightning Feedback Versus Factual Feedback,” in *Persuasive 2010* (Berlin, Heidelberg: Springer-Verlag, 2010).

- 15 By comparing and analyzing the topics of papers presented at the Persuasive Technology conferences, Törning and Oinas-Kukkonen found that ethics is very rarely discussed. Kristian Törning and Harri Oinas-Kukkonen, "Persuasive System Design: State of the Art and Future Directions," in *Persuasive 2009* (ACM International Conference Proceeding Series, 2009).
- 16 There are a few exceptions; for instance: Julie Khaslavsky and Nathan Shedroff, "Understanding the Seductive Experience," *Communications of the ACM*, 42:5 (1999), 45–9; Katarina Segerstahl, Tanja Kotro and Kaisa Väänänen-Vainio-Mattila, "Pitfalls in Persuasion: How Do Users Experience Persuasive Techniques in a Web Service?," in *Persuasive 2010* (Berlin, Heidelberg: Springer-Verlag, 2010).
- 17 Dan Lockton, David Harrison, and Neville A. Stanton, "The Design with Intent Method: A Design Tool for Influencing User Behaviour," *Applied Ergonomics*, 41: (2009), 382–92.
- 18 Brian Wansink, "Environmental Factors That Increase the Food Intake and Consumption Volume of Unknowing Consumers," *Annual Review of Nutrition* 24: (2004), 455–79.

to when to apply which strategy. Although the work of Lockton et al. has been carried out in relation to environmental issues, thereby taking a social perspective, the application of their work in other social areas has not been discussed.

In this article, we argue that the choice of strategy needs to be based on the intended user experience, which plays an important role in the strategy's effectiveness. One can imagine that the user is already, to a greater or lesser extent, willing to change his behavior and therefore, to a greater or lesser extent, is receptive to influence in the first place. Developing a product to support someone who is trying to stick to a diet allows for different strategies than, for example, when the product wants to convince somebody to quit bashing up bus shelters. In the first case, our collective concern about health is in line with individual concerns. In the second case, our concerns of safety and decency clearly conflict with the individual concerns of the vandal about status and/or challenge. In the next section, we explain in greater detail the relationship between behavior and both collective and individual concerns.

Regarding Behavior from a Social Perspective

When we talk about designing products that influence behavior, in this article we refer to the behavior that realizes desired social implications (Figure 1). As an example, the size of a plate appears to influence our eating behavior.¹⁸ People who use a small plate serve themselves less food and therefore eat less than people who use a big plate. Serving less, as such, does not yet create any social implication. However, the eating activity that follows contributes to obesity, of which, from a social perspective, we might be concerned. By knowing the relationship between serving and eating, designing a product that changes how we serve food influences our eating behavior.

When the starting point, for a designer concerned with obesity, is to change people's eating behavior, changing the amount

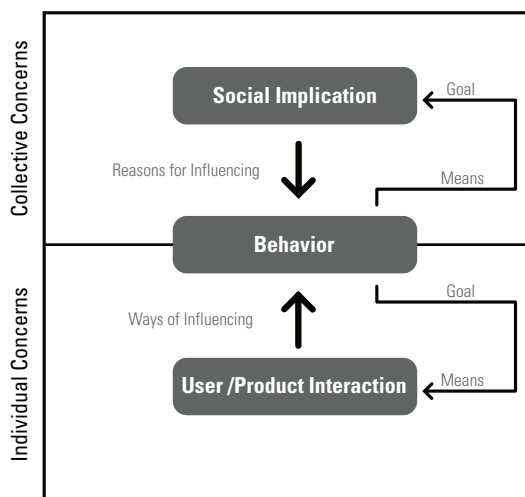


Figure 1
The framework shows how behavior forms an intermediate stage between social implications and the user-product interaction, and thereby respectively between collective and individual concerns. The latter explains, respectively, the reason for influencing and the way of influencing.

of food being served is one way to do so; of course, designing attractive food packages for relatively healthier food as a means to influence purchases might be another way. Both of these perspectives of human-product interaction influence peoples' eating behavior, but they address different individual concerns. People interacting with the small plate serve themselves less because doing so is an automatic response, or they might do so because they feel embarrassed about overloading the small plate with food in a public setting.¹⁹ The attractive food packages may address concerns about aesthetics and status. None of these influential designs try to address the collective concerns directly with the user; instead, they trigger different individual concerns to stimulate the behavior that is desirable from a social perspective.

Why is this distinction between social implication, behavior, and human-product interaction so important? When designers design products intending to change behavior, evidently there are reasons why the desired form of behavior is not automatically performed. The possible discrepancy between which behavior is desirable from a social perspective and how people behave shows a conflict between collective and individual concerns. The individual does not always embrace or prioritize collective concerns. What is best for the collective (and thus on average also for the individual) is not always felt or experienced as best for the individual or is easily overruled by other conflicting concerns.²⁰ Take, for instance, the example of sustainability. From a social and long-term perspective, it is not too difficult to connect the collective concerns with the corresponding desirable behavior (e.g., traveling to work by bike rather than taking the car). However, this behavior conflicts with a lot of individual concerns, such as a desire for comfort and efficiency.

The power of design lies in its potential to bridge these concerns. A desired social implication, based on collective concerns, defines what behavior is desired from a social perspective. The designer's task then is to address individual concerns in interaction with the product to elicit this behavior. Understanding the relationship between collective and individual concerns, whether they collide or coincide, helps to identify what type of influence and strategies can be effective.

Discouragement and Encouragement of Behavior

We distinguish discouragement of undesired behavior from encouragement of desired behavior. Products that are deliberately designed to change behavior are often based on the occurrence of undesired behavior. People eat unhealthily, people drive unsafely, people irritatingly hang around at specific places, or people do not pay for their train tickets. Designers can intervene either by discouraging the problematic behavior or by encouraging other desired or accepted behavior that is incompatible with that undesired behavior. But encouragement of behavior can certainly also be a goal in itself. This

19 Collective concerns are concerns we have as society, organization, family, or any other social group. Individual concerns are concerns we have as an individual. However, individual concerns can be of a *social* kind (e.g., a person's concern to be loved).

20 Paul A. M. Van Lange and Jeff A. Joireman, "How We Can Promote Behavior That Serves All of Us in the Future," *Social Issues and Policy Review*, 2:1 (2008), 127–57.

distinction is necessary in understanding how the design interferes with the user's intention to behave in a certain manner and the user's motivation to behave differently, as these both affect the user experience.

Two deliberate interventions to stop or discourage fare dodging—reactions to unwanted behavior—clearly show these different ways to approach behavioral change. Fare dodging as a behavior is simply illegal and collides with our collective concerns of equality and honesty. However, not buying a ticket for public transportation can happen for several reasons, based on individual concerns. People may not have enough money to pay for travel costs, or they might enjoy the rush they get from acting illegally; some people might simply forget to buy a ticket, or some do not buy one because fare dodging is just so easy to do. Now we compare two interventions as a reaction to this undesired behavior: the ticket portal and the lottery ticket. The first is designed to discourage undesired behavior, while the second is designed to encourage desired behavior that is incompatible with the undesired behavior.

The ticket portal (Figure 2) is placed at the entrance of the station; because the portal opens only when a ticket has been inserted, it obstructs fare dodging. The only way to fare dodge is to jump over the portal, making the illegal behavior visible to others. As soon as we link the fare-dodging behavior with people who do not have enough money, or who enjoy the kick of illegal acts, it becomes questionable whether this intervention is sufficient. However, when the majority of fare dodgers consist of those who simply forget to buy a ticket, the intervention might be quite successful.

A different way to intervene is to make each ticket serve a dual purpose: The ticket for the transport is at the same time a ticket in a lottery to encourage people to buy the ticket (Figure 3). Adding to the ticket a chance to win a certain amount of money might seduce the fare dodgers who do not have a lot of money, as well as the ones who enjoy a risky life style. It can also draw extra attention to the

Figure 2 (left)
Ticket portal. Photograph by Nynke Tromp.

Figure 3 (right)
Tram ticket as lottery ticket.
Scan: Nynke Tromp.



ticket offices to trigger the people who often forget to buy a ticket to buy one, too.

These two examples show that the user experience of the product is an important factor in the user's motivation to alter his or her behavior.

Different Psychological Processes

To clarify the different ways products can trigger psychological processes a little further, we examine several interventions to stop risky driving behavior, including speed bumps, speed limit cameras, "rue de la mort" signs, "drive with your heart" campaigns, countdowns, and a junction without any signs. For all these interventions, it is clear that they have been designed as a result of collective concerns of safety and responsibility. Although safety is evidently an individual concern also, all kinds of reasons stemming from other individual concerns can easily overrule this concern.

The speed bump, described earlier, was designed to obstruct irresponsible driving behavior (Figure 4). The speed bump damages the car when the driver does not slow down. In most cases, concerns about the quality of the car and the hassle to restore the damage play a bigger role than individual concerns about safety or responsibility. The speed bump functions as a punishment for the undesired behavior. The speed limit camera (Figure 5) makes use of the same strategy, though addressing different concerns (i.e., concerns about costs). But again, the user is punished when undertaking the undesired behavior. In both examples, the motivation to alter,



Figure 4 (Top)
Speed bump. Photo: Nynke Tromp.



Figure 5 (Bottom, left)
Speed limit camera. Photo: Nynke Tromp.



Figure 6 (Bottom, right)
"Rue de la mort" sign. Photo: Nynke Tromp.

- 21 Richard M. Ryan and Edward L. Deci, "Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions," *Contemporary Educational Psychology*, 25: (2000), 54–67.

22 Ibid.

behavior is externally regulated, which means the user experiences the behavior as controlled or regulated.²¹

"Rue de la mort" signs (Figure 6) follow a different strategy. The signs depict human representations of people who died in car accidents at the actual site of the accident along the road. The representations of the human bodies are anonymous; only the number of accidents along that road and the number of people who died in the accidents are represented. The representations are intended to make the user aware of the dangerous character of the road and thereby stimulate responsible driving behavior. The idea is that, by becoming aware of the possible consequences of irresponsible driving behavior, the driver alters his own driving behavior to prevent the negative consequences. Slightly different, but along the same line, is the campaign to "drive with your heart" (Figure 7). The message explicitly brings into focus the user's responsibility regarding other road users. When effective, the collective concern of responsibility is regulated through identification²² (i.e., by becoming an individual concern).

These four interventions all try to explicitly motivate users to adopt a more responsible driving style. The countdown (Figure 8) and the junction (Figure 9) are two interventions that try to elicit responsible driving behavior on a different basis. The countdown depicts the number of seconds before the traffic light becomes green. This counting down prevents feelings of uncertainty, because drivers know what to expect, and thereby decreases the rate of stress and agitation. This reduction in stress automatically also decreases the

Figure 7 (Top, left)
"Drive with your heart" campaign. Photo: Nynke Tromp.



Figure 8 (Bottom, left)
Countdown. Photo: Paul Hekkert.

Figure 9 (Bottom, right)
Traffic junction without signs. Retrieved from <http://www.fietsberaad.nl>, 2009.



likelihood of irresponsible driving behavior. The junction represents a reverse intervention. In the north of the Netherlands, a particular junction was known for its large number of accidents. The increasing number of signs and traffic lights placed at the junction to increase safety all failed. Only when the local government decided to take away all signs did the number of accidents drop. Without any signs or warnings to heed, people automatically slowed down at the junction because of the lack of sight.²³ These two interventions show how design in a more implicit manner can elicit desired behavior by shaping the conditions for more automatic responses.

A Classification of Product Influence

We have shown that products can discourage or encourage behavior and can thereby trigger different psychological processes. To come to a classification of product influence based on the intended user experience, we collected a range of products that were either designed to have or appeared to have influence on user behavior. We included only those products that influence behavior *and* that have a social implication. Thus, products and services designed, for example, to help people remember their keys when leaving home (i.e., behavior without clear social implications) were excluded. Moreover, for each product we analyzed they exerted influence as follows: We reflected upon each intervention as eliciting behavior that otherwise would not have been performed. When designing for social issues, individual and collective concerns can easily collide; therefore, there may be little user motivation to alter behavior. Considering each intervention in relation to unmotivated users allowed us to derive the most powerful design strategies.

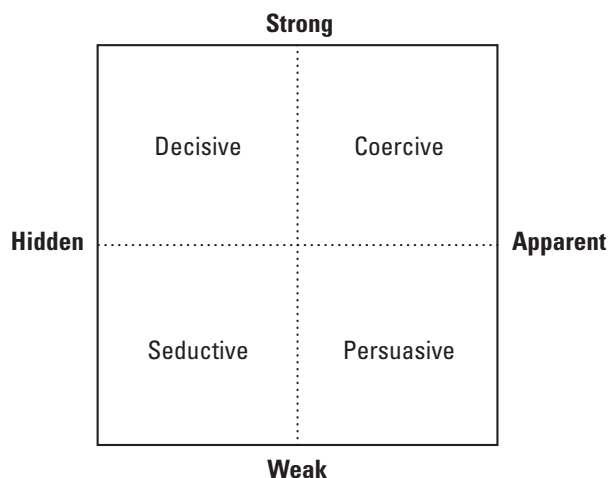
In taking this user perspective, we deliberately took no notice of the theory underlying some of the designs. For example, although we are aware that the intentions are different, we regard the Social Cups designed by Niedderer²⁴ as a possible intervention for social issues (e.g., cohesion within a company). The idea of the design is that the cups can only be placed stably on the table when linked to other cups. This condition requires social interaction because the user needs to cooperate with other people for the cups to remain stable. Assuming that they are not motivated to interact without the cups (because of anxiety or other concerns), these people likely are fully aware of being influenced and most probably will experience this intervention as forceful. Different use of the cups is still possible, but its “proper” functioning forces the user to interact with others.

This example shows very well the two different dimensions on which we can classify the experience of the influence: force and salience. A design can exert influence that can vary from weak to strong (force), and a design can exert influence that can vary from an implicit to a more explicit manner (salience). Based on these two dimensions of exerting influence, we distinguish four types of influence: coercive, persuasive, seductive, and decisive

23 Fryslân-Province 2005, *Shared Space—Room for Everyone: A New Vision for Public Space*, (Leeuwarden: Fryslân Province, 2005).

24 Kristina Niedderer, “Designing Mindful Interaction: The Category of Performative Object,” *Design Issues*, 23:1 (Winter 2007), 3–17.

Figure 10
Four types of influence based on the
dimensions of force and salience.



influence (Figure 10). A product can coerce, persuade, seduce, or decide for somebody.

Coercive design is strong and explicit in its influence (e.g., the speed camera to discourage fast driving). People who are being coerced by design are aware of the influence and experience this influence as a strong force. A change in behavior therefore will be regarded as a reaction to the influence (i.e., externally motivated). This perspective also holds true for persuasion, although the influence then is experienced as weak. Persuasive design is both weak and explicit in its influence (e.g., a campaign to promote healthy eating). Seductive design is weak and implicit in its influence (e.g., a microwave's effect on family dinners). People who are being seduced by design are not aware of the influence and most probably regard the behavior as internally motivated. Decisive design is both strong and implicit in its influence (e.g., a building without any elevators to ensure physical activity). People who encounter decisive design experience their behavior as externally regulated but do not recognize this regulation as a deliberate influence of the designer.

Although we mention some designs to clarify the categories, the consequence of categorization based on user experience is that a product as such can never be assigned to a category. Only the user who eventually experiences the design can categorize it as coercive, persuasive, seductive, or decisive. This individual categorization has two consequences: First, different people can assign the same product to a different category. People who notice the influence of the microwave on their eating patterns experience persuasion; others who do not, experience seduction. Some people experience a speed camera as persuasive, others as coercive. Second, one person can assign the same product to different categories over time. A person might thoughtlessly spend (i.e., be influenced to spend) a lot of money after being offered a credit card, but he might only become aware of this influence after seeing his credit card statement. The signs and striping used to mark off parking spaces (e.g., for those who are disabled or pregnant or driving hybrid cars) might be

experienced as persuasive one day but coercive the next, when time is short and a parking space is needed right away.

Design Strategies Based on Individual Concerns

Although it is impossible to soundly assign products to categories based on user experience, we propose that design strategies be assigned to these categories. These strategies show how designers can trigger different psychological processes and thereby affect the user experience. Although we relate these strategies to the expected user experience, the user experience is richer than can be understood by categories of coercive, persuasive, seductive, or decisive alone. Even when a design is exerting coercive influence and a user indeed experiences this influence as coercive, the experience can still differ in nuances. One might experience the design, for example, as “parenting,” while others consider it to be “powerful.”

We explain each strategy both in general terms and by means of a clear-cut example. Note that this list of strategies is not intended to be an exhaustive one. In addition, note that these strategies *cannot* guarantee that the user will experience a particular type of influence. However, because the strategies aim to trigger psychological processes that are to a greater or lesser extent forceful and that can happen to a greater or lesser extent consciously, the strategies can be classified into one of the four categories. Using physical pain to influence is stronger in force than eliciting emotions to motivate action tendencies. In addition, giving arguments for specific behavior is logically a more salient way to influence than using physiological processes. Although the strategies are never a guarantee for a particular result, as the way a designer eventually applies the strategy is of great influence, we do think we can claim that certain strategies increase or decrease chances of exerting a particular influence. Figure 11 shows the relation between the design strategies and the type of influence the product most probably will exert.

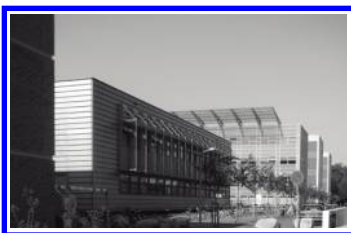
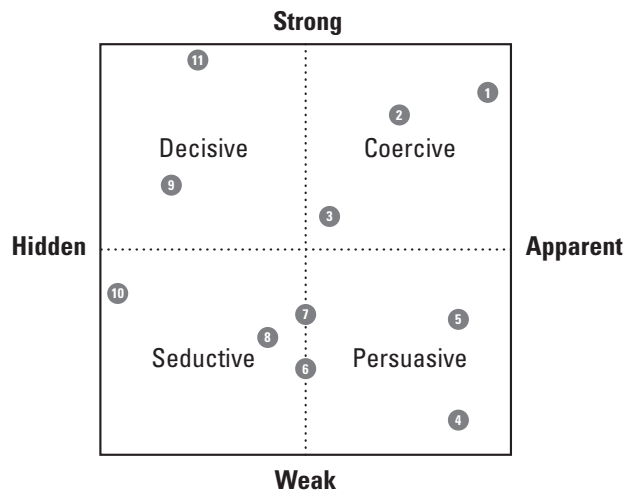


Figure 11 (right)
Four types of influence and related strategies.

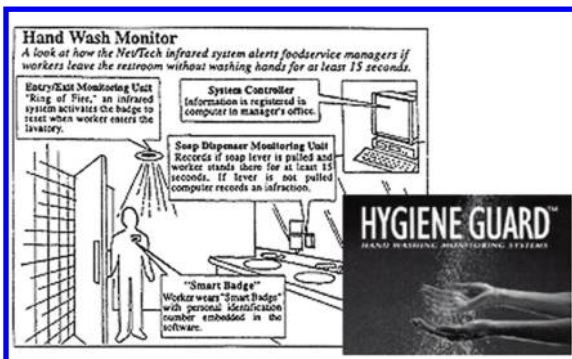
Figure 12 (above)
Stones to block parking. Photo: Nynke Tromp.



1. *Create a perceivable barrier for undesired behavior (pain).* This strategy warns the user about injuries, or uses actual physical stimuli that harm either the users or the products they are using (e.g., a car). Figure 12 shows how natural stones are placed to prevent cars from being parked at places that were not intended for this use. This strategy uses a so-called physical punisher for unwanted behavior (the car will be heavily damaged if one decides to park there anyhow). Psychologists commonly agree that enduring behavioral change can only be developed if a reinforcer, rather than a punisher, consistently follows the behavior. Although very effective, this particular approach is a situational and temporary solution and does not result in an enduring change of behavior.
2. *Make unacceptable user behavior overt (shame).* This strategy leads to products that make illegal behavior, or behavior we commonly regard as socially unacceptable, publicly visible. Figure 13 shows the Hygiene Guard, which is designed to make sure employees wash their hands after toilet use. The Hygiene Guard activates a flickering light attached to the employee's badge as soon as the soap dispenser isn't used and/or the water tap does not run for at least 15 seconds. This strategy increases the pressure of and extends an already existing social norm.
3. *Make the behavior a necessary activity to perform to make use of the product function.* When interacting with a product, the user has a specific goal related to the product function. This strategy is about including a design element that requires the user to perform a specific behavior to reach his or her goal. Figure 14 shows the Social Cups designed by Niedderer. The cups can only be placed securely on the table when linked to other cups. The social interaction becomes a necessary activity for the cups to achieve stability. This strategy relies on the motivation of the user to make use of the product function. As soon as users consider the behavior to require more effort than they are willing to give to achieve the goal, the strategy most likely will fail.

Figure 13 (left)
Hygiene Guard. <http://captology.stanford.edu/Examples/hygiene-guard.html>, (accessed 2009).

Figure 14 (right)
"Social Cups," Kristina Niedderer, 1999.
Photo: Kristina Niedderer.



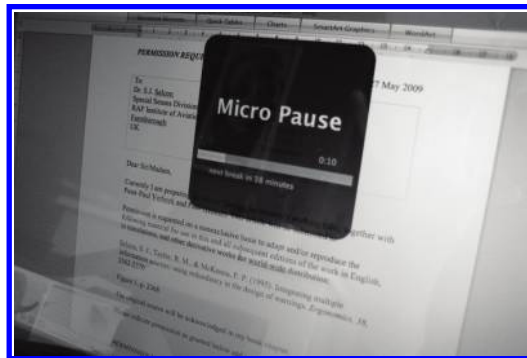


Figure 15 (above left)
Text on cigarette package.
Photo: Nynke Tromp.

Figure 16 (above right)
RSI preventing software. Photo: Nynke Tromp.

Figure 17 (lower left)
Garbage bin as basket. Photo: Nynke Tromp.

4. *Provide the user with arguments for specific behavior.* This strategy provides the user with objective information about the consequences of certain behavior. A well-known example, shown in figure 15, is the cigarette package that contains explanations of the consequences of smoking. This strategy tries to address, shape, or alter attitudes, rather than directly facilitating behavior. Studies have shown that people prefer to make choices that can be more easily substantiated by verbal arguments, even when they would eventually appraise other options as better ones.²⁵

5. *Suggest actions.* This strategy explicitly proposes certain actions or suggests certain specific behavior. For example, typical RSI prevention software suggests that computer users do small exercises when working on their computer to decrease the chance of developing persistent injuries (Figure 16). This strategy can explicitly use information to ground the suggestion, but it is not necessary. When the product also provides arguments, it aims at changing attitudes and facilitating behavior. In cases where it does not, it seeks to trigger a more temporary and automatic reaction (e.g., a gear sign on the dashboard of a car that suggests when the driver should shift gears).

6. *Trigger different motivations for the same behavior.* This strategy adds an extra function to the product that elicits the desired behavior. To illustrate, the garbage bin along the highway is designed as a basket used in sports to score (Figure 17). By its design, it gives a different meaning to the action of throwing garbage in the bin. A strong aspect is that the strategy thereby aims at a different but intrinsic motivation for the behavior.

7. *Elicit emotions to trigger action tendencies.* This strategy tries to elicit an emotion to seduce people to certain reactions. The smiley in figure 18 is placed on the side of a section of road that needs maintenance and forces the driver to slow down. The smiley explicitly thanks drivers for their

25 Timothy D. Wilson, Douglas Lisle, Jonathan W. Schooler, Sara D. Hodges, Kristen J. Klaaren, and Suzanne J. LaFleur, "Introspecting About Reasons Can Reduce Post-Choice Satisfaction," *Personality and Social Psychology Bulletin*, 19:3 (1993), 331–9.



Figure 18 (left)
Sign with smiley along the highway.
Photo: Nynke Tromp.



Figure 19 (middle)
Go-to-Move table. <http://www.arboportaal.nl/arbo-magazine/staand-vergaderen-bespaart-miljarden>, (accessed 2009).



Figure 20 (right)
"Puzzle Switch," Karin Ehrnberger and Loove Broms, 2007. <http://www.tii.se/groups/energydesign/press>, (accessed 2009).

understanding, with the expectation that the driver will not get agitated and start driving recklessly. This strategy aims at influencing the affective component of the attitude system to shape or change an attitude and therefore the evolving behavior.

8. *Activate physiological processes to induce behavior.* This strategy makes use of human physiological processes that result from bodily states so that specific behavior is more likely to occur. The table Go-to-Move, in figure 19, requires its users to stand rather than sit during a meeting. The standing posture is expected to lead to a more active mood. This strategy aims at stimulating preferred attitudes by activating physiological processes of which users are often unaware.

9. *Trigger human tendencies for automatic behavioral responses.*

This strategy activates a human tendency by creating a perceptual stimulus. The light switch in figure 20 plays with the human inclination toward order and a preference for symmetry.²⁶ By attracting attention to its asymmetrical position when the light is on, users will be more inclined to turn it off when the light is not needed or when leaving the room. This strategy makes use of human automatic behavioral responses that are instinctive or learned.

10. *Create optimal conditions for specific behavior.* This strategy uses design to create an optimal situation in which the desired behavior can occur naturally. An example is the coffee machine in the hallway of a company. A coffee machine in the hallway (Figure 21) encourages people to gather at a neutral place. This situation naturally results in small talk between colleagues who might not interact in the normal course of the day. This strategy manipulates the conditions so that behavior can occur naturally but does not necessarily interfere in the underlying psychological processes of the behavior.

11. *Make the desired behavior the only possible behavior to perform.*

This strategy uses design to make behaviors other than the desired one impossible. An example is the positioning of bus stops, which determines the distance that passengers

26 Paul Hekkert and Helmut Leder, "Product Aesthetics," in *Product Aesthetics*, ed. H. N. J. Schifferstein and P. Hekkert (San Diego, New York, London, Burlington: Elsevier Science Publishers, 2008)

Figure 21 (left)
Coffee machine placed in the hallway
of a company. Photo: Nynke Tromp.

Figure 22 (right)
Bus stop. Photo: Nynke Tromp



need to walk and thereby determines their physical activity (Figure 22). When this strategy is applied to unmotivated users, the behavior is experienced as externally regulated, although it might not be recognized as a deliberate influence.

Bridging Concerns: Repositioning the Designer

Looking back at our framework in Figure 1, it is in the interaction that the influence of the product is exerted; it also is in this interaction that individual concerns are addressed. Now the question arises: how to choose what type of influence to exert. At this stage the relationship between individual and collective concerns starts to play a role. As soon as a desirable behavior is defined on the basis of collective concerns, consideration needs to be given as to how these concerns relate to possible future users. In the relationships between collective concerns and individual concerns, we can distinguish two types: They are either in line or in conflict with each other. Generally, we can say that coercive influence is effective when concerns conflict, persuasive influence when concerns are in line, and seductive and decisive influence are suitable for both. However, choosing a strategy requires some additional considerations.

Coercive influence can be an effective intervention for specific types of social issues. Coercive interventions are often experienced as conflicting with individual freedom and therefore can only be applied in instances in which the desired behavior is almost unanimously agreed upon. Nobody revolts against the reasoning behind such a design strategy when it concerns matters of life and death. Creating obstructions so that drivers cannot exceed the limit of 30 kilometers an hour within a school and playground area is acceptable and understandable. However, designing obstructions that prevent homeless people from sleeping on public benches becomes already more debatable. Coercive influence is very

27 Erratic Radio reflected upon by Redström: Johan Redström, "Persuasive Design; Fringes and Foundations" *Proceedings of PERSUASIVE* (2006).

restricting, and it therefore requires authority to be applied. As a result, the public domain and institutional domains are domains for which coercive design often is suitable, in that government and managers have the authority to implement such interventions. In the private domain, a radio for personal use that starts malfunctioning²⁷ as soon as too much energy is consumed is an example of coercion. When it concerns the private domain, coercive influence can only be applied when collective and individual concerns are in line with each other.

Persuasive influence also is best applied when collective concerns are in line with individual concerns, which means they are easily identified or experienced as individual concerns. Many interventions that use persuasion are about health or safety issues, which are easily related to and accepted by the individual. However, persuasive interventions can easily fail as soon as they concern behavior that has long-term implications but that collide with short-term matters. A good example is smoking behavior. Smoking in the long term conflicts with concerns about health, but in the short term addresses concerns of enjoyment. Persuasive interventions are present in all domains but are presumably most successful when interaction with them occurs on a voluntary basis. A campaign alongside the road to promote safe driving behavior most probably is less effective in influencing behavior than the (purchased) personal digital sport coach that structures your behavior during exercise.

Of course, social issues often do not deal with matters of life and death or with concerns that are in line with short-term individual concerns. Many issues are constructed around collective concerns that are often not related to individual behaviors. In addition to sustainability, these issues are often socially constructed issues, such as immigration, integration, discrimination, and social cohesion. Within these phenomena, seductive influence can be very useful in eliciting desired behavior because these phenomena often do not allow for enforcement or explicit arguments. Forcing people to talk to their foreign neighbor is simply unthinkable, and providing explicit explanations to people about how contact with neighbors contributes to cohesion in the area somehow does not sound so compelling so as to influence behavior. It is especially for these issues, which leave governmental institutions powerless, that design can offer elegant interventions.

Decisive influence is a very strong influence in that the design makes the desired behavior the only possible behavior. However, the application of this influence is limited. The design of infrastructure and buildings typically is decisive design: The design of infrastructure determines the distance of a public institution to a bus stop and thereby influences physical activity, or determines the width of an alley and thereby its access to cars. But social behavior, such as communication, is hard to influence with decisive design. Moreover, decisive design can easily lead to unpleasant experiences.

28 In "Which Politics for Which Artifacts?" (Ibid), Latour states that the political significance of artifacts needs to be made explicit and debatable. In politics, not only the humans need to be represented, but the nonhumans as well. Designers have the potential to be this link between the human and nonhuman elements of politics.

As soon as the government decides to take away half of the bus stops to stimulate physical activity, objections can be expected.

Most, if not all, social issues deal with human behavior. Deliberately affecting behavior to stimulate specific social implications requires a redefinition of the role of the designer. Although designers can never fully predict the social implications of their design, and although the political significance of artifacts changes over time,²⁸ this reality does not imply that designers should refrain from taking seriously the social implications of their designs. Designers no longer can hide behind the needs and wishes of the consumer; instead, they have to take responsibility as "shapers" of society. Doing so entails a shift from a user-centered approach to a society-centered one. In defining desired social implications and behavior, it is the designer's task to incorporate relevant experts, such as sociologists and policy makers, as well as citizens. Subsequently, it is the designer's quality and expertise that can translate the collective concerns to individual concerns by means of design.