social design

How products and services can help us act in ways that benefit society

PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Technische Universiteit Delft,
op gezag van de Rector Magnificus prof.ir. K.C.A.M. Luyben,
voorzitter van het College voor Promoties,
in het openbaar te verdedigen op 12 juli 2013 om 12.30 uur

door

NYNKE TROMP

ingenieur Industrieel Ontwerpen
geboren te Leeuwarden.

Dit proefschrift is goedgekeurd door de promotoren:

Prof.dr. P.P.M. Hekkert
Prof.dr.ir. P.P.C.C. Verbeek

Samenstelling promotiecommissie:

Rector Magnificus	voorzitter
Prof.dr. P.P.M. Hekkert	Technische Universiteit Delft, promotor
Prof.dr.ir. P.P.C.C. Verbeek	U-Twente, promotor
Prof.dr. E.A. Stolterman	Indiana University
Prof.dr. P.A. Lloyd	Open University
Prof.dr. E.M. Steg	RU Groningen
Prof.dr. T.R.A. de Rijk	VU Amsterdam
Prof.dr.ir. P.A. Kroes	Technische Universiteit Delft
Prof.dr. E. Giaccardi	Technische Universiteit Delft, reservelid

This research is partly funded by the Dutch police - LAPV2010,
and Estrade/Vestia Rotterdam.

Nynke Tromp
Social Design - How products and services can help us act in ways that benefit society

www.socialdesigncommunity.com

ISBN 978-94-6186-181-8

contents

PART 2.
DESIGNING PRODUCTS AND SERVICES WITH DESIRED SOCIAL IMPLICATIONS

PART 3.
COMPARING DESIGN TO MORE COMMON TYPES OF INTERVENTION

introduction

Western societies are currently facing a number of crucial problems. High unemployment rates, addictions of all sorts, civic burnout, obesity, intercultural tension, terrorism, and global climate change...all are collective problems of our time. Reflecting upon these contemporary issues shows how complicated they can be and how powerless governments often are to effect change.

One of the most predominant issues of today is the economic crisis we face. There is an article or television item nearly every day that refers to our current economic woes: speculations about Greek bankruptcy and European loyalty, the increasing number of unemployed, or suggestions for improvement by financial experts. Apart from the financial crisis, on any given day the newspaper relates details about shootings at American high schools, or the fact that less educated people make more use of the Dutch healthcare system than more educated people, but pay less. Problems like the financial crisis, the shootings, and our communal healthcare costs are immensely complex, and solutions are far from clear-cut. Are bankers accountable for the crisis, or is it a deficit in our economic system? Do the weapons and game industries contribute to the shootings or is no one else to blame but the shooter? And do the less educated have less healthy lifestyles because they do not care about their health, or has a healthy lifestyle become too expensive in our country? It is not always clear whether problems are personal or communal, stakeholders often have conflicting concerns and the effectiveness of potential interventions is usually uncertain, all of which factors complicate the process of counteracting these problems. In order to successfully resolve the issues of our era, concerted action is clearly needed between governments, organizations, and *individuals*.

Indeed, although we often consider solving such problems largely a governmental task, individuals play a crucial role in both realizing and counteracting all of these problems. For instance, if people were willing to live in smaller houses, their mortgage would not present such a heavy burden. Or if people were willing to give up their guns, teach their children how to deal with anger, or care for people who isolate themselves, this may help to prevent shooting incidents–just like exercising and healthy eating helps to reduce our communal health care costs. However, governments are mostly unable to affect the direction of individual behaviour. In a democracy, governments use laws and regulations to set the boundaries

of what behaviours are (not) permitted. But they have limited means to actually stimulate desirable behaviours. They can change policies, subsidise institutions, and simply call for action, but it appears difficult to mobilize people to actually change their behaviour (Gerritsen & Van der Noort, 2004; Rijnja, Seydel, & Zuure, 2009).

Applying design thinking to social issues

At the same time, designers have become increasingly interested in contributing solutions to the complex issues of our time, which has led to various design movements. Some focus specifically on developing countries in order to 'do good' by means of design (e.g., Dibb, 2009; Kandachar & Halme, 2008; Kandachar, Diehl, Parmar, & Shivarama, 2011). But to an increasing extent designers are also interested in the potential design has to induce social change in Western societies. For instance, in 2002 there was the 'Design against Crime' initiative, in which designers explored how design might discourage theft (Davey, Cooper, Press, Wootton, & Olson, 2002). This exploration has expanded today to include other areas, and is referred to as socially responsible design (Davey, Wootton, Thomas, Cooper, & Press, 2005) or socially responsive design (Gamman & Thorpe, 2011; Thorpe & Gamman, 2011). At the Design Against Crime Research Centre (DACRC), linked to the socially responsive design research agenda, several (student) projects resulted in products to counteract theft and increase safety (Figure 1).

FIGURE 1
THE 'STOP THIEF CHAIR' -BY THE DESIGN AGAINST CRIME RESEARCH CENTRE (DACRC)

Both design scholars and agencies alike advocate using design to *transform* existing problematic social and public situations. Transformation Design (Burns, Cottam, Vanstons, & Winhall, 2006), or what some explain as service design applied to social systems (Saco & Goncalves, 2008), is driven by the notion that design skills and techniques can be extremely valuable in changing social and public services (Sangiorgi, 2011). Indeed, this user-centred focus in design appears to have relevance for social domains that are typically very top-down oriented. For instance the London based agency Participle (2012) shows the value of user involvement in the development of public services (Figure 2). And CEO and president of design consultancy IDEO Tim Brown (2009) illustrates the potential of design thinking in realizing social change and transforming organizations.

FIGURE 2
'THE LIFE PROGRAMME', A SERVICE SYSTEM FOR FAMILIES WHO STRUGGLE TO COPE WITH MULTIPLE DIFFICULTIES -BY PARTICIPLE

Rethinking design to support sustainable living

Parallel to this movement, many design scholars have recently argued that we need to change the way we design, as current products support an unsustainable lifestyle. Over 25 years ago, Papanek (1984) posited that with the rise of mass production and hence mass consumption, product design had become one of the most influential disciplines. Concerned with the depletion of resources and the rising piles of junk around the globe, his book was, and is, a call to designers to move away from commercial business and this consumption-based economy. Many design scholars have expressed their concerns about the unsustainable lifestyle and level of consumption to which design has long contributed (e.g., Manzini, 2006; 2009; Manzini & Rizzo, 2011; Ehrenfeld, 2008).

To reduce the environmental impact of our current lifestyle, some embrace the idea that designers should move away from mass production, and instead develop and support local, shared services (Manzini, 2006; Jegou & Manzini, 2008; Figure 3).

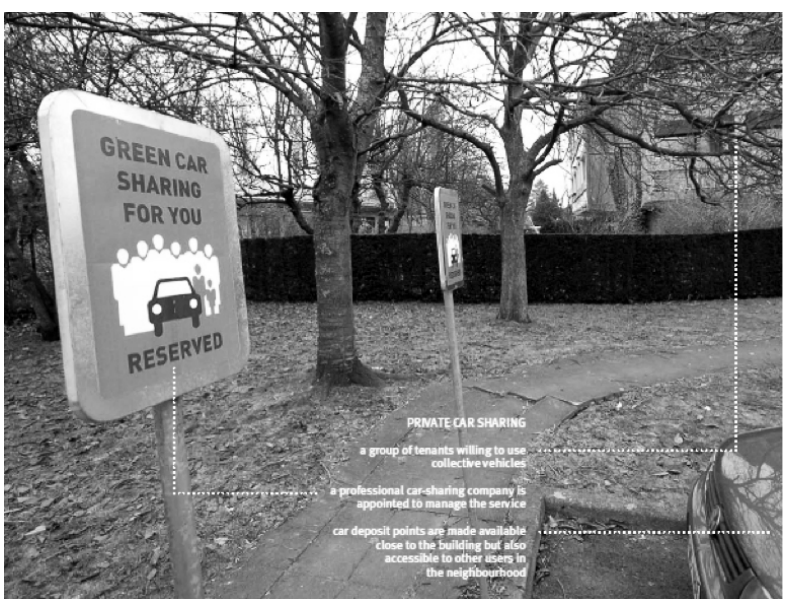


FIGURE 3
PRIVATE CAR SHARING; INSTEAD OF OWNING PRODUCTS, COLLABORATIVE SERVICES ENCOURAGE PEOPLE TO SHARE PRODUCTS

Others do not necessarily move away from the design of objects, but explore how these objects can be redesigned to evoke sustainable behaviour. To this end, some encourage designers to explore and co-create new and sustainable behaviours together with users, and develop products to support these (e.g., Scott, Bakker, & Quist, 2012). Others encourage designers to design products that make people aware of the impact of their use and evoke critical reflection, e.g., on their energy consumption (e.g., Mazé & Redström, 2008, Figure 4). And many design scholars more generally explore how to change people's wasteful behaviours through design (e.g., Bhamra, Lilley, & Tang, 2008; Lilley, Lofthouse, & Bhamra, 2005; Lilley, 2009; Lockton, Harrisson, & Stanton, 2008; Midden, McCalley, Ham, & Zaalberg, 2008; Wever, Van Kuijk, & Boks, 2008).

FIGURE 4
THE 'STATIC! POWER-AWARE CORD' TO RAISE AWARENESS ABOUT ENERGY CONSUMPTION -BY INTERACTIVE INSTITUTE SWEDEN

Although the environmental implications design presents have by far received the most attention from designers and design scholars, many agree that designers should also include the social facet of sustainability in order to develop products and services that contribute to human wellbeing.

What about the current role of design?

Overall, it seems that many designers and design scholars wish to explore the social or global potential of design. Some have shifted their focus to social problems, and now use their skills and thinking to resolve these, while others encourage designers to facilitate the development of locally-embedded services which are less wasteful, or rather, more sustainable. Although starting points and foci may differ, many agree that the way to bring about sustainable living by design is to involve users within the design process. Involving people as active participants in lifestyle transformations and supporting them in 'living the change', these movements position themselves in contrast to regular design practice where 'expert designers' design mass-produced products for 'passive consumers' (e.g., Gamman & Thorpe, 2011; Keitsch, 2012; Manzini & Rizzo, 2011; Morelli, 2007; Scott, Bakker, & Quist, 2012; Vezzoli, 2006).

But what about mass-produced products: how did they become so successful in advocating for particular lifestyles? It is quite reasonable for many scholars to have moved away from a design practice that has contributed to the wasteful consumption pattern we see in many Western societies. Indeed, at least as regards energy consumption, design plays a tremendously problematic role that seems impossible to counteract by continuing to develop products the way they have been developed up to now. However, despite the clamour to address environmental sustainability concerns emanating from public and private sectors alike, it is not the only pressing issue we face, and not the only issue in which design has played a role. The way we have designed our lives on the whole has also contributed to collective social issues like the economic crisis, shootings, health care costs, and intercultural tensions. By 'simply' moving away from regular design practice–either by shifting to 'public design' or by developing 'radical' new ways of designing–we are wasting a valuable opportunity to direct the influential role of design differently moving forward [1]. Certain products available today are apparently quite powerful advocates for particular behaviours! Once designers have become adept at understanding how the influence of design shapes human existence, innovative avenues open up for them to design, apply and direct this influence, and address or counteract the social problems we face. Hence, this book aims to help designers grasp the potential social implications of their designs and direct this unique power of design toward serving 'the greater good'.

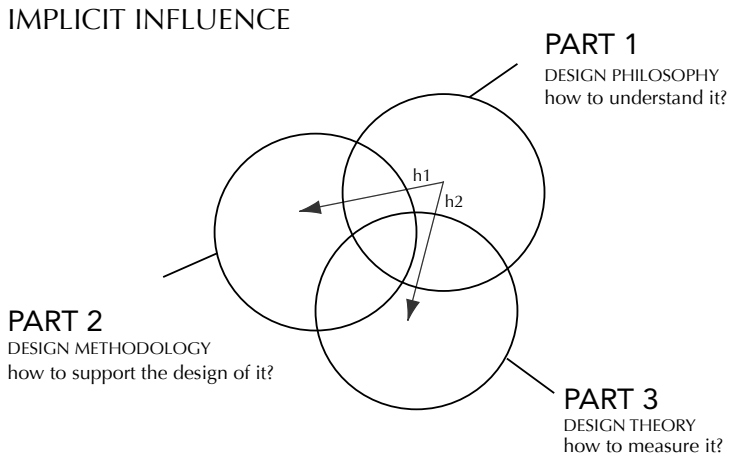
The outline of this book

This book aims to foster designers' understanding and assessment of the social implications of design, in order to contribute *through design* to solving social problems. To this end, the book starts with an elaborated account of the structure of social problems: what they are, why they arise, and how design currently plays a role in this. Chapter 1 provides answers to these questions. Through the lens of social dilemma theory it becomes clear that human beings have both personal and collective concerns, and that these can easily be in conflict. Each day, we are relentlessly presented with options that force us to choose between acting in our own interests or in favour of the greater good. Based on studies from behavioural economics and evolutionary and social psychology, we demonstrate why it is so difficult to act in favour of society nowadays, and hence, why social problems arise. By reflecting upon how design has contributed to obesity, immigration issues, and environmental problems, the chapter concludes that by *facilitating behavioural change*, design induces social implications. Hence, this often hidden and unintended influence of design becomes the main object of study.

The remainder of the book is divided into three parts. The first part is to understand this implicit influence of design in more detail and for the purpose of designing it. We study the dimension 'salience of influence' and argue why implicit influence may be mostly effective to design when

[1] Besides, moving away from regular design practice does not do justice to the incredible improvements design has also brought to people's wellbeing. Only an honest view of the role design plays in human life can help in understanding both its benefits and drawbacks.

personal and collective concerns collide. We carefully develop a framework of product influence and end this part with a discussion on how it may support the design of it. In the second part, we study the design activity in which this influence of design is deliberately directed to realize social change. In the final part we compare such design interventions to more common interventions to realize behavioural change. In this, we measure whether implicit influence is more effective than explicit influence to counteract a specific social issue. The parts thereby respectively address and contribute to design philosophy, design methodology, and applied social psychology and design theory (Figure 5).



hypothesis 1

OUR FRAMEWORK OF PRODUCT INFLUENCE SUPPORTS THE DESIGN OF IMPLICIT INFLUENCE

hypothesis 2

IMPLICIT INFLUENCE IS MOST APPROPRIATE AND EFFECTIVE WHEN PERSONAL AND COLLECTIVE CONCERNS COLLIDE

FIGURE 5
THESIS OVERVIEW; TWO HYPOTHESES FORMED IN PART 1, AND TESTED IN PART 2 AND 3 RESPECTIVELY

Part 1. Understanding The Influence of Design on Human Behaviour

This part of the book provides a detailed account of the often hidden influence of design in the way we live our lives for the purpose of designing it. In Chapter 2 we discuss the concept of 'mediation', which explains that through interaction, products and services affect the way we act and engage with the world on top of their mere functioning. Although this perspective is insightful and provides an umbrella term to describe the influence of design, it does not yet support the design of this ever-present influence to counteract social problems. Thus in Chapter 3 we compare six theories in which the influence of design on human behaviour is explicitly taken into account. A comparison of these shows that the influence of design can be understood as part of a larger system, or as a result of the interaction between a product and a user. We discuss how both approaches have instrumental value for designers who aim to design this influence to realize social change. In Chapter 4 we intend to clarify the influence of design from a user perspective. Based on an analysis of sixty-eight products and

services, we establish two dimensions of product influence that define its experience: the salience and the force of influence. Products and services can be more or less explicit in influencing people's behaviour, and can be more or less forceful in this. Together these dimensions explain that products can coerce, persuade, seduce, or decide for people. We propose eleven design strategies to design these various types of influence and discuss when to apply what type of influence. We argue that influence of which people are unaware (implicit influence or hidden influence) is most appropriate and effective to counteract 'soft' social problems. In Chapter 5 we illustrate how our understanding of the behavioural influence of design can be used to analyse social design projects. This analysis helps to identify which steps in the design process seem crucial when designing implicit influence and to use these as the basic ingredients for the design method developed in Part 2.

Part 2. Designing Products and Services with Desired Social Implications
Through a series of studies, the second part of the book reports on the development of a design method, i.e., the Social Implication Design method (SID). This method intends to assist designers in intentionally designing the influence of a product or service in order to bring about a desired social change. Chapter 6 begins with a detailed explanation of the 'Vision in Product design' method (ViP). After discussing its origin and structure from a design methodological perspective, we argue why it constitutes a suitable method to use as the basis for social design. Although the method emphasizes a designer's responsibility, the method does not go so far as to explicitly direct designers to design from a social perspective. Chapter 7 starts with an explanation of the Social Implication Design method (SID). We explain how our understanding of the influence of design (as explained in Part 1) has been integrated in the ViP method to assist the design of it. Next, it reports on a multiple case study spanning three graduate student projects where the SID method was applied. The instruction for each student was to use the method to develop a design that addressed a soft social problem in a deprived neighbourhood (for which we assume that implicit influence is most appropriate and effective). This study shows that the method is largely effective in supporting the design of implicit influence to realize social change. However, the usability of the method is considered too limited, for which improvements are discussed. Chapter 8 reports on the evaluations provided by several social experts of the design concepts as developed in this multiple case study, Through the use of narratives, social workers, social psychologists, and sociologists assessed how realistic the concepts are in facilitating the intended behavioural change and in contributing to the desired social implications. We discuss how the results from this study support both the evaluation of the SID method and our understanding of the design of implicit influence.

Part 3. Comparing Design to More Common Types of Intervention
The final part of this book is devoted to understanding the effectiveness of design as compared to more common interventions that similarly seek to bring forth desired social implications. Chapter 9 reviews studies from the domain of social psychology in which strategies to stimulate pro-social behaviours are discussed and applied. This review shows that the way people may experience interventions to change behaviour has received no

deliberate attention, yet is latently present in much of the work. Chapter 9 concludes with the formulation of two hypotheses regarding the salience of influence, and the type of intervention that would facilitate behavioural change. On the basis of previous work we assume A) that implicit influence is more effective than explicit influence, and B) that products are more effective than posters with text, in facilitating behavioural change in 'soft' social dilemmas. In Chapter 10 we elaborate on how we designed the interventions used to test these two hypotheses; the subject of these interventions was 'how to reduce the amount of litter in a school canteen'. We show how an analysis of the problem at hand, in terms of conflicting concerns, can support the design of interventions. Next, we discuss how the strategies from Chapter 4 fed the design process, and how this differed when designing a product or a poster. Chapter 11 reports on the experiment conducted to test our hypotheses. A significant interaction was found between the salience of the influence and the type of intervention, yet none of the interventions was effective. This finding suggests that products can be best designed to exert implicit influence and posters to exert explicit influence. We discuss these findings in relation to the set-up of the experiment and suggest potential clarifications. We conclude by explaining the problematic aspect of studying the salience of influence and suggest future directions.

The final chapter offers a critical examination of the research presented within the previous chapters, which sought to understand, design, and measure the hidden influence of design that might contribute to desired social change. We discuss the main findings and suggest directions for future research. Finally, we discuss the implications of our findings for design practice and conclude with an ethical discussion about this.

social problems, behaviour, and design

Every day, when we turn on the news or open the paper, we are confronted by stories detailing humanity's most pressing woes. Obesity, poverty, resource depletion, pollution, war, immigration, and economic crisis are all examples of issues that collectively 'threaten' human beings, whether as members of communities and nations, or as inhabitants of planet Earth. In conversation, nobody would deny that these are indeed serious problems. Most of us agree that the current level of pollution is worrisome, and that a high unemployment rate is undesirable. However, the extent to which we truly experience such problems as our own problems is often not so great. For example, the current climate changes have been stressed in the media as one of the biggest problems of our time. And even though many people agree on this and may even be worried about it, still few people act upon it.

When we share a problem with many other people, responsibility for it becomes diffused. In practice, this diffusion often means that nobody experiences great incentive to act upon these problems individually. When the problem is a social or global phenomenon, most people consider their government responsible for generating, implementing and administrating a solution. Indeed, in democratic countries, this is one of the tasks governments are expected to perform: addressing social problems and developing interventions to counteract them. However, the complexity lies in the fact that most–if not all–of these human problems require individual and collective changes in our behaviour to be neutralised effectively. We need to be willing to give up our current lifestyles and rely more on public transport instead of our car, move closer to work, or work at home more often, in order to reduce our collective oil consumption. We need to be willing to buy sustainably/organically grown fruits and vegetables, and be less picky about their appearance, to reduce food waste and pollution. We need to become more responsible eaters, and take the stairs instead of the escalator, to prevent ourselves from becoming obese. We need to be willing to include immigrants, talk to them and greet them in our streets in order to reduce intercultural tensions. And we need to be willing to pay more taxes to stabilize the financial situation for everyone when there is a financial crisis.

Putting it as simply as this, by explaining how social problems can be counteracted by individual action, one already experiences the tensions that may arise. Why should I take the train, when that person is driving a SUV? Why should I pay more for vegetables that rot more quickly? Why should I search for the dodgy stairwell in the shopping mall when the escalator is clean and nearby? Why should I greet immigrants, when they do not speak our language? And why do I need to pay more taxes for people who do not put any effort into finding a job? A social problem easily becomes *someone else's* problem, or at least, *not my* problem.
So although particular behaviours may be desired from a social perspective, people rarely prioritize these social problems over other factors when deciding how to act.

People relate their behaviours to others' behaviour, are guided by their environment, and consider individual gains in deciding how to behave. So even when people acknowledge a social problem as partly their problem, and are in principle willing to act upon it, the social and environmental contexts are extremely influential in determining whether people will indeed change their behaviour or not. Before we can effectively study and explain how products and services can be designed to serve the greater good, a deeper understanding is required of the structure of social problems. What are social problems, why do they arise, and what role does design play in these problems?

How to deconstruct social problems

Social problems are complex phenomena that are often discussed in abstract terms. They are understood and explained by psychological, cultural, sociological, and political processes in which design plays no substantial role. How to grasp these complex processes as a designer and how to understand the role of design in these? The designer of today is not solely the designer who fixes material problems or shapes beautiful objects. Nowadays, designers are taught to find out what people need and desire, how people interpret the products they use, and how this affects their experiences. The user-centred designer is well-versed in quite a bit of the psychology that plays a role in user-product interaction. Hence, the designer is taught to take a user's perspective in design in order to develop products that people want to have, understand, and enjoy using. But how does this design practice affect society? If we wish to support designers in taking responsibility for the social implications of their designs, or to create designs that contribute positively to social problems, we need to understand how designers can incorporate a social dimension into their design efforts. To this end, we introduce social dilemma theory. Social dilemma theory (e.g., Dawes, 1975, 1980; Liebrand, Messick, & Wilke, 1992) explains social problems as situations in which too many people act in accordance with personal concerns and thereby in conflict with collective concerns. It represents an appropriate theory for designers to employ, as it broadens their familiar user perspective by including the wellbeing of society.

Conflicting concerns

Social dilemmas are situations in which personal interests are at odds with the interests of the group [2] (Van Lange Liebrand, Messick, & Wilke, 1992). In these situations, a person is confronted with a choice between individual or societal gain: do I act in my own interest, or in favour of society? Phrased like this, these dilemmas may sound truly perplexing. Yet social dilemmas are more common than we may think. We are confronted daily with this kind of dilemma: do I take the car or shall I go by public transport? Do I leave my empty coffee cup at the table, or throw it in the garbage bin? Do I buy free-range eggs, or eggs from battery hens? Do I go to the annual excursion with colleagues, or shall I keep working toward meeting a personal deadline? In all these situations, our individual interests conflict with those of the group. Or in other words, personal concerns clash with collective concerns. And in all these situations, it is tempting to act in line with personal concerns: going by car is very convenient, walking to a garbage bin takes effort, free-range eggs are expensive, and meeting a deadline brings satisfaction. Typically, social dilemmas are situations in which we feel we gain more when we act on the basis of personal concerns than on the basis of collective concerns.

Temporal and social conflicts

Van Lange and Joireman (2008) explain that conflicting interests in social dilemmas can contain both a social and a temporal dimension. Behaviour may have consequences for others, but may also have consequences for the self over the long term.

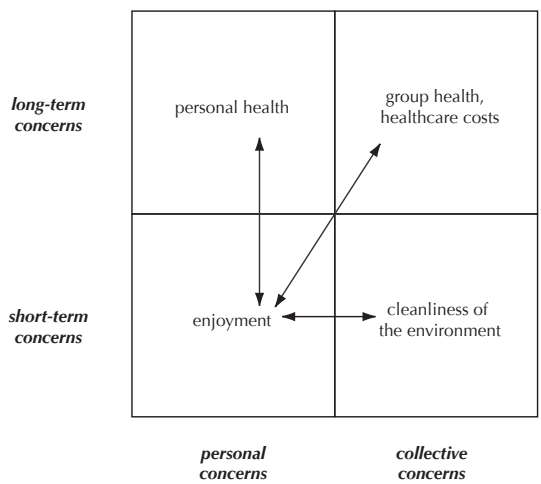


FIGURE 6
A SOCIAL DILEMMA REFERS TO A SITUATION IN WHICH SOCIAL AND/OR TEMPORAL CONCERNS ARE CONFLICTING, LIKE IN THIS CASE OF SMOKING

To illustrate some of the possible conflicts a social dilemma can contain, consider the dilemma of smoking (Figure 6). From an individual perspective smoking can be desirable because one enjoys a short moment of relief. However, smoking contributes to long-term individual implications by

[2] Note that various types of social dilemmas exist including two or more persons, e.g., Prisoner's Dilemma or The Tragedy of the Commons, and that each type implies different interdependencies between choices (e.g., Kollock, 1998; Liebrand, 1983). However, for the purpose of understanding how individual behavior can lead to social implications, a simplified notion of social dilemmas will suffice.

causing health problems, it impacts others in the short-term by causing annoyance from the cigarette ash and smoke, and over the long term by increasing shared healthcare costs. In other words, behaviour may cause implications for the individual and the collective over both the short and long term simultaneously.

The focus for the remainder of the book is on conflicts between personal and collective concerns, since we are dealing with social problems. However, many personal conflicts, i.e., situations in which people favour short-term gains and act in conflict with long-term concerns, may lead to social problems. When too many people smoke, or when too many people are obese, it is considered a social problem. In these situations, exercising and eating healthily even become desired behaviours from a social perspective.

When situations become problematic

One of the things that make social dilemmas complex is that people gain more when they act on the basis of personal concerns rather than collective concerns, but that all are better off when acting in favour of the group (Dawes & Messick, 2000). In other words, what we gain (or lose) as result of a particular choice or action depends on the choice of others. This explains why a situation in which personal and collective concerns clash only leads to a social problem when too many people decide to act in favour of themselves. Only when a lot of people take their car do traffic jams occur and fuel emissions become a serious threat to our environment. Only when many people leave their empty cups at the table does the canteen become dirty and unpleasant to be in. Only because many people buy eggs from the battery cage do these cages still exist and seriously harm animal welfare. And only when many colleagues prefer to concentrate on meeting individual deadlines does the annual excursion become a failure. So, a lot of these behaviours are not bad as such, but can become harmful to the group when too many people engage in them. This shows that a so-called 'tipping point' characterizes each social problem, both for its coming into existence and for its being resolved (or reduced to such an extent that we do not feel the need anymore to act upon it as society). For instance, as soon as 50% of car drivers take public transport, most traffic jams would be resolved, and the environmental impact of car driving would probably decrease to such an extent that the focus of governments could shift to other areas. The question therefore becomes, how can we instigate these tipping points? How can we inspire a high enough number of people to act in favour of society in the face of social dilemmas?

An instrument to understand human behaviour in relation to social problems

Social dilemma theory holds that when confronted with a social dilemma, people assess both to what extent their actions contribute to their personal wellbeing and to the wellbeing of the group, e.g., family, team, colleagues, or society. It thereby assumes that these considerations take place consciously. The theory is based on the rational-choice theory, or game theory, that considers humans as conscious and rational decision makers. Many studies on social dilemmas have been performed by placing people in a social situation and by asking them to divide goods, e.g., money, or

to play a game in which participants need to compete and collaborate to win (e.g., Dawes, 1980; Kollock, 1998; Liebrand, 1983; or for a more recent study, Milinski, Sommerfeld, Krambeck, Reed, & Marotzke, 2008). Many of the studies have therefore been performed by explicitly confronting participants with a dilemma. However, as we have already seen, many social dilemmas are pervasive and far more unobtrusive in daily life. Who would consider our choice for transport, or the handling of our empty cup as social dilemmas? Hence, our reactions to these dilemmas are typically not conscious decisions in which we evaluate the implications for the group and ourselves.

Unconscious processes steer much of our daily behaviour, which means that in 'deciding how to behave' we do not deliberately weigh our personal concerns with or against those of the group: we simply act. Taking the car has just become a habit; we sometimes simply forget to throw away our empty cup; and we often tend to pick the eggs that are at eye level. As has been acknowledged within the research field, the rational-choice theory that underlies social dilemma theory is therefore not a valid theory to predict human behaviours (Ostrom, 1998; 2000), but is mainly useful in understanding the social consequences of human behaviour. How people behave, and more importantly, why it is so difficult to act in favour of the group, will be further discussed in the next section.

Conclusion

In this section we proposed using social dilemma theory to analyse existing social problems. The theory can support designers in understanding which conflicting concerns a specific social problem may contain, as in the cases of obesity, immigration issues and environmental damage (see Figure 7). It thereby helps to understand why particular behaviours or choices are undesirable from a social perspective, yet desirable from a personal perspective. For instance, I love to eat cake, and would rather stay on the couch than go exercise: these behaviours are in line with my short-term personal concerns for enjoyment and comfort. However, these behaviours conflict with my personal long-term health concerns, and currently also with collective concerns about health and economic burden.

In a similar fashion, the abstract problem of immigration issues can be disentangled. From a social perspective, it would be desirable to greet my new, foreign neighbour and invite him for coffee once in a while. Such behaviours are in line with long-term collective concerns about cohesion and harmony within the group. However, these behaviours conflict with my personal concerns about safety and comfort. Inviting a stranger with a different background to my house is quite scary and it therefore takes quite a lot of effort to overcome this fear.

Finally, we engage in much behaviour that leads to environmental pollution because these alternatives closely align with our personal needs for convenience, efficiency, comfort and enjoyment. For instance, many families love the comfort of using a tumble dryer to dry their clothes. However, as we now know, these machines consume significant amounts of energy and are therefore considered one of the least environmentally friendly appliances to be found in our homes. Social dilemma theory helps to break down abstract social problems into concrete behaviours while considering both personal and collective concerns in both the short and longer term. However, it is

not only a useful theory to illustrate what conflicts are at odds, it also helps designers to discuss, argue, and understand which behaviours are desirable from a social perspective. It thereby adds this social perspective to the regular user perspective in discussing needs and concerns.

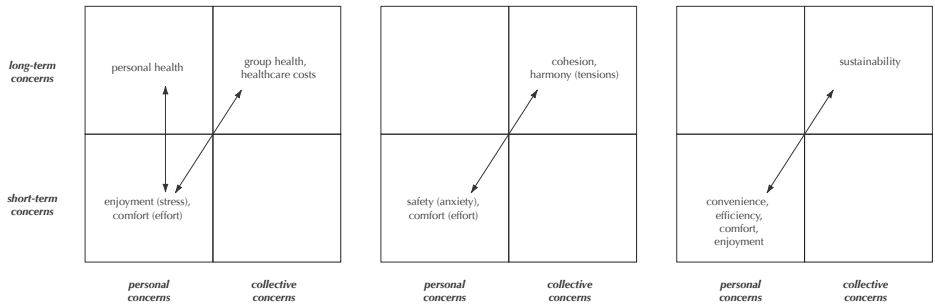


FIGURE 7
THE ANALYSIS OF SOCIAL PROBLEMS AS SOCIAL DILEMMAS HELPS TO ILLUMINATE CONFLICTING CONCERNS, DEMONSTRATED HERE IN THE CONTEXT OF OBESITY, IMMIGRATION, AND ENVIRONMENTAL POLLUTION RESPECTIVELY

1.2 *Why is it so difficult to act in favour of society?*

From an evolutionary perspective, many human behaviours have served us for thousands of years. Much of what motivates us does so because subsequent behaviours have shown to be beneficial to our survival. For instance, all human beings fear death, experience sexual jealousy, and distinguish themselves from others (Brown, 1991). In addition, less obvious concerns like our concern for beauty and our preference for symmetry are also universal drives for behaviour (for a review on this work, see Little, Jones, DeBruine, & DeBruine, 2011). An evolutionary perspective may therefore help to explain many of the behaviours we see exhibited today. However, in discussing the role of evolution in aiming to understand why people behave as they do, we want to prevent two pitfalls.

First, there is a misconception that through evolution we have developed into selfish human beings. Empathy and altruism are also part of human nature (De Waal, 2008). It is argued that for thousands of years, people lived in groups that were no larger than about hundred-and-fifty people (Dunbar, 1993). In these social structures, helping others without any direct individual gain is therefore expected to have been beneficial to the survival of the group. The fact that both a concern for our own wellbeing and a concern for the wellbeing of others are part of human nature means that, in principle, human beings are driven to act in favour of both.

Second, when behaviour is explained from an evolutionary perspective, this does not mean that this behaviour is justified as morally good or bad behaviour (Pinker, 2002). Human beings have universal drives for behaviour

and it is argued that we even have universal morals (Roeser, 2005). Yet, what are 'common', and thus accepted or correct behaviours constitutes in our culture, even with primates (Whiten et al., 1999). By living together, groups have formed their own rituals and norms, which have been passed on from one generation to the next. Ways of dealing with danger, birth and death have developed into rituals, while punishments for misbehaviours have established societal norms. By means of imitation and tools, such rituals and norms have been transferred over time, and now constitute the foundations of every culture we know today. However, groups have grown bigger and culture has evolved beyond the culture of primates with the advent of language and script. It became possible to *prescribe* what behaviours should be performed and what behaviours are not acceptable. Philosophy, spirituality, and religion developed and prescribed morals and values to organize group life. Over the years, groups grew even bigger and higher-level systems to maintain peace and prosperity within the group were formed. Groups established systems such as democracy or communism with laws and rules to formalize norms, and with police and courts to enforce these.

'Social glue'

Human beings have always been confronted with conflicting concerns: do I act in favour of myself or in favour of the group? Conflicts between personal and collective concerns are inherent to living in groups. This brief history of the evolution of humankind shows that over time, we have developed refined ways of dealing with such conflicts. Even among primates, a concern for belonging and a fear of rejection are strong incentives to act in favour of the group (e.g., Williams, 2007). In this way, the wellbeing of the group is closely tied to personal wellbeing. However, conflicts can be strong conflicts. Our need to distinguish ourselves from others has also proven to be a powerful driver of human behaviour (and has apparently equally served human survival). Human beings are competitive, even when this can lead to the destruction of others. Some people feel a natural drive to be in charge and may use their power to suppress others. And we all want to be more beautiful, more attractive, or own more than others, and thus may not care about those who are less successful or fortunate in life. In other words, universal drivers for behaviour can sometimes lead to undesired implications for the group.

To smooth out the process of dealing with these omnipresent conflicts between personal interests and group interests, various social constructs have evolved over time. For instance, our tendency to imitate the behaviour of others ('mimicking' or 'descriptive norms') ensures that our behaviour does not deviate from the behaviour of the group. Our empathy motivates us to help others in need. The 'reciprocity norm', which explains our tendency to want to return a favour, ensures equality in our social relationships. 'Injunctive norms' motivate us to behave in line with what groups approve of. Social values, like respect, ensure that our behaviour does not harm others. And our rules, laws and legislation set the borders of our behavioural options.

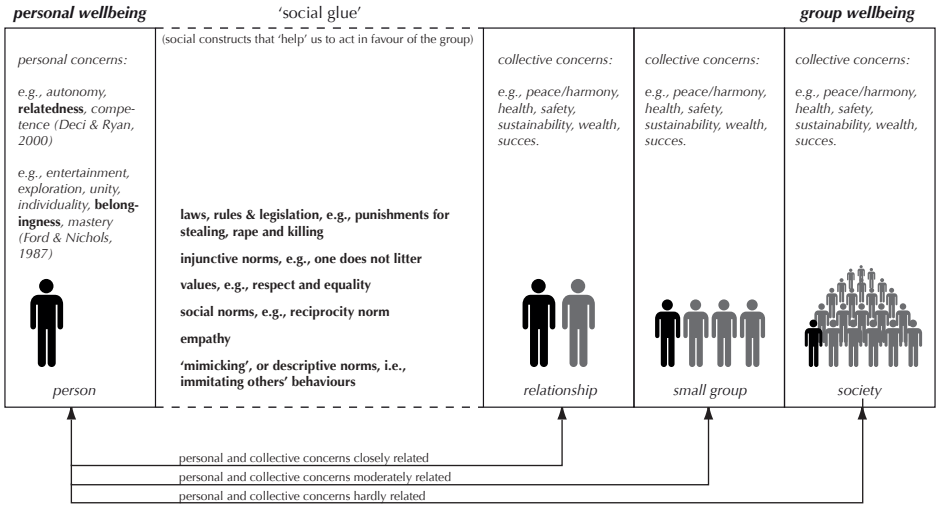


FIGURE 8
AS SOCIAL DILEMMAS ARE INHERENT TO GROUP LIFE, HUMAN BEINGS HAVE SUCCESSFULLY ESTABLISHED 'SOCIAL GLUE' THAT ENABLES BEHAVIOUR IN FAVOUR OF THE GROUP RATHER THAN SOLELY IN FAVOUR OF AN INDIVIDUAL.

In the continuous flow of decisions we have to make on a daily basis, all these drivers may therefore 'help' us to act in favour of the group rather than solely in favour of ourselves.
One might say that we have developed a kind of 'social glue' through the years that helps to ensure group wellbeing [3] (see Figure 8). The question then arises, 'with this "social glue" to facilitate behaviours in favour of the group, why are we still being confronted with so many social problems?'

We have difficulty estimating long-term consequences

In order to deliberately act in favour of the group requires people to estimate the consequences of their actions in the short and the longer term. When people are consciously confronted with such choices, for instance when they have to select an energy provider or insurance company, people have to leverage their present concerns with the concerns they may have for the future. Hence, this choice contains a temporal dimension. Economists have studied these so-called 'inter-temporal choices' (e.g., Loewenstein & Prelec, 1992; Loewenstein & Thaler, 1989), and found that in making them, people have to weigh up and estimate the current and future costs and benefits of a decision that has to be made in the present, a process called 'discounting'. In this process, one would expect that people would apply deductive logic to arrive at the best option or choice. However, people have difficulty 'discounting' due to probability and the delay in decisional outcome (Green & Myerson, 2004).

Logic would indicate that people would prefer receiving €110 over €100. The option only differs across a single dimension, i.e., value, while other

[3] Hopefully we need not to be reminded that individual people are always part of this group, which means that acting 'in favour of the group' inherently means also acting 'in favour of oneself'. Yet, the consequences of acting in favour of the group can be less beneficial or less immediate than consequences of acting in favour of oneself.

dimensions such as time and probability remain equal for both options. Things get tricky when these options, or choices, differ on more than one of these dimensions. For instance, people might prefer to receive €100 immediately, instead of €110 next week, although this may be logically perceived as the best option. In contrast, they might prefer to receive €110 euros after a year and a week, instead of just €100 after a year. It appears that when the outcome of the choice is judged as uncertain because time is involved, people adopt illogical behaviours. It is not hard to imagine that in selecting an energy or insurance provider, this kind of discounting could lead to choices that are sub-optimal. Or even in less explicit choices, like choosing what to eat, troubles in discounting may play a role. The relationship between the sum total of a person's diet and the amount of weight he or she gains is quite uncertain, despite the fact that research allows us to estimate on the basis of averages. Consistently making decisions that do not lead to gaining substantial amounts of weight is no easy task. This may partly explain why people tend to 'opt for' the incredible enjoyment of a piece of pie in the short term, as the outcome in the longer term is uncertain anyway. Additionally, as a child, many of our behaviours are taught through direct reinforcement, either consciously or unconsciously (Skinner, 1953). Acting on the basis of a delayed reinforcement may therefore be harder than direct reinforcement.

To examine how people make choices that contain uncertainty related to outcomes, Tversky and Kahneman (1974) conducted a series of experiments. In their highly cited article 'Judgment under uncertainty: heuristics and biases' they report on these studies and describe three heuristics people use to assess the probability and value of uncertain outcomes: representativeness, availability, and adjustment & anchoring. The core argument of the paper is that these heuristics often come in handy [4], but also may cause bias and lead to serious errors.

The 'representative heuristic' refers to our human tendency to assess the probability of a relationship between two phenomena on the basis of their similarity. However, this may falsely overrule factual relatedness. For instance, when part of a jury, it may be that you consider a black person more likely to be guilty than a white person for the same case. When you are familiar with many instances in which a black person committed such a crime, you may unconsciously consider 'blackness' representative of guilt.

The second heuristic is called the 'availability heuristic'; it refers to our human tendency to assess the probability of relations between phenomena, or events, on the basis of our ability to recall such a relation. When Theo van Gogh (a Dutch public figure who condemned Islam) was assassinated in 2004, it suddenly appeared quite probable that disagreeing with Islam in the Netherlands might get you killed. It is not so strange that such rare incidents lead to proposals for more stringent policies and punishments to prevent future assassinations. Yet, these new policies are often disproportionate in relation to the factual chance that such crimes will happen again.

[4] Heuristics are often argued to be even part of expert behaviour (e.g., Dreyfus, 2002; Shanteau, 1992).

The third heuristic is called the 'adjustment and anchoring heuristic' and refers to the human tendency to assess the probability of an outcome in reference to an initial value or frame. If people are first asked to estimate whether their chances of becoming seriously ill in five years are lower or higher than 50%, or lower or higher than 10%, and are subsequently asked what they consider the chances are that they will become ill in the future, people in the first instance consider their chances higher than people in the second. In receiving advice on energy suppliers, health insurance or mortgages, one can imagine that such 'anchors' might be misleading.

As many social dilemmas contain a temporal dimension and have outcomes that are relatively uncertain, allowing heuristics to inform choices may easily lead to consequences that are not beneficial from either a personal or social perspective.

We have limited willpower

Sometimes initiatives and social campaigns may have convinced us to exercise more or be more compassionate with new neighbours who do not speak our native language. Yet, being persuaded may not directly lead to behaviour change, as conscious behaviour change requires willpower. When we apply willpower, or self-control, our conscious system needs to overrule behavioural tendencies proposed by our unconscious system. To go exercise, or to invite our new neighbour for coffee, we have to resist the temptation to do other, easier things, like watching television or playing with our own children. However, resisting temptations becomes harder when we need our consciousness for other demanding tasks or when we have depleted our resources of self-control.

Baumeister and colleagues (Baumeister, Bratslavsky, Muraven, & Tice, 1998) showed convincingly that our self-control indeed requires consciousness, and can therefore interact problematically with other conscious processes. In a study, participants thought their taste perception was being tested. A bowl with freshly baked chocolate cookies and a bowl of radishes were placed on a table in the room where the experiment took place. Participants were asked not to eat in the three hours prior to the experiment, and were assigned to eat either cookies or radishes. The participants assigned to the radish condition were expected to resist the temptation the cookies presented. Afterwards, participants were given a puzzle and told they could take as long as needed to solve it. The puzzle was unsolvable: instead of being interested in taste perception, Baumeister and colleagues were interested in observing how suppressing an impulse would affect the effort put into solving the puzzle. Participants assigned to the radish condition spent significantly less time trying to solve the puzzle than those who were asked to eat the cookies, or those in the baseline condition which did not include the taste perception task. Apparently, self-control can deplete the resource needed for conscious and demanding tasks, also referred to as 'ego-depletion' (Baumeister, 2002; Muraven & Baumeister, 2000).

Recent studies even show that self-control, or willpower, functions like a muscle, relies on glucose, and can be trained (Gaillot et al., 2007). This research tells us it is quite demanding to consciously control one's behaviour while one's tendencies or impulses are different. In a context

where we have to use our willpower for so many other things, like studying, working, doing groceries and so on, behaving consciously in favour of society piles another, considerable demand on our plate. We are unconsciously influenced by our social and physical environment. Over the years, the role of unconscious processing in how people make choices or how people behave has been studied extensively, and has been argued to be larger than we often think (e.g., Bargh & Chartrand, 1999; Dijksterhuis, Smith, Van Baaren, & Wigboldus, 2005; Kahneman, 2011). Behaviours that are guided by unconscious processes rely on automaticity, which is defined as 'the direct environmental control over internal cognitive processes involved in perception, judgment, behaviour and goal pursuits' (Bargh, 2011). Automatic processes indicate a causal effect of the environment on behaviour that occurs outside of awareness (Bargh & Ferguson, 2000). Many different aspects of our environment can trigger these processes, e.g., (cues from) the behaviour of others, or social constructs primed by words, sounds, smells, or objects. As we are clearly social by nature, many of our behaviours are adjusted or anticipated in relation to others, even unconsciously. For instance, we automatically want to return the gesture when we receive help or gifts (Gouldner, 1960), we want to buy things that not many others can buy (Cialdini, 2001), and when there is only the slightest hint that we belong to a group, we care more about our in-group members than about others (Hewstone, Rubin, & Willis, 2002). But not only other people affect our behaviour. In addition, 'artificial' stimuli, like words or objects, can unconsciously guide our behaviours too.

One of the basic experimental set-ups to study the role of unconscious processing in behaviour is on the effect of priming. Priming [5] explains how the (subliminal) exposure to a stimulus may influence people's response to a later stimulus based on the working of their implicit memory. As I discuss my work with you, I may start talking about the set-up of my workspace at home and the appliances I use; when I mention a 'tablet', you would most probably interpret this as a 'tablet PC' rather than a 'medical pill'. In this case, you were primed by our prior conversation about working from home, and have therefore associated the word 'tablet' with work tools. This facilitation process is typically very convenient in conversation. However, the process may be present in various forms, and does not always lead to desirable results. As Dijksterhuis and Knippenberg (1998) demonstrate, participants who were primed with the stereotype of a hooligan, or the trait 'stupid' are dumber for at least 15 minutes. The stereotype of a 'professor' or the trait 'intelligent' works the opposite way and makes participants smarter for a short while.
Although many famous studies show the effect of priming on behaviour (e.g., the famous 'Florida-effect' by Bargh, Chen, & Burrows, 1996), the effect of priming has limitations. Macrae and Johnston (1998) studied the effect of priming the concept 'helpfulness', compared to no priming, on helping behaviour, using two different conditions. In the first condition participants walked by a person who then 'accidentally' dropped a set of pens. In the second condition these pens were also dropped, but in this case the pens were leaking ink. They found indeed a significant priming effect in the case

[5] Priming refers to a cognitive operation people may adopt when faced with an ambiguous stimulus in which they relate this stimulus to information from memory (Tulving & Schacter, 1990).

that the dropped pens were clean. However, no effect was found as soon as the pens were leaking. Apparently, priming can be overruled by other motives.

The experiments we have discussed so far show that the priming of traits and stereotypes through words can affect (social) behaviour. However, in addition to the fact that words (which convey meaning) can implicitly activate social constructs, sensorial stimuli also appear to be able to convey similar meanings and cause similar effects. So although we may objectively distinguish the social environment from the physical environment, as we will see, the physical environment can mediate social constructs like norms, attitudes, or goals. The interesting part of using different stimuli than words is that priming can move beyond visual priming into multisensory priming. Williams and Bargh (2008) show that experiencing physical warmth through any object can increase feelings of interpersonal warmth in participants and therefore evoke congruent behaviours, e.g., through more pro-social choices in the selection of a gift after the experiment, as compared to participants who evaluated a cold one.

Aarts and Dijksterhuis (2003) studied the effect of representing complete environments on participants' behaviour. The representation of a fancy restaurant or a library alone triggers normative behaviour, like acting well-mannered or lowering one's voice. Likewise, most of us lower our voice when entering a church, or when visiting a graveyard or war monument. These spaces are representative of norms related to their function. Studying, worshipping God, or remembering the ones we have lost are serious activities for which silence is the code of honour. We might not always be aware of the effects these environments have on our behaviour, but we often do agree and consciously comply with these norms. A series of experiments done by Vohs and colleagues (Vohs, Mead, & Goode, 2006) shows more worrying results. Using nine experiments, they show that when people are primed with money (via posters and screen savers), a pro-self orientation is activated, leading to preferences for playing and working alone, and for keeping more physical distance to strangers. In a similar fashion, Kay and colleagues (Kay, Wheeler, Bargh, & Ross, 2004) show that being around mundane objects related to business, like briefcases or an executive style pen, makes people act more selfishly and competitively. So even though we should be careful in assigning great powers to priming, it helps to understand how environments may automatically decrease (or increase) our willingness to act in favour of the group.

Conclusion

Social problems arise when too many people act out of personal interest in situations where individual interests and the interests of society conflict, i.e., in social dilemmas. Because social dilemmas are inherent to social life, we have successfully developed a kind of 'social glue' that helps us act in ways that benefit society rather than solely in favour of ourselves. However, the very existence of many social problems indicates that we have created a living environment in which we are seemingly more driven to act in favour of ourselves, or our own social group, rather than in favour of society. We have built metropolitan cities in which we are repeatedly primed with pro-self constructs, for instance through advertisements, fashion, and office

buildings, which do not motivate us to automatically act in favour of society. Making people aware of the dilemmas of our time may stimulate people to consciously consider collective concerns, but as we have already mentioned, considering the social and long-term implications of our actions is difficult. Moreover, consciously acting in favour of society when one's preferences are different requires willpower, which may be depleted by other conscious processes: altruistic options can easily be cast aside when we are tired or busy with other things. Hence, to act in favour of society often means we have to fight our human tendencies using conscious control. But what role does design play in this? In the next section, we examine more closely how products and services have contributed to the problems we face today, and try to understand what role products and services play in this conflict between personal and collective concerns.

1.3 *What role does design play in social problems?*

The role of design in society has been discussed in various books (e.g., McDonough & Braungart, 2002; Papanek, 1984; Whiteley, 1993), and at various conferences (e.g., Design for Need, 1977; Changing the Change, 2008), and many authors have discussed the social responsibility of designers from an historical perspective (e.g., Madge, 1993; Margolin, 2007; Woodham, 1997). However, the potential harm design presents to society has been considered mostly in terms of harming users (leading to the development of product standards), producing waste, and stimulating consumerism. However, to what extent the use, rather than the production and disposal of products has led to undesired social implications has not been discussed extensively. Although the role of design in co-shaping human life has been analysed by both philosophers (Dorrestijn, 2012; Verbeek, 2005) and sociologists (Latour, 1992; Shove, Watson, Hand, & Ingram, 2007), few direct relationships have been delineated between existing products and the social problems we face today. To provide insight into how design may have contributed to these problems, we have chosen several products and services to illustrate the possible contributions they have made to three social problems: obesity, immigration, and environmental pollution. We focus on the use of the products/services and shed light on how using them has resulted in behaviours with what appear to lead to undesired social implications.

Obesity

Obesity, i.e., being extremely overweight, is a phenomenon in Western societies that demonstrates that human life has been organised such that it has become standard for people to eat too much fat and sugar, while not physically exercising enough to compensate for this. Various products and services can be said to have contributed to these behaviours, by addressing personal concerns almost too successfully. By nature, human beings love fat and sugar, and by nature, human beings avoid needlessly wasting energy, preferring comfort instead (Pollan, 2006). Many architects, (service) designers, retail designers, urban planners, and food chains have been incredibly successful at addressing these personal concerns.

FIGURE 9
SEVERAL PRODUCTS AND SERVICES STIMULATE BEHAVIOURS THAT CONTRIBUTE TO OBESITY

For instance, in our society one can find a fast-food restaurant on every block in the city and along every highway. And with the invention of the drive-through, we do not even have to get out of the car to order our French fries (Figure 9).
On top of this, in the Netherlands we have entire walls of windows offering various fried snacks that can be bought for just one euro, 24/7. Even when buying our groceries we are continually seduced by foods that are sweet and fat. Colourful, shiny packages full of sweets and crisps entice us directly, or through our children, to buy an endless variety of sugar/fat bombs. And it takes quite a lot of willpower to go against the cries of our children. After surviving the bewildering array of options throughout the store, when we near the cashier, yet again there are sweets to satisfy our impulses. Supermarkets know that at this point we are vulnerable, because even if we were able to resist their pull earlier, our willpower to resist may have successfully been reduced after having spent an hour selecting groceries with two excited kids in tow. What's more, we have developed a culture in which achievements and holidays are celebrated with cake, sweets and alcohol.

Sweetness and fat are omnipresent and mostly associated with pleasant experiences. All of this may not be such a big problem when we exercise enough to burn their calories off. However, we have designed the world we live in to serve our need for comfort so well that we do not have to exert much physical effort anymore. The development of machines and computers has automated many laborious and physical tasks, e.g., doing the washing, working the land, or building houses. We have also developed a transportation system, including buses, trams, trains, cars and scooters, to reach even the most remote areas of our country. And when we enter

a large office building or shopping mall, there are conveniently located elevators and escalators to bring us to higher levels. Stairs are often hidden in dodgy stairwells that we are usually only allowed to use in case of fire. Of course this has value in some respects, but the phenomenon has diminished a degree of physical effort that used to be unavoidable. Many campaigns are currently trying to counteract obesity. Even Michelle Obama is teaching children how important it is to exercise. New trends in sports are repeatedly introduced to persuade people to exercise more, ranging from Zumba to Hatha Yoga; while every season a new diet promises weight loss in only three weeks. However obvious the fact that a diet or exercise will help us lose weight, we all know how hard it is to put our mind to this. Willpower is required to stick to a diet and 'drag' ourselves to the gym, and we now know that this willpower is limited. On top of this, our environment repeatedly entices us to behave otherwise.

Immigration

In many cosmopolitan cities, people from various backgrounds live together side by side. In the Netherlands, most immigrants currently come from Turkey, Morocco, and Poland. Although the Netherlands has always been quite tolerant to people from different countries, intercultural tensions have risen in the last few decades, and 'integration' has become a serious focal point for national politics. The clash of norms and values originating from different religions and cultures can easily lead to situations in which people do not understand each other or misinterpret each other's behaviours. Although immigration issues are naturally far more complex than this, many such neighbourly tensions could be resolved if people would only talk to each other a bit more often. However, talking to strangers can be quite scary, especially when they have a different background. On top of this, we have designed an environment in which talking to newcomers is not needed at all, not even when they live right next door. We simply do not need to get close to our neighbours in order to satisfy our need for social contact anymore.

FIGURE 10
SEVERAL PRODUCTS AND SERVICES STIMULATE BEHAVIOURS THAT OPTIMIZE CONDITIONS FOR INTERCULTURAL TENSIONS

With SMS, Whatsapp, Skype or email we can easily stay in touch with friends who live further away, and since we have cars and other means of transportation we can even visit these friends frequently. In addition, we no longer need our neighbours to help us out with daily chores when we are less mobile for a short or longer period of time. Grocery stores conveniently deliver groceries to our homes after a few clicks on the Internet. There are even services that allow us to hire people to walk our dog (Figure 10). In parallel, local specialty shops are gradually vanishing, unable to compete with larger chains that sell similar goods for lower prices in centralised shopping malls or via the Internet. Therefore, the number of places where accidental, intercultural meetings might transpire is gradually decreasing. Additionally, less and less public space in the Netherlands has led architects to decide that the so-called hybrid zones, i.e., zones in which private and public space overlap, need to be diminished in some streets. Hybrid zones like front gardens or private outdoor benches increase the chances of neighbourly contact (Van Ulden & Heussen, in review). So not only have we designed an environment in which we do not need to rely on our neighbours to satisfy our social and instrumental concerns, we have also decreased the likelihood of accidental interactions.

Many social initiatives are devoted to neighbourly contact and aim to improve intercultural interactions and relations. Events are organized to attract people from various backgrounds, and so-called neighbourhood centres are established to organize activities and social gatherings. But for many people, these events and activities are less attractive than activities shared with people in their personal social network. They therefore only attract a very small group and often fail to bring about major, far-reaching changes.

Environmental pollution

In Western countries, nearly everything we do is supported by products that run on electricity: whether it is the toast we make in the mornings, the scans we make at the office, or the television we watch in the evening. All of these behaviours have become so common in daily life that we do not even consider making toast wasteful to our environment. Our households are full of products that support a lifestyle entirely powered by electricity: we blow our hair dry, brush our teeth and shave electronically, we cook by using mixers, blenders, toasters, teakettles, ovens, and cooker hoods, we do the laundry with the help of a washing machine, a tumble dryer, and an electric iron, and we clean with dishwashers and vacuum cleaners. Moreover, all the means we use to stay in touch require energy. Our smartphones need to be recharged every night, we often use television and laptop at the same time, and nearly every bar or pub continuously displays football matches or music channels on large screens. These examples may all sound common, but now that many more people in the world are adopting this lifestyle, the delicate balance of our environment is under threat.

There are even more striking examples of the problematic way we organize life when reflecting upon energy consumption. For instance, an increasing number of café terraces in the Netherlands are heated during winter to enable people to sit outside; practically all Western countries have indoor skiing (Figure 11) and swimming facilities (including artificial waves); and

in Abu Dhabi there are even shopping malls that simulate a rainy day by creating showers every once in a while. In other words, we design artificial climates to experience other conditions than our natural ones, while at the same time contributing to current, undesirable climate change. Finally, when it comes down to the use of lighting, our use is excessive. Not only do we light deserted office buildings and empty rooms, we have extraordinary displays of Christmas lights, neon-lit theme parks, casinos, or big city advertisements. We consume extraordinary amounts of energy just to create enchanting settings. The products we own, and the (entertainment) services we utilise address our personal concerns so well that most of the time we do not even consider the energy consumption required for all these activities to be harmful to our environment. Many campaigns and energy-saving alternatives are trying to raise awareness about the need to save energy. However, it is quite hard to abandon our comfortable lifestyle and it is hard (and disturbing) to consider the environment continuously in everything we do.

FIGURE 11
SEVERAL PRODUCTS AND SERVICES STIMULATE BEHAVIOURS THAT CONTRIBUTE TO ENVIRONMENTAL DAMAGE.

Design, behaviour and social implications

These three examples illustrate how design can promote behaviour change that has social implications. In fact, since we interact with products and services that address our personal and short-term concerns so pleasurably, we often do not even consider collective concerns that may be in conflict with these when 'deciding' to follow a particular course of action. However, our behaviours–as facilitated by design–can clearly have implications that conflict with collective concerns about health, cohesion, or sustainability. Systematically put: through our interaction with products and services that address our personal concerns successfully, we behave in ways that lead to social implications that may be either desirable or undesirable regarding our collective concerns (Figure 12).

Given all the social dilemmas we face continuously throughout the day, the products and services we use can be convincing advocates for acting solely based on one's personal interests, rather than in favour of the group.

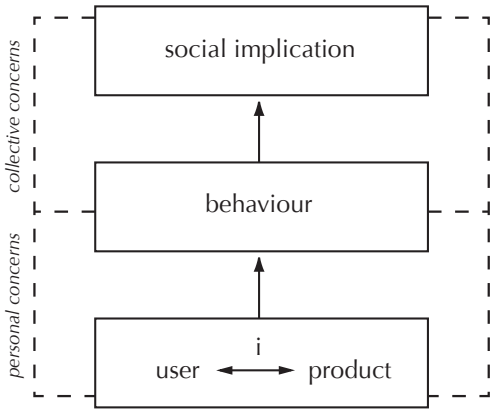


FIGURE 12
HOW THE INTERACTION WITH PRODUCTS LEADS TO BEHAVIOURS THAT HAVE SOCIAL IMPLICATIONS

In fact, design can advocate for behaviours without people noticing it and without any deliberate intention of the designer.
Who has noticed that they are eating badly thanks to the design of a supermarket, or exercising less due to the introduction of escalators? Who has noticed that they are paying less attention to the neighbours since the rise of social media and delivery services? And who has noticed that they are consuming more energy thanks to an electric teakettle? Surely, none of the designers of these products and services wanted to induce people to gain weight, ignore their neighbours, or damage our environment.

1.4 *Conclusion*

In this chapter, we have unravelled the structure of social problems and attempted to clarify how design plays a role in them. By developing products and services that address personal concerns successfully, design can stimulate behaviours that are not always desired from a social perspective. Design clearly plays a crucial, advocating role in the unobtrusive and omnipresent social dilemmas we face in daily life. Not only do we urge designers to take responsibility for these so-called side effects of design, we also argue that designing products with desired social implications is necessary if we wish to successfully counteract the problems we face today. Because when we keep creating designs that solely address personal, short-term, concerns in a way that seduces people to act out of personal interest, people need to apply willpower to resist these seductions in order to act in favour of society. And by now, we have come to understand how difficult this is. The question we therefore wish to answer in the remainder of the book is: how can we understand this hidden influence of design better, in order to use it to help people act in favour of society? In the next chapter, we begin our investigation into this hidden influence of design, to support the later purpose of designing it [6].

[6] The aim for studying something logically influences the study itself. To simplify this statement, imagine you are interested in coconut in terms of nutrition, e.g., you are interested in finding out how long someone can survive on only coconuts. In that case, you would study the coconut quite differently compared to a study of the coconut as a weapon to knock someone out. In the first case you would study the chemical structure of the coconut, while in the second case its strength, and the hardness of its surface (and both in relation to different aspects of the human body).

understanding the influence of design on human behaviour

02

influence, a relational concept

- GUNS KILL PEOPLE! -
- YEAH RIGHT, AND PENCILS MISSPELL WORDS. -

The observation that design influences people's behaviour without them realizing it, and without any intention of the designer, compels us to examine to what extent we assign agency to products and services. As we showed in the previous chapter, simply by using products and services our behaviour can be transformed. How can we understand this transformation better? And who bears responsibility when it turns out to be an undesired transformation?

I often ask my second-year students whether they would ever like to design a gun. Everybody immediately senses the gravity of the question, and for a moment, a tense silence sets in. Luckily this soon ends with some brave student–often a male– responding quite firmly that he 'definitely would'. When I ask him why, I like to think he hesitates a little. However, he usually manages to respond quite quickly by saying that the design 'would be extremely interesting from a technical standpoint.' Immediately, other students raise their hands to claim that they 'would never design a gun!' When I ask them why, they say they would never want to 'support killing'. Clearly, the discussion is not very nuanced, but it effectively illustrates the variety of viewpoints that designers may adopt while designing, and the grey areas of responsibility that tend to emerge. As designer of a gun, are you actually supporting the act of killing?

In understanding who or what should be held accountable for the killing, Latour (1999, p178) argues that it is the *gun+man* who is responsible for the killing. In his view, it is the assembly of the two parts that perform the act of killing, and therefore both gun and human share responsibility. Analysing the situation as a 'program of action', Latour shows how the gun is able to transform the goals of the user. A gun has the ability to translate an aggressive intention into the goal of killing. To this, Waelbers (2011, p29) adds that the translation can even happen at 'a deeper level'. With a gun in one's pocket, one may feel more in control and therefore decide to confront that burglar instead of running away. Accepting the assembly of

human and product as the entity that undertakes action, Verbeek (2011) argues for the development of a new concept of moral agency. Because moral agency is distributed between humans and non-humans, he argues, so too is moral responsibility. However, as products can never be held responsible, designers share an important part of the moral responsibility for establishing what he calls *mediations* of behaviour.

Mediation of behaviour

Verbeek (2005) adopts a postphenomenological approach to study the role of technology in human existence. His work is not intended to 'formulate a theory to 'explain' empirical reality', but rather 'to find concepts with which to make visible and understand as many aspects of reality as possible' (Verbeek, 2005, p162). To arrive at these concepts, Verbeek explains, criticizes and translates work from Ihde, Latour and Borgmann into a postphenomenological vocabulary. As a postphenomenologist, Verbeek is concerned with the relationship between humans and their world, and as a technical philosopher, Verbeek is concerned with the role of technology in this. Rejecting both the instrumentalist and substantivist view on technology in human life, Verbeek explains that we can neither see products as neutral means to an end, nor say that it is products that determine the way we live our lives.

Verbeek argues in fact that products *mediate* how we experience and exist in the world. In other words, relating to products helps us to perceive and give meaning to the world around us, but also to act in and engage with this world; in doing so, both products and humans play a role. Like Latour, in describing the nature of these roles, Verbeek is keen on establishing a vocabulary that helps move away from the object-subject dichotomy that often prevails in analyzing human-product relationships. Instead of seeing humans and products as two static entities that together define a relationship, they argue that the nature of each should be seen as emerging from their relationship. For example, imagine a person who uses his bicycle to ride through the countryside every now and then. Through this relationship, the person becomes a cyclist and the bicycle becomes a means to explore and/or experience the countryside. Without this relationship, the person is 'just' a person and the bike is 'just' a bike. The term 'mediation' acts as an umbrella covering the range of different roles technology can play in this human-product-world relationship, beyond their 'mere functioning'; it is used to convey the sense that products are intermediaries which co-shape human existence.

In regarding product mediation *of behaviour* (the type of mediation that concerns us the most) Verbeek builds on the work of Latour. Latour regards both humans and nonhumans as equal entities within networks. Latour is thereby concerned with the often hidden networks that have brought the product into existence. For instance, regarding the chair upon which I sit, this network would consist of the person who cut the wood, its assembler, the department store where I bought it, the car that brought it here, and

so on. In that sense, the chair connects me to this network. Verbeek, however, is interested in the relationship between the user and his world *as experienced and enacted* by the user, and *mediated* by the product. In the case of my chair, Verbeek would be interested in how it mediates my comfortable presence in the garden.

This distinction in analytical focus led Verbeek to adopt only 'translation' and 'delegation' as relevant meanings for mediation, out of the four originally defined by Latour (1992; 1999). Translation refers to the notion that products can transform courses of action by changing user goals, as demonstrated by the example of the gun. Delegation refers to the fact that products can prescribe actions to users. To detail this concept, Latour (1992) elaborates on the term 'script' as introduced by Akrich (1992) to describe the 'implicit manuals' that products embody. Latour expands on the concept to specify the relation between designer, product, and user. He 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 affordance, 1979), and 'subscriptions,' which explain how users interpret these prescriptions. One of Latour's examples of designs that deliberately aim to alter behaviour is the speed bump. Designers inscribe such objects with a message to 'drive slowly and responsibly.' This inscription potentially leads to a prescription, such as 'slow down,' and can lead to a subscription, like 'slow down to avoid damaging the car.' A similar and often-mentioned example in this context is the overpasses over the parkways on Long Island, New York, as reflected upon by Winner (1980). 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 to people with access to a car. Winner (1980) 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. Both the speed bump and the overpasses demonstrate how material interventions can, quite directly, dictate and thus mediate particular behaviours. But the concept of mediation helps to identify also more indirect forms of influence design has on human behaviour.

How a smartphone influences our social interactions

To illustrate the various types of behavioural mediations that exist, let us reflect on the use of the smartphone. Since the use of the smartphone has become fairly common in many societies, several behaviours have been gradually changed through its use. For example, since calling someone is not restricted to a landline any longer but can be done anywhere and any time, a train ride has become the perfect moment to call our friends or colleagues. Although it can be quite convenient to use travel time for social talk, we inadvertently force other travellers to follow our private conversations. Our phone use thus mediates behaviours that can be quite disturbing in the social setting of train travel.

The navigation applications every smartphone offers mediate a different kind of social interaction. A GPS, for example, can come in quite handy when we are in a city we are not familiar with. It has become nearly impossible

to get lost now that our smartphone can instantly show where we are and where to go on up-to-date maps. A side effect of this facility is that we do not need to engage in conversations with strangers anymore. Before navigation applications, we used to ask people who just happened to be there for directions. And although this often felt quite scary, it also created opportunities for surprising interactions in which we often experienced people's general kindness.

A final example of how the smartphone has changed our behaviour is illustrated by the digital calendar every smartphone contains. Thanks to automatic notifications for all the birthdays in one's social network, the digital calendar supports our attentiveness towards others. If we wish, we can even write a general text message and let the smartphone automatically send this after having added the name from the contact list. However, one wonders how attentive this text messaging then becomes and how this mediates subsequent behaviours. It may well be that to really show attentiveness, sending a handwritten postcard suddenly becomes more meaningful. On the other hand, forgetting somebody's birthday may become even more painful now that it is so simple to not forget it. The existence of such a superefficient calendar mediates our interpretations of people's behaviour and thereby our social interactions.

The example of the smartphone and reflecting on its role in changing our social interactions in the train, with strangers in a city, and with our friends and family shows how unintended and hidden this influence actually is. None of the designers of the smartphone, the navigation application, or digital calendar probably intended for these behavioural changes to occur. Moreover, most of us do not recognize how our behaviour is altered through the use of these products.

2.2 *Designing mediation*

Understanding and discussing the use of a smartphone in terms of mediation shows that Verbeek indeed defines an appropriate concept to describe and understand the role of products in shaping behaviour. However, the question remains how this concept might support the design of this influence. Verbeek (2011) reflects on two methods that may support designers in anticipating, assessing and even designing mediations. He reflects for instance on the work of Jelsma (2006), who developed a method for designers to align 'user logic' with 'script logic' in order to reduce environmental impact. By studying how existing designs prescribe particular unexpected (and undesired) behaviours of users, products can be redesigned as to function in line with this user logic and to mediate more sustainable practices. Although Verbeek affiliates himself with Jelsma's way of approaching product influence, he argues that mediation covers a broader view of product use and subsequent behaviours, as products can also change interpretations or pose moral choices.

Besides the work of Jelsma, Verbeek reflects on the 'value-sensitive design' approach of Friedman and colleagues (2002). This is developed as

a three-phase approach with conceptual, empirical, and technological investigations. The approach encourages designers to consider the various values that come to play in interaction with the product-to-be-designed. For instance, to what extent a navigation application based on GPS technology may conflict with a value like privacy, but may simultaneously support a value like autonomy. The method supports designers to reflect on such values, and to discuss potentially conflicts between them. Verbeek argues that the method offers a solid first step towards the development of a method for designing the morality of artefacts, but may be insufficient. He argues for instance that the method does not explicitly include a vision for the future use of the design, or a framework for assessing the eventual design from an ethical perspective. As a result Verbeek proposes an integration of both methods of Jelsma and Friedman and colleagues, and argues that designers should follow five stages to design the morality of their designs.

The process starts with the designer's conscious decision to moralize his design explicitly from the start, or to do this implicitly and assess the morality of the design when it is at a more mature stage. When a designer decides to explicitly moralize his design, Verbeek suggests a conceptual analysis, a mediation analysis, and a moral assessment before the final stage of deciding upon a design. The conceptual analysis is more or less in line with Friedman and colleagues' (2002) suggestion to analyse, discuss, and decide on, the values embedded in the design. The mediation analysis is more or less based on Jelsma's idea of aligning 'user logic' with the design's 'script logic'. Verbeek suggests the use of scenarios to anticipate future use of the design and to highlight potential interpretational and behavioural mediations. Finally, the designs and their intended mediations, the implicit mediations evoked by the design (as far as these can be anticipated), the form of mediation used, and the outcomes of these mediations can be morally assessed by involving relevant stakeholders. Verbeek argues that a final design should be selected based on this assessment, while acknowledging that designs can always lead to unexpected use and appropriations.

Although Verbeek stresses the need for designers to take responsibility for the mediations of their designs, he also stresses the limited extent to which designers can factually control them. In his view, mediation should be understood as a concept that emerges in the complex human-product-world relationship. Designers can, at best, anticipate this relationship, but never define it. It is not strange therefore that Verbeek proposes a design approach that aims to embody the full spectrum of possible mediations for a product yet to be designed. In a regular design process, in which the product-to-be-designed is defined already, this approach would indeed make sense. In these situations the question becomes: a product is being designed, e.g., a cooking appliance, how can we appropriately 'moralize' this product in order to induce desired social implications rather than undesired ones? However, the approach falls short when designing for social problems. In these design projects, the designer aims to alter a particular behaviour, with the ultimate goal to counteract the social problem at hand. Yet, at this stage, the designer does not know by means of what product or service to do so. For these design projects, the question is rather how a desired behaviour can be mediated by any design, i.e., any product or service. This means that instead of discussing the broad spectrum of mediations that can be elicited

by a particular product or service, we rather aim to understand what product or service can be best designed to realise the intended mediation of behaviour.

2.3 *Conclusion*

The concept of mediation successfully shows how technological innovations as well as mundane physical objects in our environment affect people's goals and actions. It explains that through the interaction with products and services, people engage in a different relationship with their social and physical environment than they would without these products, or with different products. Hence, products co-shape our experiences and behaviours. The concept of mediation thus successfully explains how design does more than neutrally provide a means to an end, but that it can affect behaviours on top of its plain function. In order to understand this often hidden influence of design, we therefore have to understand product influence as a human-product-world relationship.

The concept of mediation functions as an umbrella term used to describe and understand the behavioural effects induced by an existing (concept) design. We have argued that Verbeek's proposed method for designing mediations may be valuable in design projects in which the product-to-be-designed is defined at the beginning of the project. However, the approach does not provide clues for designers who need to reason from a desired behaviour to a design. Although we agree that influence is a relational concept emerging in the human-product-world relationship, we consider it necessary to more closely understand and grasp this relationship in order to design a product or service for a desired mediation of behaviour. In the next chapter, we therefore take a closer look into the role design plays in behavioural change.

two approaches for understanding product influence

- THIS CHAPTER IS BASED ON THE BOOK CHAPTER:
TROMP, N., & HEKKERT, P. (2012). DESIGNING BEHAVIOUR.
IN J. DONOVAN & W. GUNN (EDS.), DESIGN
ANTHROPOLOGY: ASHGATE -

Many scholars investigated (and still investigate) how people's behaviour has changed or may change due to the use of products and services. Some wish to better understand how products can bring about instant change; others try to understand how changes develop over time. This chapter introduces various theories from a variety of disciplines that have been developed to explain the influence of products on behaviour. The origin and key principles of each theory are explained. An example design brief is used to illustrate the instrumental value each theory offers to the field of design. A comparison of the theories reveals that two general approaches exist to explain the influence of products on human behaviour: a synthetic and an analytic approach. Based on the illustrative designs, the potential value both may offer to the process of designing product influence is discussed.

Example Design Brief
The number of people suffering from obesity is rapidly increasing in developing and developed countries; it has become a major health issue in Europe and the US. We imagine here that an unspecified government has asked for a product (or service) that prevents people from overeating.

In this chapter, we show how different theories are instrumental in considering the design of a product to prevent people from overeating. We want to stress that in developing these designs, we have drawn on assumptions that may be unfounded. For instance, for one of the designs we assume that 'overeating is a stress-coping mechanism'. Whether this is true or not does not matter for the present purpose: we only refer to these assumptions to illustrate how each theory may support the designer's thinking about the problem at hand, i.e., obesity.

3.1

Six theories about product influence

Affordance Theory

Discipline: Ecological Psychology
Summary: Originally formulated by perception psychologist Gibson (1979), and introduced to the field of design by Norman (1988), the theory of affordance describes how perception can inform the meaning of a person's physical environment (Jones, 2003). According to Gibson, people do not first perceive an object's properties, like colour, form or texture, but rather what the object affords, or offers, them. Affordances of the environment are 'what it offers the animal, what it provides or furnishes, either for good or ill' (Gibson 1979, p127). Although affordances arise in direct perception, and thereby prompt the actions of the perceiver, they exist independently of this perception (Michaels, 2003). This means they are both objective and subjective, in the sense that they can be objectively described in relation to a subject who may or may not perceive them. A heavy stone affords 'throwing' to an adult, while it does not afford this to a one-year old. The affordance 'throwing' is derived from adult (or bigger, stronger) sensibilities, and is thereby subjective. The fact that this affordance exists, even when the adult does not perceive it, makes the affordance objective. Michaels (2003) proposes to define affordances as action-related, referring to the range of potential actions a subject has in relation to an object or the environment. Once perceived, affordances always guide actions back to the affording object. Hence a chair affords sitting on that chair, a switch affords switching that switch, and a wall affords hiding behind that wall to any particular subject.

Relevance: Applying the notion of affordances helps designers to clarify how products may (differently) influence behaviour: they show that user perception of a product's properties plays an important role in actualizing the types of behaviour the product affords. Behaviour is thus explained as resulting from an unconscious process in which perceived product properties are linked to personal abilities. This implies that either changing product properties in relation to human capabilities, or increasing or decreasing the salience of these properties can influence behaviour.

FIGURE 13
A RELATIVELY SMALL BOWL DESIGNED TO PREVENT PEOPLE FROM SERVING THEMSELVES TOO MUCH FOOD

Illustration: As regards obesity, designing and incorporating an affordance that would prevent overeating (to the wide range of users likely to be exposed to the product) means designing a product that does not afford much eating. With this in mind, a very small bowl is designed that simply cannot hold much food.

Nudge Theory

Discipline: Behavioural Economics
Summary: The term nudge describes the subtle push the environment often gives us to make certain choices. Thaler and Sunstein (2008) posit the concept of 'nudge' in opposition to the idea that people behave rationally, choosing what is best for them as long as they have the proper information. By showing a variety of examples and referring to various experiments, Thaler and Sunstein show that people often make choices that may not be considered 'ideal' from a rational standpoint. To explain this phenomenon, they argue that people make most choices by using their automatic system, i.e. the cognitive system located mostly in the unconscious. In making 'automatic' choices, people are not led by reasonable arguments, but by tendencies evoked by latently existing or intentionally orchestrated, subtle cues, i.e. nudges. Nudges are 'aspects of the choice architecture that alter people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives.' (Thaler & Sunstein, 2008, p. 6). This means that designers – 'choice architects' – exert considerable influence over those choices through product presentation, or by extension through design of the choice environment. Consider the action of voting: not only does the way candidates are presented influence the vote, e.g., the way the names of the candidates or their pictures are presented, but also the environment in which the vote is recorded. Studies have shown that when votes were recorded in a school, people were more inclined to vote for educational renewal plans (Berger, Meredith & Wheeler, 2008).

Relevance: Nudges indicate how products and environments can activate particular human tendencies. Behaviour is explained as the outcome resulting from an offer of choice and the automatic behavioural responses it triggers. By recognizing the choice(s) offered by products, and by developing the ability to predict behavioural responses based on fundamental research, a designer can deliberately design influence.

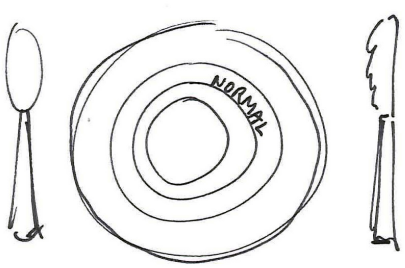


FIGURE 14
A PLATE DESIGNED TO INDUCE PEOPLE TO SERVE THEMSELVES 'NORMAL' PORTIONS OF FOOD

Illustration: Designing a product that nudges against overeating means that the product should trigger a natural tendency to eat less, without activating feelings of restraint. Deriving inspiration from a related tendency in human nature, i.e., when confronted with what most people do, or what is 'normal', people unconsciously steer their behaviour in that direction (e.g., Cialdini, 2003), a plate is designed that presents a standard, or 'normal', portion of food. The plate shows several concentric 'portion lines', with one explicitly labelled 'normal'. Serving food inside this line could prompt the consumption of smaller portions for those people who often eat too much.

Persuasion Theory

Discipline: Social Psychology
Summary: Persuasion is used to describe how people influence one another in interpersonal relationships, and are influenced through mass communication. Fogg (2003) was the first to use the term persuasion to describe the influence products (may) have on human behaviour, in conjunction with his research on 'persuasive technology', defined as 'any interactive computing system designed to change people's attitudes or behaviours.' (Fogg, 2003, p.1). Advances in hardware technology and software had made interactivity possible, and products had begun to 'talk back'. Fogg began investigating the degree to which computers might be able to alter what people think and do. His research heavily relied on the work of social psychologist Cialdini (2001) whose aim it was to understand which psychological principles underlie a human's choice to comply with a request. Although Cialdini explicitly emphasizes the role played by automatic processing in guiding people's behaviour, the field of persuasive technology mostly provides examples of how products can support behavioural change based on the deliberate and conscious choice to change. Fogg, Cuellar & Danielson (2003) distinguish 'macrosuasion' from 'microsuasion'. Macrosuasion refers to persuasive technology that is explicitly designed with a change in behaviour as the main goal of the design. An example of this is the 'Baby Think It Over' doll, designed to address teenage pregnancy by providing young people with the opportunity to experience caring for a newborn baby. Microsuasion refers to technology that contains some persuasive elements, for instance an ATM that emits a beep to remind you not to forget your ATM card.

Relevance: Applying the theory of persuasion to human-product interaction implies that products can be seen as social actors displaying human qualities and thereby wielding persuasive influence. Behaviour is then explained as the outcome of a user-product interaction in which similar principles are at play as those elicited during interpersonal interaction. Experimenting with the transmission of social principles through design, the field of persuasive technology offers a wide range of design principles for persuasive design.

FIGURE 15
A WEIGHT/CALORIE SCALE DESIGNED TO HELP PEOPLE MONITOR THE NUMBER OF CALORIES IN THEIR MEALS

Illustration: Persuasive technology is often developed for situations where people are already motivated to change their behaviour, e.g. they want to quit smoking or stick to a diet. Therefore, in this case it is assumed that the user is motivated to reduce the amount of food he or she consumes. This assumption makes providing accurate feedback an effective strategy to stimulate and support behavioural change. Therefore, a weight/calorie scale is designed that shows how many calories a particular portion contains. This allows the user to easily monitor and control the amount of calories he or she consumes.

Activity Theory

Discipline: (Soviet) Psychology
Summary: Activity theory was devised by Leont'ev (1974) and developed as a reaction to the behaviourist approach. Instead of seeing behaviours as automatic reactions to stimuli, activity theorists explain behaviours as complex, socially constructed phenomena in which products are explicitly assigned a role. An activity is composed of a subject (a person or a group of people), an object (the purpose of the activity), plus actions and operations (Nardi, 1996). An activity is a conscious and goal-directed process that can be supported by automatic operations happening unconsciously. For instance, when one is learning to drive a car, shifting gears is an action with an explicit purpose that requires conscious attention. However, over time, shifting gears becomes a routine that happens automatically (Nardi, 1996). Kaptelinin and Nardi (2006), two present-day activity theorists, agree that products cannot be regarded as neutral instruments, though they are hesitant to assign products with powers of agency. In their view, products can cause (behavioural) side effects, but can never 'delegate' an action to a person without that person having the intention to act. Behaviour implies intention, either on the part of the designer or the user. Activity theorists thereby argue for a subject-object dichotomy. As an example they refer to a cell phone that starts beeping because it requires new batteries. They argue that a user will replace the battery because of a deliberate choice to use the cell phone. In their view, comparing how users exercise the freedom to act with a cell phone that is programmed to beep shows the asymmetry of people and products (Kaptelinin & Nardi, 2006, p.249).

Relevance: Although activity theorists point explicitly towards the role of products in activity, they stress that human intentionality is the main driver for behaviour. Nevertheless, they state that designers can design products that change behaviour, and that products can have unintended effects on behaviour. To explain behavioural change, activity theory places user-product interaction in a social context. This theory is valuable to the process of designing product influence not so much by providing a detailed description of how product influence works; however the notion of contextual activity can support designers to systematically map and study the social context of product use.

FIGURE 16
A BOOK DESIGNED TO CORRECT PARENTS' MISCONCEPTIONS ABOUT FOOD- AND HEALTH-RELATED DISCIPLINE

Illustration: By considering eating as an activity, 'overeating' should be regarded as part of a relevant social 'context of use' in order to conceive the to-be-designed product. The context in which eating habits evolve is considered most relevant in this case, and thus focus is put on the context of dinnertime at home. In this situation, parents often use their authority to

make children finish their meal, even though children argue that they have had enough. This may teach healthy children to overeat from a young age. By designing a book about eating and caring, the idea is to raise parental awareness of the misconceptions they may have about food and health when disciplining their children.

Practice Theory

Discipline: Sociology
Summary: Practice theory sees human behaviours as essentially social, and considers a 'practice' the smallest unit of analysis, of which behaviour is a part/component. A practice is 'a routinized type of behaviour which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, and background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge.' (Reckwitz, 2002). In sum, the dynamics of what makes up a practice can be represented as the interplay between conventions, skills and artefacts (Kuijer & De Jong, 2009). To clarify this, consider the practice of cycling in the Netherlands. The act of a cyclist yielding to a pedestrian is part of a practice that contains several elements. At the moment of giving way, the cyclist's ability to notice pedestrians, the bicycle brakes that actually enable the cyclist to give way, the infrastructure of separate lanes for cyclists and pedestrians, and the relevant traffic rules are all elements that interact and together shape the practice. Although Shove, Watson, Hand and Ingram (2007) sympathize with Latour when he stresses the interrelatedness of people and products and the influential role of products in shaping behaviour, they highlight the importance of understanding the evolving nature of this relationship. In practice theory, emphasis is placed on the historical development of practices and on the interplay between practice elements that explain this development.

Relevance: Practice theory builds on actor-network theory to understand the role of products in changing behaviour, though here this role is placed in a cultural and historical context. Although it stresses the influential role of products in shaping behaviour, it also stresses products' dependence on the context in a historical and cultural sense. This theory is valuable to the process of designing product influence because it helps designers recognize the contributions of history and culture to the social significance of products. More specifically, it may help to understand the continuous interaction between various influential factors on behaviour over time.

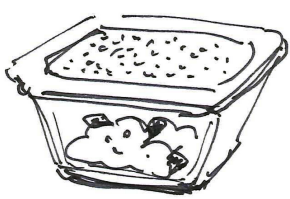


FIGURE 17
A CONTAINER DESIGNED WITH THE TECHNOLOGY TO MAINTAIN LEFTOVERS FOR DAYS OUTSIDE THE REFRIGERATOR

Illustration: The act of eating is treated as a practice, in order to investigate the evolution of eating over time, and to research the various conventions and norms related to it. It appears that as hunter-gatherers, but also during

the periods thereafter, having plenty of food was the exception rather than the rule. Throwing away food was unthinkable during those periods. Given this, overconsumption can be understood as a consequence of a genetically or socially transferred reluctance to throw away food. Because people feel resistance to the idea of throwing away food, they may feel the need to finish it all and eat too much. Therefore a specific kind of container is designed that keeps food fresh for days, outside the refrigerator.

Systems Theory

Discipline: System Dynamics
Summary: Many examples of how design has had an influence on people's behaviour are often described in terms of their side effects; the term is used especially when describing unforeseen behavioural consequences engendered through product use that have become apparent after quite some time. For example, last summer in the Netherlands (2012) a news item revealed that the number of children lost per year at the beach had increased. There was much speculation as to the cause of this development; one explanation was that nowadays parents are overly occupied with their smartphones and pay less attention to their kids. This would typically qualify as a side effect. By offering users a wide range of highly valued possibilities, the smartphone may cause behavioural drawbacks that only become apparent over time. The field that is explicitly studying the longer-term consequences of interventions is the field of system dynamics, originated by Forrester (1961). System dynamics uses systems thinking and system modelling to understand how interventions cause both immediate effects and side effects (Sterman, 2000). In doing so, 'system thinkers' stress the importance of so-called feedback loops, e.g., reinforcing loops or balancing loops, that explain how causal relations are always two-way (Richmond, 1994).

Relevance: Although system dynamics does not focus specifically on the role of products in changing behaviour, it does help to understand how products cause unintended side effects on behaviour. To define specific causal relations, other theories have to be consulted, but feedback loop principles can help designers remain aware that products also exert influence over time. Its systematic approach is suitable in reasoning from intended side effects back to the role of the product within a particular system.

FIGURE 18
A BOOKLET DESIGNED TO INVITE CHILDREN TO RECORD INSTANCES WHEN THEY FEEL PROUD OF THEMSELVES AND THEIR EFFORTS AT SCHOOL

Illustration: By treating overeating as a side effect of something else, research is done into overconsumption. This showed that eating is often a stress-coping mechanism that develops from an early age. It is because of our competitive and results-oriented primary school culture that children

become anxious and start eating more than needed. To prevent this, an educational intervention program is developed. This intervention includes an initiative for schools to provide children with a booklet in which they write down one thing they achieved that day and of which they are proud. Doing this every day is intended to decrease stress among children and prevent them from overeating. Moreover, the booklet could help children to find their strengths and may support a teachers evaluation of the child's performance.

3.2 *A theoretical comparison*

The reason to compare these, sometimes, disparate theories is to discuss, at least in theory, how each may contribute to designing behaviour.

Although each theory includes the role of products in its study of behaviour, each is the result of an investigation motivated by a different intention, and so the type of behaviour each theory is concerned with varies greatly. While some researchers were interested in investigating the effect of choice framing by products, others felt understanding was needed about the influence of products on cultural development. The term 'behaviour' may refer to choosing an ice cream at a cafeteria, or the way Dutch people celebrate Christmas. When considering for instance the use of a toothbrush, the brush plays a role in how one brushes one's teeth in operational terms, e.g., orientation of the brush or duration of brushing, but also in (social) behavioural terms, e.g., how it may produce intimate interaction when one is brushing one's children's teeth, and even in routine behaviours that belong to specific cultures, e.g., how a toothbrush is part of and contributes to the norm of brushing one's teeth before going to bed.

The first three theories, i.e., affordance, nudge, and persuasion theory, describe product influence by analysing the relationship between user and product in great detail. In understanding the role products play in altering behaviour, they make user-product interaction the focus of analysis: attributes of the product are related to individual processes that explain behavioural change. The other three theories, i.e., activity, practice, and systems theory, are based upon the argument that no complete understanding of product influence can be gained without including the context that codetermines this influence. These three theories acknowledge the importance of products in shaping behaviour, but regard other factors such as other people, culture, and history as inextricably linked to this process. Products are tied in with these other factors to understand behavioural change. This comparison of the theories shows that the first three theories explain product influence by means of analysis, i.e., studying product influence as composition of its parts, while the latter three explain product influence by means of synthesis, i.e. studying product influence as part of a larger composition (Ackoff, 1994, see Figure 19).

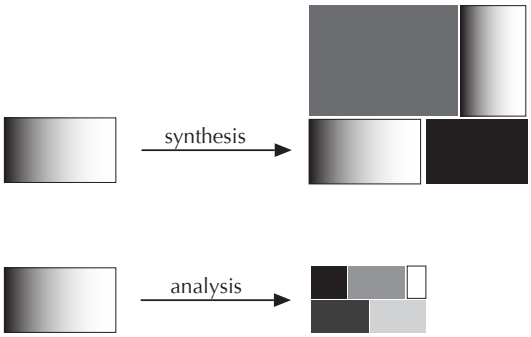


FIGURE 19
IN UNDERSTANDING A PHENOMENON, ONE CAN TAKE AN ANALYTIC APPROACH, I.E., UNDERSTANDING THE PHENOMENON AS SUM OF ITS PARTS, OR A SYNTHETIC APPROACH, I.E., UNDERSTANDING THE PHENOMENON AS PART OF A LARGER WHOLE

The instrumental value of the analytic and synthetic approaches to design

All of the theories discussed here hold unique value for designers, and enable them to more consciously account for the influential power of their products. Naturally, a theory that explains product influence in relation to its context offers different instrumental value for designers than a theory that explains product influence by zooming in on user-product interaction. When designing behaviours, a synthetic approach helps the designer recognize other factors apart from the product that influence this behaviour. The designer is stimulated to make an inventory of these factors and given some guidance towards understanding the interactions between them. The synthetic approach increases the designer's understanding of the context for the behaviour, and thereby the chance the designer will design an appropriate intervention. Looking back at the exemplary design brief and the illustrative designs, the latter three theories indeed prompted consideration of the reasons people might have to eat more than necessary, and to tap into these underlying reasons.

On the other hand, theories derived from a synthetic approach give little to no guidance regarding the embodiment of the actual design. Although a designer gains a better understanding of where to intervene, and what exact behaviour to stimulate, he or she might be left clueless about how to actually realize this by means of a design. For instance, regarding the idea that overeating may be a consequence of parenting styles, it remains open to question whether a book is the best way to change parental behaviour. Compare this to the first three designs, which are based upon powerful influential strategies. The embodiment of these designs can be explained in relation to their intended influence: the bowl is small, the plate cues to a norm through the line, and the scale gives feedback. The first three theories are clearly more useful in supporting the designer seeking to define behaviour-influencing product properties.

Indirect and Direct Influence

If we call to mind the illustrative designs, it might be said that theories based on a synthetic approach support a designer's efforts to develop interventions that indirectly influence behaviour, while theories derived from an analytic approach support designers' development of interventions that directly affect behaviour.

The bowl, the plate, and the weight/calorie-scale, are trying to *directly* prevent people from overeating. The bowl and the plate steer 'food portioning', and the scale affects 'food preparation'. These two instrumental actions are unmistakably part of eating food. By influencing these actions, one directly affects the consumption of food. On the contrary, the book, the container and the booklet are more *indirectly* trying to prevent people from overeating. The book seeks to change 'parenting behaviour', the container to affect 'leftover handling', and the booklet 'coping with stress'. Of course these behaviours are also related to eating behaviour, but less directly; by seeking to impact these parallel behaviours, designers more indirectly aim to change overeating behaviour.

When one has the intention to stimulate a particular behaviour it is logical to focus on that behaviour when thinking of a design. If we want people to do sports, how can a product stimulate sporting activity? If we want people to stop smoking, how can a product discourage smoking? And if we want neighbours to meet one another, how can we encourage meetings? However, it is not necessarily true that the best place to treat a problem is the place where it appears (Ackoff, 1994). Knowing that influence can be direct and indirect ought to help designers to think of other, related behaviours that stimulate behavioural change. If we want people to do sports, maybe discouraging television watching is more effective? And maybe it would be more effective to design a product for partners of smokers, instead of smokers themselves? And if meetings between people with different backgrounds is what we are after, it might be better to think of ways to change shopping behaviour and thereby increase the chances for accidental meetings, rather than organizing meetings directly. Synthetic theories may be supportive of this 'broader thinking'. We would need analytic theories to understand how to effectively discourage watching television, change the behaviour of partners of smokers, or alter shopping behaviour of people. Eventually, products always change behaviour directly, but can influence the target behaviour indirectly.

3.3 *Conclusion*

We compared six theories in which the role design plays in behaviour is explicitly mentioned. By means of illustrative designs, we showed the potential instrumental value of each theory. A comparison of the theories revealed that to understand product influence, one might adopt either a synthetic or an analytic approach. We argued that both have instrumental value to designers who aim to design for behavioural change. Synthetic approaches to understanding product influence raise specific awareness of the dynamic, interacting factors that make up human life, which may in turn help a designer to better understand where to intervene when aiming to change behaviour. By expanding the designer's scope, these holistic theories reveal how interventions may indirectly affect behaviour.

As a complement, analytic approaches to understanding product influence provide a clearer grasp of what happens during user-product interaction, and how this interaction impacts behaviour directly. This knowledge increases

the designer's understanding of how to actually materialize the influence of a design. Although these two approaches to describing and understanding product influence may be grounded in fundamentally different worldviews, this should not affect design practice. We simply cannot afford to neglect either when we aim to support designers in shaping a better world.

This chapter provides a more detailed account of the relationship between users, products, and their context, thereby equipping the designer to design this influence. This chapter does not, however, make reference to the user perspective that Verbeek considers essential to understanding the often-unintended influence that products appear to have. In his view, the factual role of design emerges in their relationship. A more careful understanding of the user and his concerns, ideas and notions in interaction with the design is therefore crucial to anticipate this role as best we can. How might we consider the user perspective in designing interventions to change behaviour? What concerns do users have? And how do these affect their experience of the intervention and therefore any inclination to change their behaviour? Even though our understanding of designing product influence is rapidly expanding [7], there is little notion of how to consider the user in this design practice [8]. In the next chapter we discuss how to deal with the user aspect of designing for behavioural change with a social purpose.

[7] E.g., we can match target behaviour to relevant theories and techniques (Fogg & Hreha, 2010), we have learned how technology offers a means to create a person's persuasion profile (Kaptein & Eckles, 2010), and designers are offered various strategies to apply (Lockton, Harrison, & Stanton, 2009).

[8] There are a few exceptions, e.g., attempt to understand the seductive experience (Khaslavsky & Shedroff, 1999), and a study to the experience of persuasive techniques in web services (Segerståhl, Kotro, & Väänänen-Vainio-Mattila, 2010).

04

four types of influence

- THIS CHAPTER IS BASED ON THE PAPER:
TROMP, N., HEKKERT, P., & VERBEEK, P.-P. (2011). DESIGN FOR SOCIALLY RESPONSIBLE BEHAVIOUR: A CLASSIFICATION OF INFLUENCE BASED ON INTENDED USER EXPERIENCE.
DESIGN ISSUES, 27(3) -

The way people experience external influence plays an important role in their inclination to actually change their behaviour. Similar to a situation where a person tries to persuade you to act differently: features like his attitude, tone of voice and expressions affect your experience and thereby your motivation to act. Hence, the experience of the influence plays an important role in the design's overall effectiveness. Additionally, people are to varying degrees willing to change their behaviour, and therefore, to varying degrees, receptive to influence. Developing a product to support somebody's dieting efforts may indicate a different strategy than, for example, designing something to stop people from bashing up bus shelters. To understand what strategy to apply when designing for behavioural change, we therefore need to understand how users perceive and experience such external influence and anticipate this at the best we can.

This chapter takes current understanding of the influence of design further by studying this influence from a user perspective. Based on an analysis of sixty-eight influential designs, we propose a classification of influence that comprises two dimensions, i.e., the salience and the force of influence. People can be more or less aware of an influence, and people may experience more or less force to actually change behaviour due to the design. These two dimensions together define four different types of influence, i.e., coercive, persuasive, seductive, and decisive influence. To clarify when and why to apply what type of influence, we discuss the role of the relationship between personal and collective concerns in the dilemma at hand. We conclude that one's choice of strategy needs to be based on considerations of both its effectiveness and its appropriateness.

4.1 *Discouragement and encouragement of behaviour*

To reseach the same goal, one can discourage undesired behaviour or encourage desired behaviour. Products that are deliberately designed to change behaviour are often based on some undesired behaviour that has transpired. People eat unhealthily, people drive unsafely, people irritatingly hang around at specific places, or do not pay for their train tickets. Designers can intervene either by discouraging the problematic behaviour or by encouraging other desired or accepted behaviour that is incompatible with the undesired behaviour. However, encouragement of behaviour can certainly also be a goal in itself. The distinction is necessary to clarify how a design interferes with the user's intention to behave in a certain manner and the user's 'original' motivation to behave differently, as these both affect the experience of the influence.

There are two deliberately conceived interventions to limit or discourage fare-dodging— reactions to unwanted behaviour—that clearly shows these different ways to approach behavioural change. Fare-dodging, as behaviour, is simply illegal and clashes with our collective concerns for equality and honesty. However, not paying the public transportation fare can happen for several reasons, based on personal concerns. People might not have enough money to pay their travel costs, or maybe they enjoy the rush they get from acting illegally; some people might simply forget to buy a ticket, while others do not buy one because fare-dodging is so easy. Now we compare two interventions developed in response to this undesired behaviour: the ticket portal and the lottery ticket. The first is designed to discourage undesired behaviour, while the second is designed to encourage desired behaviour that is incompatible with the undesired behaviour.

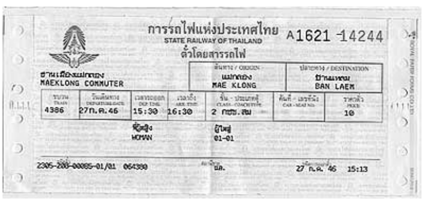


FIGURE 20
TWO INTERVENTIONS SPECIFICALLY INTENDED TO REDUCE FARE DODGING: THE TICKET PORTAL AND THE LOTTERY TICKET

The ticket portal (Figure 20) is placed at the entrance of the station; the portal opens only when a ticket has been inserted, and hence obstructs fare dodgers' movements. The only way to fare dodge is to jump over the

portal, making the illegal behaviour visible to others. As soon as we link the fare-dodging behaviour with people who do not have enough money, or who enjoy the kick they get out of acting illegally, 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 effective.

A different way to intervene is to make each ticket serve a dual purpose: the transport ticket is also a lottery ticket, to encourage ticket sales (Figure 20). Adding a chance to win a certain amount of money to the ticket might seduce fare dodgers who do not have a lot of money, as well as the ones who enjoy a risky lifestyle. It could also draw extra attention to the ticket windows to trigger different behaviours from forgetful passengers.

These two examples show how personal concerns of the user, plus the way a design relates to these, weigh heavily on a user's motivation to alter his or her behaviour.

4.2 *Different psychological processes*

To clarify the different ways products can trigger psychological processes and thereby exert different types of influence, we shall examine several interventions to halt risky driving behaviour. These interventions are respectively, the speed bump, the speed limit camera, the French 'rue de la mort' signs, the Dutch 'Drive with your heart'-campaign, the countdown, and a junction explicitly designed without any signs. All these interventions have been clearly designed out of collective concerns about safety. Although safety is naturally a personal concern as well, all kinds of other concerns can easily overrule this: we may be in hurry to pick up our children from day-care or to be in time for a job interview, we may be annoyed or listen to loud music and accelerate without noticing, or we may be simply enjoy speeding and showing off our driving skills. Various personal concerns, like being a responsible parent or future employee, relieving tension, or status and skills development, may therefore compel people to drive faster than what is considered responsible. In response, various interventions have been developed to change people's behaviour.

The speed bump was designed to obstruct irresponsible driving behaviour. The speed bump will damage the car if the driver does not slow down (Figure 21). By and large, concerns about the quality of the car and the hassle to repair the damage play a bigger role in reducing speed than concerns about safety or responsibility. The speed bump's function is to punish undesired behaviour. In a similar fashion, by addressing a different concern, the speed limit camera discourages speeding. If one exceeds the speed limit, one risks getting a fine. The user will be punished after the undesired behaviour is performed. In both examples the motivation to alter behaviour is externally regulated, which means that the user will most probably experience his behaviour as controlled or regulated (Ryan & Deci, 2000).

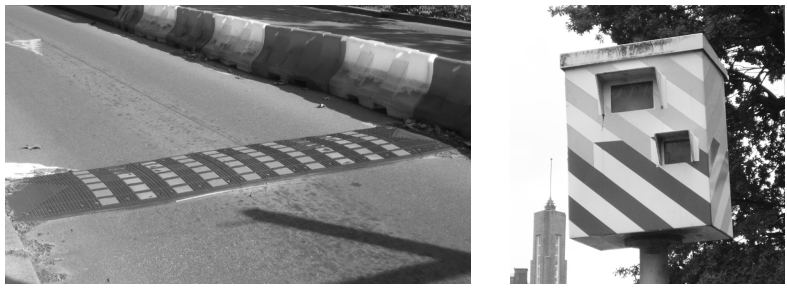


FIGURE 21
THE SPEED BUMP AND SPEED CAMERA TO OBSTRUCT SPEEDING

'Rue de la mort' signs (Figure 22) follow a different strategy. The signs are human-shaped, and stand for the people who died in car accidents at the actual site of the accident along the road. The human body-shaped representations are anonymous; only the number of accidents along that road and the number of people who died in the accidents are represented. The signs are intended to make the user aware of the dangerous character of the road and thereby stimulate responsible driving behaviour. The idea is that by becoming aware of the possible consequences of irresponsible driving behaviour, the driver then alters his own driving behaviour to avoid these negative consequences. Slightly different, but along the same line, is the campaign to 'drive with your heart' (Figure 22). The message explicitly brings into focus the user's responsibility regarding other road users. When effective, the collective concern of responsibility is regulated through identification (i.e., by becoming a personal concern) (Ryan & Deci, 2000).

FIGURE 22
THE 'RUE-DE-LA-MORT'-SIGN AND A DUTCH CAMPAIGN TO STIMULATE PEOPLE TO DRIVE RESPONSIBLY

The four previous interventions try to explicitly motivate users to adopt a more responsible driving style. Two others, the countdown and the junction (Figure 23), try to elicit responsible driving behaviour on a different basis. The countdown depicts the number of seconds before a traffic light turns green. This counting down eases feelings of uncertainty, because drivers know what to expect, and thereby decreases the rate of stress and agitation. The reduction in stress automatically also decreases the likelihood of irresponsible driving behaviour. The junction, on the other hand, 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 the 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 indications (Fryslân Province, 2005). These two interventions show how designing in a more implicit manner can elicit desired behaviour by making the conditions conducive to more automatic responses.

FIGURE 23
THE COUNTDOWN AND A JUNCTION WITHOUT ANY SIGNS TO ELICIT CALM DRIVING

4.3 *A classification of product influence*

We have shown that products can discourage or encourage behaviour and can thereby trigger different psychological processes. To arrive at a classification of product influence based on experience, we analysed a set of sixty-eight products. These products were either designed to have, or appeared to have influence on user behaviour. We included only those products that influence behaviour and have social implications. For example, products and services designed to help people remember their keys when leaving home (i.e., behaviour without clear social implications) were excluded. Moreover, for each product we analysed the influence exerted as follows: We reflected upon each design in terms of its ability to elicit behaviour that otherwise would not have been exhibited. Personal and collective concerns can easily collide at a societal level, and hence there may be little user motivation to alter behaviour. By considering each intervention in relation to unmotivated users, we were able to come up with 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 Niedderer (2007) as a potential intervention for social issues (e.g., social connectedness within a company). The idea of the design is that the cups are only stable when linked to other cups. This condition requires social interaction: the user needs to cooperate with other people for the cups to remain stable. Assuming that they would not be motivated to interact if it weren't for the cups (because of anxiety or other concerns), it is likely that these people are fully aware of being influenced and most probably will experience this intervention as forceful. Different uses for the cups are still possible, but its 'proper' functioning forces the user to interact with others.

This example effectively demonstrates the two different dimensions that classify our 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). Within these two influence-exerting dimensions, we distinguish four types of influence: coercive, persuasive, seductive, and decisive influence (Figure 24). A product can coerce, persuade, seduce, or decide for somebody.

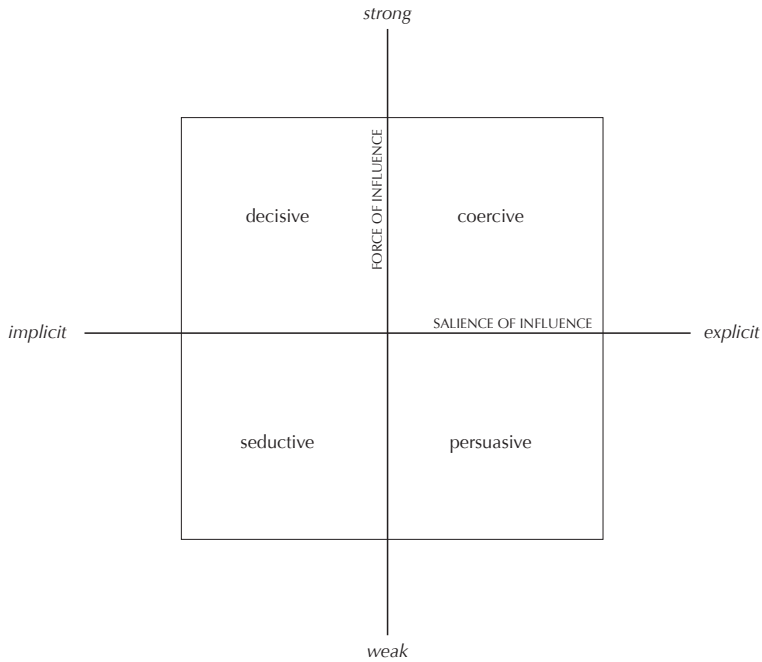


FIGURE 24
THE TWO DIMENSIONS, I.E., 'FORCE' AND 'SALIENCE', TOGETHER DEFINE FOUR TYPES OF INFLUENCE

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 behaviour 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 junction without signs to encourage slow-driving). People who are being seduced by design are not aware of the influence and most probably regard the behaviour 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 behaviour as externally regulated but do not recognize this regulation as a deliberate influence of the designer.

Although we have mentioned some designs to illustrate each category, it is important to note that when categorization is based on user experience a product can never be assigned *ipso facto* to a category. Only the user (who experiences the design) can categorize it as coercive, persuasive, seductive, or decisive. This personal categorization has two consequences: first, different people can assign the same product to different categories. Some

people experience a speed camera as persuasive, others as coercive. Second, the same 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 markings used to delineate or restrict 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 personal concerns

Although it is impossible to conclusively assign products to categories based on user experience, nevertheless we propose that design strategies be assigned to these categories. These strategies indicate how *designers* can trigger different psychological processes and thereby affect how the influence will most probably be experienced. Although we relate these strategies to the expected experience of influence, we are aware that user experience is richer than can be understood from defining it in terms of coercive, persuasive, seductive, or decisive categories 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 forceful to a greater or lesser extent and can happen consciously to a greater or lesser extent, 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 behaviour is logically a more salient way to influence than using physiological processes. Although the strategies are never a guarantee of a particular result, as the way a designer eventually applies the strategy is of great influence, we do think we can claim that specific strategies increase or decrease chances of exerting a particular influence. Figure 25 shows the relationship between the design strategies and the type of influence the product will most probably exert.

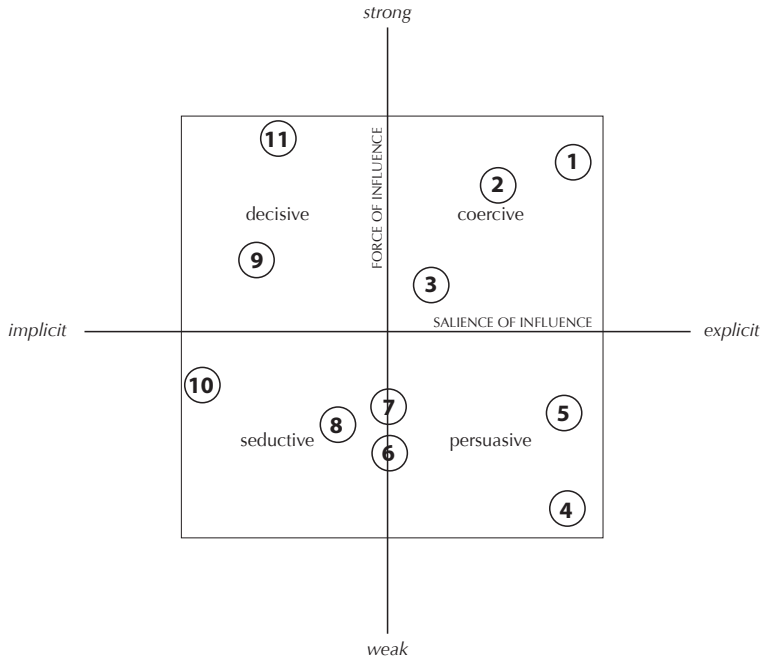


FIGURE 25
DESIGN STRATEGIES IN RELATION TO THE TYPE OF INFLUENCE THEY ARE EXPECTED TO LEAD TO WHEN APPLIED TO A DESIGN

1. Create a perceptible barrier for undesired behaviour.
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 26 shows how natural stones are placed to prevent cars from being parked in places that were not intended for this use. This strategy uses a so-called physical punisher for unwanted behaviour (the car will be heavily damaged if one decides to park there anyhow). Psychologists commonly agree that lasting behavioural change can only be developed if a reinforcer, rather than a punisher, consistently follows the behaviour. Although very effective, this particular approach is a situational and temporary solution and does not result in an enduring change of behaviour.

2. Make unacceptable user behaviour overt.
This strategy leads to products that make illegal behaviour, or behaviour we commonly regard as socially unacceptable, publicly visible. Figure 27 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 behaviour necessary for the product to 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 behaviour to reach his or her goal. Figure 28 shows the aforementioned Social Cups designed by Niedderer (2007). 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 behaviour to require more effort than they are willing to give to achieve the goal, the strategy most likely will fail.

4. Provide the user with arguments for specific behaviour.
This strategy provides the user with objective information about the consequences of certain behaviour. A well-known example, shown in Figure 29, is the cigarette package featuring explanations of the consequences of smoking. This strategy tries to address, shape, or alter attitudes, rather than directly facilitating behaviour change. 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 (Wilson et al., 1993).

5. Suggest actions.
This strategy explicitly proposes certain actions or suggests certain specific behaviour. For example, typical RSI prevention software suggests that computer users do small exercises when working at their computer to decrease the chance of developing persistent injuries (Figure 30). This strategy can explicitly use information to ground the suggestion, but it does not have to. If the product also provides arguments, it aims at changing attitudes and facilitating behaviour. 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 behaviour.
This strategy adds an extra function to the product that elicits the desired behaviour. To illustrate, a garbage bin along a highway is designed like a basket used in sports to score points (Figure 31). By its design, it gives a different meaning to the action of throwing garbage in the bin. A strong aspect of this strategy is that it aims at a different, intrinsic motivation for the elicited behaviour.

7. Elicit emotions to trigger action tendencies.
This strategy tries to elicit an emotion to seduce people into certain reactions. The smiley face in Figure 32 is placed on the side of a section of the road that needs maintenance and forces the driver to slow down. The smiley explicitly thanks drivers for their understanding, and rides on the expectation that drivers will not become agitated and start driving recklessly. This strategy aims at influencing the affective component of the attitude system, in order to shape or change an attitude and therefore the evolving behaviour.

8. Activate physiological processes to induce behaviour.
This strategy makes use of human physiological processes that result from bodily states so that specific behaviour is more likely to occur. The table Go-to-Move, in Figure 33, requires its users to stand rather than sit during meetings. 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 behavioural responses.
This strategy activates a human tendency by creating a perceptual stimulus. The light switch in Figure 34 plays with the human inclination toward order and a preference for symmetry (Hekkert & Leder, 2008). 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 behavioural responses that are instinctive or learned.

10. Create optimal conditions for specific behaviour.
This strategy uses design to create an optimal situation in which the desired behaviour can occur naturally. An example is the coffee machine in the hallway of a company. A coffee machine in the hallway (Figure 35) encourages people to gather at a neutral place. This situation naturally results in small talk between colleagues who might not interact during the normal course of a day. This strategy manipulates conditions so that behaviour can occur naturally but does not necessarily interfere in the underlying psychological processes of the behaviour.

11. Make the desired behaviour the only possible behaviour to perform.
This strategy uses design to make behaviours other than the desired one impossible. An example is the positioning of bus stops, which determines the distance that passengers need to walk and thereby determines their physical activity (Figure 36). When this strategy is applied to unmotivated users, the behaviour is experienced as externally regulated, although it might not be recognized as a deliberate influence.

When to apply what type of influence?

At the beginning of the chapter, we argued that individual experience is expected to play an important role in the degree of a design's effectiveness in changing behaviour. Both the extent to which a person is concerned with changing behaviour, and the extent to which a design addresses a (possibly different) personal concern for behaving differently play an important role not only in how people experience an influential design, but also to what extent they are subsequently inclined to change their course of action. In considering what type of influence is most appropriate and most effective to apply, the relationship between collective and personal concerns emerges as a contributing factor.

As soon as a desirable behaviour is defined on the basis of collective concerns, consideration needs to be given as to how these concerns relate to possible future users. Two types of relationship between collective concerns and personal concerns, can be distinguished: conflicting or in line. 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 either way. However, choosing a strategy requires some additional consideration.

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 situations where the desired behaviour is almost unanimously agreed.

FIGURE 26
STONES STRATEGICALLY PLACED TO PREVENT UNWANTED PARKING (STRATEGY 1)

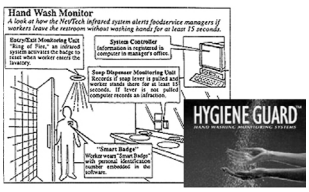


FIGURE 27
HYGIENE GUARD IS A SERVICE THAT FORCES PEOPLE TO WASH THEIR HANDS AFTER TOILET USE (STRATEGY 2)

FIGURE 28
SOCIAL CUPS THAT STIMULATE SOCIAL INTERACTION (STRATEGY 3)

FIGURE 29
A LABEL ON A CIGARETTE PACKAGE WARNS USERS ABOUT ONE DANGER OF SMOKING (STRATEGY 4)

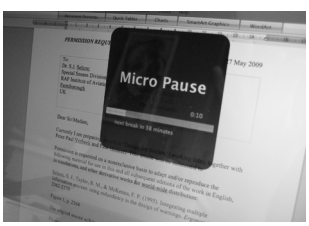


FIGURE 30
SOFTWARE TO PREVENT RSI SUGGESTS REGULAR BREAKS (STRATEGY 5)

FIGURE 31
GARBAGE BIN THAT CHALLENGES PEOPLE TO PLAYFULLY TOSS THEIR GARBAGE (STRATEGY 6)

FIGURE 32
A SMILEY FACE ALONG THE ROAD TO SHOW UNDERSTANDING FOR THE ANNOYANCE CAUSE BY ROAD MAINTENANCE (STRATEGY 7)

FIGURE 33
MEETING TABLE TO SUPPORT QUICK AND TO-THE-POINT MEETINGS, AS PEOPLE HAVE TO STAND (STRATEGY 8)

FIGURE 34
A LIGHT SWITCH THAT CATCHES ATTENTION WHEN THE LIGHT IS ON, AND TRIGGERS PEOPLE'S NEED FOR SYMMETRY, REMINDING THEM TO TURN IT OFF (STRATEGY 9)

FIGURE 35
THE COFFEE MACHINE IN THE HALLWAY THAT SUPPORTS SPONTANEOUS MEETINGS WITH COLLEAGUES (STRATEGY 10)

FIGURE 36
THE LOCATION OF THE BUS STOP DETERMINES THE DISTANCE ONE HAS TO WALK TO GET THERE (STRATEGY 11)

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 kilometres an hour around a school and playground area is acceptable and understandable. However, designing obstructions that prevent homeless people from sleeping on public benches is arguably more questionable. Coercive influence is very restricting, and it therefore requires the application of authority. As a result, the public and institutional domains are often suitable for the application of coercive design, in that government and managers have the authority to implement such interventions. In the private domain, a personal radio that starts malfunctioning as soon as too much energy is consumed is an example of coercion (Redström, 2006). When it concerns the private domain, coercive influence can only be applied when collective and personal concerns are in line with each other.

Persuasive influence also is best applied when collective concerns are in line with personal concerns, which means they are easily identified or experienced as personal concerns. Many interventions that use persuasion are about health or safety issues, which are easily related to and accepted by individuals. However, persuasive interventions can easily fail as soon as they concern behaviour that has long-term implications that collide with short-term concerns. A good example is smoking: in the long term it conflicts with concerns about health, but in the short term it satisfies a concern for enjoyment. Persuasive interventions are present in all domains but are presumably most successful when interaction with them occurs on a voluntary basis. A roadside campaign promoting safe driving is likely to be less effective in influencing your behaviour than the (purchased) digital personal sports coach that structures your exercise regime.

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

Decisive influence is a strong influence in that the design makes the desired behaviour the only possible behaviour. The design of infrastructure and buildings typically uses decisive design: infrastructural design 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 behaviour, such as communication, is harder to influence with decisive design. And decisive design can easily lead to unpleasant experiences. As soon as the government decides to take away half of the bus stops to stimulate physical activity, objections can be expected.

4.4 *Conclusion*

Based on an analysis of sixty-eight products, two dimensions of product influence have been defined: the force and the salience of influence. Together, these dimensions present a classification of product influence based on the experience of this influence, leading to four types of influence: coercive, persuasive, seductive, and decisive influence. Regarding the social problem at hand, the domain of interference, and the expected relation between personal and collective concerns, some types of influence are expected to be more appropriate and effective than others. Regarding our interest in the hidden influence of design, we are particularly interested in the design of implicit influence. We argued that implicit influence, i.e., seduction by design, is most appropriate and effective in counteracting soft social problems in which personal concerns are in conflict with our collective concerns. To study the design of this implicit influence, we therefore focus our attention mainly to such 'soft' social dilemmas. In the next chapter, we are going to explore to what extent our knowledge of product influence is valuable in analysing and understanding the design of it. We do this by discussing various social design projects and the behavioural change targeted by means of design. This discussion helps to identify what seem to be crucial design steps when designing implicit influence for social purposes.

a reflection on six design cases: theory in practice

- TWO CASES HAVE BEEN PUBLISHED IN:
TROMP, N., & HEKKERT, P. (2010). A CLASH OF CONCERNS: APPLYING DESIGN THINKING TO SOCIAL DILEMMAS. PROCEEDINGS OF DTRS8, SYDNEY, AUTRALIA -

In this chapter, six design cases are presented in which product influence was designed intentionally for a social purpose. All but one (case 3) of these cases were carried out by graduate students to complete their Industrial Design Engineering master course in Delft in the period 2007-2011. All cases relate to the research reported in this book, as they often functioned as explorations to test initial assumptions within the scope of the research; all have contributed to it in their own way. In this chapter however, we describe these cases to illustrate the value of the understanding of product influence we gained so far. To this end, we will briefly explain how our understanding of product influence can be translated into a framework, and subsequently show how this framework is intended to support the design of this influence. We will then discuss each design case with respect to the three main elements of the framework: the designer's approach to deciding which behaviour to change, the relationship between users' personal and collective concerns, and the type of influence designed. We conclude this chapter with a discussion about how to structurally develop support for the design of implicit influence of products for social purposes.

Building a framework of product influence

In Chapter 1, we deconstructed the role of existing products and services in some of the social problems we are currently facing. This deconstruction showed that design can play an advocating role in the omnipresent social dilemmas we deal with on a daily basis. In everything we do, we create implications for ourselves, and others, in the short and long term. This holds for simple actions like buying chocolate, and for more complex social behaviours like celebrating New Years Eve. We showed that by addressing personal concerns extremely effectively, design can invite behaviours that are detrimental to society. We positioned design in social dilemma theory to explain how *interacting with products* may lead to *behaviours* with undesired *social implications* (see Figure 37).

For instance, the use of a microwave allows heating up pre-cooked meals very efficiently and individually, enabling family members to be more flexible with their time. In interaction with the microwave, their personal concerns for flexibility and/or independency are therefor very well addressed. Yet, the fact that family members are not restricted to a time to share a meal anymore may be less positive from a social perspective. As a family, people share a collective concern for harmony within the family, and as society, we all benefit from a healthy family structure (for instance to decrease developmental problems with children). In this social dilemma by the conflicting concerns of flexibility/independency and harmony/resilience, the microwave clearly promotes behaviour that is in line with personal benefit rather than social benefit.

In Chapter 1 we concluded that we needed a better understanding of this hidden influence of design, in order to support designers in taking responsibility for it and in designing it intentionally to contribute to society. In fact, our overall aim is to enable designers to design this hidden influence to effectively counteract social problems. Our study on product influence therefore had to deliver the insights for designers to reason from a *desired* social implication to a design, i.e., a product or service that is expected to induce this social implication.

We concluded that a useful theory to better understand this hidden influence of design is mediation theory. Mediation theory helps to understand product influence as emerging from the human-product-world relationship. Through the interaction with products and services we engage in and enact the world around us. The theory illuminates the role of design in shaping behaviour and illustrates well that products affect behaviour *on top of their mere function* (Figure 38). Hence, behaviour should be regarded as something different than making use of a product. Behaviour may be displayed in interaction with the design, but can also move also beyond the physical human-product interaction. We regard behaviour as an activity directed at the world rather than the design.

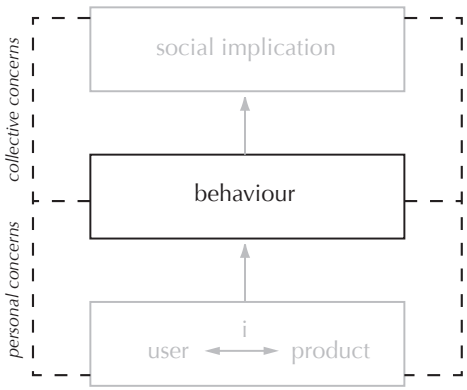


FIGURE 37
UNDERSTANDING THE ROLE OF DESIGN IN SOCIAL DILEMMAS: BY ADDRESSING PERSONAL CONCERNS EFFECTIVELY, BEHAVIOURS ARE ELICITED THAT MAY RECEIVE A DIFFERENT MEANING IN RELATION TO COLLECTIVE CONCERNS (CHAPTER 1)

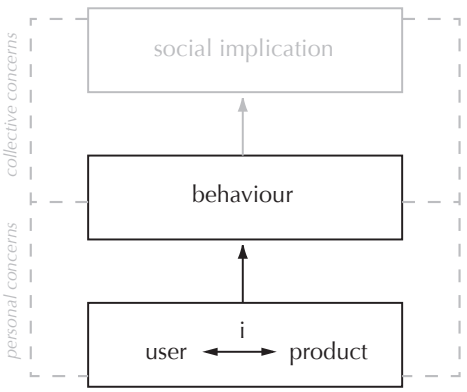


FIGURE 38
MEDIATION THEORY EXPLAINS HOW BEHAVIOUR MAY CHANGE *THROUGH* INTERACTING WITH PRODUCTS RATHER THAN JUST *IN* INTERACTION WITH PRODUCTS (CHAPTER 2)

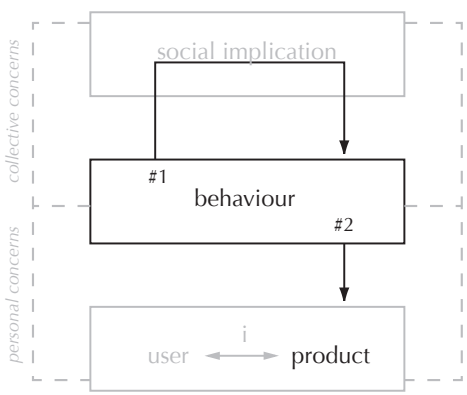


FIGURE 39
THE INSTRUMENTAL VALUE OF SYNTHETIC AND ANALYTIC APPROACHES FOR UNDERSTANDING PRODUCT INFLUENCE: #1 WHERE TO INTERVENE, AND #2 HOW TO INTERVENE (CHAPTER 3)

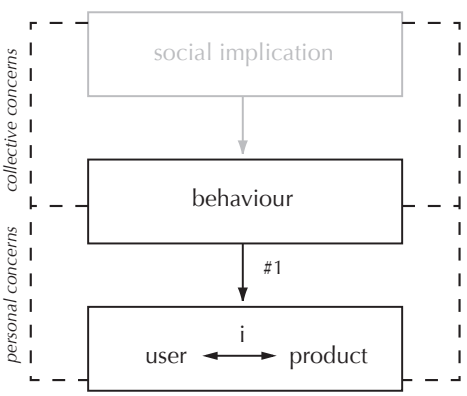


FIGURE 40
UNDERSTANDING HOW TO INTERVENE FROM A USER PERSPECTIVE: #1 COERCE, PERSUADE, SEDUCE, OR DECIDE FOR PEOPLE (CHAPTER 4)

Although mediation theory explains the hidden influence of design, it does not help in defining what product or service can be best designed to realize intended behaviour change. The theory helps to analyse and foresee possible mediations of behaviour of existing (concept) designs, and even to anticipate these. But without a concrete or tangible product or service to analyse, the theory loses most of its instrumental value for design. Hence, we analysed six additional theories to understand how we may support designers in reasoning from behaviour to design.

The analysis carried out in Chapter 3 of the six theories that explicitly mention the role of design in behaviour change showed that there are two approaches for understanding product influence: an analytic, and a synthetic approach. We illustrated that theories emerging from a synthetic approach may help the designer to understand where to intervene, i.e., which behaviour to affect, to actually counteract a social problem, while theories resulting from an analytic approach support the designer's selection of potential product aspects to be designed, and argued that both have instrumental value for design (see Figure 39).

Theories that result from a holistic view on product influence support designers to study the context that co-shape behaviour, e.g., historical, cultural or political factors. It helps designers to refrain from quick behavioural fixes by stimulating them to gain a more contextualised understanding of the phenomenon at hand (see the 'loop' in the figure). Theories as result from an analytical perspective provide the designer with fundamental understanding of the interaction between characteristics of the product and psychological concepts of human beings. These theories thereby support understanding of the concrete embodiment of the design in order to influence behaviour.

Additionally we discussed how the first type of theories prompt the designer to consider how to influence behaviour indirectly, while the second guides the designer to more direct ways of influencing behaviour. Although these theories support reasoning from behaviour to design, they do not (explicitly) adopt a user perspective. We argued that, for a designer, it is important to consider the *experience* of the influence, as it affects both the effectiveness and the appropriateness of the eventual design. However, this particular user perspective is not discussed in these six theories (therefore the user is 'grey' in the figure).

To better understand how the influence of design can be experienced, and how this experience contributes to people's inclination to actually change behaviour, a study of sixty-eight products was carried out, which revealed two dimensions of influence that together define how a person may experience an influential design: force and salience. These two dimensions of influence determine that products can coerce, persuade, seduce, or decide for people (see Figure 40). Depending on the social aim of the designer, some types of influence may be more appropriate and effective than others. We suggested deciding upon a type of influence based on considerations about *the type of social problem* at hand, i.e., whether or not this is a matter of life and death, *the domain of interference*, i.e., whether it is the private, semi-public, or public domain, and *the relationship between personal and collective concerns*, i.e., whether they are in line with or conflict with each other. As a result, we identified eleven design strategies.

The value of the framework

Now that we have gained some understanding of the influence of design, and some idea of how this understanding might be used to support the design of this influence, we will examine and discuss six social design cases. The aim of this discussion is to illustrate to what extent the framework proposed here bolsters efforts to *design* the hidden influence of products and services. Commensurate with the framework, the design cases have been organised along three main lines: 1) the designer's approach to deciding what behaviour to change, 2) considerations about the relationship between personal and collective concerns, and 3) the type of influence designed (see Figure 41). The actions/decisions of a designer deliberately designing product influence for social purposes should reflect these three elements accordingly.

Before we discuss each design case along these three lines, we first explain the project outcome, i.e., the product or service, and its main working principles. Next, we explain what behaviour it intends to stimulate, and to what beneficial social implications this behaviour is supposed to contribute.

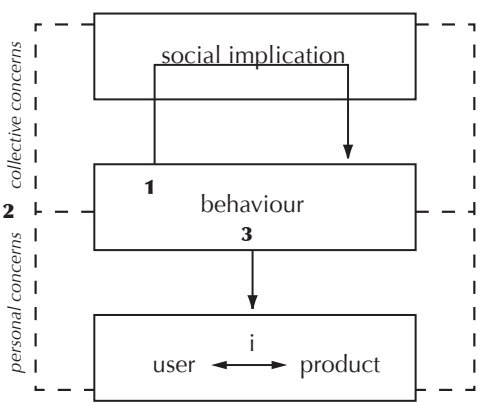


FIGURE 41
A FRAMEWORK FOR DESIGNING PRODUCT INFLUENCE SHOWING THREE MAIN ELEMENTS: 1) APPROACH TO DEFINE BEHAVIOUR, 2) CONSIDERING CONCERNS, AND 3) TYPE OF INFLUENCE

Design Case 1: Social Cohesion

Client: The Hague municipality
Project Description: This was my graduate project, completed in 2007 (Tromp, 2007). Driven by my fascination for the debate surrounding immigration, I took the initiative to approach The Hague municipality for permission to carry out the project. The goal was to design a product or service to counteract the problems surrounding the integration of immigrants in The Netherlands. I applied the Vision in Product design approach (Hekkert &

Van Dijk, 2011). During the project, which took about six months, I was supervised by Prof. dr. Hekkert and Dr. Snelders (from DUT), and Mrs. Manschot (from The Hague municipality).

Design: The 'Gift Swing' (Figure 42) is a product-service combination that stimulates the exchange of personal gifts between residents of a neighbourhood. After receiving a gift, together with a recorded personal message from a neighbour, the user is asked to offer a personal object as a gift to another neighbour. The service randomly links people to each other.

Behaviour: The exchange of personal objects is a tangible version of the exchange of personally relevant information. Intercultural contact most often leads to the exchange of information related to people's social identity and therefore easily leads to stereotyping. To prevent this and to stimulate the exchange of *personal* information, people are asked to give away an object that explains something about their personal life. Receiving the gift happens in-home. This prevents any judgmental reactions on the basis of physical characteristics of the other, and it decreases anxiety that is often present in interaction with a relative stranger.

Social Implication: The exchange of personal information was set as the behavioural objective of the design in order to increase public familiarity within the neighbourhood. Public familiarity is a required condition to initiate bonding of any type. The service does not aim to directly forge bonds between neighbours in order to increase social cohesion in the neighbourhood, but aims to optimize the conditions for this to happen naturally.

FIGURE 42
'THE GIFT SWING': A PRODUCT-SERVICE SYSTEM THAT RANDOMLY EXCHANGES PERSONAL GIFTS BETWEEN NEIGHBOURS THROUGH A BOX WITH AN AUDIO RECORDING DEVICE

Approach: The initial step in the project was to reframe the scope. Framing the objective of the project as 'solving the problems surrounding immigrant integration' may already imply that it is immigrants who need to alter their behaviour to counteract these problems. However, by reframing the scope of the project as 'social cohesion', the ultimate aim is to live peacefully together, and Dutch inhabitants also come into play and share responsibility for the situation.

Research into social cohesion theory revealed that it is established by social relationships between people in a group. Yet, these relationships can be of various kinds, ranging from transactional and instrumental relationships to actual friendships. This teaches us that the most direct way to increase the cohesion in the neighbourhood is to stimulate relationships, and hence, bring people together and facilitate social interaction. However, in this project, the deliberate choice was to stimulate the development of social relationships in a more indirect manner, i.e., by revealing information about each other without direct social interaction.

Clash of Concerns: People may have various reasons for not wanting to reveal personal information to (relative) strangers. One of the most predominant objections is the fear of showing who we really are to people we do not yet know or trust. However, as regards our concern for cohesion between people from various backgrounds, we argue that this behaviour is desirable. From a social perspective, it would be beneficial if people could reveal personal information to others, as it reduces stereotyping and may lead to self-initiated moments of contact.

The aim of the Gift Swing is to resolve this friction between our collective concern for cohesion and people's personal fear of revealing personal information to strangers. Explicitly asking people to tell something personal about themselves to strangers was therefore not considered a convincing and appropriate strategy. But by 'packaging' it in such a manner that a gift embodies this information, different motivations come into play. Receiving a box triggers one's curiosity to open it, while receiving personal information from someone else triggers a 'reciprocity norm' to return the favour.

Type of Influence: By facilitating information exchange, the Gift Swing intends to increase familiarity between people. Familiarity appears to be a crucial condition for initiating moments of contact and is often lacking between people from varying backgrounds. The behaviour of 'exchanging personal information' is directly facilitated to indirectly stimulate self-initiated contacts between neighbours.

Although the Gift Swing asks neighbours to find a personal object to offer as a gift to a neighbour, it is expected that people are not consciously aware of the fact that the exchange of gifts is actually intended to exchange personal relevant information. Hence, the influence is considered implicit. As people of course have the freedom to participate, the influence is weak rather than forceful. Therefore the expected experience is seduction.

Design Case 2: Emancipation

Client: Delft University of Technology
Project Description: This project was the graduate project of Floor Borgonjen, completed in 2009 (Borgonjen, 2009). Driven by her fascination about the limited number of women in top positions in organisations, she set herself the goal to explore how design could contribute to gender equality in the top tier of the labour market. During the project she applied the Vision in Product design approach, together with initial insights from the present research. This mainly meant that she adopted a systematic approach and focused on behavioural change in the design process. During the roughly 8 months of the project, she was supervised by Prof. dr. Hekkert, Sleebos, and me (all from DUT).

Design: 'Label' (Figure 43) is a product-service combination to support female employees in the development of their company's vision. The product stimulates small exchanges between colleagues about possible plans or directions for the company. To provide a record of these talks, the device enables the recording of visual data. Software was developed to collect this data and construct a coherent vision or storyline in the form of a presentation.

Behaviour: By enabling a 'feminine' method of constructing a vision: establishing social support for their ideas encourages women to build and present these ideas and visions for their company. Through interacting with the device and the software program, Label aims to trigger women's ambitions on the one hand and to increase visibility of women in the company on the other.

Social Implication: The development and presentation of a one's ideas or vision for the company was set as the behavioural objective of the design. The increased visibility that is realized by this is intended to lead to more offers for attractive career opportunities to women, ultimately increasing women's career mobility.

FIGURE 43
'LABEL': A DEVICE WITH BUILT-IN CAMERA AND RELATED SOFTWARE TO SUPPORT FEMALE EMPLOYEES TO ACTIVELY COLLECT INFORMATION IN ORDER TO BUILD A VISION FOR THEIR COMPANY

Approach: This project started off by garnering an understanding of the appropriate scope of the project. The fact that men hold more top positions in the labour market than women is due to a complex interplay of various social systems, e.g., labour systems and family systems, in which many people play a role, e.g., male and female employees, male and female employers, both parents, nannies, and so on. Hence, to counteract gender inequality in top positions, the behaviour of many could be changed. For instance, stimulating men to take over the household tasks could possibly contribute to more women in top positions.

After some research, it was decided to focus on the 'sticky floor', and to try to understand the observation that women who are highly educated and are highly motivated to work when finishing their studies, somehow lose or downgrade their ambitions after a few years. Hence, this project ultimately aimed to stimulate female career. By stimulating (female) employees to 'not stick to a comfortable position' but explore other job opportunities, it was expected that this would also stimulate women to move to 'higher' positions. Hence, Label intends to stimulate female employees to develop ideas and visions of company-related topics they find interesting and relevant. By developing these ideas and plans, personal ambitions are brought to life, while presenting these ideas increases their visibility within the company.

Clash of Concerns: The ultimate behavioural objective of the design was to encourage (female) employees to present their ideas and visions to higher management. Although women may be motivated to work on ideas that contribute to the future vision they have for their company, they are often hesitant to present these to upper management, as they generally have a fear of standing out. Women appear sensitive to social bonds at work and generally feel uncomfortable placing themselves 'outside the group'. Hence, a personal concern for social connectedness at work conflicts with societal concerns for emancipation and equality.

The aim of Label is to overcome this clash of concerns by ensuring social support for the ideas women are working on, and the vision they wish to share. In developing these visions and ideas for the company, women are prompted to 'test out' their ideas among their peers and involve colleagues in idea development: ideas are shared with colleagues first, mobilizing social support when presenting these to upper management.

Type of Influence: By facilitating the development of ideas and visions directly, Label aims to indirectly stimulate women to present these within the company and increase their visibility. It is expected that women will not be aware of the fact that the software program is designed to specifically attract women. By transforming idea and vision development into a visual and social act, the product-service is designed to fit with a 'female' way of working. However, it can and may be used by anybody. Additionally, women have the freedom to not use the product. Therefore the expected experience is seduction.

Design Case 3: Police car

Client: The Dutch police, project group LAPV2010.
Project Description: This was a research project carried out by me for the Dutch police in 2010 (Tromp, Hekkert, Van Dijk, 2010). At the time, the Dutch police tendered a Request for Proposal for the first national police car. One of the criteria was having the possibility of a car distributer to closely collaborate with the police in the development of this car towards an idealized design. Current production facilities of cars had become increasingly flexible, and because car distributers were, and still are, increasingly collaborating with software developers, some car distributers are capable of producing police cars with completely in-built IT systems.

In reaction to this, the Dutch police formulated the following question: With all the recent and future technologies that could be built into the car, what is the ideal design of the police car? They asked the Delft University of Technology to help in building this future vision. Through dialogue, the goal defined for the project was to develop a vision of the future Dutch police car from a social perspective. During the project, I was supervised by Prof. dr. Hekkert and Prof. ir. Van Dijk (from DUT) and the project took about nine months.

Design: 'Master-IT' is an in-built information and communications technology ICT) system for police cars in the Netherlands (see Figure 44 for a storyboard on the information flow). The system offers three main types of information flow depending on the situation. When an officer is taking direct action, the system is obedient and provides only necessary and relevant information. While in surveillance mode, the system presents information about the immediate area to optimize the officer's knowledge. When parked, the system invites the officer to contribute his knowledge to the system by delivering input related to his expertise and help respond to other officers' requests for information.

Behaviour: By helping officers accrue knowledge and manage information, the system aims to support the development of officers' expertise rather than taking over from them. The system is intended to motivate officers to responsibly interact with citizens. Based on the notion that systems can only provide information, while people can acquire knowledge, the IT-system is designed to support this knowledge acquisition and is therefore designed to facilitate learning.

Social Implication: Enhancing the 'expert behaviour' of the officer was defined as the behavioural goal. By supporting knowledge development, the system stimulates responsible behaviour as a consequence. Taking adequate responsibility is one of the most important qualities of an officer, according to the public. Supporting this intends to increase the trust of citizens in the Dutch police system.

FIGURE 44
STORYBOARD ABOUT THE INFORMATION FLOW TO SUPPORT POLICE WORK AS PROVIDED BY 'MASTER-IT'

Approach: This project began with the objective of developing a concept design of the future Dutch police car and its in-built ICT system. However, as a police car is typically a product that exists to serve society, developing this concept with a social perspective is highly relevant.

To integrate a social perspective into the design process, the relevant social system that evolves around the use of a police car was mapped. The car is primarily used by police officers to do their job and fulfil their tasks. A typical user-centred approach to the design of the car would therefore imply a focus on the officer, and his concerns, needs, and wishes. However, a police officer operates within a larger social system that includes, on the one hand, his colleagues, a chief officer, organisational staff, journalists, and even politicians; and on the other hand, both obedient and disobedient citizens. Based on a map of the roles of all these 'actors' in this social system, and the interactions between them, it became clear that it was of utmost importance to support the officer in actually demonstrating 'expert performance'. We came to understand that protocols and procedures are often implemented by a police organisation to ensure that officers perform well, but also to standardize working procedures and formalize accountability within the police organisation. However, increasing

the number and detail of protocols and procedures may paradoxically decrease the actual responsibility felt by officers. In order to feel safe, it is important for citizens to see that officers act out of responsibility rather than just obeying rules and following procedures. The implementation of various expert systems within a police car therefore presents the risk that officers will be led by these systems, rather than remaining superior to them, subsequently degrading civic trust and sense of safety. Master-IT is conceptualized to prevent this and to support expert behaviour.

Clash of Concerns: Based on our concern for safety, we want police officers to act out of a real sense of responsibility and therefore demonstrate 'expert behaviour'. However, officers may currently be hindered by an overwhelming sense of accountability. Their behaviour is often guided by procedures and protocols, rather than intrinsic feelings of responsibility. Additionally, increased access to expert systems might worsen this, and run the risk that officers feel directed by and dependent on the system, rather than feeling superior to it and using it only when needed.

Master-IT seeks to resolve this. Master-IT is an ICT system to which officers contribute in a meaningful way. The system requires organisational change, and demands expertise development throughout the organisation by facilitating interaction and peer learning between officers. One officer may be interested in drug-related crime; while another is interested in the role religion plays in violent crime. The system enables officers to share and demonstrate their expertise via a central platform. By discussing their cases and answering one another's' questions, they show and build their expert status. In fact, the system is a learning system, designed to not only provide output in emergency situations, but also to request input from officers.

Type of Influence: Master-IT facilitates learning behaviour through interaction with the system. It is via this very interaction that the system enables responsible behaviour vis-à-vis the citizens. The system is formal, one that all officers must use once implemented. The influence of the system on learning behaviour is rather forceful, yet we expect for the IT-system be experienced as a professional information system to which they contribute, rather than a learning system. Therefore the expected experience is decisive.

In stimulating officers to develop expertise on a subject they find interesting, and by developing a social platform across which this expertise of officers is valued and consulted by colleagues, Master-IT hopes to trigger intrinsic motivation for learning.

Design Case 4: Social mobility

Client: Laak-Noord, a neighbourhood in The Hague.
Project Description: This was the graduate project of Femke Heikamp, completed in 2010 (Heikamp, 2010). Through contact with Jaap Westbroek, who is involved in the development of Laak-Noord and improving its liveability, the project was initiated to test the preliminary steps of our method. These steps are more closely defined in the multiple-case study described in Chapter 7, in which the application of the method has been systematically studied. Femke defined 'social mobility' as the phenomenon to focus on in her project. These means that her goal was to develop a product or service that would somehow affect the social mobility of people in the area. During the 12-month project, she was supervised by Prof. dr. Hekkert, and me (from DUT) and Mr. Westbroek (Laak-Noord).

Design: 'Tree of Talents' (Figure 45) is a website that supports people's exploration of what their talents are, and how these can be of value to others. The website connects people in search for a job with available (temporary) job opportunities, tasks, or calls for volunteers. By suggesting (voluntary) jobs on the basis of activities people like or are good at, the website offers a low threshold to finding out what jobs one may apply for. Additionally, it provides a way to get up-to-date information about the jobs on offer.

Behaviour: By facilitating the exploration of one's talents as they relate to job offers, people are persuaded to actually apply for these jobs and show their talents. By connecting people with talents to people who need talents, the Tree of Talents supports people showcasing their talents, skills and expertise to people who are expected to value these.

Social Implication: Being able to create value for others by doing something one is good at is intended to empower the inhabitants of this poorer neighbourhood. By being able to use one's skills and knowledge to create value for other areas in The Hague outside Laak-Noord, it aims to better connect the deprived area (Laak-Noord) to the rest of the city (The Hague).

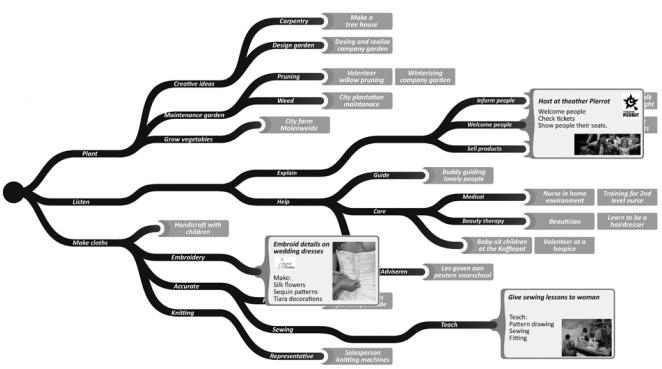


FIGURE 45
'TREE OF TALENTS': A PLATFORM TO EXPLORE ONE'S TALENTS BY FOLLOWING THE ACTIVITIES ONE ENJOYS DOING OR IS GOOD AT, AND FIND RELATED JOBS OR CHORES ON OFFER

Approach: Her project started with an investigation into the Laak-Noord area. Laak-Noord is a neighbourhood in The Hague where people that have come from various ethnic backgrounds are trying to start a new life for themselves.. The notion is that the area as such is not very well integrated into the rest of The Hague, which makes its inhabitants feel like outsiders that do not matter to the rest of the city. People there have a hard time working out their place in the city's organizational infrastructure, speaking the language and finding a job. Drawing from a study on the general processes that support group-forming, it became clear that to really become part of the overall identity of The Hague city, the people of Laak-Noord need to be valued on the basis of their skills, knowledge, and talents. The underlying assumption is that every citizen in principle has something of value to offer to the group. Hence, the aim was to design a product that stimulates inhabitants of Laak-Noord to present their value, their talents, to the rest of the city.

Clash of Concerns: Showing what you know and are capable of is not easy when you do not speak the language or understand the organisational structure of a country or a city. Additionally, it may be hard to understand what the value is of the knowledge and the skills you have developed in a different country. However, this is a common concern in any society: how to make optimal use of the 'human capital' there is, i.e., knowledge and skills of citizens, and to increase general social mobility. However, when people are insecure about the value of what they are capable of and do not know how to present themselves and their qualities, this may stop them from trying.

By guiding people through the site on the basis of activities they like or are good at, e.g., listening to others, cooking, playing with children, and leading them to both formal and informal 'talent-seekers', the website intends to overcome insecurity and provide insight into the value of people's skills and knowledge.

Type of Influence: The service directly facilitates people's efforts to find and apply for informal and formal job offers. As the website is clearly designed for this purpose, the aim people have when interacting with it is the same aim as for which it has been designed: finding a way to do something with one's knowledge and skills. Although some qualities of the influence are less obtrusive, e.g., exploring one's talents in a playful and seductive manner, the influence remains rather explicit. As the service does not enforce behaviours, it is expected that people will experience persuasion.

Design Case 5: Aggressive behaviour

Client: 'De Fjord', a Centre for Orthopsychiatry and Forensic youth psychiatry, at Lucertis, Parnassia
Project Description: This was the graduate project of Annet Bruil, completed in 2011 (Bruil, 2011). The project was initiated in collaboration with Lucertis, a division of Parnassia and one of the largest mental institutions in the Netherlands. The objective of the project was to design a product or service for youngsters with a disruptive behaviour disorder. Annet used insights from the present research during her project: she explicitly considered both personal and collective concerns, and she deliberately designed a particular type of influence. During the seven-month project, she was supervised by dr. Visch and me (from DUT), and Mrs. Haijer (Lucertis).

Design: 'Beat-it' (Figure 46) is a smartphone application for young people who suffer from an aggression disorder. In a state of increased arousal, they can distract themselves by starting the application. This 'music game' application prompts youngsters to drum to the beat of their favourite music using their smartphone. As the beat gently slows down, arousal also lessens. The application contains both play- and therapy-elements.

Behaviour: Beat-it supports youngsters with an aggression disorder by regulating negative emotions and preventing aggressive outbursts.

Social Implication: Supporting self-regulation of aggression is intended to diminish aggressive outbursts and enable youngsters to better integrate into regular society. Being able to control one's aggression independently enables youngsters to experience control and feel confident to participate in society.

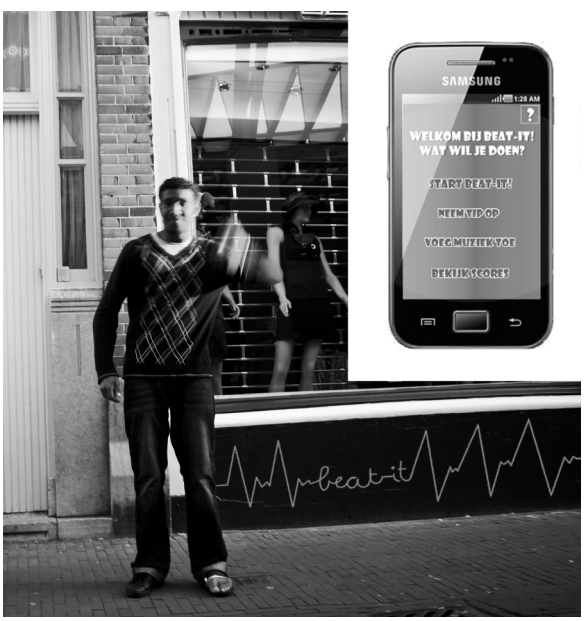


FIGURE 46
'BEAT-IT': A MOBILE APPLICATION THAT ALLOWS YOUNGSTERS DIAGNOSED WITH DISRUPTIVE BEHAVIOUR DISORDER TO LITERALLY BEAT TO THE DRUM OF THEIR FAVOURITE MUSIC, SIMULTANEOUSLY LOWERING THEIR AROUSAL

Approach: In this project, the goal of the project was already defined at a behavioural level. Analysing the situation from a social perspective logically leads to the conclusion that aggressive behaviour is detrimental to our communal concern for safety. Additionally, youngsters who are diagnosed with such a disorder receive a significant level of care and have a hard time fitting into society. Hence, it is costly to ensure they do not harm themselves and others in their environment. From this perspective, it was decided to focus on the actual reduction of aggressive behaviour, rather than helping these youngsters in other respects. Yet, what *specific* aspect of the behaviour to focus on was not defined beforehand, e.g., dealing with the trigger that raises anger, reflecting on one's behaviour after an outburst, etc.

An analysis was made of the anger- building process, up to the moment of an outburst, and into the period thereafter. It was decided that to really help youngsters to deal with their anger, the point to intervene would be the moment just before an aggressive outburst. By developing a tool that helps young people to prevent their own outbursts, they are given a tool to actually cope with their disorder independently.

Clash of Concerns: In this case, young people's personal concerns tend largely to be in line with the concerns we share as a society. Young people feel anger when bullied or threatened, and these youngsters express their anger quite vehemently. However, when we talk about 'disorders' and actually provide therapy and medical treatment, this means that we consider part of their behaviour as an illness. Every youngster diagnosed with such a disorder would probably wish he or she did not suffer from it and could function normally within society. Youngsters do have a concern for 'being normal'. Hence, being able to cope with this disorder is compatible with both personal and collective concerns, yet the young people are often incapable of doing this very thing.

Type of Influence: The application interferes directly with aggressive behaviour. The interaction with the application is in fact a form of therapy, and thus, interacting with the application means that one is aware of its intended function: to decrease aggressive outbursts. However, the fact that the drum-movements decrease arousal is based on automatic processes (e.g., embodied cognition), of which youngsters are unaware. After being calmed down, the youngster is asked to reflect upon the moment and to learn from it, which is a very explicit strategy to change behaviour. Overall, we expect that in interaction with the application, young people experience persuasion.

Design case 6: Street culture

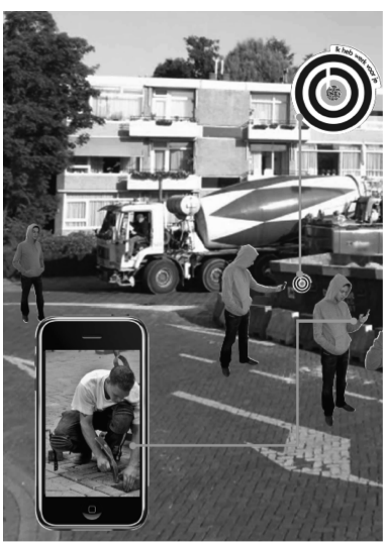
Client: Foundation BOOG
Project Description: This was the graduation project of Sacha van Ginhoven, completed in 2011 (Van Ginhoven, 2011). The project was initiated in collaboration with foundation BOOG, a foundation that develops initiatives to increase liveability in The Hague region. The objective of the project was to design a product or service for the problematic youth who form

gangs and live mainly in the streets in Houtwijk and Nieuw-Waldeck, two neighbourhoods in The Hague. Sacha followed the structure of reasoning from desired social implication, to behaviour, to design. Hence, she adopted the thinking developed through the present research in her project. During the seven-month project, she was supervised by Prof. dr. De Rijk and me (from DUT), and Mrs. Wensink (BOOG).

Design: The 'WorkTag' (Figure 47) is a sticker with a QR-code that links to a job vacancy or short-term odd jobs on offer. The idea is that employers can stick this tag to the place where work is available, e.g., near a bus stop when there is a vacancy for a bus driver. Youngsters can read the tag with their smartphones to obtain more information, and express their interest by recording a small video. The recruiter invites job applicants on the basis of this video.

Behaviour: By providing a way to demonstrate their interest in a regular job or odd job while still in their own domain, i.e., the streets, young people's confidence to apply is supported. Moreover, the video prevents judgement based on their (foreign) name or bad writing skills. An honest representation by means of video provides a first impression that normally would only be possible after acptance of an application letter.

Social Implication: By moving the first contact between a recruiter and the youngster to the streets, the service aims to reach out to youngsters rather than the other way around. The Tag invites youngsters to show themselves as they are. The possibility of getting invited by a recruiter means that the youngsters don't need to be persuaded to enter an employment agency. In doing this, the service intends to contribute to the integration of street culture into larger society.



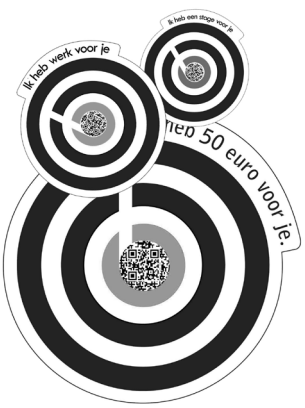


FIGURE 47
WORKTAG: A LOCATION-BASED SERVICE THAT ALLOWS YOUNGSTERS TO APPLY FOR A JOB ON LOCATION BY MAKING A SHORT VIDEO

Approach: This project started off with a close look at what 'street culture' is, and why youngsters become part of such a culture, and form gangs that rebel against society. One of the reasons that youngsters show derailed behaviour, like stealing and dealing drugs, rather than get a job, is it earns more, and they are more appreciated for it in their social network. Often these youngsters feel that society has rejected them, and therefore they reject society in turn. From this viewpoint, they often experience little shame for misbehaving. But these youngsters also dream of owning a house, having a proper job, and building a family. To make sure that these youngsters integrate into society rather than becoming serious criminals, and because having money is a serious personal concern to these youngsters, the product was intended to stimulate youngsters to apply for a job.

Clash of Concerns: Our collective concern is to include youngsters within society and prevent them from becoming seriously derailed and turning into criminals. However, street cultures swell when groups of youngsters feel they do not fit into societal structures. In these cultures, money is 'earned' through drug dealing and small crimes. Hence, our communal concern for inclusion conflicts with a personal concern of these youngsters for acknowledgement and autonomy.

By acknowledging street youth as the 'owners of the street' and by reaching out to them by moving the job application procedure to the streets, Worktag hopes to stimulate them to integrate into society on their terms, and seize opportunities for their future. The idea is that Worktag lowers the threshold to applying for a job: making a movie on the spot takes less effort and is less scary than dropping by an employment agency and writing a formal letter.

Type of Influence: The Worktag application intends to support the arrangement of a job interview. In interaction with the application the act of applying for a regular job or an odd job is facilitated. Hence, the goal of the application is obvious. However, the application procedure is designed in a way that reaches out to youngsters rather than persuading them to step into regular organisational procedures. By moving towards youngsters, instead of making them to 'act like normal people', we expect that they will not experience persuasion. By being seduced to see what job-offer is behind a location-based QR-code, and by offering a low threshold to actually apply for a job or task and thereby earn money, we expect that youngsters will experience seduction.

5.3 *Conclusion*

In this chapter, we showed to what extent our knowledge of product influence helps to analyse social design projects in which this influence is deliberately designed.
Not only does this analysis help us to identify the value of the framework, it also helps to identify what particular elements of the design process could benefit from design support. To get to these conclusions, we discuss to what extent these cases reflected 'the design of the implicit influence of a product or service in order to contribute to solving a social problem'.

In Chapter 1 we identified the current role of design in social problems as a hidden influence of which users are often unaware. We concluded that if we managed to 'take hold of' this hidden influence of design, the design outcomes might offer a unique contribution to solving social problems. We are therefore mostly interested in the design cases where the designer indeed managed to design the hidden, or implicit, influence of his or her design, i.e., cases where the user is expected to experience either 'seduction' or 'decision', This was true for four of the designs in this chapter: the Gift Swing, Label, Master-IT, and the Worktag. We assume that when people are interacting with these designs, they do not have any idea that their behaviour is changing through use of these product-services. On the contrary, we expect them to be aware of changing their behaviour while using Beat-it and the Tree of Talents.

The reason to interact with Beat-it is for the purpose of lowering one's aggression, and the reason to interact with the website Tree of Talents is to find a way to make oneself valuable to others. An interaction with these designs is self-initiated by the user for the very same reason the product-service is designed. If we look back at the development of Beat-it and Tree of Talents, we see that in fact people are expected to be motivated to change their behaviour, but simply do not know how to do so. Users of Beat-it are expected to be motivated to prevent their own aggressive outbursts, and visitors of the website Tree of Talents are expected to be willing to work, help, or do other things that are of value to others. In fact, these designs are only effective when this is the case. Studying the situation at hand convinced the designers that people are in principle willing to change their behaviour, and are maybe even already trying this, but fail. These designs therefore may successfully help people to achieve their behavioural goals.

In the other four cases, the situation was assessed differently. It was assumed that people would not be intrinsically motivated to either initiate contact with relative strangers ('Why would I put effort into contact with him, as he never greets me anyway?'- Gift Swing); or present ideas and visions to upper management ('I am fine in my current position, and do not want to ruin my bonds with colleagues', Label); or apply for a job ('I hate society: they never want me anyway'- Worktag). Here, it is not a question of them not knowing how to change their behaviour: it is more that they do not see the value of changing their behaviour. Hence, the designs aim to change this perception of the world, and thereby seduce people to ultimately change their behaviour. As regards Master-IT, we do assume that police officers are intrinsically motivated to act responsibly in interaction with citizens, but that the existing organisational structure primarily guides them to comply with procedures and protocols. However, as this design case did not start with a social problem to solve but rather at a product level, the case does not illustrate the design of implicit influence of a product, but successfully illustrates the design of implicit influence of the product.

Out of the four implicit designs, only the Gift Swing is an unusual product that does not really provide a 'useful' function. It is rather part of a social initiative, a gesture, or a tradition, than an actual product or service to use for instrumental purposes. The Gift Swing is therefore probably quite rapidly linked to social aims in the mind of the user. However, the fact that

the box comes to users, providing them a gift first, means the whole design is expected to cause seduction rather than persuasion. This same 'movement' is recognized when analysing the Worktag. The procedure for applying for a job comes to the youngsters, instead of dragging them into a procedure they fear and detest. The Worktag is considered an implicit design, as the user 'stumbles' upon it, rather than actively seeking out this interaction, as is the case with the Tree of Talents. Yet, the Worktag is similar to the Tree of Talents in its functioning: both intend to guide people to a (temporary) job. Both designs directly affect the target behaviour via interaction, as the desired behaviour is included in the product functioning. In contrast, the Gift Swing, Label and Master-IT affect behaviour *on top of their mere functioning*. The Gift Swing intends to stimulate people to seek contact with each other, *through the exchange of gifts*. Label intends to stimulate women to present their ideas and visions for the company to upper management, through developing this vision with social support. And Master-IT intends to stimulate expert behaviour in interaction with citizens, *through facilitating learning in interaction with the system*.

In conclusion, a careful reflection on the cases in which the implicit influence was designed helps to identify crucial steps and decisions in the design process that led to this. As for the approach to isolate which behaviour to stimulate which will best counteract the social problem at hand, we consider it valuable to reframe this very scope. When the scope is framed as a problem, it is tempting to 'jump to conclusions' and approach the problem with some kind of 'fix' in mind. However, it may help to reframe the issue as a neutral phenomenon to see other relevant aspects that contribute to it. In this way, focusing on the problematic integration of immigrants is reframed as an effort to promote 'social cohesion'; a focus on too few women in top-tier positions is reframed as a 'sticky floor'; and a focus on the problems attached to delinquent youth is reframed as 'street culture'. This reframing helps to understand every relevant 'actor' within the domain, and supports the designer's decision of where to intervene, i.e., which behaviour to affect, or whose behaviour to affect. In retrospect, this broadening of the scope seems crucial to design the implicit influence of products and services. Hence, designers should be encouraged to reframe a problem-oriented objective as a neutral phenomenon, and thereby take a holistic approach to defining what, or whose, behaviour to change.

Secondly, all these cases illustrate how one could argue which behaviour is desirable on the basis of collective concerns. Simultaneously, a careful analysis of personal concerns helps to identify why people behave differently, or what concerns they may have about changing their behaviour. Hence, we conclude that the designer should be encouraged to adopt a social perspective when deciding *which* behaviour to stimulate, while he or she should be encouraged to adopt a user perspective to understand *how* to do this.

Finally, we come to the conclusion that seduction is indeed an appropriate type of influence when personal concerns are in conflict with collective concerns. In these situations, people do not see any value in changing their behaviour vis-a-vis their perception of the world. The design cases in which implicit influence has been deliberately designed show that by actually

addressing personal concerns (the curiosity in the case of Gift Swing, social connectedness in the case of Label, and recognition in case of Worktag) people have a personal incentive to change their behaviour, i.e., it becomes valuable to them to change behaviour. In these cases, people are expected to feel as if they are acting entirely autonomously, although their behaviour has implicitly been affected by design. As we consider this hidden power of design unique, and one that generates elegant solutions for problematic social situations, we are greatly interested in understanding how to support this design practice more structurally.

This chapter forms the closure of Part 1, in which we have developed an understanding of hidden product influence, for the purpose of designing it. In this part we have integrated various perspectives on product influence, in order to provide understanding of this phenomenon that will be valuable for designers. Part 2 focuses on the actual design of this influence. Instead of taking interest in product influence as such, in this part we are interested in developing a structured approach to designing product influences that induce intended social implications. This means that the object of study becomes *the act of designing* rather than the relationship between the user and the product, and the ultimate aim is to develop design support for social design practice. Hence, the work in this part of the book aims to contribute to design methodology. The second part of the book begins with an introduction to the origin of design methods and the field of design methodology. Next, it introduces the design method Vision in Product design (the ViP method). After having explained this method in depth, by discussing its origin and by situating it within the wider field of design methodology, we discuss why it constitutes a suitable method to use in order to design the implicit influence of products and services to counteract social problems.

designing products and services with desired social implications

06

taking responsibility, as designer

Before going into detail about the studies for developing a method to support social design, the point of departure in these studies is explained. As these studies aim to contribute to design methodology, we first reflect on current knowledge about design activity and explain how the work in this part of the book relates to it. We start with an account of the two prominent design paradigms taken when interpreting design activity. Second, the nature and development of design methods is described and it is explained how the Vision in Product design method (ViP, Hekkert & Van Dijk, 2011) relates to this. The chapter concludes with an explanation of why the ViP method is used as the main building block in developing support to design for social change.

6.1 *Design methodology*

We may say that the origin of design methodology marks the origin of design research in general. Design methodology, defined as the study of principles, practices and procedures of design (Cross, 1984; 2007), was born thanks to various attempts by skilled designers to describe and explain their design activity. From that point onwards, a range of studies were initiated to grasp the processes of design, and hence, science met design. However, an overview of the developments in design research from 1962 onwards (Cross, 2007) shows the tension between science and design, which is partly still present today.

Herbert A. Simon (1969) defines design as a course of action with the aim of 'changing existing situations into preferred ones' and Jones (1992) defines design as 'the initiation of change in man-made things'. These definitions show that design is concerned with creation, i.e., with transforming present states into future states. In contrast, science is originally concerned with describing and explaining *existing* phenomena in the present. Scientific theories may eventually help to predict future states, but is not primarily concerned with changing them. In often-used terms, design is synthesis,

and science is analysis. However, ambiguity rises when design becomes part of research, and when research becomes part of design, although both are common practices (Fallman, 2003). We may design a product to test a hypothesis in academic research, and we may need to research some use aspects first before we can effectively design the product in practice.

For quite some time, design researchers have been extensively discussing the relationship between science and design, and between the scientific method and 'the design method' (Cross, Naughton, & Walker, 1981). Over the last few decades, the relationship between design and design science seems to have established itself somewhat in three types of design research: research on (or about) design, research for design, and research through design (Forlizzi, Stolterman, and Zimmerman, 2009; similar distinctions have been made by Frankel and Racine, 2010, and Horvath, 2007). Based on interviews and literature, Forlizzi et al. (2009) define these three types of design research as follows: the goal of *research on design* is to gain understanding of the human activity of designing; the goal of *research for design* is to develop different kinds of theory that may be applied in the practice of design; and *research through design* is considered a research approach in which repeated problem reframing, which is a distinctive characteristic of design, is used as a research method.

Design paradigms

The tension between science and design has also led to tensions between design methodology and the act of designing. The creative, often iterative and unstructured process that reflects how people design (the act of designing) is not always compatible with the rigid and structured models that have been developed to describe it (design methodology). Due to its analytical nature, the scientific approach to studying the act of designing led to rational, formal models that describe and explain it. The paradigm used to study designing was ingrained in its description: the design process was seen as a 'rational search process' and the designer was seen as 'information processor' (Dorst, 1997).

However, during the seventies, prominent design methodologists started to reject the behaviourist view and machine-like language inscribed in the design models at that time (Cross, 2007). In 1983, Donald Schön introduced his book *The Reflective Practitioner*, in which he regards designing as a process to a unique problem, not to be solved by a step-by-step process. In his view, design artistry and knowledge can only be developed through reflection-in-action. With Schön, a new paradigm was born in which the design process was seen as a 'reflective conversation' and the designer was seen as a 'person constructing his/her reality' (Dorst, 1997).

By means of theoretical and empirical investigation, Dorst and Dijkhuis (1995) show that both paradigms are useful in describing design activity. The rational, problem-solving approach supports the description of a design activity when the task is clear-cut, e.g., the embodiment phase of the design process. Reflection-in-action is better suited to describing the conceptual stage, when the designer is still trying out different problem-solution structures (Dorst and Dijkhuis, 1995).

From models *of* **design, to methods** *for* **design**

The first models used to describe the design process were also taught as methods to novice designers' to improve their design process. Based as they were on the rational problem-solving paradigm, these methods thereby implied that a design problem is best solved with logical reasoning. In a reflection upon the development of methods (or models, as these terms are used interchangeably) in architectural and industrial design, Roozenburg and Cross (1991) show that the first methods in design indeed resembled engineering models, depicting a linear and structured process that distanced the designer from his preconceptions. However, over the years these methods have gradually begun to incorporate the preconceptions of the designer and encourage reflections upon these.

The dual role of models in both describing and assisting design activity raises ambiguity. Roozenburg and Cross (1991) therefore distinguish *prescriptive* models/methods (that prescribe the line of reasoning to be followed) from *descriptive* models/methods (that describe the design process as it occurs). Yet, it remains possible that a descriptive model *developed* to describe the design process is used to prescribe the line of reasoning to be followed. This possibility clearly complicates the attribution of these characteristics to a specific method. Preventing this ambiguity, Eekels (1982, p24) defines a method in interaction with a user. In his view, a method is 'the consciously applied diachronic structure to an activity'. In this respect, models can be used as methods, but are not necessarily developed as such.

To understand how to develop a (prescriptive) method or to understand when a (descriptive) model has prescriptive power, we should understand the value of using a method.

> *A method is useful because it is supposed to 'organize [designing] behaviour so that it is more effective and efficient than unaided ... ways of working'* *(Roozenburg & Cross, 1991)*

In this respect, a method is always *applied to an activity* and should not be confused with the activity itself [9]. However, when the method is developed *as a method*, it is generally developed to structure the designer's thinking and to remind the designer of essential steps, helping the designer to work effectively and without too many detours (Van Boeijen & Daalhuizen, 2010).

Apart from design methodology, other types of design research have also led to methods for design. For example, studies of product sounds (Özcan, 2008) or emotions (Desmet, 2002) have led to the development of methods (or tools and techniques) intended to support the design of these aspects. Clearly, these studies focus on a different unit of analysis than design methodology does. They are interested in the effect product attributes have

[9] Neither can it be seen as an instruction that, when followed properly, leads to success.

on users, rather than the act of designing. In these types of studies, the design methods developed target specific design outcomes, rather than accompanying the design process in general. Referring again to Forlizzi et al.'s (2009) distinction of design research types, these studies can be qualified as 'research for design'. In contrast, 'research on design' specifically denotes research carried out so as to understand the act of designing as such. This type of research is descriptive, and may generate insight that improves the design process, without necessarily specifying the design outcome.
In sum, a model represents an abstraction of the design activity under study. Depending on the paradigm with which the design activity is studied, these models have either a prescriptive or descriptive character. Although they can be used as such, they are considered models when they have not been developed as a method to be applied to a design activity. Design models always originate from design methodology, while methods for design can also stem from different types of (design) research.

Desired origin of design methods

As described in the previous section, most current design methods are either based on design models or on targeted qualities of the final design. Methods of the latter kind are more specific, and are often applied at a particular stage of the overall process. Methods of the first kind, i.e., general design methods, originate mainly from design methodology, and hence, are based on research on the design activity as it has been performed (by expert or talented designers). But does the study of current design activity indeed lead to the best (general) design methods? Although no answer exists at this stage, there is still the implicit assumption underlying current design methodology that the more we know about how designing is done, the better we can support the way it is done. However, we should dare to ask ourselves the question of how we think designing *ought to be done* (Vermaas, 2010).

A method that has been developed as an answer to this same question is 'Vision in Product design (ViP)' (Hekkert & Van Dijk, 2011). This method has been developed on the basis of a philosophical supposition about both the role of products in people's lives and the role of the designer in establishing this. The method does not indicate how designers ought to proceed effectively and efficiently through the design process from brief to outcome. The essence of the method is rather to guide designers' understanding of and eventually their assuming responsibility for co-shaping people's lives. In Hekkert and Van Dijk's view, reflecting and discussing should be the core activities of the design process. In contrast to the commonly held notion of a 'good' method, ViP inspires (sometimes lengthy) ruminations that may delay the process of design rather than speeding it up. However, Dorst (2008) already questioned whether efficiency should be one of the most important criteria of a design method. What if it takes time to get to more responsible design?

6.2 *Vision in (product) design*

The origin of the Vision in Product design approach dates back to 1996, and the method has been developed since then by Hekkert and Van Dijk. It has been part of curriculum at the faculty of Industrial Design Engineering in Delft, The Netherlands since it was first conceived. In 2011, the founders of the method published the book *Vision in Design* to explain the theoretical underpinnings of the method and illustrate its value for practice. A short explanation of the ViP method will be given following the graphical representation taken from the book (Hekkert & Van Dijk, 2011).

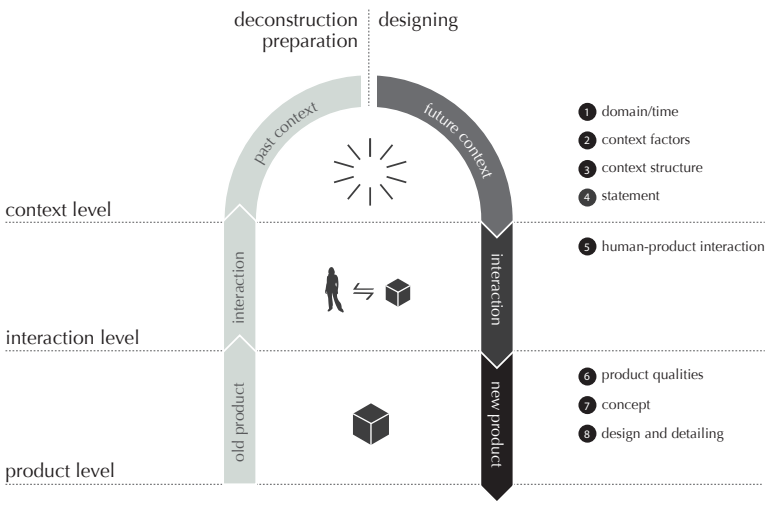


FIGURE 48
THE TWO STAGES AND EIGHT STEPS OF THE VISION IN PRODUCT DESIGN METHOD, EMBEDDED IN A MODEL OF THE PRODUCT-HUMAN-WORLD RELATIONSHIP

The method represents two main stages, supports eight design steps, and is embedded in a three-layered model that represents a structuring of product-human-world relationships.

The three levels of this model, i.e., product, human-product interaction, and context level, reflect its philosophical origin. A product (level 1), is used by people (level 2), and thereby helps them to relate to the world around them (level 3). The method prompts the designer to see and understand products on all three levels. The product level describes the characteristics of the product as it is, e.g., a product can be robust, modern, lovely, or simple. The interaction level describes the interaction qualities between the user and the product, e.g., an interaction can be smooth and intuitive, or familiar and intense. The context level describes the worldview reflected in the design. This worldview does not have to be objectively true; it is the worldview of the designer. For example, a product that facilitates 'effortless interaction' may be based on a designer's worldview that 'people are constantly busy' which made him decide to help the user in relating to this world by 'enabling

him to feel in control'. Any designer can determine such views of the world and, implicitly or explicitly, inscribe these in the design. ViP stimulates the designer to make his or her worldviews explicit, to question them, and to respond to them thoughtfully: what relation between people and their world do you wish to establish through design? That products only become meaningful in relation to people is one of the main premises underlying the ViP method. Consequently, Hekkert and Van Dijk argue that designing is about designers determining a *purpose or effect* of this relationship, a.k.a. the statement (step 4), before the relationship and subsequently the product itself can be defined and designed (step 5-8).

The ViP method has two stages: a preparation stage, i.e., deconstruction, and a stage that guides the actual designing. The deconstruction stage analyses existing products on the three levels described earlier. It is called preparation, as it helps the designer to practice describing an existing product at these levels, which comes in handy during the designing stage. However, the main aim of this stage is to encourage the designer to let go of any preconceptions about his design brief. For instance, when the brief is 'to design a mixer' immediately representations of mixers and solutions to improve them enter the designer's mind. The deconstruction stage helps designers to detach themselves from such preconceptions and begin the designing stage with an open mind.

The eight design steps will be described briefly below. However, for an elaborate and detailed account we refer to the book (Hekkert & Van Dijk, p.137-187).

1.Establishing the domain
During this step, the designer (re)frames the scope of the project. An initial brief 'to design a hairdryer' may have its domain expanded to: 'hair care in 2020'. Establishing a broader domain than the initial brief prompts the designer to look for design possibilities outside the 'problem area'.

2.Generation of context factors
The designer is instructed to collect a set of factors that define a view of the future world. Factors should be relevant to the domain and appealing to the designer. Factors describe both changing aspects of the world, like trends and developments, and stable factors, like (scientific) principles and aspects of our world and behaviours that are considered stable.

3.Structuring the context
To be able to respond appropriately to this future world, the designer is instructed to first establish this context–his/her view on the world–coherently. As factors represent scattered bits of this world, the relationship among these should be found.

4.Statement definition
The designer's ultimate goal with the design is to be defined in a statement. This statement is a response to the context, and defines specifically what the design should offer or bring to people in this future world, i.e., what relationship between them and their world it should establish, on top of its mere function.

5.Establishing a relationship: defining human-product interaction
Now that the designer knows what he or she wants to offer people, it remains to be defined how this will be manifested. Defining the interaction qualities is the first step in 'designing' this effect.

6.Defining product qualities
Subsequently, to elicit the previously defined interaction, the product should have certain qualities. These qualities can be character-related, i.e., referring to characteristics one can also apply to human beings or other characters; or they can be action-like, referring to qualities that describe actions.

Step 6 completes the design of the vision. Steps 7 and 8 support the transformation of this vision into product features and details. However, as these steps are commonly known in design, they are not treated here.

A methodological analysis of the ViP method

The Vision in Product design method guides the general process of getting from design brief to design. It is considered a method rather than a model as it originates from philosophy instead of design methodology, and has been developed to prescribe the act of designing. Therefore, it does not model design activity as observed, but is based on a vision of how design activity should be. For this reason, the design paradigm inscribed in the method cannot be traced back to any research underlying the method, but requires different sources. To understand the model of the designer that the ViP method adheres to, e.g., a rational problem solver, or a reflective person who constructs his or her own reality, a deeper analysis of the method is needed.

First, the origin of the method resembles a post-phenomenological stance towards the role of design in human life. Indeed, Hekkert and Van Dijk (2011) explain that, with reference to Verbeek and Kockelkoren (1998), a product as such is 'nothing but a piece of junk lying around'. A product only becomes meaningful when people relate to it. In Hekkert and Van Dijk's view, the essence of designing should therefore be about defining this relationship. What should a product mean to the people who use it? Second, they argue that in defining this, a designer should be as authentic, responsible and free as possible. In their view, experiencing freedom in a design process enhances both authenticity and responsibility, leading to 'highly original, very thoughtful and deeply human designs' (Dorst in Hekkert & Van Dijk, 2011). This shows that the designer and his/her beliefs are assigned an important role in the design process. Reflections and discussions in which the designer questions his/her own thoughts and preconceptions are therefore highly valued activities. 'We won't tell you what you have to do, but rather help you articulate the appropriate questions at the right time.' (Hekkert & Van Dijk, 2011, p.82)

Both the philosophical stance underlying the ViP method and the role envisioned for the designer aptly fit the design paradigm of reflection-in-action, in which the design process is seen as a 'reflective conversation' and the designer 'someone constructing his/her own reality' (Dorst, 1997).

However, two important features of the method make this qualification an uncomfortable one.

First, the method represents a clear rationale in the ordering of each step. The relationship between statement, interaction and product qualities specifically represent a cause-effect relationship, i.e., particular product qualities should evoke a particular interaction, enabling a particular relationship between the users and their world. However, in defining the statement, the interaction and the product vision, the designer is asked to reason from a desired effect to an appropriate cause, instead of reasoning what effects may result from a particular cause. Although these three steps represent a logical progression, taking these steps is a highly abstract and intuitive process. This means the process requires tapping into one's intuition, but certainly requires rational structuring.The method thereby enhances both personal reflection *and* logical reasoning.

'We give room to feelings and intuition as they do at art schools, but simultaneously require students to develop a sound argument, in order to justify and explain every decision they make, which means understanding where each decision comes from and what its consequences are.'

(Hekkert & Van Dijk, 2011, p.128-129)

Second, throughout the book, the importance of the role played by human universals in design is repeatedly stressed. In developing a future context, the designer is asked to select factors that together make up this context. Besides factors that are regularly considered by designers, like trends and developments, Hekkert and Van Dijk argue the importance of so-called 'states' and 'principles' in design. Principles, derived from fundamental science or personal observations, provide the designer with a deep understanding of the future context. For example, psychological principles help the designer to fundamentally understand human experience and behaviour and thereby form a solid foundation for design. According to Hekkert and Van Dijk, this fundamental understanding of human life increases the chances for successful creation of future human-product-world relationships.

6.3 *Conclusion*

In sum, Vision in Product design is a method that considers design as a reflective process in which the designer constructs his or her own reality. However, in the construction of this reality, the method stimulates the designer to incorporate fundamental principles of human life. Moreover, the method provides a clear rationale for the designer to argue his or her decisions.

The ViP method offers a method to design a product on the basis of how it should enable people to relate to their world. In doing so, the method requires designers to postpone the automatic generation of ideas and solutions until they have defined this, i.e., the statement. Therefore, the statement does not refer to the mere function of the design, but to what it offers people on top of this, i.e., particular experiences or behaviours. The ViP method thereby supports designing *on the basis of intended mediation*. Although not specifically focusing on behaviour, the ViP method supports the reasoning from (behavioural) effect to design, something we argued mediation theory is lacking. The method acknowledges that the role of design in people's lives can only understood in relational terms, yet helps to deconstruct and design this relation as designer. By assisting the design of this behavioural effect *through* the interaction with a product rather than in interaction, the ViP method may successfully help in designing implicit influence.

Moreover, the method encourages the designer to consider the intended effects of their designs thoughtfully and assume responsibility for it. In building a worldview, the designer creates his own view but is encouraged to do this responsibly. In composing this worldview, designers may adopt a user perspective, or a social perspective, or any other perspective as they see fit. ViP thereby offers a good starting point for exploring design on the basis of desired mediation of *behaviour* with social implications. However, no explicit encouragement is offered to adopt a social perspective or consider collective concerns. In addition, ViP does not specifically focus on mediation of behaviour, while this focus is important to induce actual social change. The next chapter shows the initial explorations to add these elements to

07

the SID method and its application

Based on the Vision in Product design approach, and our understanding of product influence as presented in Part 1, a preliminary version of a method has been developed to support the design of product influence with desired social implications. This chapter deals with a study carried out to examine the application of this method. After an explanation of the Social Implication Design method (SID), the set-up of the study will be explained. By comparing three similar design projects in which the SID method was applied, useful insights have been gained to pinpoint the strengths and weaknesses of the method in order to develop it further. The study reveals preliminary insights into what extent we are able to design the implicit influence of design and to what extent the method is helpful in this.

7.1 *The Social Implication Design method*

The main aim of the Social Implication Design method is to support the designer in reasoning from a social problem to a design proposal. In this, focus is on the consequential social implications of the design to counteract the social problem at hand.

In Figure 49, the Social Implication Design method is presented. This method is an integration of our framework of product influence as presented in Part 1 (Figure 41) and the ViP method explained in Chapter 6 (Figure 48).

Our framework of product influence brings the various perspectives one may have to understand product influence together in such a manner, that it is expected to support the design of it to counteract social problems. To this end, we discussed six cases along three main lines that relate the framework to expected actions and considerations of the designer: 1) the approach to define which behaviour to change of whom, 2) the relationship between personal and collective concerns, and 3) the type of influence designed.

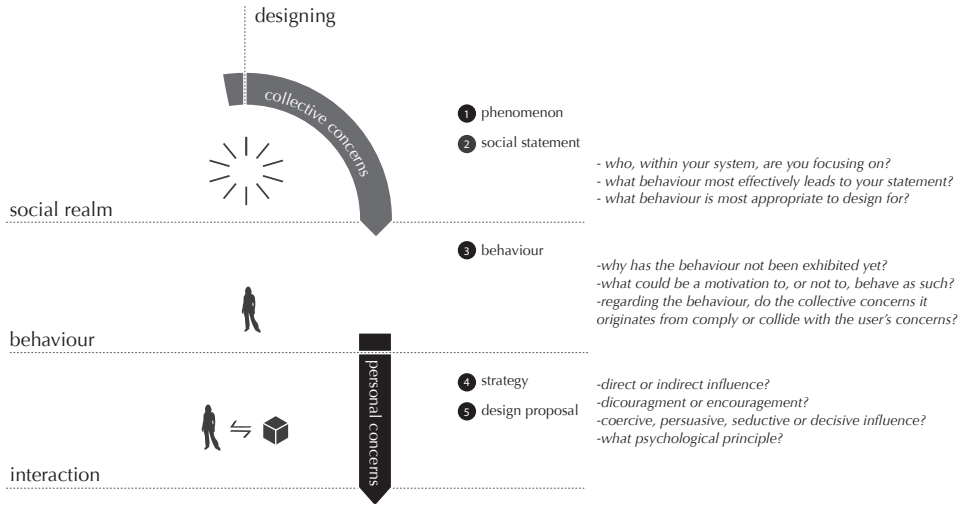


FIGURE 49
THE SOCIAL IMPLICATION DESIGN METHOD

Based on our discussion of the cases, we concluded that –in order to design the hidden influence of products and services for social purposes- the designer should be stimulated to reframe a problem-oriented focus in the project to a neutral and wider social phenomenon. This broader scope would stimulate the designer to prevent jumping-to-conclusions and explore relevant related factors to the problem at hand. Subsequently, we concluded that the designer should adopt a social perspective in deciding which behaviour to change, being able to argue for this on the basis of collective concerns. However, in understanding how to affect behaviour through design, the designer should adopt a user perspective and consider personal concerns. We saw that the implicit influence of design may indeed be most appropriate and effective when designing for 'soft' social problems in which personal concerns are in conflict with collective concerns. However, for any project, the designer should argue for a given type of influence on the basis of the anticipated relationship between personal and collective concerns, along with the type of problem and domain of intervention. Integrating these findings within the Vision in Product design method has led to the steps described here.

The method consists of three layers (derived from our framework) and five design steps. The three layers, i.e., the social realm, behaviour, and interaction, illustrate the three main perspectives the designer should consider in relation to the design. 'Behaviour' is the middle layer as it connects the 'world of the user', i.e., user-product interaction, to our social world. In our actions we relate to others. And as we know, what these actions mean to others may be different than what it means to ourselves, in the light of our collective and personal concerns respectively.

The five steps should help the designer to frame the project (step 1), to define a desired social effect (step 2), to focus on a particular behaviour to reach this effect (step 3), to apply a particular strategy based on considerations of what type of influence is most appropriate and effective (step 4), that leads to an particular concept (step 5). Some steps are accompanied by a set of

questions the designer can ask him- or herself. In getting from step 1 to 3, the designer is encouraged to take a holistic and social perspective and argue for decisions on the basis of collective concerns. In getting from step 3 to 5, the designer is stimulated to take a user perspective and consider personal concerns. The five steps are described in detail, and both the origins and reason for each step is explained.

1. Phenomenon
Similar to how regular design projects often start with a problem, so social design projects often start with a social problem. In line with the ViP method and based on the insights gathered, the Social Implication Design method holds the premise that taking a problem as a starting point for design limits the designer's possibilities. Therefore, the designer is asked to reframe the scope of the project in terms of a neutral phenomenon that encapsulates the social problem, rather than focusing on the problem as such. A phenomenon refers to a subject we deal with as society, meaning it concerns us collectively. A phenomenon is neutral and can be objectively described.

2. Social Statement
Based on a holistic and coherent view of the phenomenon, the designer is asked to explicitly define what he/she wants to contribute to society, i.e., the desired social implication he or she wishes to foster. A social statement is the desired implication regarding the phenomenon, which is a statement how it should change. Similar to the ViP method, the act of defining a social statement requires reflection, discussion, sound argumentation, and explanation of the goals behind the project.

3. Behaviour
Behaviour can refer to actions or activities on different levels of specificity. The designer is asked to define the behaviour as specifically as possible, without losing the faith that it will induce the intended social implication.

4. Strategy
A strategy is a conscious attempt to inscribe product influence in a design proposal. After garnering an understanding of why people do not exhibit the desired behaviour, what objectives or concerns they have that prompt them to behave differently, and how their concerns relate to our collective concern in the matter, the designer is then asked to define the intended type of influence. To this end, the designer may apply one of the strategies proposed in Chapter 4.

5. Design Proposal
A design proposal refers to a preliminary idea for a product or service that should still be further developed into a mature concept and detailed design, potentially supported by different methods. The final step in this process is for the designer to 'check' whether the design leads to the predefined behaviour and social implication. This check can be done through logical reasoning, discussing the proposal with experts, or by low-fi testing of essential components of the design.

Before we explain the set-up of our study, we first establish an understanding of how to evaluate a design method in general.

7.2 *How to evaluate a design method*

Design methods are assumed to improve design performance. Although few rigorous studies have reported on design method evaluation (Dorst, 2008), many studies analyse design processes to identify the 'ingredients' needed for good design performance. For example, some studies examine outstanding or successful individual design approaches that designers may learn from (e.g., Fricke, 1996; Cross, 2003). Other studies compare the design processes of novice designers/advanced beginners with those of experienced/senior/expert designers to identify successful strategies (e.g., Atman, Chimka, Bursic, & Nachtmann, 1999; Ahmed, Wallace, & Blessing, 2003; Daalhuizen & Badke-Schaub, 2011). Within these studies, design performance is often judged by the quality of the outcome and the time it took the designer to finalize the task at hand. This implies that a design method should be evaluated based on these two qualities too: 'quality of the outcome' and 'efficiency of the process'. But whereas time can be measured objectively, quality is certainly harder to operationalize, and views on what constitutes the quality of an outcome can vary greatly. Quality may be indicated by the quality of sketches/drawings (Radcliffe & Lee, 1989), the fit of the solution with criteria derived from the assignment (Fricke, 1996), or the creativity quality of the outcomes (Cross, Christiaans, & Dorst, 1994).

More importantly however, is whether design performance should only be judged by these two criteria. First, a design method serves more than the purpose of solely arriving at a high quality outcome. Besides supporting the creative process, methods also support communication and planning to convince clients or support teamwork. Hence, to assess the value of a method, it should be evaluated in terms of these outcomes as well. Second, methods that support thoughtful considerations within the design process can also be valuable without necessarily reflecting an efficient process [10]. As we know, Hekkert and Van Dijk (2011) argue that considering the role of design in shaping human life responsibly is regarded a characteristic of good design performance, despite the fact that this may delay the process. Although it is hoped that these considerations lead to better designs in general, regardless of their outcomes they still contribute value.

To explain the latter, imagine the following situation. You are working in the garden and suddenly you hear your son (let's say Abel) fighting with the son of the neighbours (Max). However, what you did not see is that Max stole Abel's marbles. Things are getting pretty out of hand and you decide to interfere. What do you do?

1) You get up quickly, walk up to the boys and without any considerations, you give Max a caution.

[10] Some studies do include an assessment of both the quality of the outcome and the quality of the process. In these studies, the latter refers for instance to the number of design criteria considered or the explicit assumptions made (e.g., Mullins, Atman, & Shuman, 1999).

2) You get up quickly, walk up to the boys and try to find out what happened. However, the two each start their own story and both are hard to follow. You make an incorrect estimation of the situation and decide to give Abel a caution.

3) You get up quickly, walk up to the boys and try to find out what happened. Each tries to tell his side of the story, you are able to make a good estimation of the situation and decide to give Max a caution.

I think we all agree that option 3 represents the most desired option, showing the best 'parenting performance' (of the three, at least). But which option do we consider second best? Option 2 shows the same approach, but leads to a result that is unfair. On the contrary, option 1 shows an unfair approach, but accidentally leads to a fair result. Regarding the use of a method, we could imagine a similar situation. Either we use a method that does not stimulate thoughtful considerations, but may accidentally lead to a desired outcome. Or the method stimulates thoughtful considerations, but runs the risk that the designer is not able to translate these into the eventual design. No method can ever guarantee the quality of an outcome. In the end, how well such considerations are translated into a design always depends on the quality of the *designer.* This means that when the use of a method reflects thoughtful consideration, that method has (moral) value independent of the outcome. A method should therefore be assessed both by virtue of its ability to support designers consideration of important and relevant aspects of a design *in addition* to facilitating the outcome itself.

Previously cited literature assessing design performance, and our additional arguments that planning, communicating and contemplative aspects of designing should also be supported by design methods, have led us to define five indicators for good design performance.
Designers should be able to *understand* the activity and be able to *plan* its execution; *consider* relevant [11] aspects of the design, e.g., moral aspects, experiential qualities, usability, manufacturing aspects, and so on; translate desired aspects into a design proposal (i.e., to *design* these); and *communicate* both the process and the result to others.

The SID method is a method to support design on the basis of intended social implications. Consequently, this means that the method helps designers to 1) understand the relationship between design and its social implications; 2) plan the process of designing social implications; 3) consider the social implications of a design; 4) translate desired social implications into a design proposal; and 5) be able to communicate both this process and the outcome. These indicators help evaluate the Social Implication Design method. For a method to be considered effective, designers who apply it should be able to do the above *to a greater extent* or *better* than designers who applied no method or used another one. However, the present study is not only being carried out to evaluate a method, but also to describe and understand the use of the method in order to improve it, as it is still in its infancy. To this end, we decided to study the use of the method in-depth, rather than comparing these processes with unaided design processes.

[11] Depending on the aim of the method.

7.3 *Set-up of the multiple-case study*

Two studies were performed to evaluate and improve the Social Implication Design method. The remainder of this chapter reports on the set-up, results and conclusions of the first study. In this study, three design projects in which the Social Implication Design method was applied are thoroughly analysed. Chapter 8 covers the second study, in which the outcomes of these processes were assessed with experts.

Social design for a deprived neighbourhood

Three students applied the Social Implication Design method (from now on referred to as 'the SID method') for their graduate projects at Industrial Design Engineering (IDE), Delft University of Technology. Every graduate student of IDE receives supervision throughout the project from a chair (often a professor), a mentor (assistant/associate professor or a PhD candidate) and a company mentor. The student is free to define the topic of the project. In practice this means that the student either selects a project from a database of projects on offer, or initiates a self-defined project. On average, a graduate student takes about 8 months to finalize the project.

The three students who were willing to apply the SID method carried out their projects for Estrade, a real-estate developer for housing corporation Vestia. At the time, Estrade was developing urban plans for the Afrikaanderwijk, a neighbourhood in Rotterdam that is confronted with a number of social problems like high unemployment, crime and intercultural tensions.
As it owns a large amount of the houses in the Afrikaanderwijk, Estrade is interested in learning how the physical environment can positively affect the social processes within the area. At the time, Estrade had just defined a shared ambition with other interested parties to integrally improve the physical, social and economical quality of the area. The documentation supporting this ambition provided the starting point for the students.

Having read this document, the students were free to set a more specific focus for their project individually, i.e., what social phenomenon to focus on.
Student 1 decided to work on the 'social identity' of the neighbourhood. She was interested to understand how the place where people live is reflected in their identity and to what extent people contribute to the identity of a neighbourhood, and how this affects their behaviour.
Student 2 decided to frame the scope of his project as the 'self regulation' of the area. He was interested to know how and when people form formal and informal organisational structures in order to cope with problems themselves, i.e., without support from other organisations like the police or the housing corporation.
Student 3 decided to work on the 'social ties' in the neighbourhood. As the Afrikaanderwijk is home to people from a wide range of cultural backgrounds, he was interested to see how social ties were shaped and how they affect the liveability of a neighbourhood.

To explain the SID method, the students received three documents at the start of the project: one describing the steps and questions that make up the method, one explaining the underlying premises of the method, and the third a paper explaining the theory behind the method and providing possible strategies to apply during the process (Tromp, Hekkert & Verbeek, 2011, and largely described in Chapter 4). In addition, a presentation was given to explain all this in a group setting, and to allow for questions. During the process, the students attended a workshop and received personal advice and guidance from the supervisors.

The students' main goal was to use the method to design a product or a service based on intended social implications. The students had to apply the method, but were free to select additional methods, tools, and techniques. The strategies reported in Chapter 4 were provided to support the actual design of product influence. We organised each project accordingly, such that all three started working on 'soft' social problems. This was done to increase the chances that they would design implicit influence to realize desired social implications, i.e., the type of influence in which we are most interested. We explained our assumptions that implicit influence was expected to be most appropriate and effective in such situations. Although we encouraged the students to design implicit influence, the students were above all told that it was up to them to decide upon the most appropriate and effective type of influence, and to argue for this.

Procedure

Dorst (2008) defines four elements that make up a design activity: *the object* of the design activity, i.e., the design brief and its emerging design, *the actor*, i.e., the designer or the design team/organization, *the context* in which the activity takes place, i.e., anything that impacts the act of designing, and *the process*, i.e., the structure and dynamics of design activities. Shifting the often-held focus in design methodology from the process, Dorst argues that to fully understand design activity, all four elements should be studied. Studying the use of a design method means that all four elements should be considered, yet only two are expected to be affected: *the process* and *the object*. Hence, we are interested in the effects of the SID method on the object and the process of the design project (s), but we eventually discuss these in relation to *the actor* and *the context* of the design activity.

Purpose of the study: The main purpose of the study is to evaluate the SID method and to understand how it can be developed further to better support social design.
The assumption is that the SID method supports the understanding, planning, consideration, designing and communication of the social implications of a product or service. These activities, which are all indicators of desired design performance, are shown in interaction between the four elements of design activity (actor, object, context, and process).

Type of study: The application of the method is studied using a multiple-case study design following replication/duplication logic (Yin, 1993). The type of study is typical of a qualitative study. A qualitative study allows us to go into the details of the processes. Yet our replication logic allows us to compare cases and to generalize these results to the theory underlying the

method. The insights help to adapt the components and structure of the method in order to improve it.

Data collection: To evaluate the method, data is collected on both *the process* and *the object* (Dorst, 2008). Multiple sources have been consulted to allow for data triangulation, like email conversations, reported observations, four recorded group interviews during the process, two recorded individual interviews (one in the middle of project development and one at the end of project development), design reports, and the final designs. Data gathering is structured in line with the five indicators. When an indicator was not shown, the problems encountered by the designer(s) are reported and discussed in relation to the method, possibly leading to improvements of the method. In Table 1, the indicators have been linked to both the subjective and objective sources, i.e., respectively the reflection of the designer and asessment of the designer's behaviour, report, design, and project presentation.

TABLE 1
TYPES OF SOURCES USED TO ASSESS DESIGN PERFORMANCE BASED ON FIVE INDICATORS

indicators:	**source 1:** *designer's reflection*	**source 2:** *external assessment*
1. understand	interviews	–
2. plan	interviews	observations
3. consider	interviews	observations, report
4. design	interviews	design proposal
5. communicate	interviews	company, chair

Data Analysis: Both group and individual interviews were analysed by going through the interviews two separate times, noting down all the relevant quotes. The quotes were reported as shortened transcriptions. For each interview, these shortened transcriptions were summarized and translated from Dutch to English. Going through these summaries, themes were identified. To check whether we did not miss any themes, we conducted a cross-case analysis. The findings were discussed with the students afterwards to check whether they recognized their process and were not missing any essential themes. Before we go into detail about the results, we first present the designs of the projects. We discuss the main working principles of the product or service, the behaviour the designer wishes to stimulate with it, and to what desired social implication he or she intends to contribute.

Design case 1: 'Welding Works', a course to weld products to contribute to the spatial identity of the neighbourhood

Design: 'Welding Works' (Figure 50) is a welding course in which participants are taught to design, construct, and eventually weld fences for construction areas. The course aims at youth who did not finish school and who live in deprived neighbourhoods that often have construction areas. The fences can offer various sub-functions like football goals, basketball rings, benches, bicycle sheds, or gym tools. The idea is that the maker signs each of his fences with a so-called 'tag' or signature before it gets placed in his neighbourhood.

Behaviour: The sub-functions of the fences are intended to stimulate residents of the area to explore new parts of their neighbourhood. Additionally, the 'ownership' of the fences by the youngsters is intended to stimulate relatives to go out and admire his/her work. In both ways, the fences are intended to seduce people to visit places they normally would not visit.

Social Implication: The exploration of new parts of the neighbourhood is intended to lead to an increased involvement and attachment to the area, and thereby an increased acceptance of change. By inviting people to the construction area and allowing them to be part of it, the intention is that resistance to any environmental and social alterations should decrease.

FIGURE 50
'WELDING WORKS': A WELDING COURSE FOR YOUNGSTERS IN WHICH THEY DESIGN AND PRODUCE FENCES WITH SUB-FUNCTIONS, TO BE PLACED AROUND THE DECONSTRUCTION AREAS IN THEIR PERSONAL NEIGHBOURHOOD

Design case 2: 'Solidshare', a service to contribute to a neighbourhood's self-regulation

Design: 'Solidshare' (Figure 51) is a service provided by a housing corporation to its residents. High-quality tools, like drilling or sewing machines, are offered for loan with the proviso that residents themselves store and maintain the tools. A website is designed to support the exchange of the tools. Making a booking for a specific tool on this website provides the user with the details of where to pick up the tool, i.e., which resident is having it in one's custody at the moment of booking.

Behaviour: The exchange of tools is a way to meet people from the same neighbourhood one did not know beforehand. The service thereby aims to stimulate residents to acknowledge one another as a neighbour rather than to label each other as complete strangers.

Social Implication: Meeting unknown neighbours and recognizing each other as being part of the same neighbourhood is intended to create feelings

and actions of solidarity. Solidarity is considered to be an important part of the social organization of the neighbourhood, and more specifically its collective efficacy.

FIGURE 51
'SOLIDSHARE': A WEB-BASED PLATFORM THAT ALLOWS CITIZENS TO BORROW HIGH-QUALITY TOOLS, OFFERED BY THE HOUSING CORPORATION, BUT MAINTAINED BY PEOPLE THEMSELVES

Design case 3: 'Birthday Slide', a product to contribute to social ties.

Design: The 'Birthday Slide' (Figure 52) is a slide for primary schools that serves as part of ritual when children leave kindergarten and move to higher grades. For children who are in their final year of kindergarten, the slide is used to celebrate their transitional year whenever it is someone's birthday. At the end of a birthday, the slide is moved against the school building, and all children are allowed to slide downwards by stepping out of a window on the first floor. The parents are asked to help with this activity during the year.

Behaviour: The fact that the slide is only moved when three or four adults collaborate offers a moment of contact between parents. The parent whose child has his/her birthday and is allowed to go first is assigned the responsibility for the positioning of the slide. The shared concerns about the enjoyment of the children are intended to overrule cultural boundaries.

Social Implication: By stimulating contact between people with various cultural backgrounds, the Birthday Slide aims to contribute to weak ties between different communities in the neighbourhood.

FIGURE 52
THE 'BIRTHDAY SLIDE': A SLIDE TO BE USED IN A TRANSITIONAL YEAR AT PRIMARY SCHOOL. IT ALLOWS CHILDREN TO SLIDE THROUGH THE WINDOW ON THE FIRST FLOOR DOWN TO THE SCHOOLYARD

7.4 *Results: effectiveness and usability of the SID method*

The first part of this section shows the results of the study for evaluating the method in relation to its purpose. As these results do not honestly reflect the struggle the students encountered throughout the process, a section is added that reports on an evaluation of the usability of the method. According to Jones (1992), in general a method should be presented accompanied by comments on both the effectiveness and usability of the method. Hence, it allows us to improve not only the method itself, but also its introduction to designers.

Effectiveness of the SID method

Does the SID method support the understanding, planning, consideration, designing and communication of the social implications of design?

Understand: All students mentioned that they learned to look at design differently thanks to the method. After the project, they explained they were now able to recognize that a design realizes consequences at both a behavioural and social level. However, this understanding was developed throughout the project, rather than being present at the beginning of the project.

> 'I thought of the effects of design at way more levels than I would normally.' -student 1

> 'The method made me more conscious [of the social implications of design]…and it taught me to look at products differently.' -student 3

'The understanding grows throughout the process. Every step leads to more depth. […] The method has certainly forced me to think differently.' *-student 2*

Plan: The steps helped the students to plan their projects on paper, but not in practice. None of the students was able to estimate a feasible amount of time required for each step, nor were they able to decide on the activities to undertake for each step, let alone to plan these.

Consider: Reports and observations of design meetings show thoughtful and sound considerations from all three students. However, the students argue that these considerations were too elaborate and took up too much of the process. They argue that the method indeed supports considering the social implications of the design, but provides little support in thinking about the immediate use and functioning of the design. They argue that emphasis is too much on long-term, social implications, leading to imbalanced results.

#issue 1 *What about the quality of the design on the short-term?*

'My final design is in its primary function useful, and I am happy with that.' -student 1

'[Next to realizing a desired social implication], I also want to design a solution to a direct, practical problem' -student 2

'I feel my design is way out of balance, it is too far from reality.' -student 3

Design: All students reported that the strategies indeed led to ideas, but not to ideas they were confident about developing further. The strategies help in considering more options than they probably would have done without the strategies.

#issue 2 *Design is not the application of a strategy*

'They gave me insight in what ways a behavioural goal can be reached; they opened up my scope. But this was rather the model [referring to coercive, persuasive, seductive and decisive] than the actual strategies [referring to the psychological principles].' –student 1

'The strategies support divergence, but I did not want that at that moment [in the process]. It leads to various possibilities [for influencing behaviour], but there are no criteria [to select one].' –student 2

> 'They were helpful in diverging, but they were too stiffly formulated. Plus, they are not helpful when you want to influence behaviour implicitly.' –student 3

Student 2 is quite confident that he managed to inscribe his intentions in the design. Student 3 shows relative doubt and student 1 shows fundamental doubt at this point. Consequently, objective evaluation is needed to be able to judge the effectiveness of the method in supporting the inscription of social implications in the design. It can be concluded that the method does not convincingly provide support in gaining this confidence.

Regarding the type of influence, all students aimed to design implicit influence. However, student 1 showed moral doubt about this and had rather designed a more explicit type of influence. Student 2 aimed to design for seduction as he considered this the most appropriate experience of influence in relation to his goal. In contrast, student 3 aimed to design for decision. According to student 3, it would be impossible to get people from almost clashing social groups to interact with each other without a little force.

Lack of confidence *#issue 3*

> 'I am very happy that I managed to design a solution that shows social benefit in its primary functioning too. Because, about the behavioural and social consequences I am still not confident at all.' –student 1

> 'There are many pitfalls, but I truly believe in the concept. Many aspects have been considered...!' –student 2

> 'Well, it should still be developed further I guess… With the right conditions… maybe it works…' –student 3

Communicate: All students managed to convincingly and clearly report on and present both their process and their final design, so that Estrade agreed to build all three concepts. However, the students did not always consider it easy to communicate their project to others.

> 'I will always need my report to be able to explain my design, I'm afraid. Actually, I am quite ashamed of having to tell such a story in the first place. A design should speak for itself.' -student 1

> 'Well, afterwards, yes. During the process, no.' –student 2

> 'Hmm, yes, it [the method] provides a storyline.' -student 3

Table 2 The conclusions of the evaluation of the effectiveness of the method are briefly presented in relation to the type of source these conclusions are derived from.

TABLE 2
RESULTS OF THE EVALUATION OF THE METHOD: DID THE METHOD IMPROVE DESIGN PERFORMANCE?

indicators:	source 1: *designer's reflection*		source 2: *external assessment*	
1. understand	interviews	yes	–	–
2. plan	interviews	no	observations	no
3. consider	interviews	yes, but...	observations, report	yes
4. design	interviews	partly	design proposal	?
5. communicate	interviews	yes, but...	company, chair	yes

Usability of the SID method

All three students experienced great difficulties applying the method, and it took them on average about fifteen months to complete the project. The process of getting from design brief to proposal (the part of the process supported by the method) took respectively eleven, ten, and twelve months for student 1, 2, and 3. Afterwards, all agree that the method provides clear logic. However, applying this in a design project was not experienced as a logical and clear process at all. The issues are presented below, and continue the list of issues that was presented in the evaluation of the effectiveness of method.

#issue 4 *Criteria*

In taking the steps and moving through the process, an important hurdle to all was the fact that the method did not provide any criteria for the steps to meet. This hindered the students from making choices. Neither did the method provide examples, nor a blueprint for the outcomes.

#issue 5 *What to do?*

Although all agree the method supported reasoning during the process, it provided limited to no support in 'doing'. The students mentioned they were lacking advice on concrete actions throughout the process.

#issue 6 *Linear vs. Iterative*

All, but especially students 1 and 3, stressed that their process had not been as linear as the method suggests. At the start of the project student 1 was already encountering difficulties with the order of steps, as her intuitive focus was on the user rather than society. For her, reasoning from individual perspective to social perspective worked better than the other way around. Reflecting on the process,

student 3 stressed that he would have preferred to know beforehand that the process was not as linear as presented. For him, the linearity of the process made it even more difficult to make decisions. To him, the linearity suggested that a decision had to be right once and for all and that 'going back' in the process did not mean progress.

Shifting perspectives *#issue 7*

The method requires the designer to shift from a social perspective to a user perspective as soon as the behaviour that one wants to stimulate has been defined. This shift in perspective appeared to cause various problems. First, not all students were able to deliberately take a different perspective from their intuitive one. Student 1 preferred to start with her intuitively taken perspective, i.e., a user perspective, but encountered difficulties in arguing her decisions from a social perspective. Student 2, on the other hand, fully surrendered himself to the method and started off with a social perspective. However, he encountered problems in shifting to a user perspective later in the process. According to the students, the method did not provide the steps needed to ground this individual perspective and consider the personal concerns of the user.

Moving from abstract to concrete *#issue 8*

The method starts with the selection of a social phenomenon the designer is designing for. This phenomenon reflects quite an abstract social construct. In the development of a design, a shift has to be made from an abstract to a concrete level. For the students, this was a difficult step to take, and each developed different personal strategies to do so. Student 1 encountered difficulties in thinking in abstract terms about the Afrikaanderwijk in the first place. Her strategy was to develop a theoretical framework, and to find connections between this framework and the concrete developments in the area. Student 3 explained that for him the selection of a location to focus on for the design (i.e., the schoolyard) had been an important step in his project. With the aims he had in mind, he selected a site that already provided optimal conditions to evoke this behaviour. Student 2 systematically defined criteria of the situation to realize, e.g., the level to which it needed to be possible 'to walk away from the interaction with the design', or the level to which the interaction needed to be 'part of daily life'. Next, student 2 used a powerful analogy and selected general concerns for all people in the Afrikaanderwijk to address, i.e., an economic concern.

7.5 Discussion

In order to understand to what extent this multiple-case study contributes to a validation of the method, we adhere to the validation method proposed by Pedersen et al. (2000). In an attempt to advance the development of design methods, Pedersen et al. offer an initial model to support a structured validation of a design method. To this end, the authors propose what they call a 'Validation Square' representing four stages: Theoretical Structural Validity (TSV), Empirical Structural Validity (ESV), Empirical Performance Validity (EPV), and Theoretical Performance Validity (TPV). Although the authors emphasize that the model is still in its infancy, it offers a comprehensive framework (and the only one available) to discuss to what extent this study has contributed to the validation of the SID method.

The first step in the validation of a design method is validation of its theoretical construct. In Pedersen et al.'s view, references to the author of the theoretical construct represent the acceptance of its theoretical validity. In our case, the theoretical construct is not yet an advanced theory to which scholars refer. However, it relates to mature and well-accepted theories like the theory of social dilemmas (Dawes, 1980; Dawes & Messick, 2000; Liebrand, Messick, & Wilke, 1992) and mediation theory (Verbeek, 2005; 2011). Besides references, showing internal consistency of the method is required to validate its theoretical construct. This means that the method should be able to represent a logical information flow, in which the output of one step serves as comprehensible input for the next. In our case, the students' statements agreeing on the logic, components, and order of the method are in this respect regarded as support for Theoretical Structural Validity (TSV).

Regarding Empirical Structural Validity (ESV), Pedersen et al. argue that example projects with which the method is tested should represent example cases in line with the intention of the method. Accepting this resemblance, which is the case regarding the three projects presented in this chapter, would support its ESV.

In order to evaluate a method's Empirical Performance Validity (EPV), two types of evaluation are defined. First, outcomes of the method should be evaluated in relation to the purpose of the method. Second, performance should be linked to the method by comparing processes in which the method is applied to processes in which no or other methods are applied. In this respect, EPV can only be evaluated quantitatively. Pedersen et al. argue that the outcome of the process should be studied as an indication of good or bad performance. However, the outcome should not be confused with the result. In their argument, 'outcome' may refer to qualities of both the process and the result. In the study reported in this chapter, the EPV of the SID method is evaluated qualitatively, and on the basis of five indicator of good performance. It thereby provides a first step towards assessing the EPV of the method. Moreover, as discussed earlier, an important element in our performance evaluation is lacking, i.e., the objective evaluation of the

method in designing social implications of the design. As this is regarded as the most important part to be supported by the method, a subsequent study has been carried out to objectively evaluate this. This study is reported in Chapter 8.

Theoretical Performance Validity (TPV) refers to successful application of the method to problems that go beyond example problems. Logically, this is not yet relevant when the method is still in its infancy. Therefore, we conclude that the study presented in this chapter only validly assessed the structure of the method (TSV and ESV) and provides first steps to validly assess performance of the method (EPV). In other words, the study does evaluate performance, but it remains impossible to ascribe this performance fully to the method. At the same time, a qualitative evaluation of the performance supported by the method does allow for improvement of the method.

Although the logic, components and structure of the method can be said to support social designing, why did the students struggle so much, and how can this be prevented in future projects?

In considering to what extent the issues reported are due to any deficits of the method and therefore require adaptations of the method, these issues should be evaluated in relation to *the actor* and *the context* (Dorst, 2008). First of all, the designers involved are students, which means that the designers are technically still novices or, at best, advanced beginner designers (Dreyfus & Dreyfus, 2005). This means they have little experience, and have not yet developed a stable 'way of working'. Secondly, the fact that it is a *graduate* project seems to introduce even more uncertainty. A colleague at the faculty of IDE once explained what she called 'the graduate effect', referring to the phenomenon that many students want to graduate with a sublime project or at least the best project of their studies. They increase the pressure to perform to such a degree that they start to fear making any design decisions. Third, the project represents a solo-performance, while the main design projects throughout a student's career (and in practice) are often executed in teams. This increases student responsibility and may also lead to postponing design decisions. Fourth, both the method and the theory behind it were completely new to the students. And finally, our students were never trained to take responsibility and adopt a position vis-a-vis moral, social dilemmas.

Next, the issues the students encountered will be discussed, and when appropriate, adaptations to the method are proposed.

#issue 1 *What about the quality of the design in the short term?*

The SID method does not clearly indicate what the outcome will be when one applies the method. It may therefore have given the wrong impression that the five steps lead to a detailed design. Moreover, the presentation of the 5 steps in a similar fashion may have given the impression that each step would take about the same amount of time. However, some steps are expected to take longer than others. Moreover, it felt as though too much time was spent considering the social implication of the design, while too little time was spent considering the immediate benefit of the product for its user. Hence, both perspectives should be balanced better and receive equal attention.

conclusion The relation of the method to the entire design process, plus the relative duration of the steps, requires clarification. Next, consideration of short-term personal concerns should receive as much attention as long-term societal concerns (see also issue 7).

#issue 2 *Design is not the application of a strategy*

The strategies applied led to ideas, though these did not satisfy the students. The inscription of an influence within a design seems an intuitive process that is not well supported by rationally and consciously applying strategies. However, it did inspire and help the students to recognize what influence was designed eventually.

conclusion The strategies should be presented as inspiration, and as vocabulary used to label influence, instead of a formula that leads to design ideas.

#issue 3 *Lack of confidence*

The lack of confidence shared by two of the students regarding the effect of their designs may be partly ascribed to their lack of experience. However, this confidence in the design is considered an important aspect of the method. It is desirable that the method supports assessment of the concepts as regards the intended effects, so that the designer feels confident and is able to present the design confidently to a client.

conclusion A step to evaluate the design in terms of its intended effects is a desired part of the method and should be added.

Criteria *#issue 4*

The steps, or the results of the steps, do not include criteria to meet, which complicated the students' decision-making. However, this may also be related to the situation the students were in, as discussed earlier. For instance, the increased pressure they felt to make an ideal or sublime project, or the fact that they were working alone rather than as par of a team, may also have contributed to their hesitance to make decisions. In any case, basic criteria to meet, or example projects, may provide a blueprint for the method and inspire the designer.

Criteria and/or example projects should be provided together with the method. *conclusion*

What to do? *#issue 5*

This issue relates strongly to the previous issue. In reference to Blessing (1994), the method represents stages in the design process, but no activities. The steps thereby refer to the development of the overall design instead of the problem-solving process of the designer. This is a conscious effort to provide the designer with the necessary freedom to find original approaches. However, the fact that the method does not include any guidance, except for questions, is experienced as problematic.

Tips & tricks on what *might* be done (instead of what is expected to be done; Jones, 1992) should be added to make the method suitable for novice designers. *conclusion*

Linear vs. Iterative *#issue 6*

The differences between the linear structure of models prescribing design activity and the iterations within actual design activity are commonly known and discussed (e.g., Roozenburg & Cross, 1991). In general, design activity never happens in the linear fashion suggested by the method. To represent this, iterations are often represented in a model by overlapping stages or two-way-arrows (Blessing, 1994). Such an adaptation can be easily made to the SID method. However, in the SID method, the order of steps does not necessarily denote chronology, rather hierarchy. This means the overall aim defined in the social statement should be driving the subsequent decisions. However, in actually taking these steps and defining statement and behaviour, various iterations can be made.

conclusion

An explanation of the meaning of the order of steps in the method should be added. Subsequently, it should be indicated that it is fine to go 'up an down' iteratively through the steps.

#issue 7

Shifting perspectives

In general, it is said that designers apply integrative thinking to integrate various perspectives within design (Dorst, 2007; Tromp & Hekkert, 2010). The SID method requires the designer to adopt a social perspective first, and to shift this deliberately to a user perspective after the desired behaviour has been defined. This shift is to indicate that collective concerns should be prioritized when defining behaviour, while individual concerns should be prioritized in the development of the design. However, this shift appeared to be problematic. It was either experienced as counterintuitive in the first place, or it felt illogical when the shift had to be made. Illogical in the sense that it did not relate well to the previous steps, and that it felt as if a new project had to be started. As designers are generally already taught to integrate various perspectives simultaneously throughout the process, distinguishing these perspectives is considered to be an artificial step in the SID method. Yet the method is intended to help designers understand the role of both collective and individual concerns within the process and the potential clash between these.

conclusion

Adaptations need to be made so that the method encourages the designer to take a social and individual perspective simultaneously throughout the process. In addition to this, the method should support the designer in explaining both the conflicts and agreements between collective and individual concerns.

#issue 8

Moving from abstract to concrete

The method requires talent in abstract thinking and in applying this adequately in a design. Rather than supporting a solution-oriented process or the co-evolvement of problem and solution (Dorst & Cross, 2001) regularly found in design processes, the method requires considering the role of the product in society before considering any product as such. The complexity of this approach has been known from experience with the Vision in Product design method, from which this aspect as been derived. However, not only should these considerations lead the development of the design, actually postponing the actual embodiment of these consideration has proven to lead to original designs (Hekkert & Van Dijk, 2011). However, in line with recent

studies, a given method is not deemed suitable for every type of designer (Daalhuizen, Person & Gattol, 2012). Yet, we could provide some strategies to the designer.

The method should explain for what type of (mindset of the) designer it is suitable. Tips and tricks can be provided.

conclusion

7.6 *Conclusion*

A structured comparison of the application of the SID method in a multiple-case study allows evaluation of the method in terms of effectiveness and usability. In conclusion, the method seems effective in supporting the understanding, consideration, designing and explanation of the social implications of a design [12].

However, whether the method indeed supports the design of social implications has not been evaluated objectively, and a subsequent study on this is reported in the next chapter. The usability of the method was negatively evaluated and led to directions for adaptations in terms of: introduction of the method (type of designer, part of process, perspectives in the process), additional guidance in the method (examples, tips & tricks), and additional steps (mapping concerns, evaluation).

[12] The planning of this activity has not been studied extensively as it was the designers' first use of the method and therefore setting feasible targets was impossible.

assessing the behavioural effects of concept designs

When it is intended to affect behaviour implicitly, assessing product influence is not an easy task. As people are not always aware of how they behave and why, simply asking people about their behavioural intentions is not a reliable method to study product influence. The most valid way to assess implicit product influence is therefore by observing whether behaviour actually changes through interaction with the design. However, the fact that the act of designing is, in essence, concerned with developing new and original–hence non-existent–products means that such an examination is all the more complicated. How can we possibly observe changes in behaviour and the social implications of these changes due to products that do not exist?

The easiest answer to this question is to realize the product or service, let it be used by participants, and perform a study to assess its effectiveness in changing behaviour. Although this may be the optimal solution from a scientific point of view, it is hardly pragmatic. Not only does product realization require investment, an empirical study would also require an enormous investment of time and money. Certain behavioural changes, and certainly their social implications, need a significant amount of time to become apparent. This means that intensive, longitudinal studies are needed with one design, and often such studies can only include a few participants. So when we wish to draw generalizable conclusions, even more investment is needed. Hence the question: is there a way to assess the long-term effects of non-existent products more easily?

This chapter reports on a study to assess the intended behavioural effects, and the associated long-term social implications, of non-existent products, i.e., the outcomes from the three design projects cited in Chapter 7. These three products/services are designed to stimulate particular behaviour to induce social change, but do not yet exist. The objective of this study is to assess them in terms of their effectiveness in doing so. 'Effectiveness' refers to the extent to which the designs actually lead to the intended behavioural outcomes and subsequent social implications through interaction.

In the present study, an answer is therefore sought to the question: *how effective will the designs be in evoking the intended behaviour and inducing the intended social implication?*

8.1 *Narratives*

The set-up of the study is based on research about the use of narratives to assess user evaluations of not-yet-existing products (e.g., Van den Hende, 2010). In such studies, narratives have shown to be an appropriate means of explaining the intended use and benefit of products-in-development, such that users can provide valid product evaluations. In such studies, participants are asked to express their appreciation of the product. In the study reported in this chapter however, participants are asked to assess to what extent they consider the product realistic to lead to resulting events as depicted in the narrative. Hence, our aim in using narratives for product evaluation deviates somewhat from the regular purpose. Before going into the details of the set-up of the study, we first review the use of narratives found in similar studies and discuss the implications of this work for the design of our study.

Narratives as a tool to support users' product evaluations

Narratives are stories in which one or more characters with goals and intentions perform actions and experience events, which all comes to a resolution in the end (Van den Hende, 2010). In the new product development process, narratives are used for various purposes, of which one is to support user evaluations of products that are still in the developmental phase. To this end, a narrative represents a story in which a main actor, i.e., the protagonist, is introduced to the use context of the product, has goals and intentions, and experiences the benefits of the product (Van den Hende, 2010). The reason why narratives are so useful for the evaluation of products that do not exist is that they work on the basis of transportation, i.e., 'an integrative melding of attention, imagery, and feelings, focused on story events' (Green & Brock, 2000; based on Gerrig's metaphor of a traveller's journey, 1993). These three elements define the degree to which the reader is absorbed into the narrative world and can experience the actions and events as if they were one's own. Transportation increases the chances a user will not get distracted by the technical features of a product, but rather devote his or her full attention to the use and meaning of it. Studies show that a narrative about product use provides a better tool for product evaluation than bulleted descriptions of the benefits of the product (Van den Hende & Schoormans, 2012). Van den Hende and Schoormans show that narration is a key element in supporting valid product evaluations. Based on this, narratives are considered a promising tool for evaluating the behavioural and social implications of designs that do not yet exist. To that end, some additional findings in narrative-based studies need to be considered in relation to this purpose.

When narratives are used to evaluate a product's usability, appeal or meaning to a user, as is the case in regular narrative-based studies, the narrative world is a given starting point. In fact, these studies ask users: 'Imagine X narrative world is real, how usable, appealing and meaningful do you consider the product?' In other words, the level of the story's realism is not questioned as such. In contrast, we intend to use narratives to evaluate the causal relationship between a sequence of events, which is the product use, the subsequent behaviour and resulting social implication. Therefore in our study the question is reversed: 'Imagine X product is real and used, how realistic do you consider the occurrence of the subsequent events in the narrative world?'

Perceived realism of narratives

I once watched the movie The Lord of The Rings (part two: The Two Towers) with friends of mine. Probably like most everybody else watching that movie, we were completely absorbed, experiencing this imaginary world with elves, dwarfs, wizards and orcs as if we were part of it. At a certain point in the movie, during an important battle at Helms Deep, Legolas (an Elf) grabs a shield and uses it as a sliding board to glide off the stairs, unleashing arrows simultaneously. At that point my friend suddenly exclaimed in disbelief: 'Yeah right, that is total fantasy,' referring to the event as completely unrealistic. We were distracted for a second by his remark, but then burst into laughter. While the whole movie is of course one big fantasy, at this point in the film it somehow exceeded his notion of what could be real in that fantasy world.

Narratives exist in various forms, e.g., movies, games, books, comics and television in general. As stated, narratives work via transportation, allowing the reader to become absorbed in the story and experience the narrative world. While reading a book or watching a movie, the reader or viewer can perceive the narrative as more or less realistic, judging its correspondence with external reality. However, perceived realism should not be confused with the absence of fiction. Many stories, like fairy tales or parables, contain fictive elements, and readers generally know these stories do not depict reality. However, readers may perceive the stories as realistically simulating essential aspects of human life. Just like my friend showed, an evaluation of a narrative's realism includes both an account of its resemblance with the actual world, *and* an account of consistency between its logic, motivations and events (Busselle & Bilandzic, 2008). In addition to this, Shapiro and his colleagues explain that older children and adults have the ability to 'imagine what something would be like if it were to happen' (Shapiro & Chock, 2003; Shapiro, Barriga, & Beren, 2010). This abstract evaluation of a narrative is what they call a 'relative realism judgment'. In other words, people are able to accept the narrative world as given, and subsequently evaluate the level of realism of the course of events within that world.

Research shows that the level of transportation correlates with the level of perceived realism (Green, 2004). Although direction of causality is not measured, on the basis of previous work the authors suggest that high transportation probably increases perceived realism. In other words, the more one becomes absorbed in the narrative world, the more one will

perceive the narrative as realistic. However, it sounds equally plausible that the more realistic one considers a narrative world, the better it allows one to become absorbed in it. The relationship between the level of transportation and the perceived realism in terms of causality is therefore considered unknown. However, transportation is said to play a role in the persuasive power of narratives. Studies show that the level of transportation augments story-consistent beliefs (Green & Brock, 2000). This means that when a reader becomes fully immersed in a story, chances are high it will affect his beliefs in the direction of what the story depicts. This, in fact, can be problematic in relation to the aim of our study and therefore should be considered carefully in the set-up of the study.

Type of story information and perceived realism

The main aim of the present study is for the readers to judge the level of realism of a cause for events depicted in a story. In line with this, Shapiro et al. (2010) have reported on a series of experiments designed to understand how the type of information provided in a story interacts with automatic inferences of causality of events when evaluating the level of realism of a story. Their conclusions are based on consistent findings that show that people tend to ascribe events that are negative to the self to situational factors, while they ascribe the same event for someone else to his or her disposition. In other words (and bluntly put), if something bad happens to us, we blame the conditions; if something bad happens to others, we consider it their responsibility. And the other way around: if something positive happens to us, we consider it the result of our own effort, talents or personality. But if the same thing happens to others, we consider the conditions responsible for it.

Shapiro et al. (2010) were interested in determining to what extent additional information about the cause of such typical events in a story would affect the level of realism perceived. The type of information could be of the situational or dispositional kind, referring respectively to either external conditions or personality traits of the main character. They found substantive support for the idea that when people consider themselves as the main character in a story, they judge stories that provide information in line with their spontaneous attributions as more realistic. Thus stories in which positive events happen to the 'reader himself' were judged as more realistic when their events were caused by dispositional aspects, rather than by situational aspects. Similarly, stories that present situational information as causing negative events to the reader were considered more realistic than those presenting dispositional information as the cause.

Remarkably, no significant effect was found when readers had to judge the level of realism in the same stories with the same types of information when the main character was somebody else. When the researchers stressed the main character as 'the other' by describing him or her as ethnically different, it did not seem to matter to what extent the information provided was congruent or incongruent with assumed spontaneous inferences. In relation to the study presented in this chapter, this conclusion is important: based on these studies, it is expected that the information in the narratives will not interfere substantially with participants' assessments of realism. The expected automatic inference to ascribe the positive events in

our narratives, i.e., the pro-social behaviour, to situational factors, i.e., the product, when it concerns 'the other', seems not to interfere with assessments of realism. For that reason, it is important to stress in the set-up that the judgments should be made in relation to other people rather than the self.

8.2 *Set-up of the narrative-based study*

Based on a review of relevant literature, the following conclusions are drawn in relation to the set-up of the study. To reiterate, this study was carried out to evaluate the effectiveness of non-existent products in affecting behaviour and inducing social implications.

Narration is key to assess non-existent products. Narratives provide suitable means to evaluate non-existent products. Narration appears to be of key importance–in contrast to bulleted, factual descriptions of products–as it provides readers with a meaningful account of events that in turn supports a valid assessment of a product. The fact that narratives induce transportation, i.e., absorb the reader into the narrative world, is assumed to explain why narration enables people to evaluate non-existent products 'as if they were using them'. In such product evaluations, products are assessed in relation to the participant's personal standards, preferences and/or experiences. In contrast, our study asks participants to judge (to the best of their abilities) the realism of the events in the story as evoked by the product, in relation to the participant's objective knowledge of such processes. This requires participants to be able to estimate what are 'realistic causalities' within the narrative.

Valid judgment of realism by selecting experts as participants and realizing reader-protagonist dissimilarity. Information about the cause of the events in a narrative appears to affect the level of perceived realism when the narrative is read as if it is happening to the self. Yet, the effect such information on realism judgment of the narrative seems to disappear when it is read as if it is happening to someone else. In the set-up, participants should be stressed to conceive the protagonist of the story as 'the other', rather than 'the self'. Because people cannot validly assess their own behaviours, nor have the expertise to do this for others, it is not 'users' evaluating the role of the product in causing the events in the narratives, but experts. Participants in the study were required to have expertise in social behaviour and social processes (in inter-ethnic interactions and/or due to external interventions).

Specificity in what to assess and reader-protagonist dissimilarity decrease persuasive power of narratives. Narratives have the power to change readers' beliefs. When a narrative induces high levels of transportation, this may change the reader's beliefs about important events in the story. However, studies that show these belief changes report on how general beliefs are affected. For example, a reader may believe that 'psychiatric diseases are contagious' after having read a story about a psychiatric patient. Specific events of a story appear to have the power to change general beliefs, just like this

happens when we observe such events in real life. In this study, the specific role of the product described in the story is being evaluated on its realism, rather than general claims. It is therefore important to refer to this as specifically as possible. Additionally, dissimilarity between the reader and the protagonist is shown to reduce the level of transportation (Van den Hende, Dahl, Schoormans, & Snelders, 2012) and therefore decreases the chance of augmenting story-consistent beliefs.

Developing the narratives by testing their realism (pre-study)

The three designs that were developed for three graduate projects and studied in a multiple-case study (see Chapter 7) are assessed by means of a narrative-based study. Each narrative briefly explains the context of the story, i.e., the situation of an immigrant family living in a deprived neighbourhood in The Netherlands. Subsequently, the use of the product is explained, and the story goes on to explain how its use elicited specific behaviour and induced particular social consequences. Each narrative presents a regular storyline: a protagonist with goals and intentions experiences a series of events that ends with a resolution. Each narrative contains about 1500 words and five illustrations and is written in Dutch (see Appendix). The stories have been checked with a professional writer on the quality of writing, their coherence and similarity. Adjustments are made for each narrative on the basis of comments made by this professional writer.

In order to judge the feasibility of the role of the products suggested in the narratives, every other element in the narrative should portray the narrative world as realistically as possible. Moreover, to be able to compare the effectiveness of the products to each other, it is important that narratives are perceived similarly in terms of realism. In order to compare the three designs, it is desirable that the level of realism of the three stories is as similar as possible. Therefore, a first study is conducted to measure the overall perceived realism of the narratives.

Twenty-two participants assessed the narratives on their level of realism. Participants were all Dutch men and women between 28 and 47 years of

		the dialogues in the narrative are realistic and believable	*people in this narrative are like people you or I might actually know*	*events that have actually happened or could happen are discussed in this narrative*
#1 Dania WeldingWorks	mean N std.dev.	5.3 22 1.5	4.9 22 1.6	3.9 22 1.8
#2 Kadem Solidshare	mean N std.dev.	5.3 22 1.1	5.2 22 1.4	4.9 22 1.5
#3 Nazli Birthday-slide	mean N std.dev.	5.2 22 1.4	5.1 22 1.4	5.3 22 1.6
total	mean N std.dev.	5.3 66 1.3	5.1 66 1.5	4.7 66 1.7

age. Participants were asked to read all three narratives and complete a modified version of the Perceived Reality Scale as used by Green (2004) for each narrative: Seven items are used to measure the overall perceived realism of the narratives and are rated on a seven-point scale ranging from strongly disagree to strongly agree (α=.80), i.e., 'The dialogues in the narrative are realistic and believable', 'The setting for the narrative just doesn't seem real', 'People in this narrative are like people you or I might actually know', 'Events that have actually happened or could happen are discussed in this narrative', 'This narrative shows that people have both good and bad sides', 'I have a hard time believing the people in this narrative are real because the basic situation is so far-fetched', 'This narrative deals with the kind of very difficult choices people in real life have to make'. The results, i.e., the means per item per story, are depicted in Table 3.

A comparison of these means on each item shows the differences per story. Items that scored below 4 are considered to interfere with the perceived realism of that narrative in general. When an item's narrative mean deviates from the means of one of the other two narratives with a difference of 1 or more, the difference in the level of realism between these narratives is considered to obstruct a comparison of the designs. Table 3 shows the problematic items per narrative.

For each deviating item, two participants who strongly agreed and two participants who strongly disagreed were asked to provide their argumentation. In this way, unrealistic aspects of the narrative could be adjusted without removing realistic aspects. Additional information was sought to determine what type of information would be more realistic. For instance, one participant explained that she did not think it was realistic that a Turkish single mom would move abroad with her son without having family there (item 'I have a hard time believing the people in this narrative are real because the basic situation is so far-fetched'). Verification with a Turkish woman revealed that this is indeed uncommon. The narrative was changed and starts with explaining how a Turkish single mom moves in with her sister together with her son. The altered versions of the three narratives are used as stimuli in the expert evaluation and shortly summarized below.

this narrative shows that people have both good and bad sides	*this narrative deals with the kind of very difficult choices people in real life have to make*	*the setting for the narrative just doesn't seem real (inv)*	*I have a hard time believing the people in this narrative are real because the basic situation is so far-fetched (inv)*
(3.3) ~~22~~ 1.8	4.2 22 1.5	(4.3) ~~22~~ 2.1	4.7 22 2.1
(3.7) ~~22~~ 1.8	(3.3) ~~22~~ 1.4	5.4 22 1.5	5.2 22 1.9
4.0 22 1.5	4.3 22 1.6	5.6 22 1.2	5.8 22 1.3
3.7 66 1.7	4.0 66 1.6	5.1 66 1.7	5.2 66 1.8

TABLE 3
COMPARISON OF THE MEANS FOR EACH NARRATIVE TO INCREASE SIMILARITY IN 'LEVEL OF REALISM'

Narrative #1 - How Dania's world expanded - WeldingWorks
Dania is the daughter of a Turkish family living in the Afrikaanderwijk. Her family is confronted with a large construction site in their neighbourhood, which gives them uncomfortable feelings as familiar people move and pleasant places vanish. Dania's brother, Ahmet, is invited to join a welding course to weld the fences that need to be placed around the construction areas. He decides to join, and welds various fences with various sub-functions attached to these, e.g., bicycle rack, benches, and soccer goals. He enjoys the work, and when the course is finished he proudly explains to his family where his fences will be placed in the neighbourhood. Dania listens and decides to visit Ahmet's fences with a friend. When wandering through the area in search for his fences, they experience the beauty of the new area and discover new shops along the way. Dania enjoys discovering her neighbourhood again and seeing how all the sub-functions of the fences are being used. She decides to go again the week after.

Narrative #2 - How Kadem gained trust - Solidshare
Kadem is a Turkish man who lives in a very small apartment with his family in the Afrikaanderwijk. His wife is pregnant and he worries about giving his family a proper home, yet he has too little money to move. At night he tries to figure out how to resolve the situation and he suddenly gets the idea to build bunk beds for his children. He remembers the service called Solidshare his wife once told him about, and he starts to browse the Internet. He books all the equipment he needs: the van to transport the wood, a jigsaw, and an electric drill. During the week, he visits several neighbours to pick up all the tools. At that moment the van is being supervised by his neighbour across the street, a Dutch guy named Johnny. Kadem meets him when picking up the van, and although the meeting is a little awkward, Johnny explains he is a carpenter and offers to help Kadem. That Saturday, both work silently together and finish the beds, to the delight of Kadem's children.

Narrative #3 - How Nazli met Fatiha - Birthdayslide
Nazli is a Turkish single mother who just moved in with her sister in the Afrikaanderwijk. She decides to enrol her son Erdem in the Aartenaschool. This school has the tradition that in the last year of kindergarten, just before going to first grade, children may use an enormous slide on their birthdays. To symbolize the transition from kindergarten to first grade, the children are allowed to glide out of the windows of the first floor, down the slide and into the schoolyard. On their children's' birthdays, parents are expected to help to position the slide against the window. When a Moroccan friend of Erdem has her birthday the next day, Erdem is so excited about it that Nazli volunteers to help position the slide, as there needs to be a minimum of four adults to do this safely. While all the children glide off one by one, and everyone receives treats, the girl's mother thanks Nazli with great relief and introduces herself as Fatiha.

Procedure

Forty Dutch experts were approached to take part in the study. People were considered as expert on the basis of their experience or expertise with social behaviour in public spaces and various cultures, and the possible role of interventions in this. Experts could therefore be senior social workers, teachers, or social psychologists and sociologists. Experts were mainly found through the Internet and personal networks, and were approached by mail. In the end, twenty-one experts participated in the study.

The experts received the three narratives by email as three separate PDF's. A second email was sent with a link to the survey online. To measure the level of realism of the role of each product in stimulating behaviour and inducing social change, experts were asked answer two questions per narrative. The first question referred to the relationship between the product and the behaviour, i.e., the suggestion that [the product] stimulates [behaviour] is realistic, agree/disagree. The second question referred to the relationship between the product and the social implications, i.e., it is believable that [the product] contributes to [social implication], agree/disagree. Per question, the expert was asked to briefly provide an explanation for his or her (dis) agreement with the statement. The three narratives were randomized, but the order of two questions per narrative were similar in each survey, i.e., first the relation with behaviour, second with the social implication. The results are presented to the experts. The experts did not know each other and were kept anonymous in the presentation of the results [13].

8.3 *Results*

Per narrative, a summary of the experts' evaluations is presented. This includes the percentage of experts that agreed with the item, together with a summary of the relevant clarifications for this result.

Narrative #1 - How Dania's world expanded - Welding Works

1. The suggestion that the fences stimulate citizens to explore new parts of their neighbourhood is realistic. (8 out of 21 experts agreed, 38%)

2. It is believable that the fences contribute to the ability to cope with changes in the structure and composition of the neighbourhood. (13 out of 21 experts agreed, 62%)

7 experts partially (dis)agreed:
1 expert, proposition 1 = agree, proposition 2 = disagree
6 experts, proposition 1 = disagree, proposition 2 = agree
One expert agreed with proposition 1, but disagreed with proposition 2.

[13] Similar studies, like the Delphi method, also involve experts to assess the possible consequences of new technologies (e.g., Turoff & Linstone, 2002). However, in these studies, the evaluation is open ended, which means that through several rounds of discussions between experts (who are anonymous) consensus is gained about 'the future' of the technology at hand. In contrast, this study assessed the realism of intended consequences of a design rather than assessing its possible consequences.

This expert explains the exploration (proposition 1) would only be once, and that long-term effects would not occur. Six experts disagreed with the fact that the fences would lead to exploration, but agreed that they could help as a means to cope with the changes in the neighbourhood thanks to other qualities of the concept.

Relevant clarifications: Many experts who agreed that the fences would realize effect mentioned that the effect would be small. Many experts said that the fences would seduce relatives of the maker to explore that area, but no other people (8/21).

Experts who disagreed with the proposition mentioned the fact that fences exist in the first place to ward off people instead of attracting them. This made them doubt the realism of the fences in evoking exploration (5/21). Others mentioned that the fences could contribute to a better image of the whole restructuring process, but that it is 'too much honour for a fence' to suppose that it might lead to any behavioural or long-term social consequences.

Three experts mentioned that the fact that the youngsters becoming a part of the restructuring process through the welding course is a strong aspect of the concept. The sense of ownership to which this contributes is marked as important in the development of an area.

One expert mentioned the power aesthetic objects in the environment have to attract people.

One expert mentioned that he could imagine a decrease in vandalism.

Narrative #2 - How Kadem gained trust - Solidshare

1. The suggestion that Solidshare stimulates contact between neighbours who did not know each other before, is realistic. (17 out of 21 experts agreed)

2. It is believable that Solidshare contributes to collective efficacy. (16 out of 21 experts agreed)

3 experts partially (dis)agreed:
2 experts, proposition 1 = agree, proposition 2 = disagree
1 expert, proposition 1 = disagree, proposition 2 = agree

Two agreed with proposition 1, but disagreed with proposition 2. One explained that the one-to-one moments of contact supported by Solidshare do not necessarily contribute to a group feeling that is required for collective efficacy. The other expert explained that the transactional character of the contact supported by Solidshare does not relate to any collective concern, while a shared concern is required for collective efficacy. The expert who disagreed with proposition 1, but agreed with proposition 2 provided answers between which no logic was found.

Relevant clarifications: Several experts (9/21) reflected on the double-edged sword of the concept. The combination of its 'functional' and 'social' aspects was mentioned often. Some experts argued that 'the individual agenda underlying the motivation for contact' or 'the goal-oriented character of the contact' both represent a natural way of getting in touch. One expert argued that the concept would only suit people who do not fear strangers (or tools). However, a different expert explicitly stated that the 'incentive for gaining something for free is more powerful than the fear of being in contact with strangers'.

Three themes can be recognized in the arguments provided to support agreement with the propositions. First, two experts explained that the goal-oriented character of the design decreases the chances that people will feel intimidated and thereby enhances the chances for success. Second, two experts explained that a tool handed over from one person to another functions as a conversation starter, e.g., sharing tips and tricks about using the tool, or discussing the jobs the tool has been or will be used for. Finally, one expert referred to the sequence of actions–booking the tool, making an appointment, picking up the tool–as a strong element in the concept as it supports frequent contact.

Although most experts agreed with the propositions, various points for discussion were raised. First of all, many experts (7/21) argued that additional factors need to be present for Solidshare to contribute to 'collective efficacy'. 'Identification of the other as a neighbour', or a so-called 'click between people' were both identified as conditions for Solidshare to be able to contribute to collective efficacy. Second, some experts argued that 'ownership' of both the project and the tools is important, and should be well organized (4/21). When a housing corporation is the initiator of the project, which is the case in the Solidshare concept, it is argued that the concept largely mediates the relationship between citizens and this housing corporation rather than among citizens. Moreover, these experts argue that only when citizens initiate the concept (with or without sponsoring of a housing corporation), the concept contributes to collective efficacy for those people involved in the project.

Finally, some experts (3/21) mentioned the high risk of damaging the concept, referring to possible doomsday scenarios: What if somebody does not email back, is not home at the agreed time, or behaves improperly? What if the tools become damaged or stolen? Etc.

Narrative #3 - How Nazli met Fatiha - Birthdayslide

1. The suggestion that the slide stimulates contact between people with various cultural backgrounds is realistic. (16 out of 21 experts agreed)

2. It is believable that the slide contributes to establishing weak bonds. (15 out of 21 experts agreed)

6 experts partially (dis)agreed:
3 experts, proposition 1 = agree, proposition 2 = disagree
3 experts, proposition 1 = disagree, proposition 2 = agree

Three experts agreed with proposition 1 but disagreed with proposition 2. These three experts unanimously argued that 'a single moment of contact does not yet contribute to bonds. Three experts disagreed with proposition 1 but agreed with proposition 2. Each expert provided different argumentation for this: one distinguished between intercultural contact (proposition 1) and contact in general (proposition 2); one interpreted 'contact' as a more meaningful relationship than a 'weak tie'; while the third expert provided answers between which no logic was found.

Relevant clarifications: Many experts (12/21) suggested that the slide only facilitates a short, rare moment of relatively superficial and instrumental contact between parents. Of these experts, most argued that a follow-up meeting is needed to sustain this moment of contact for it to contribute to actual ties (weak or strong) (10/12). Others argued that the short, superficial character of the contact is its strength as it provides a low threshold for individuals to get involved in the first place (2/12). Some experts (5/21) specifically argued that the slide can support people becoming 'familiar strangers', 'increasing the possibility that people will say 'hi' to each other', or will increase the 'public familiarity'.

In providing arguments to support their agreement with the propositions, two main themes emerged from the experts' assessments. One theme, mentioned by several experts (7/21), was the importance of the children's role in the concept. Other experts mentioned the 'universal' aspect of being a parent as a strong foundation for contact; some mentioned the 'enthusiasm of the children' and 'exuberance' of the concept as persuasive. (However, one expert argued that this aspect of the concept might be less acceptable in some cultures.) Second, some experts (4/21) mentioned the power of 'doing something together' or more symbolically, 'performing a ritual'.

The main argument against the propositions was the belief that parents would galvanise their familiar network to move the slide, rather than strangers (2/21). To counter this, one expert suggested establishing a social convention whereby parents whose children recently had their birthday are encouraged to help the next parent in moving the slide.

One expert commented that the slide is 'disproportional to its effect'.
One expert commented on the possibility of the slide creating publicity for a school.

6.3 Conclusion

What do these results tell us about the effectiveness of the designs?
From the perspective of experts in the field, at least two of the three designs suggest some degree of social influence. In percentages, 81% of the experts consider the Solidshare and 76% consider the slide as credible vectors for the behavioural effect for which they were designed (only 38% of the experts consider this believable for the fences). Subsequently, 76 and 71% (and 62%) of the experts believed these designs to contribute to the desired social implication. This shows that at least two of the three designs have been evaluated as designs with potential social power. This, at minimum, indicates that this type of design activity, i.e., social implication design, is a worthwhile undertaking. It also shows that designing products on the basis of intended influence to realize social implications is possible.

Moreover, these results are considered to confirm the assumption that the Social Implication Design method effectively supports the act of designing product influence with subsequent implications. In fact, when we reflect upon the arguments that the experts gave for their agreement as regards the feasibility of both Solidshare and the slide, interesting similarities emerge. Nine of the seventeen experts who agreed on the feasibility of Solidshare argued that its influence was believable because of the double-edged sword function of the design. Because the service addresses a personal concern so well, the service is considered feasible in evoking the intended behaviour. Similarly, seven of the sixteen experts who agreed on the feasibility of the slide argued that this was so thanks to the influential role played by the children. Concerns for one's children's enjoyment and being a good parent are indeed powerful personal concerns. Hence, these experts' comments show that by addressing personal concerns well, products and services can indeed stimulate behaviours that are desirable from a social perspective. This finding supports our assumption that the implict influence of design may be extremely powerful in counteracting soft social problems.

Beyond support for the effectiveness of the SID method and the practice of social designing, the insights this study delivered regarding the social processes around product use provide a valuable resource to further development of the designs. Many experts gave detailed explanations about how the products would mediate certain social processes; many noticed possible pitfalls and some even proposed feasible changes. These insights are not only valuable because, if implemented, they would increase the effectiveness of the design; a positive assessment could also increase a designer's confidence that he or she was on the right track. As described in Chapter 7 two of the three designers evinced considerable doubt about the effectiveness of their designs. A consult with social experts like these could have improved the designs, boosted confidence among the designers, and maybe even speeded up the process. Moreover, in practice, this type of expert-driven assessment can have persuasive power with clients.

Although the present study supports our assumption that it is possible to design social implications into products and services, it does not provide a valid method to carry this out. A valid conclusion is that both the 'Birthday slide' and 'Solidshare' are more effective than the fences in eliciting the intended behaviour and contributing to desired social implications. However, to what extent and how these products stimulate the behaviour as intended can only be better understood and estimated at this stage. Twenty-one experts assessed the behavioural and social consequences of designs that do not yet exist and provided valuable comments. These experts were involved because of their expertise in relation to the phenomena assessed. By emphasizing this expertise when inviting them to participate, a critical attitude is stimulated. In any case, experts are skilled at distancing themselves from a situation and rationally assessing the processes described in a narrative. However, one of the forty experts approached did reply that he did not want to participate in the study because he believed that no expert could foresee behavioural consequences. Moreover, one of the experts who actually participated mentioned that the binary mode of assessment (agree or disagree) contrasted the complexity of the processes under study. Both of these experts' remarks indicate the complexity of social processes and the limitations of this study. In order to validate this narrative-based study, the results need to be compared to observations of the actual phenomena. In other words, we can only validate these expert assessments of product influence by creating the designs and comparing the behavioural outcomes with the experts' assessments.

This chapter closes Part 2, in which we have studied the design of products and services with social implications. The main focus of this section was to study the design process and to develop useful support for social design practice. In this practice, focus is on the design of the implicit influence of products and services to contribute to desired social change. Regarding this focus, our expert study revealed important support for our assumption it is this hidden role of design in changing behaviour that may be especially powerful in counteracting soft social problems. A substantial number of experts explained that the power of the designs to elicit the proposed social effect was found in their ability to address personal concerns successfully, thereby motivating people to act in ways that benefit society. Regarding the Birthday slide, people come into contact with each other *out of (a universal) concern for being a good parent*. And, in a similar way, the Solidshare service enables instances of interaction *out of concern for sharing free and high-quality equipment*. We expect that it is this type of influence that makes products and services unique in changing behaviours. Hence, we are interested in finding out whether this implicit influence that design has is indeed powerful and unique. To this end we are interested in comparing design to more common interventions that seek to change behaviour in relation to social issues. In the last part of this book, we aim to answer this question. The next chapter starts off with a more detailed formulation of our assumption that it is the implicit role of design in affecting behaviour that makes it such an effective intervention in soft social dilemmas.

comparing design to more common types of intervention

09

a user perspective of pro-social interventions

The notion that products and services can change people's behaviour without them being aware of it and without any intention from the designer has been the main object of study in this book. First of all, we aim to develop the knowledge and support designers need to take responsibility for this kind of influence and prevent undesired consequences. But even more so, we are driven by the assumption that this implicit influence of design is a unique power from which we all may benefit when it is appropriately designed. The fact that design can transform behaviours in such a manner that people feel motivated to act a certain way, because the action is tied to a personal concern, opens up great opportunities. We may actually design an environment in which it is easier, more intriguing, more engaging, or more meaningful to act in ways that benefit all of us in the end.

On top of this, we have argued that this type of influence might not only be most appropriate, but also most effective when dealing with social problems in which explicit regulation often fails to yield change. These problems, such as intercultural tension, pollution, or traffic congestion, can be understood as 'soft social dilemmas'. In these types of situations, in which personal concerns are in conflict with collective concerns [14], the implicit influence of design might be more effective than more explicit strategies like public service announcements or educational campaigns. In this part of the book, we are going to explain this particular assumption in more detail, and subsequently design a study that will test this assumption rigorously. To this end, we will first relate our notion of the 'salience of influence', i.e., implicit or explicit influence, to previous studies on deliberate attempts to change behaviour for the better [15]. As our concept of the salience of influence is defined from a user perspective, we review the existing literature on pro-social interventions from this same perspective. This allows us to embed our concept in the existing literature and discuss how it adds to this.

[14] When we speak of 'conflicting concerns', we do not mean that people experience this conflict in concerns. People only experience conflicts when they have conflicting personal concerns, either in the short term or long term. A simple example is when I know I should actually exercise; but instead I decide to stay home and open a bottle of wine.

[15] Note that our concept of *the salience of influence* is derived from an analysis of products that both appeared to have and were deliberately designed to affect behaviour. This means that in this analysis, our object of study was the 'product influence'. In this part of the book however, our focus is slightly different. The object of study is 'the stimulation of behavioural change', for which a product becomes one of the possible means.

9.1

Strategies to stimulate people to act in favour of society

Various distinctions of strategies to stimulate pro-social behaviours can be found in the literature. Bitgood, Carnes and Thompson (1988) distinguish four major approaches to stimulate pro-environmental behaviour: environmental education, prompting of messages, environmental design, and consequence control. Although the difference between these four strategies is understandable, the distinction seems somewhat arbitrary. A clearer distinction is referred to as the ABC (antecedent-behaviour-consequence) model of behavioural change (Lehman & Geller, 2004) and often been used in subsequent literature reviews (e.g., Abrahamse, Steg, Vlek, & Rothengatter, 2005; Dwyer et al., 1993; Huffman, Grossnickle, Cope, & Huffman, 1995). Antecedent strategies aim at changing the situation prior to the target behaviour. This can be done, for instance, by means of written messages (also called 'prompts'), education, demonstrations, or design. Consequence strategies change the consequences of the target behaviour, for example by providing feedback or meting out punishments and rewards. Although this distinction sounds clear and is widely used to study and order types of interventions, the distinction gets blurred when a 'user perspective' is adopted. If we were to try and understand how someone might experience these two strategies and how this may affect his or her behaviour, both strategies appear quite similar. First of all, based on Skinner's learning theory (1953), it has been argued that antecedent strategies only work by communicating the consequences of the target behaviour (Lehman and Geller, 2004). Thus besides requesting a behaviour change, 'antecedent strategies' also need to stress what benefit this will bring, i.e., the *consequences* of the behaviour change. Similarly, consequence strategies require learning to become effective. For instance, it is only after having learned that one will receive a fine for speeding that the actual behaviour is altered. In other words, having received a fine once or being warned for this both function as *antecedents* and are needed to effectuate a 'consequence strategy'.

In their review, Steg and Vlek (2009) advance a different distinction in strategies to order interventions and their proven effectiveness. In reference to earlier studies carried out by Messick and Brewer (1983) regarding behaviour change in social dilemmas, Steg and Vlek distinguish 'informational' strategies from 'structural' strategies. Informational strategies, also called psychological strategies (Steg, 2008), aim at changing perceptions, motivation, knowledge, beliefs, and norms, but without changing the context in which choices are made. On the contrary, structural strategies change the context and thus the circumstances in which people make choices [16]. In doings so, structural strategies may indirectly affect perception and motivational factors. This distinction seems to make more sense from a user perspective. Regarding informational strategies,

[16] Applying structural strategies means that one is changing the structure of the choice, and therefore resembles what Thaler and Sunstein (2008) call 'choice-architecture'.

the means used to change behaviour are often quite clear in their goal. Prompts, educational campaigns, public service announcements and so on, are known to convince people to alter their behaviour. Structural strategies however, provide a change in a situation for which behaviour needs to be or can be adapted.
To illustrate the distinction, we refer to two strategies that aim to counteract traffic jams. An informational strategy would be a campaign that asks you to reduce your contribution to traffic jams by suggesting you take public transportation. A structural strategy could be the implementation of flexible working hours that allows you to start working later than usual or even stay at home. We expect that, in general, informational strategies lead to interventions that are often experienced as explicit influence, while structural strategies are more implicit in their influence [17].

9.2 *Experience of pro-social interventions*

Although the experiencing of an intervention has played no explicit role in studies on interventions that stimulate pro-social behaviours, it has been implicitly referred to in several studies. De Young (1993) for instance, proposes to distinguish three categories of interventions: information techniques, positive motivational techniques, and coercive techniques. In his view, information techniques help people understand the social problem for which behaviour needs to be changed, positive motivational techniques use extrinsic motivation, and coercive techniques constrain behavioural choices. Although De Young does not describe a clear rationale for this distinction, words like 'positive' and 'coercive' do refer to aspects of an anticipated experience of the intervention. However, no further relationship to this categorisation in terms of effectiveness is discussed.
Huffman et al. (1995) discuss the intrusiveness of an intervention as an important criterion for preferring one strategy to another. They argue that antecedent strategies are generally less intrusive than consequence strategies like punishments or rewards. They argue that next to costs and effectiveness, ethical considerations related to intrusiveness should play a role in deciding upon a strategy. Although a detailed account of intrusiveness is lacking, we all know how it feels when somebody else imposes his or her ideas upon us without our invitation.

One of the rare theories about the role of experience in the effectiveness of influence was developed by Brehm (1966), and is called 'reactance theory'. Brehm states that freedom of behaviour is a pervasive and important aspect of human life and that a limitation of behavioural freedom by somebody else can cause psychological reactance. Brehm explains that by obstructing behaviours, these behaviours become more attractive. This may even be the case when someone's initial preference for behaviour was in line with the behaviour aimed at by 'somebody else'. In other words, influence may be counter-effective if it causes reactance. As reactance is expected to occur

[17] However, as we will discuss later in this chapter, some structural strategies can be extremely explicit therefore be experienced as external influence, while some informational strategies are unnoticed as influential and therefore implicit.

in interaction with interventions that limit freedom, it is put forward to explain why negative messages like 'Don't Litter' or even 'Don't You Dare Litter' actually increased littering in a public pool (Reich & Robertson, 1979), and why positive prompts were more effective than negative prompts in reducing litter in a university cafeteria (Durdan, Reeder, & Hecht, 1985).

In a study comparing the effectiveness of 'persuasive' strategies with 'attribution' strategies in stimulating pro-environmental behaviours, similar results were found (Miller, Brickman, & Bole, 1975). For a week, three fifth-grade classes at a public school were involved in a five-day study. During these five days the teacher and principal used attribution strategies, persuasion strategies, or no strategy to discourage littering. Attribution strategies consisted of confirmations that the students were very neat students and that the class was the cleanest class in school. Persuasion strategies consisted of lectures about the negative consequences of litter and warnings like 'don't litter'. Attribution strategies appeared more effective in the short term than persuasion strategies, though both were effective. Remarkably, only attribution strategies realized longer-term results. Miller et al. (1975) argue that persuasion is less effective than positive attribution may be because persuasion can involve negative attribution (a person should be what he is not). In general it is assumed that positive reinforcement is more effective in changing behaviour than negative reinforcement. Although none of these studies explicitly argue that the experience of the influence plays a role in the effectiveness of the intervention, several aspects like coercion, intrusiveness, reactance and positive versus negative strategies have been put forward as important aspects when influencing behaviour and actually refer to experiential aspects of the influence.

9.3 *Implicit and explicit norm-activation*

In research on pro-social and pro-environmental behaviour, personal and social norms are argued to be powerful in mediating behaviour change, especially in more recent studies. The link between norms and common behaviour is logical. What we collectively agree upon as morally acceptable behaviour or unacceptable behaviour is subsequently what many people exhibit. As a society, we have argued upon and decided that we do not accept ignoring a red traffic light, animal cruelty, or littering, and most of us comply with these. In general, when people do not comply with norms and behave non-normatively, our intuitive response is to repeat the arguments and stress the social norm. However, it research shows that interventions can stress norms of a different kind, and thereby engender undesired effects.

In a series of studies, Cialdini, Reno, and Kallgren (1990) show an important distinction between what they call 'injunctive norms' ('what most people approve of') and 'descriptive norms' ('what most people do'). Signs intended to decrease non-normative behaviour can accidentally stress descriptive norms. For instance, a sign that forbids non-normative behaviour may

implicitly indicate that there are actually many people who show non-normative behaviour in that situation. In this sense, what is conveyed by the descriptive norm (many people behave non-normatively) in such an intervention may actually increase non-normative behaviour (Cialdini, 2003). In a similar way, the presence of litter stimulates littering behaviour (Reiter & Samuel, 1980). When people receive cues from the environment of what many others do, this can make them act the same way. Keizer, Lindenberg and Steg (2008) show that the activation of non-normative behaviour by such cues may be even domain independent. In other words, a cue for non-normative behaviours in one domain, e.g., being confronted with a lot of litter, increases people's tendency to behave non-normatively in other domains, e.g., stealing. 'What most people do' in a particular situation is clearly not always desirable and therefore descriptive norms may result in undesired effects.

Schultz et al. (2007) found that adding an injunctive norm to the descriptive norm in a message could counterbalance the possible negative effect of descriptive norms, while the positive effect remains. In their study on household energy consumption, they found that people who use more energy than most people in the neighbourhood are triggered to lower their consumption due to this descriptive norm. People who consume less than most people were indeed triggered to consume more, but when an injunctive formulation was added to the information, this effect disappeared. Over the years, research on the role of norms has expanded and resulted in a more nuanced view on how interventions may trigger norms and thereby affect behaviour. In a meta-analysis, Melnyk (2011) found that the descriptive formulation of a norm, e.g., '88% of the people in your neighbourhood use fans instead of air-conditioning' has a stronger effect on behaviour than an injunctive formulation, e.g., 'in this neighbourhood, we prefer using a fan rather than air-conditioning'. However, the latter formulation shows a stronger effect on attitudes.

In line with Cialdini (2003), Melnyk (2011) argues that descriptive norms may work as heuristics, while injunctive norms require cognitive assessment and internalization before affecting behaviour. The role of descriptive norms may therefore often be very implicit. This may be because people *unconsciously* perceive and process the cues indicating what many others do, as may be the case with litter. But even when what many others do is made explicit, e.g., a flyer that says '88% of the people in your neighbourhood use fans instead of air-conditioning', people do not always notice the actual influence of this on their behaviour (Nolan et al., 2008). In other words, descriptive norms triggered by explicit cues (i.e., text) can be very effective in changing behaviour without people noticing this influence (i.e., implicit influence). This shows that explicit cues do not necessarily exert explicit influence. However, De Kort, McCalley and Midden (2008) argue that texts always activate norms *explicitly*, while designs always activate norms *implicitly*. In the next section we will elaborate on the difference between both explicit and implicit influence, and the difference between design and text as interventions intended to stimulate pro-social behaviour.

9.4 *Salience of influence*

In Chapter 4, we presented two dimensions of product influence that help to explain how users may experience this influence: force and salience. We expect forceful influence to be experienced as limiting to freedom, while weak influence is not. Regarding the salience of influence, explicit influence refers to influence of which people are aware, while implicit influence goes unnoticed. In relation to the structure of social dilemmas, we have argued that implicit influence may be both more appropriate and more effective in stimulating behaviour change. We argued that especially in relation to social problems such as immigration and sustainability, explicit regulation of behaviour is either inappropriate or ineffective. Many soft social problems are not conducive to strict regulation in democratic countries. Additionally, for many social dilemmas, the individual may not have adopted a collective concern as a personal concern, i.e., the collective concern has not been internalised (yet). Persuasion techniques, such as the aforementioned educational campaigns and public service announcements, that aim to stress these collective concerns have often resulted in limited behavioural effects (Gerritsen & Van der Noort, 2004; Rijnja et al., 2009), which leads us to assume that implicit influence is more effective than explicit influence in realizing behaviour change when it comes to 'soft' social dilemmas.

Hypothesis A: salience of influence
In social dilemmas, implicit influence is more effective at stimulating pro-social behaviour than explicit influence.

We define implicit influence as *an influence of which one is unaware.* This may be because a) the intervention itself is not consciously perceived, b) the processing of the intervention happens unconsciously, or c) people do not relate the intervention to their behaviour (change). This latter form is similar to what Nolan et al. (2008) call 'nonconscious influence'. In their study, nonconscious influence was exerted by a written message. This written message was consciously perceived and deliberately processed. But because people did not subsequently relate their behaviour change to this intervention, the message is said to exert nonconscious influence.

In contrast, De Kort et al. (2008) distinguish between explicit and implicit norm activation based on the type of intervention. They argue that a normative message affects behaviour through 'explicit norm activation', which is, in our view, similar to what we call explicit influence. Based on an experiment in which they either wrote text on a garbage bin (i.e., a message) or drew arm gestures on the same garbage bin (i.e., design) to activate norms explicitly and implicitly respectively, they argue that explicit norm activation is more effective than implicit norm activation. However, we argue in line with Nolan et al. (2008), that the *type of intervention* does not define the *salience of its influence;* after all, Nolan et al.'s study showed that a message could actually activate norms implicitly.

Hence, contrary to the conclusions drawn by de Kort et al. (2008), we argue that messages can affect behaviour both explicitly and implicitly, and that designs can also exert both types of influence. In our view, the type of influence is operationalized *in the interaction* between the user and the intervention, which means that both intervention type *and* user awareness together define the type of influence. We therefore question De Kort et al.'s (2008) conclusion that explicit norm activation is more effective than implicit norm activation. We can agree with the statement that texts are more effective than arm gestures, however [18].

Although the salience of influence may often be related to the type of intervention, we argue that these are not the same. Before going into detail regarding the differences between products and messages as stimuli to affect behaviour (i.e., the type of intervention), we will first argue more specifically why we expect implicit influence to be more effective in social dilemmas than explicit influence.

Reactance, or why explicit influence may fail. The first argument for why implicit influence is expected to be more effective than explicit influence is the fact that explicit influence can cause reactance (Brehm, 1966). The definition of reactance (i.e., caused by a limitation of behavioural freedom) is probably more closely related to the force of an influence rather than to its salience. However, when one is unaware of the fact that one's behaviour is being affected, one cannot experience reactance. In other words, it is possible to exert explicit influence without causing reactance, but it is impossible to cause reactance when exerting implicit influence.

In line with personal concerns, or why implicit influence may succeed. When an intervention relates to personal concerns, people often do not recognize a subsequent behaviour change as being influenced by this intervention. For instance, a flexible working policy offers me the freedom to schedule my working week. This could prompt me to decide to arrive at the office at 10 am instead of 9 am, decreasing my contribution to any traffic jams. However, because this policy addresses my personal freedom so well, I do not regard the policy as an explicit influence to change my behaviour, let alone for the purpose of decreasing traffic jams. When reflecting upon the intervention, I would probably at most regard it as enabling something I already wished to do. However, it is by addressing this personal concern for freedom that the behaviour becomes appealing in the first place [19].
In contrast, most interventions to change behaviour as regards social dilemmas are designed to stress a concern that is clearly not perceived as a personal concern. In such cases, the intervention aims to stress the importance of a collective concern, hoping that people will experience it as

[18] In a subsequent field experiment, De Kort et al. (2008) attached a mirror to a garbage bin to trigger a personal norm, implicitly. The increased self-focus provided by the mirror was expected to implicitly trigger internalized norms. In other words, when people 'have' [already acquired] the norm to not litter, the mirror would trigger this norm and thereby prompt people to throw their garbage in the bin. The explicit norm activation was induced by the message 'Do you leave your litter lying around?' In this experiment, both interventions were equally effective.

[19] Note that this policy indeed stimulates people to start working later by stressing their concern for freedom and autonomy instead of solely and neutrally enabling a present desire to do so. It offers a choice that was not there before, thereby co-shaping the desire to start working later. Many people who take advantage of flexible working hours nowadays could not have expressed this desire before it became a feasible option. Moreover, one can imagine that a different policy, e.g., having to pay a percentage of one's salary to gain the freedom to start working whenever one wishes, also enables this behaviour but makes it less appealing as it does not emphasise one's concern for freedom as well.

a personal concern too. Of course, many explicit interventions are indeed designed to stress collective concerns, while at the same time addressing one or more personal concerns [20]. Governments make sustainable options cheaper, or role models are used to stimulate people to identify with pro-social behaviours. However, in general, when interventions address personal concerns, influence is often not experienced as deliberate influence to change one's behaviour.

Automatic responses, or why implicit influence may succeed. Finally, interventions that trigger heuristics (Tversky & Kahneman, 1974; Kahneman, 2011), social constructs or norms (Aarts & Dijksterhuis, 2003; Nolan et al., 2008) implicitly show strong effects on behaviour without people being aware of this. Many priming studies show how unconsciously triggering a social construct like 'cooperation' or 'helpfulness' can stimulate congruent behaviours. As we discussed in Chapter 1, most studies have been executed by priming participants with words, but even music and objects have been shown to affect behaviour by implicitly priming related constructs (e.g., Kay, et al., 2004; Vohs et al., 2006). Hence, implicit influence can change behaviours without people having to exert any effort. On the contrary, explicit influence often requires conscious processing and deliberation. Even when explicit strategies may have convinced people to alter their behaviour, willpower is required to indeed act upon such behavioural intentions and overcome contrasting automatic behavioural responses. But as we saw too, willpower requires consciousness and therefore may problematically interact with other conscious processes (Baumeister et al., 1998). In other words, when our conscious system is dedicated to other processes, our willpower may decline easily. Implicit influence is based on automatic processing that shows strong relations to behavioural responses, while explicit influence relies on more effortful processing of information that may present problems in guiding our actual behaviour.

In sum, explicit influence is argued here to be less effective than implicit influence because of the possibility it may cause reactance. An intervention that has been developed to explicitly affect behaviour can cause a negative experience that may decrease behavioural effects, or even engender counter effects. On the contrary, effective implicit influence is an indication that an intervention is either closely tied to personal concerns or triggers automatic responses. In these cases, the fact that the influence remains unnoticed is an indication that the intervention triggered strong behavioural drives. Note that it can be argued that automatic processes are inherently driven by personal concerns. For instance, when descriptive norms guide behaviour without people being aware of this, it can be said to occur on the basis of a fundamental, evolutionary concern for group belonging.

[20] An example of an explicit strategy that also triggers personal concerns is, for instance, governmental stimulation of pro-environment consumer choices, like purchasing solar cells or an electric vehicle. In this case, offering a subsidy is very explicit in its goal to persuade people to make pro-environmental choices. And indeed, people will most probably be aware of this. However, as the economic aspect largely guides these choices and is a common concern for people, the intervention triggers intrinsic motivations. It would be interesting to find out the difference in effect between personal economic gain when purchasing an environmentally friendly car, vs. when the government subsidizes car dealers who sell environmental-friendly cars more cheaply, without stressing the pro-environmental benefits. The second strategy would be indirect, as it is directed at the behaviours exhibited by car dealers and hopes to indirectly affect consumer choices. A consumer would therefore not experience the influence of the intervention, but only the 'typical' seduction or persuasion in interaction with the car dealer who aims to trigger existing concerns with his customers.

Type of intervention

Although we have good reason to expect that implicit influence is more effective than explicit influence in stimulating pro-social behaviour, we should not confuse the salience of the influence with the type of intervention. More common interventions to promote pro-social behaviours, like campaigns and signs, are often both explicit in their influence, and often textual. Do we therefore consider the salience of the influence accountable for the limited effectiveness of these interventions, or is it the fact that they use text to affect behaviour? Considering this question carefully, we have additional reasons to believe that design is more effective than text in promoting pro-social behaviour.

Hypothesis B: type of intervention
In social dilemmas, product designs are more effective than text and signs in stimulating pro-social behaviour.

No systemic change, or why text and signs may fail. Text or signs are inherently an intervention directed at the problem at hand. Systemically, these interventions attempt to 'fix' a problem in an existing system within which these problems arise. In contrast, products or services, as interventions to change behaviour, have the ability to change the system in such a way that the problem does not occur in the first place. For instance, Schiphol is such a clean airport not because there are signs everywhere that make people throw their garbage in the garbage bin. One of the interventions at Schiphol in order to keep it clean is that it is impossible to buy chewing gum at the airport. So instead of intervening by directing the influence at the problematic behaviour, like signs do, the intervention is directed at the cause of the problem. Now this is quite a blunt example of affecting behaviour, but it illustrates very well the different approaches.

No action-ability, or why text and signs may fail. Second, text and signs can never physically enable actions, while certain products can. Many products typically *afford* actions, e.g., a chair affords 'sitting', and therefore may guide or even stimulate these actions (Gibson, 1979; Norman, 1988). Moreover, products have the ability to engage people in what is called 'embodied cognition'. Research has shown that facial expressions and bodily posture can activate related cognitions and thereby affect behaviour. A famous experiment shows how gripping a pencil differently in one's mouth can activate related cognitions and emotions (Niedenthal, 2007). The fact that products can require particular body postures to be used (e.g., in the same way that Beat-it attempts to prevent aggressive outbursts, design case 5, p.75) can thereby stimulate particular behaviours.

In sum, products and services have the 'potential' to be more effective on the basis of these arguments. However, as products and services can still be designed without realizing systemic change, or without being action-able, e.g., a mirror used to increase self-awareness and thereby affect behaviour,

these arguments do not always explain the effectiveness of products and services. Yet, any limited effect of signs and texts may be explained by these arguments.

9.6 *Conclusion*

In this chapter we have shown that studies attempting to stimulate pro-social behaviour and the strategies derived from them do discuss the experience of influence a little, but often lack a structural user perspective. Additionally, in many studies, people's expected experience of the intervention is discussed as an important aspect to consider, both for ethical reasons and to increase effectiveness. Based on existing studies of the role of norms and how these may implicitly affect behaviour, we argued that implicit influence might be more effective in stimulating pro-social behaviours than explicit influence. Although the type of intervention has been substituted for the implicitness of the influence (De Kort et al., 2008), we argued that these are not the same. Additionally we argued why product interventions might be more successful in realizing behaviour change than messages. In the next chapter, the design of four interventions to test these two hypotheses is discussed. We have decided to focus on littering, a relevant and common social dilemma. First we discuss how to understand littering in terms of a social dilemma. Next we report on the design process of the four interventions, our considerations and how all the interventions aim to affect behaviour. In this, we refer to the strategies described in Chapter 4. In Chapter 11, the set-up, execution and the results of the experiment are described and discussed.

10

designing implicit and explicit influence

To test both hypotheses, we have to measure influence, which means we have to measure the actual behaviour change brought about by actual interventions. Although it is interesting to learn to what extent each intervention would be effective in changing behaviour, we are mainly interested in garnering a deeper understanding of what *defines the effectiveness* of various interventions. In Chapter 9 we explained our assumption that both the salience of an influence and the type of intervention play a determining role in the effectiveness of the interventions used to counteract social problems. Thus, we have to develop interventions that are clearly distinctive with respect to these variables. This chapter is devoted to describing the process of developing effective interventions that are 1) distinctive in their form, and 2) distinctive in the salience of their influence. As we focus on these specific characteristics of the interventions, we decided to not follow the Social Implication Design method as developed in Part 2 entirely; we do however use elements of the method. The behaviour we wish to change has already been defined for instance. In the development of the interventions we do explicitly consider the relationship between personal and collective concerns, and apply the strategies as presented in Chapter 4 to the design of specific types of influence. Before going into the details of the designs, we first explain how littering can be understood as a social dilemma, i.e., as rising from a conflict in concerns.

10.1 *Littering: a social dilemma*

The fact that public spaces are usually rife with litter is a common and persistent problem in society. However, in contrast to many other social dilemmas, littering has immediate social implications. If one consumes too much energy for instance, the environmental implications of this behaviour remain unnoticed. But when one litters, the consequences of this are immediately visible, causing an unpleasant and filthy environment for everyone. Especially in an environment in which these consequences affect peers rather than strangers, one would expect that social considerations

would be present. However, there is often a lot of littering in many school canteens, despite the fact that others are peers and that the space is only semi-public. When a space is semi-public, compared to fully public, the number of people who make use of the space is relatively small and people are expected to experience more of a sense of ownership regarding the place. However, the presence of litter is an indication that many people's behaviour is pro-self. Or, in other words, the presence of litter shows that many people have been acting on the basis of personal concerns rather than collective concerns. But what concerns are at stake, exactly, when it comes to littering?

As a group, we generally disapprove of littering because we value a clean environment. A clean environment is more appealing, healthier, and often a sign of ecological sustainability. These collective concerns are considered so important that in many western societies 'not littering' has become an injunctive norm (in contrast to Asian and African countries, in which littering is considered quite normal). In other words, disapproval for littering is so strongly ingrained in some cultures that 'social glue' unilaterally motivates people to throw away their garbage in the garbage bin. In such cultures, littering can even be considered a sign of disrespect. Here, respect is a mediating social value, rather than a collective concern that defines why a specific behaviour is desired in the first place, i.e., what benefits it will deliver to the group. Only when a particular behaviour has become normative do social values like respect drive behaviour nearly independent from any collective concerns.

Despite this social glue, many people do not always act on the basis of collective concerns as they may conflict with other, personal concerns. Littering may transpire out of laziness, forgetfulness, or individual concern for personal image, e.g., it is uncool to throw garbage in the garbage bin. In other words, personal concerns like ease, comfort and status can be stronger drivers of behaviour than collective concerns for neatness, hygiene, or environmental sustainability. Moreover, once litter is present in an environment, the same 'social glue' may even cause more litter: when people see other people litter, they may mimic this, and when much litter is present this can be interpreted as the norm, in this case a descriptive norm that counteracts the injunctive norm not to litter.

Hence, the presence of litter can be defined as a social dilemma in which personal concerns conflict with collective concerns. Personal concerns for ease, comfort and status conflict with collective concerns about beauty, health and sustainability. When somebody litters, this may therefore mean that his or her personal concerns relate to collective concerns in one of the next three possible ways:

1) People who litter do care for beauty, health and sustainability, but ease, comfort and status are stronger.

2) People who litter do not relate littering to beauty, health and sustainability, and therefore are driven by ease, comfort and status.

3) People who litter do not care for beauty, health and sustainability, and are driven by ease, comfort and status.

Generally speaking, interventions to stimulate pro-social behaviour in relation to social dilemmas can be developed by (1) stressing collective concerns, (2) addressing involved personal concerns, or (3) stressing other personal concerns. The question to ask is: which concerns are most at stake? In case of littering, implications affecting the attractiveness of the environment are immediate, while implications affecting health and sustainability become apparent in the longer term. Hence, we expect that even if health and sustainability are internalized concerns, these are not strong drivers for behaviour when it comes to littering. As we expect ease and comfort to be more strongly related to the act of littering than status, we consider littering to be mostly a conflict between 'beauty' and 'ease'. To overcome this conflict, we may 1) stress the collective concern for beauty, 2) address the personal concern for ease, or 3) address other personal concerns. We apply the first two approaches merely as a thought-exercise to see how these differ when using text or when using a product. Subsequently, the third approach is more elaborately discussed in the actual design of the interventions in which we adhere to the strategies from Chapter 4.

Stressing 'beauty'

In designing two posters with text that stresses beauty with a difference in salience, we consider text that literally relates to the desired behaviour more explicit than text that is stated more abstractly or generally. In the latter case, the text may refer to more behaviours than only littering.

Implicit text: 'People feel better in a beautiful environment.'
Explicit text: 'Keep your environment beautiful and throw your garbage in the bin.'

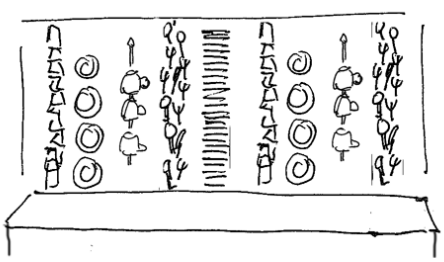


FIGURE 53
THE 'EFFICIENT WASTE-COLLECTOR'

Implicit design: Let people experience beauty by throwing garbage in the bin. This garbage and dish collector prompts users to arrange garbage neatly, subsequently creating a beautiful wall as the garbage is transported through transparent tubes. This intervention is designed to make the action of sorting garbage appear 'normal', while the design itself communicates that it is more efficient to collect garbage like this. The beauty of it is designed as an apparent consequence of its functionality.
We therefore assume that people will not recognize the collector as a deliberate influence to stimulate them to throw away their garbage in the bin: it rather seduces people to do so.

FIGURE 54
THE 'RAINBOW-BIN'

Explicit design: Let people experience beauty while throwing garbage in the bin. This transparent bin along the wall, asks you to sort your garbage on the basis of its colour to create a rainbow along the wall. The intervention is designed to explicitly make people active contributors to a beautiful appearance of the garbage. In contrast to the dish collector, the rainbow-bin shows explicit design characteristics to affect this behaviour.

Addressing 'ease'

In the design of the posters with text, again the salience of influence is made different by either referring literally to the behaviour or by remaining more general.

Implicit text: 'It is easy to be attentive.'
Explicit text: 'With the same amount of effort, throw it in the garbage bin.' ('Met hetzelfde gemak, gooi je het in de afvalbak')

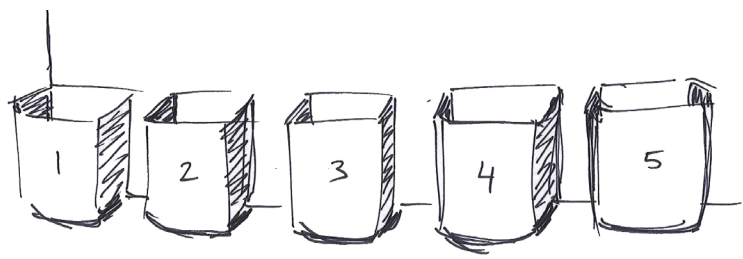


FIGURE 55
MULTIPLE BINS

Implicit design: Let people experience ease throwing garbage in the bin. Increasing the number of garbage bins makes it easier for people to throw away their garbage, as they have to walk less far to do so. Several studies have proven this strategy effective (e.g., Schultz et al., 2013).

Explicit design: Let people experience ease throwing garbage in the bin. Increasing the obtrusiveness of the garbage bins makes it easier to throw away garbage as it reminds people to do so. By helping people not to forget it, people do not have to remind themselves to do so. This strategy has appeared fairly successful (Huffman et al., 1995). The big arrow is assumed to be quite explicit in its intentions.

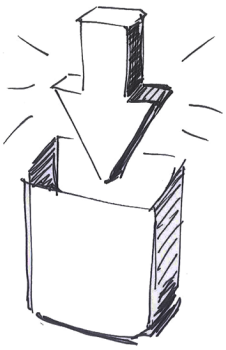


FIGURE 56
THE 'ARROW BIN'

In getting to these ideas and by reflecting upon this, we notice an interesting difference between using text or products. It is quite difficult to design posters with text that makes people experience the concern it refers to. The slogan 'With the same amount of effort, you can throw garbage in the bin' states that it is equally easy to litter, as it is to throw the garbage neatly in the bin. The slogan was actually used during a campaign in the Netherlands. However, its statement is apparently not true, as this is one of the reasons people litter: it takes effort to think of it and to actually throw things away. By truly making it easier by means of a design intervention, the ease is experienced rather than explained. The same holds for beauty. Designing an intervention that makes one experience beauty is more convincing than stating that behaviour will lead to a more beautiful environment.

10.2 *Developing interventions that result in less litter*

Regarding the interventions we used for the experiment, we decided to use two existing posters, and to design the two products. In this, we only use elements of the SID method as developed in Part 2 of the book. We consider the relationship between personal and collective concerns, and adopt a user perspective in designing the influence. To this end, we adhere to the design strategies proposed in Chapter 4.

For the experiment, we decided to focus on interventions that encourage behaviour rather than discourage it. Regarding the type of influence, we decided to develop interventions do not use any force, yet differ in the salience of their influence.

In reference to the design strategies as presented at in Chapter 4, we therefore consider all but strategy 1, 2, and 11 possible strategies to apply to develop interventions that do not use any force.

1. ~~Create a perceivable barrier for undesired behaviour.~~
2. ~~Make unacceptable user behaviour overt.~~
3. Make the behaviour a requirement for the product to function (functional goal).
4. Provide the user with arguments for specific behaviour.
5. Suggest actions.
6. Trigger various motivations for the same behaviour.
7. Elicit emotions to trigger tendencies toward action.
8. Activate physiological processes to induce behaviour.
9. Trigger human tendencies for automatic behavioural responses.
10. Create optimal conditions for specific behaviour.
11. ~~Make the desired behaviour the only possible behaviour to perform.~~

As considerations about the feasibility of the intervention in relation to the context of the experiment also play a role in the development process, we first explain this context.

Context of the experiment

The experiment was conducted in the canteen of the Applied University of the Hague. This university hosts about 50 different applied studies and provides education to 22,700 students between the ages of 16 and 26. The experiment was conducted at one of four buildings, each of which house one canteen. In all, but especially in the largest canteen, a lot of litter is thrown away every day. All available food at the canteen is wrapped in plastic or paper, which means that every student who buys something at the canteen has at least some garbage to deal with. Coffee and tea is served in disposable cups. So besides the trays that are borrowed to transport one's lunch, everything is disposable. Most of the garbage is left behind at the tables rather than disposed of on the ground (see Figure 57).

FIGURE 57
THE CANTEEN OF THE APPLIED UNIVERSITY OF THE HAGUE SERVED AS LOCATION FOR THE EXPERIMENT ON REDUCING LITTER

Posters: Regarding the posters, we decided to use existing posters in our experiment. This allows us to compare design with more common interventions that also seek to affect behaviour. Although many common interventions are signs that forbid littering or state that it is not desirable, the poster also needs to encourage behaviour rather than discourage it, and not use any force. To aim for a clear distinction in salience, we decided that the explicit poster needs to refer *literally* to the behaviour aimed at, while the text on the implicit poster can be more ambiguous, stating more *abstractly* its aim and potentially referring to various behaviours. The posters we used are depicted in Figure 58.

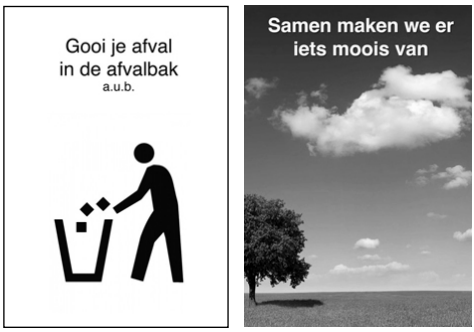


FIGURE 58
THE EXPLICIT POSTER (LEFT) SAYING 'PLEASE THROW AWAY YOUR GARBAGE IN THE BIN', AND THE IMPLICIT POSTER (RIGHT) SAYING 'TOGETHER WE TURN IT INTO SOMETHING BEAUTIFUL.'

The explicit poster we used is often used in (semi-) public spaces. The implicit poster was used during a sports event in The Hague. The posters use respectively strategy 4, i.e., suggest actions, and strategy 7, i.e., elicit emotions to trigger tendencies towards action. 'Together we turn it into something beautiful' hopes to realize solidarity and a sense of group feeling to such an extent, that people are motivated to throw garbage in the bin.

Product designs: In the development of the product designs, the strategies were sometimes used as starting points for design, sometimes recognized afterwards. The same holds for the concerns the ideas relate to. For each idea we explain its functioning, what design strategy was applied to it, and what concern(s) it intends to address. When possible, we relate the expected effectiveness to the literature. Finally, we mention whether we expect the intervention to exert influence explicitly or implicitly, and how.

1. The idea is that when people return three trays, they receive a free coffee (Figure 59). To take advantage of this deal, one has to collect trays, thereby automatically cleaning the environment. The desired behaviour is a component of the intervention's functioning (strategy 3). This intervention motivates behaviour by addressing economic concerns: it provides an economic incentive for the appropriate behaviour. Although such interventions have proven fairly effective, it has also been argued that they are costly (De Kort et al., 2008). This intervention is expected to exert explicit influence by triggering conscious processing and making people consciously decide whether to take advantage of the offer.

FIGURE 59
THREE TRAYS FOR 1 FREE COFFEE

2. By making the tools to clean the environment readily and widely available to people, those who are willing to act properly are given the means to do so (Figure 60). The intervention thereby optimises the conditions for a desired behaviour (strategy 10). The intervention can be considered one that stresses responsibility, autonomy, and one that strengthens self-sufficiency. It is expected to exert implicit influence, by supporting people who are willing to act, who probably do not recognize the intervention as influencing their behaviour.

FIGURE 60
CLEANING SET

3. The garbage bin is designed to invite people to take aim and toss their garbage from a distance and 'score' (Figure 61). It aims to trigger various motivations for the desired behaviour (strategy 6). The needs to be playful, or feel challenged, or compete with others are addressed by this design (The Fun Theory, 2012). This intervention is expected to exert explicit influence by inviting an expressive and noticeable interaction.

FIGURE 61
'CHALLENGE BIN'

4. These interventions (Figure 62) are designed to trigger human tendencies for automatic behavioural responses (strategy 9). The idea is that because people regularly do not litter when they are guest at someone else's home, or when they are in a working environment, a library, or in nature, cues related to these environments may therefore automatically stimulate this same conduct in a canteen. The presence of a guestbook, and signatures of laptops, library lamps, or sounds and pictures from nature are intended to trigger the norm that is present in these environments. These designs aim to redesign the environment so as to trigger injunctive norms (Aarts & Dijksterhuis, 2003). In this sense, the interventions stress concerns for belonging and being ethical. These designs are typically expected to exert implicit influence.

FIGURE 62
GUESTBOOK, LAPTOP-MATS, LIBRARY LAMPS, AND PICTURES OF NATURE

5. This design makes it possible for people to hang up their coats neatly (Figure 63). The idea is that when people use this and actually hang their coat neatly, they are in fact being primed to be orderly (strategy 9). Through this, the intervention indirectly suggests that people throw their garbage away, on the basis of their concern for being consistent. This design is expected to exert implicit influence on littering behaviour as it is expected to be experienced as non-influential.

FIGURE 63
COAT PEG

6. The lines (Figure 64) are intended to trigger people's automatic response to follow the lines to the garbage bin (strategy 9). The lines thereby make it easier to remember to throw away garbage and people do not have to search for a bin. At the same time, the lines are intended to stress a need for order. The lines are designed to exert implicit influence by triggering an automatic process. However, the lines obviously lead to the garbage bin and therefore people may recognize why the lines are there. Nevertheless, it is questionable whether people will notice the effect of the lines on their actual behaviour. The lines are therefore expected to exert implicit influence.

FIGURE 64
LINES

7. The images on a large screen change when somebody uses the garbage bin; an alternative is activating the sound of a whistle or a bird singing when using the garbage bin (Figure 65). These interventions aim to trigger different motivations for the same behaviour (strategy 6). As the cue is quite explicit in interaction with the bin, the interaction with the bin is expected to lead to commotion within the social context. The interventions are thereby designed to trigger curiosity and to motivate people to throw away their garbage. By making the design so noticeable, and providing a 'reward' for the desired behaviour, the 'intention' of the design is deliberately made obvious as to exert explicit influence.

FIGURE 65
SCREEN PLAYING A MOVIE WHEN THE GARBAGE BIN IS USED

Idea number 1 is considered too costly and not a clear product design, but rather a service. The second idea is considered too far-fetched, as cleaning equipment only makes sense when one has spoiled something, rather than for throwing away one's garbage. The third idea is expected to indeed lead to more attempts to throw away garbage, but can easily lead to more mess when one fails to 'score'. The fourth idea is considered to exert implicit influence that may be successful, but is very subtle. The fifth idea is similar in strategy, but has a strong component in that it includes a behavioural act. We expect that once people have already experienced acting neatly, this is a stronger 'primer' than when people are only unconsciously confronted with cues from an environment in which this neat behaviour is the norm. The sixth idea is considered potentially successful as it may guide people unconsciously to the bin. The seventh idea is a playful interaction and therefore considered possibly successful. Hence, we conducted three pilots to assess the functioning of idea 5, 6, and 7 and test our assumptions.

Three pilot studies

Three pilot studies were run for a day in the canteen at the faculty of Industrial Design Engineering in Delft. In comparison to the context of the initial experiment, this canteen offers less space for students, the institution offers a higher level of education, and the space is less littered as a rule. However, the age of the students is about the same. The pilot

was mainly carried out to test our assumptions about the interaction with the designs and the salience of their influence rather than testing their effectiveness.

Coat stand

Three coat stands were placed in the canteen at the faculty (see Figure 63). The assumption was that if people hung their coat neatly, they would also handle their waste neatly based on their need for consistency. It appeared however, that students are not really interested in hanging their coats on these stands. This may be because the stands were placed in the centre of the space and therefore stood too far away for most students. A personal coat hook attached to the table might be more effective. We were not allowed to alter (or damage) the tables. Moreover, the fact that an initial behaviour needs to be changed (hanging one's coat) for the target behaviour to also change (littering) may take too long with respect to the duration of the experiment. Therefore, we decided not to pursue this design idea.

Lines

Green tape was used to draw stripes on the tables, across the floor and converge near a bin (see Figure 64). The assumption was that people, either consciously or unconsciously, would follow the lines with their eyes before having lunch. It would 'remind' them of the bin and subsequently guide them to the bin after having finished lunch to throw away the garbage. During the pilot, approximately one-third of the people pointed at the lines and half of the people obviously looked at the lines. When questioning people about the lines, some related the lines to the bin, but most expected the lines to be put there for different reasons, e.g., to divide the table in personal spaces. It therefore appears that the lines indeed may guide behaviour without people noticing that this affects their behaviour. We therefore assume that the influence of the lines is implicit, regardless of the fact that the lines itself are quite obtrusive.

Screen

A sensor was placed inside a bin. When movement in the bin was detected, i.e., an indication that somebody threw away his/her waste, a slideshow of appealing pictures was projected on the side wall of the canteen. The assumption was that people would be curious to see the next picture and would therefore use that bin to throw away their garbage. However, it appeared that people hardly noticed the projection in the first place. Moreover, no connection was made between the bin and the projection. Therefore, a second pilot was conducted in which a screen was placed over the bin (see Figure 65). When movement was sensed, the screen would start a funny movie for about thirty seconds. To see the complete movie, about two or three people had to throw away their waste in the bin. During this pilot, very few people looked at the screen or watched the movie. Moreover, a movie as such did not appear to be a strong trigger, as the 'reward' it offered took thirty seconds to be delivered, while people were 'on the move' after having finished lunch. Although the pilot did not show strong interactions, we considered a design in which the bin and the screen were more integrated and in which the reward was more direct and appealing would be worthwhile pursuing.

In the final design used at the Applied University of the Hague, a screen was attached to a bin. The movie was replaced with funny, rewarding, or philosophical quotes, e.g., 'One man down!' or 'Go with the flow.' When movement is sensed, a new quote was displayed on the screen. A total of about 150 quotes were randomized. We expected the interaction with the screen to create some ripple in the context of the experiment and therefore explicitly affect behaviour. If we had asked people why they threw away their garbage in the bin, they would most probably have related their behaviour to the design. A screen is therefore still expected to exert explicit influence. The eventual interventions to test our two hypotheses are presented in the next chapter.

10.3 *Conclusion*

Regarding the design of the interventions on the basis of the conflicting concerns 'ease' and 'beauty', we noticed several things worth mentioning. First, although this approach to 'resolve' the dilemma seems a logical first step, it led to relatively original interventions. Specifically designing products on the basis of these concerns may therefore lead to original designs. However, by approaching the litter problem as a general conflict, we do feel we may have overlooked relevant aspects related to the specific context. If we had applied the Social Implication Design method, we would have taken the time to study this context in more depth than we did. Regarding the time allotted to the project, this was considered unfeasible. Next, we noticed an interesting difference in the application of these strategies when designing the posters and when designing the products. Although it sounds quite obvious, truly addressing a concern like 'ease' by means of a text is harder to do than by means of a product. Telling somebody that something is easy to do is quite different from making it easier for somebody to do it. Apparently, concerns are more effectively addressed with products, enabling people to actually *act out* these concerns.

Regarding the design process, we noticed two things worth mentioning. First, the strategies appeared useful for inspirational purposes during the design process, but mainly for assessing the the product concepts. It seems that understanding and assessing a product concept on the basis of these strategies and understanding the concerns that are addressed helps the development of these and other product concepts. It therefore indeed supports the design of interventions, not necessarily by 'applying' them, but rather by understanding how the concepts embody them. Second, although some strategies are indeed strongly related to a particular type of influence, it remains difficult to estimate how the influence of an intervention will be experienced and whether people will be aware of the influence or not. Interestingly however, by trying to design products to change behaviour without people noticing this, designers are driven to design products that blend in with the context, people's tendencies and people's concerns.

In the next chapter, we will explain the set-up of our main experiment, present our results and discuss our findings.

II

measuring the effectiveness of designed interventions

A semi-controlled experiment was carried out to test the effect of both the salience of an influence, i.e., implicit or explicit, and the type of intervention, i.e., text or product, on pro-social behaviour. In the experiment we compare the four interventions in their effectiveness on the reduction of litter as developed in the previous chapter. Each intervention varies by type, either a poster or a product design, and in the salience of its influence, either explicit or implicit (see Figure 66). Additionally, 'no intervention' was used as a control condition.

The experiment was conducted at one of the four locations of the Applied University in The Hague offering education to approximately 22.700 students. The canteen of this university suffers from a massive amount of litter every day. The experiment was set up in the largest canteen at the university, which hosts about 2000 guests a day. For the experiment, 8 large tables were selected. Each table can host about 16 students at a time. A selection of a limited number of tables was intended to decrease the chances of involving the same participants in the different conditions. Verification as to whether students indeed did not have a fixed lunch spot were made during the experiment by taking photos at two fixed times during the day.

II.I

Set-up of the experiment

Participants

The participants were students from the Applied University of the Hague, who frequently spend several lunch periods in the canteen during the week. The students were not informed about the experiment and were not debriefed afterwards.

Stimuli

FIGURE 66
THE FOUR INTERVENTIONS IN TESTING ORDER: EXPLICIT POSTER, IMPLICIT DESIGN, IMPLICIT POSTER, AND EXPLICIT DESIGN

Procedure

For each condition, including a control condition in which no intervention was implemented, we measured littering behaviour for five workdays in a row, i.e., Monday to Friday. However, due to technical complications with the design, the 'screen' was only tested from Tuesday to Friday. During special weeks that included holidays such as Easter, the experiment did not run. Between the implementation of two conditions, at least one week was scheduled in which no intervention was tested, to decrease the chances of any learning effect for some participants who may have been involved in more than one condition. Each intervention was introduced at the same location in the canteen. In this way, we aimed to ensure that all the interventions received similar participant attention. Twice a day, at 1:30 and 4:30 pm, the researcher took two pictures of the canteen, which allowed us to count the number of people present and compare conditions. Afterwards the researcher cleaned the space (dressed as a member of the cleaning staff) and counted the number of pieces of garbage left on each of the eight tables. Every piece was counted as one and packages or cups torn in pieces were also counted as one. The order of conditions was randomized in the following order: explicit poster, implicit design, implicit poster, and explicit design.

11.2 *Results*

During the experiment the number of people in the pictures was counted for each condition per day. As the pictures were taken twice a day at the same time for all the conditions, it allowed us to compute quite precisely the relative crowdedness for all the conditions. This number was used to weigh the amount of garbage that was counted at each table. In other words, we computed the amount of garbage per person (per table per day) for all the conditions and took this as the dependent variable in the analysis of the data.

The average amount of garbage per person for each of the conditions was: expl/pos: 0.110 (SD=0.16), impl/des: 0.099 (SD=0.12), impl/pos: 0.152 (SD=0.18), expl/des: 0.162 (SD=0.19), and control: 0.102 (SD=0.15). In other words, we measured the least garbage in the implicit design condition

(although difference with explicit poster and control condition is negligible), while the most garbage was found in the explicit design condition (though difference with implicit poster is negligible). The means are depicted in Figure 67.

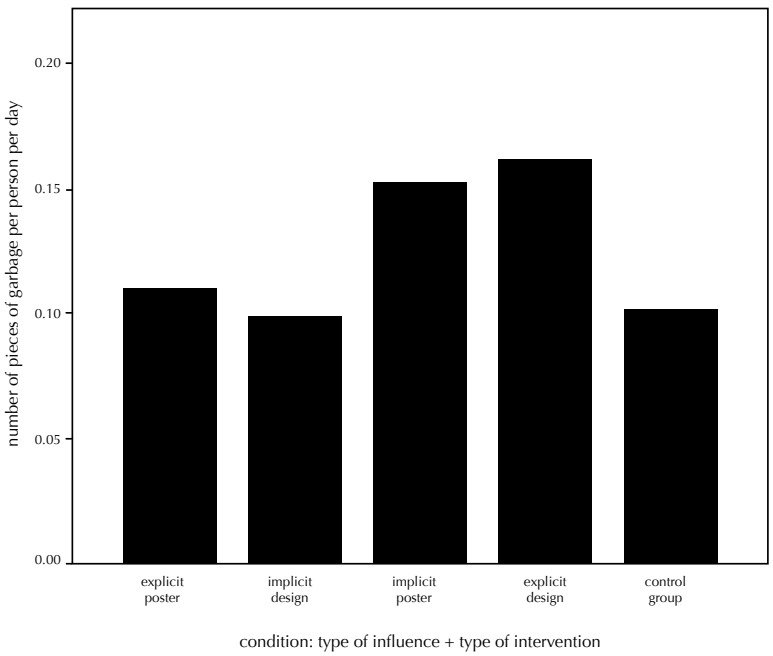


FIGURE 67
THE AVERAGE AMOUNT OF LITTER PER PERSON, PER DAY, FOR EACH EXPERIMENTAL CONDITION

A two-way ANOVA was conducted to examine the effect of the salience of influence (implicit or explicit) and the type of the intervention (poster or product) on the amount of garbage per person. No main effect for the salience of influence ($p=0.603$) or the type of intervention ($p=0.957$) was found. We found a significant interaction between the effects of salience of influence and type of intervention on the amount of garbage per person, $F(1, 349) = 7.24$, $p=0.007$. This interaction effect is depicted in Figure 68. These findings suggest that when using posters, explicit influence is more effective than implicit influence, and when using product designs, that implicit influence is more effective than explicit influence.

Additionally, we conducted an analysis to see if one of the interventions was effective in changing littering behaviour. An analysis of variance in amount of litter per person (one-way ANOVA) shows no significant main effect for the interventions, $F(4, 349) = 2.29$, $p=0.059$. A Tukey post-hoc test neither shows significance in compared effectiveness of the interventions. This means that none of the interventions can be said to be effective (or counter-effective) in stimulating people to throw away their garbage in the garbage bin.

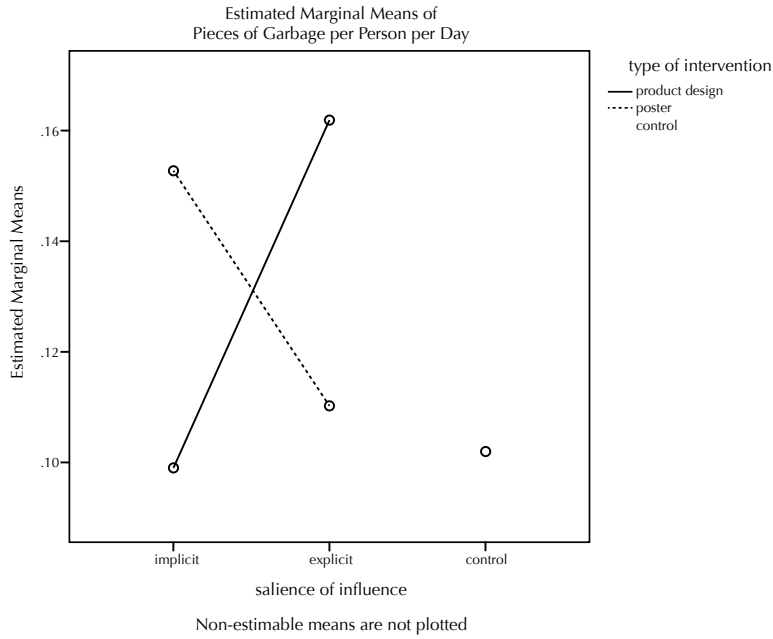


FIGURE 68
ESTIMATED MARGINAL MEANS OF INTERVENTION TYPE AND SALIENCE OF INFLUENCE, SHOWING THE INTERACTION BETWEEN THE TWO VARIABLES (P=0.007)

11.3 *Does salience of influence matter?*

Although we found a significant interaction effect between the type of intervention and the salience of its influence, it remains questionable to what extent this finding allows us to draw generalizable conclusions.
The salience of influence is a complex concept. 'Influence of which one is not aware' is quite hard to operationalize and to assign, as a quality, to an intervention. 'Influence of which one is not aware' may refer to the fact that 1) the intervention is unconsciously perceived, 2) the intervention is unconsciously processed, 3) the intervention is not recognized as having an influence, 4) the intervention is not related to the intended behaviour, or 5) the intervention is not related to the actual behaviour change. This variety demonstrates the likelihood that several aspects of an interaction between the intervention and the user define whether the influence is explicit or implicit.

In preparation for our experiment, we conducted three pilots to assess the salience of the influence of these interventions. However, they were small pilots and revealed the ambiguity of the concept. The lines were recognized by some as deliberately being placed to stimulate people to throw away their garbage in the bin, while others did not share the same recognition. Although recognition of an influence may cause reactance, it may also be that the lines still trigger automatic responses and that even the people who recognized the aim of the intervention did not recognize being influenced

by it after all. Regarding the posters or even the screen, some may have perceived these interventions consciously, but did not devote any further thought to them. Without any deliberate processing of the interventions, they still may have affected behaviour implicitly by having drawn attention to the garbage bin itself, thereby seducing people to throw their garbage in the bin. A poster may similarly exert implicit influence regardless of the message or picture it depicts.

11.4 *How to explain the limited effect of the interventions?*

A striking conclusion regarding our results is the fact that no intervention significantly affected the littering behaviour of the students. Moreover, the only effect that is shown, though not significantly, is that two of the four interventions increased the amount of litter in comparison to the control condition. Both the poster that said 'Together we turn it into something beautiful' and the screen that rewarded desired behaviour with a funny slogan actually seemed to be counter- effective.

Messages on posters

Using text to implicitly affect behaviour sounds quite contradictory. We already know that messages featuring descriptive norms appeared to be quite effective without people noticing this (Nolan et al., 2008).
In this study, the influence is indeed implicit, but the intervention is explicit *in its intentions*. The descriptive message used in their study literally requests people to use fans instead of air-conditioning to lower energy consumption, arguing that many people do so. Instead of using a descriptive norm in a similar way to exert implicit influence by means of text, we decided to use a message that had already been used in a real-life setting: 'Together we can turn it into something beautiful.' This message was assumed to trigger a collective sentiment and express hope. Because the text does not literally refer to the behaviour it wishes to stimulate, we considered the message as one exerting implicit influence.
It has been previously argued that increasing the explicitness of the message in terms of 1) the behaviour it wishes to stimulate, 2) the consequences of the behaviour, and 3) who is expected to perform the behaviour may increase the effectiveness of the message in realizing behaviour change (Melnyk, 2011). As our implicit poster did none of these, this may explain its limited effect. In contrast, the explicit poster was explicit about the behaviour it aimed to stimulate, but did not provide any arguments to do so, nor did it specifically target people. This may also explain its limited effect. Based on this, our results are in line with the conclusion that an implicit message is less effective in achieving behaviour change than a message that explicitly refers to the behaviour it wishes to stimulate, and this *regardless of the salience of the influence.*

Although this may explain the limited effectiveness of both posters, it does not yet explain why the implicit poster actually increased the amount of litter. We therefore expect that, even though people may not have related

the text of the implicit poster to the intended behaviour change, the poster may have caused reactance. We imagine that any poster or prompt runs the risk of causing reactance, regardless of the explicitness of the message or the salience of its influence. Therefore, it may be the case that when a message triggers descriptive norms it can even overcome a possible counter effect of reactance.

Product designs

The relative effectiveness of the two designs is in line with our expectations. Indeed, the average amount of garbage in the implicit design condition is lower than in the explicit design condition. However, we expected the implicit design to be effective, and we did not expect that the explicit design would be counter-effective and actually increase litter. Regarding the screen, we suspected that people's interaction with the design would catch attention. Motivated by a curiosity to see the next quote, it was expected that people would throw their garbage in the bin. As the relationship between the design's functionality and user behaviour is quite direct, it was expected that people would relate their behaviour to the design when asked afterwards. Indeed the design caught much attention amongst students. What we may have overlooked however is that it may be exactly this that would *demotivate* the students to throw away their garbage in that bin. Being at a relatively vulnerable stage in terms of social relationships, standing in front of the screen would potentially be quite scary. On top of this, some quotes gently mocked the user or joked around a bit. This would make it even more frightening to be in the spotlight. So even though we took several concerns into consideration, we may have overlooked this important concern of youngsters. Regarding the lines, we do expect that many participants followed the lines with their eyes, either consciously or unconsciously. The reason that it did not affect behaviour significantly may be because the effect of 'remembering' to throw away one's garbage and unconsciously following the lines to do so is not strong enough. Of course it may also be that both interventions caused reactance.

General considerations

Next to the functioning or malfunctioning of the interventions, various general factors may also explain why we did not find any significant effects. First of all, a canteen is a location where people go on a daily basis. The behaviour that we wished to alter can therefore be regarded as habitual rather than incidental and therefore harder to change. Studies performed in labs or other 'new' environments for participants have the advantage that when people are in new environments they are unconsciously seeking information on how to behave (e.g., Zimbardo & Leippe, 1991). This human tendency may therefore have increased the effectiveness of particular interventions in other studies, as people were in search of cues. For instance, it has been shown that increasing the obtrusiveness of the bins in a mall has a significant effect on behaviour change (Geller, Brasted, & Mann, 1980). Next, youngsters appear to litter more than adults (Schultz et al., 2011), which may indicate that the behaviour is more persistent and harder to change. And finally, the type of littering that we wished to alter is considered 'passive littering'. Passive littering means that people just leave their waste at the table or bench and walk off. In contrast, active littering is

deliberately throwing garbage in public areas, e.g., littering on the streets. It has been shown that passive littering is harder to counteract than active littering (Sibley & Liu, 2003), which again may have complicated the study. In terms of the study's overall aim, the context may have interfered too much in the experiment.

Conclusion

In sum, it is challenging to solidly argue or soundly measure that a particular intervention exerts implicit or explicit influence. We therefore have to ask ourselves the question of whether the salience of influence is a useful concept after all. In Chapter 9 we argued in detail why we expected implicit influence to be more effective than explicit influence. Besides providing the benefit of potentially decreasing reactance, the fact that influence goes unnoticed is often *an indication* that automatic processes have been activated or of the fact that personal concerns have been addressed. Hence, the salience of influence as such does not explain why people change their behaviour or not. Indeed, in discussing the findings of the experiment, we were obliged to use additional arguments to understand why the interventions failed to engender an effect. Hence, we mostly consider the salience of influence a useful concept for the *design* of an intervention.

In practice, relatively few politicians or designers dig deeply into social theories when designing their interventions. Although it is difficult to verify that it is the implicitness of the influence that is accountable for any effectiveness, the chance that designers design interventions that trigger automatic responses or personal concerns may be higher when aiming for influence 'of which people are unaware'. In trying to promote pro-social behaviour, it is quite easy to come up with various possible interventions. However, we noticed that this often leads to obvious and explicit interventions that appeared to have limited success in realizing a behavioural effect. It can be quite difficult at first to design products that affect behaviour without people being aware of it. However, noticing 'the salience of an influence' stimulates designers to consider how people behave and to study present concerns, which increases the chances that effective influence will be designed. In fact, it may be because we did not take the time and approach for this as suggested by the Social Implication Design method, that our designs are ineffective.

general discussion

Now that we have an understanding of the influence design has on human behaviour, an idea of how to design this influence with a social perspective, and a notion of what type of influence might effectively realize social change, a more general discussion of these findings allows us to consider the value of all this. We first will critically examine the limitations inherent in the set-up of the studies and discuss the general findings and conclusions. Based on this, we discuss potential future avenues for research. Next, we discuss the main implications of this work for design practice, and consider the contribution of social design practice to the wellbeing of society. We conclude our general discussion with a note on the ethics of this type of design.

General discussion of the findings

The main supposition underlying the studies described in this book is the idea that the ever-present influence of design may be a unique and effective force enabling desired social change. Hence, more in-depth understanding of this influence is desirable not only so that designers might harness it to prevent undesired social implications, but also so that they might counteract social problems and contribute to society's wellbeing.

Analysis of existing theories about, and designs with, hidden influence (Part 1)
The basis we started from in understanding the hidden and often unintended influence of design on human behaviour is mediation theory. This theory helped us to understand the hidden influence of design as emerging in the human-product-world relationship, yet did not provide sufficient clues to design this influence for social purposes. Reviewing existing theories about the influence of design allowed us to understand that designers may directly and indirectly affect targeted behaviour by means of design. Studying existing products and services that exhibit influence from a user perspective helped us understand that people may be discouraged and encouraged to act in a particular manner, and allowed us to redefine product influence in terms of salience and force. Based on this analysis, we redefined the hidden influence of design we are interested in as 'implicit influence'. The work presented in Part 1 contributes to a philosophical understanding of product influence that is, in its vocabulary, intended to bring existing knowledge closer to the act of designing.

In developing this detailed account of product influence that would be valuable to designers, we included no empiricism. Rather, our approach represents a philosophical and theoretical elaboration of existing views on the role design plays in shaping behaviour. The instrumental value it tends to provide has therefore not been systematically verified. However, our theoretical framework of product influence is integrated in the design method as tested in Part 2 and partly applied in Part 3. Based on the design cases and studies presented there, we consider the theory valuable to designers, yet in a different way than expected. The four types of influence based on user experience indeed seem to encourage the designer to consider the appropriateness of an intervention, in addition to its effectiveness. However, it seems that the strategies to actually design the influence only help designers to understand, evaluate, and develop the influence they are designing, rather than supporting the design of a pre-defined type of influence. Therefore the question arises: does our classification on product influence present added value to mediation theory?

Mediation theory itself provides a fine framework to assess the behavioural mediation of existing ideas and the further development of an idea on the basis of such reflections. Yet we believe that the types of influence described do provide additional value, as they indicate specific forms of mediation. Specifying mediation in terms of force and salience of influence, demonstrates to designers how the eventual design embodies the influence. Moreover, highlighting that both direct and indirect forms of influence can be designed, should stimulate the designer to view both the effects of design *in* and *beyond* the human-product-interaction. Additionally, redefining influence in terms of salience and force spurs consideration and discussion of both the appropriateness and effectiveness of an intervention, and to adopt a user perspective. Nonetheless, to structurally assess the instrumental value of our philosophical account of product influence (directly/indirectly stimulating desired behaviour, and the strategies that intend to lead to coercion/persuasion/seduction/decision), we need to conduct additional studies.

Studying the design of product influence with desired social implications (Part 2)
Our approach to designing this influence represents a holistic approach that leaves various decisions up to the designer/design team. However, in making these decisions, the designer is encouraged to take both a social and a user perspective, and hence consider both collective and personal concerns over the short and longer term. In deciding upon the type of influence to be exhibited by the design, the designer is encouraged to argue in terms of the intervention's effectiveness and appropriateness. Yet, throughout the studies presented here, emphasis was put on the implicit influence of design.

Regarding the design of product influence based on desired social implications, the multiple-case study, in combination with the narrative-based expert study, led us to the conclusion that the Social Implication Method is structurally valid. This means that its structure was shown to represent a logical order. However, to be able to assess its performance validity, i.e., to what extent the method improves design performance, the use of the method still needs to be quantitatively assessed. In addition, the

usability of the method appeared poor. Based on the qualitative insights that emerged from the multiple-case study, improvements were suggested that would not change the structure of the method. In hindsight, we suspect that a set of tools would be more appropriate and would be more usable in regular design practice. On page 175-179 these tools are presented and discussed in relation to the Vision in Product design method. However, we expect that these design tools would be valuable to any design project, regardless of the methods used.

In more general terms, our multiple-case study provided insights regarding how to evaluate design methods. In this way, the study contributes to design methodology. Based on the work of Dorst (2008), we argued that a design method intends to improve both the object and the process of design activity, for which not only the criteria 'quality of the outcome' and 'efficiency' apply. We proposed five indicators of desired design performance. We argued that improvements on these five indicators should be assessed in order to understand the quality of a design method: a method should help a designer to *understand* and *plan* the act of designing, to *consider* and *design* relevant aspects of the design, and to *communicate* both. We argued, in line with Jones (1992), that a method should be both effective and usable in these aspects.

To judge the effectiveness of the method regarding the *design* of product influence with social implications, we additionally carried out a narrative-based study with experts to assess the concept designs. However, the study has limitations. Although narrative-based studies have shown to lead to valid user evaluations of concept designs (e.g., Van den Hende, 2010), the use of the method for the present purpose has not yet been validated. We are therefore only allowed to conclude that the findings underline, but do not yet verify, our assumptions that designing product influence based on desired social implications is possible, and hence, that the SID method supports this design activity. To assess the validity of a narrative-based study using experts, future studies may focus on the comparison of narrative-based studies with field experiments that measure product influence. However, the design of actual products and services to facilitate behaviour change may prove costly and time consuming. Yet, once we are able to demonstrate the validity of narrative-based studies with experts to assess behavioural and social implications of the use of products and services, such a method would have substantial value for design research and practice.

Measuring the effectiveness of product influence (Part 3)
We measured whether the implicit influence of design is more effective than its explicit influence, and whether a product design is more effective at changing behaviour than a regular intervention. This final study thereby hoped to show that the ever-present influence of design counteracts social problems uniquely and powerfully. In discussing the findings, a critical examination of the 'salience of influence' to explain behavioural effects revealed that it may be largely useful during the *act of designing* effective product influence.

By setting up an experiment to assess the effectiveness of design as a facilitator of behavioural change, our goal was to show the value of social

design as a practice. Our overall aim was therefore a practical one. Yet our approach to the design of the experiment adhered to social psychology to substantiate the initial assumption that salience is an important characteristic of influence to prompt an effect. Additionally we argued that *salience of influence* should not be confused with *the type of intervention*. We aimed to measure the effect of these two independent variables on actual behaviour change, in this case littering behaviour. We wanted to understand more closely which characteristics of (the influence of) an intervention might account for its effectiveness in order to contribute to design theory.

During the actual design phase of the interventions however, combining a practical aim with an academic aim served to complicate the process. Interventions needed to be 1) effective, 2) distinctive in the salience of their influence, 3) distinctive in type, 4) equal in force, and 5) equal in the direction of their influence, i.e., all encouraging rather than discouraging behaviour. On top of this, the development of the interventions was restricted by practical limitations such as limited production time and limited possibilities to physically change the canteen in which the experiment was conducted. In retrospect, we therefore consider that the combination of the various purposes included in the study (i.e., to demonstrate effectiveness of product interventions in a real-life setting, to compare explicit with implicit influence, and to compare product design with textual interventions) made the aim of the study too complex in relation to the set-up of the experiment. We simply wished to study too much with too little means. Therefore, both the practical implications and the theoretical contributions of our findings are debatable.

Nevertheless, the interaction effect that emerged supports previous conclusions of similar studies that when text is used to change behaviour, an explicit reference to the desired behaviour is more effective than an implicit one that leaves the message open to multiple interpretations. Regarding the use of product designs however, we suspect that designing implicit influence leads to more effective interventions than those designed to exert explicit influence, regardless of the actual salience of the influence in interaction with users.

We concluded the discussion of these findings by reconsidering the value of the 'salience of influence' as a concept, as we needed psychological theories to explain the effects. After the general conclusions, we take this discussion a step further by discussing the potential value of combining design theory with psychological theories for the development of successful interventions to counteract social problems. However, first we will consolidate our current understanding of the hidden role of design in affecting and discuss how this leads to potential future avenues to study it.

Directions for future research

An analysis of current social problems and the role design has played in their emergence (Chapter 1) illustrated how products and services may advocate for particular behaviours without people noticing it and without any deliberate intention of designers. We showed that because they address personal concerns so well, products and services are possible facilitators of behaviour change that has social implications. The aim of the studies in

this book was to understand how to design this hidden influence of design to lead to desired social implications.

The unique value of design is its power to resolve a clash of concerns

-proposition 1

Throughout the book, we have demonstrated the potential role of design in actually resolving the conflicts that exist between personal and collective concerns. We suggest that the occurrence of undesired behaviours or the lack of desired behaviours (from a social perspective this is) is the result of this conflict: personal concerns conflict with collective concerns, and people prefer to act in line with their own personal concerns. Understanding these situations as social dilemmas allows us to isolate three typical approaches used to prompt people to behave on the basis of collective concerns: promote collective concerns, stress involved personal concerns, or address other concerns to change behaviour. For instance, when I do not talk to my neighbour out of fear, this means that someone may try to change my behaviour either by 1) stressing the need for doing it anyhow as it contributes to cohesion; 2) explaining to me that fear is not necessary; or 3) offering me other benefits, e.g., money, to do so. Regarding the dilemma, these three strategies attempt to persuade me to make a choice that is opposed to the tendency I feel to not talk to my neighbour. Design, by contrast, can actually resolve the dilemma at hand. As design case 1 illustrates, developing a product-service in which personal information is exchanged without face-to-face contact lowers interpersonal anxiety. By interacting with the product-service, my fear is lessened and my concern for safety truly addressed. Hence, regular interventions like campaigns, prompts, and therapy indeed have the power to teach, convince, or help people to behave differently in the dilemma by advocating for different behaviour. However, the unique power of design can actively resolve the dilemma at hand, as illustrated by the 'Gift Swing', 'Label', and the 'WorkTag' (see Chapter 5).

Often, people do want to act in a pro-social manner, because it also contributes to their personal wellbeing in the longer term. After all, people are part of the society or the community to which their behaviour is detrimental. However, people can be 'blocked' from acting in line with collective concerns due to fear, lack of energy, or simply by forgetting. In these situations, personal concerns about safety, comfort, and simplicity conflict with desired behaviour. In these types of conflicts, we consider product interventions a very suitable and effective means to facilitate behavioural change, by simply resolving the conflict. For example, the fear of standing out that hinders some women from applying for top positions can be diminished by supporting the social connectedness between women (Label, p.68), while concerns for being autonomous that may stop young people from applying for a job are actually addressed by facilitating recognition during interactions with job agencies (Worktag, p.76). Hence, the unique power of design is that it has the ability to resolve dilemmas. In doing so, design offers elegant and effective solutions in comparison to

regular interventions like campaigns and messages that wish to motivate people to make different choices when faced with existing dilemmas.

In being able to develop designs that resolve dilemmas, we consider adopting a holistic approach and taking a user perspective crucial to the design process. This means that even when the desired behaviour has already been defined, e.g., by policy makers or sociologists, the designer is encouraged to research the situation more holistically and with a user perspective. On the basis of the studies in this book we argue that a holistic approach helps the designer to understand 'where' to intervene (see also Chapter 3). A user perspective helps designers to understand why people do not behave in line with collective concerns. Studying user concerns is regular practice for today's user-centred designers, and developing a product or a service that addresses these concerns has become a common skill for user-centred designers. However, for dilemmas where behaviours are not 'blocked' by personal concerns, but where people do not see any value in behaving pro-socially, resolving the conflict becomes harder, and bypassing the conflict may be more effective. We explain this further in the section that follows.

By designing products and services people (love to) interact with, designers can implicitly facilitate behaviour change

-proposition 2

Reflecting back on the comments made by the experts assessing effective forms of influence (Chapter 8), and the results from our experiment (Chapter 11), the power of design to change behaviour may not be ascribed to its implicit character, but rather to its potential to directly address personal concerns people wish to act upon. The assessments of concept designs by social experts revealed that the strategy of connecting other personal concerns to the behaviour change by means of design is expected to be effective. Talking to people from a different social group, *out of concern for being a good parent,* becomes possible thanks to the 'Birthday slide', and talking with neighbours, *out of concern for being self-sufficient and wanting to lend high-quality equipment,* is feasible thanks to the 'Solidshare' service. In these cases, the design links a different concern to the desired behaviour, one that would not otherwise be related to the behaviour without the design. This is similar to when a descriptive message relates a concern for belonging to a desired behaviour, e.g., using a fan instead of the air-conditioning, *out of concern for belonging,* thanks to a message (Nolan et al., 2008). So even though textual messages like signs can also relate other concerns to desired behaviours, we consider designed objects and services as presenting many more possibilities to do so, which we suggest demands further investigation.

Hence, we consider interventions that address a concern that users feel they have to act upon, whether this happens consciously or unconsciously,

to be most powerful in changing behaviour. Although this sounds quite obvious when stated as such, we hope we have convincingly illustrated the various ways in which design may accomplish stimulation of behaviour change. Reflecting back on Figure 8, in which we explained how human beings have developed a kind of social glue to help them act in favour of the group (Chapter 1), and reflecting upon the effectiveness of strategies that activate automatic processes, e.g., priming and descriptive norms (Chapters 1 and 9), fundamental human concerns are clearly important in our actions. Whether such fundamental concerns are addressed without people being aware of it or not may therefore not matter that much after all [21]. The fact that these concerns are so close to our nature may however explain why we are often unaware of them and the role they play in our behaviour. Fundamental human concerns may in fact be quite a successful source of inspiration when one wishes to stimulate people to change their behaviours: every single person shares these concerns, but remains mostly unaware of the role they play in behaviour. From this perspective, we consider particular theories of persuasion and behavioural economics to specifically explain how these fundamental concerns may be triggered. Cialdini, for instance, proposes six principles of persuasion, i.e., reciprocity, consistency, social proof, authority, liking, and scarcity (Cialdini, 2001). These principles can be associated with underlying concerns that might trigger them. For instance, the principle of consistency, which explains that we prefer being consistent over time in our actions and decisions, might be triggered by a concern for positive self-image (Ford & Nichols, 1987) or personal psychological wellbeing (Chulef, Read, & Walsh, 2001). Besides fundamental concerns, design methods and tools that help the designer to understand both the explicit and more latent concerns people have (e.g., Froukje-Sleeswijk Visser, 2009) can help clarify what concerns people act upon. We therefore conclude that interventions that address fundamental human concerns or more specific personal concerns do have the power to implicitly facilitate behavioural change. Or in other words, by developing products and services people (love to) interact with, designers can implicitly facilitate behavioural change.

To prevent any misunderstanding, addressing 'completely different' concerns to induce behavioural change, or resolving the conflict between different concerns are not the only two ways in which design can bring about behavioural change. Design can also transform long-term, collective concerns to short-term, personal concerns. To illustrate this, we refer to the lamp that features a tree that dies when one consumes too much energy (see Figure 69). In this design, an environmental concern has been transformed into a personal concern–caring for the tree–by means of the design itself. This strategy is in line with what Fogg (2003, p.25) calls 'a medium that provides an experience'.

[21] Although exerting explicit influence has the risk of engendering reactance.

FIGURE 69
THE ENERGY PLANT REFLECTS YOUR ENERGY USE IN ITS HEALTH CONDITION- BY INTERACTIVE INSTITUTE SWEDEN

Similarly, Facebook and other social media can make people *experience* their social belonging to society in a way, and therefore, prompt them to act in line with what society approves of. To illustrate this, consider a horrible incident that happened in Eindhoven, the Netherlands, on the fourth of January 2013. Eight kids were heading home after a night out, wrecking bicycles on their way. A 22-year old student said something to the kids about it, and was severely beaten by the group, eventually ending up in hospital.
The incident was videotaped and made public in order to trace the offenders. This move resulted in a massive public outcry against how brutally the student is kicked in the head. In fact, because of an overwhelming expression of condemnation on the Internet, and several public threats, the kids voluntarily turned themselves in to the police.
This illustrates how social media made the youngsters *feel* society's disapproval of their behaviour (after which they reported themselves) in contrast to a police officer and a judge that *tell* you your acts are in conflict with what society approves of. Social media clearly has the potential to support collective concerns and group processes, as we saw during the 'Arab spring'. However, it is as important to consider short-term, personal concerns in the use and design of social media. We need to be aware of how this technology, or its design, collides with personal concerns like privacy and freedom. Being threatened after a video has been put online is also in conflict with rules and regulations (intended to protect privacy). Hence, when designing products and services to encourage people to act in favour of society, personal concerns should to a similar degree be considered as collective concerns.

The three strategies to overcome a conflict between personal and collective concerns by means of design are depicted in Figure 70.

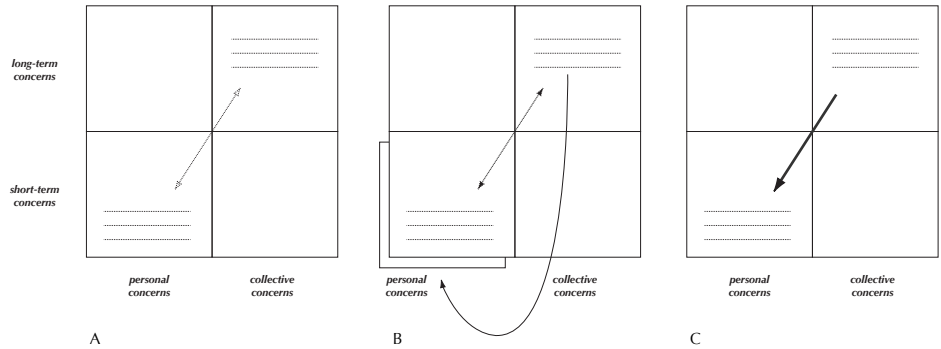


FIGURE 70
THREE WAYS TO STIMULATE BEHAVIOURAL CHANGE BY MEANS OF DESIGN WITH REFERENCE TO A SOCIAL DILEMMA: (A) RESOLVE THE CONFLICT IN CONCERNS, (B) BYPASS THE CONFLICT IN CONCERNS, OR (C) TRANSFORM COLLECTIVE CONCERNS INTO PERSONAL CONCERNS

Regarding the influential character of design, adopting a social perspective within the design process should be as 'normal' as adopting a user perspective

-proposition 3

In understanding how individual action relates to social problems, we proposed social dilemma theory as helpful to designers to understand which collective concerns are in conflict with which personal concerns regarding the design task at hand. The theory supports designers' arguments for desired action because it takes collective concerns into consideration. The theory comprehensibly extends the designer's regular user perspective to include a social perspective. In the first two chapters we reported various examples that illustrate how design can carry social implications. This notion alone justifies the claim that a social perspective should be as normal as a user perspective in regular design practice.

However, no clear rationale existed that can actually assist designers to do so, and hence a designer's social perspective often does not exceed considerations on the level of product production and disposal. Indeed, it is desirable that designers consider all the phases in the life cycle of a product. Rejecting child labour in the production stage, designing on the basis of cradle-to-cradle principles, or developing designs that can be easily disassembled are important to a society's wellbeing too. However, regarding the *usage* of products, often only safety is considered in the design process. No designer considers the effect of kitchen appliances on family structures, and no retailer considers how his online-sales may affect neighbourhood relationships. Yet, they do contribute to these social implications by facilitating behavioural change.

Hence, to prompt designers to take responsibility for such 'side-effects' in regular design practice, and to prevent social designers from denying the power and presence of personal and individual concerns, we conclude that an integration of both the user and social perspectives in designing is called for. In fact, only when both personal and collective concerns are considered, designers do justice to what makes us human.

The value of design theory in addition to psychological theory

Many theories that originate from sociology, psychology, philosophy, and behavioural economics may be of great value to designers in designing product influence. We explored the value of a design-specific theoretical account of product influence, both to understand the phenomenon and to manipulate it *as a designer.* However, the studies reported in this book highlight that 'design is not the application of a strategy', and that the salience of a product's influence could not fully explain the results of our experiment. As this touches upon some limitations of a design-specific theoretical account of influence, we will take some time to discuss design theory for product influence and propose potential directions for future research.

Design as transformation of psychological principles

As discussed in Chapter 3, any behavioural theory may help designers to design product influence. However, how a designer transforms this knowledge into a product or service remains, to a large extent, unknown. Yet, we believe this transformation plays a role in how effectively a design actually changes behaviour. Imagine that we wish to draw upon social norms to realize behavioural change by means of design. *How* the design does this can still vary. We argued that a design can do this more or less forcefully in relation to the user, and can do so explicitly or implicitly. Although we argued that the use of specific psychological principles in a design increases or decreases the chances a designer will design for coercion, persuasion, seduction, or decision, this remains dependent on the way the designer eventually materializes this principle.

The aim of our experiment was to gain a practical understanding of which type of influence most successfully realizes behavioural change, regardless of the psychological principle it embodies (Chapter 11). However, in our discussion of the results of our experiment to test this, we needed social psychology to explain the effects. In retrospect, the set-up of the experiment was not well designed for our intentions. If one wishes to study whether design has value in the social realm, whether it can be effective in stimulating behaviours we consider desirable as society, future studies should focus on the development of effective designs to do so. A holistic, user-centred approach should be adopted, in order to actually understand where and how to intervene. In this respect, a simple research design in which the use of the design is compared to a control condition suffices. Ideally, multiple studies are executed in several different domains, to understand the role of designed interventions in many social dilemmas. If one wishes to understand more closely what characteristics of the interventions explain their effectiveness, future studies should focus on a single psychological principle at a time, and develop various embodiments of this principle in a design, i.e., explicit/forceful, explicit/weak, implicit/

forceful, implicit/weak. In this way, we can have a more valid discussion regarding the additional value of a design-specific theoretical account of behavioural change by design.

Although our research demonstrates that design is not the application of a strategy, we sincerely believe a design-specific theoretical account of product influence supports the designing of it; it may be that explaining the designer the dimensions of product influence suffices.

Convergence instead of divergence

In studying the influence of design on human behaviour, the sequence of the studies reported in this book represents a convergent approach. To do justice to the importance of product influence and its various roles, we started off by encompassing multiple views that exist to clarify and explain the influence of design on human behaviour. Subsequently we explored and studied the design of (mostly implicit) influence to counteract social problems. We ended up with a structured and controlled study, very much in line with social psychological experiments, to measure this product influence. In the set-up of all these studies, the potential implications of the studies for design practice played a fundamental role.

This convergent approach was taken to develop design knowledge that does justice to the relatedness of the phenomenon under study, i.e., both its relationship to the real-life context and to the social realm, and the fact that it arises in interaction between the user, the product, and even in a way, the designer him/herself.

In contrast, analytic approaches, e.g., psychological studies, often take a divergent approach. They study the phenomenon as structured and controlled as possible (e.g., lab studies), and extrapolate and discuss their findings in relation to complicated contexts and domains. Logically, these studies do not provide insight into the effect of the context on the phenomenon under study. To this end, studies are conducted in real-life settings (e.g., field experiments). However, practical implications resulting from these studies are often very direct, and do not include general or explanatory characteristics of the intervention. For instance, some applied social psychological studies show that increasing the number of garbage bins decreases litter. Such a finding leads to very specific implications, but does not explain which aspects of such an intervention make this intervention effective, and how this can be applied in other domains to change other behaviours.

In contrast, synthetic approaches, e.g., those that utilise sociological theories, take a holistic approach. Sociologists often consider psychological principles too rigid to explain human life. In doing so, they acknowledge the fact that the transformation of such principles via design plays an important role in the actual effect (apart from other contextual factors). Yet, it seems that this stance hinders them from considering characteristics of the design at all. Rather, focus is placed on the process of design and the involvement of future users, stressing the fact that change is a dynamic and time-related process. Hence, they assign a role for products and services, but do not specify general product characteristics accounting for this role.

On the basis of this, we consider a design-specific theoretical approach to product influence valuable to understand more closely what design characteristics account for any effect. We even consider it necessary in order to assist designers in both designing appropriate and effective influence.

Human concerns: a building block for a transdisciplinary language?

In this book, the word 'concern' was principally employed to connote a driver of behaviour that occurred or was desirable. We refrained from defining concerns explicitly with reference to other authors that use the word to describe behavioural processes. In fact, we consider its ambiguity to be a necessary quality. As a designer, it does not make sense to focus on only one explanation for behaviour when aiming to design for behavioural change. Whether people act according to norms or are motivated by goals, whether they have private motivations or values, whether they show habits or are driven by ambitions, to a designer who wishes to change behaviour, all of these explanations help to explain behaviour and eventually how to change it. We therefore did not want to rely on a single theory, but instead, used a concept that–in our view–applies to all of these more specific reasons why people behave as they do.

The term 'concern' can indicate something very specific, or something more abstract. For instance, my concern for efficiency means that I want to park my car as close as possible to the entrance of the faculty. However, my concern for personal growth drives my ambition to work both in the practical realm and the realm of academia. Concerns can refer to drivers of which I am aware, but also to ones I may not be aware of, yet still have. For instance, my concern for being a good caregiver ensures I take good care of my cats. In this case, I am very aware of this concern, as I have to remember when to feed them, when to go to the vet, and to play with them on a daily basis. On the other hand, my concern for social belonging affects many of my daily choices, of which I am less aware, e.g., what type of lunch I buy at the canteen. And finally, concerns may refer to societal/group/collective concerns or to personal/individual/user concerns. As society we may be concerned with innovation, and as an individual, I may have a concern for love. Hence, we consider the use of 'concerns' to relate to the various drives for behaviour, whether unconscious or conscious, and to discuss whether behaviours are desired or undesired from both a personal and group perspective, quite valuable.

We sincerely hope that in building a design theory for product influence on the basis of concerns, we can build a language that relates to other disciplines. By setting up future studies in close collaboration with the social sciences, we will be able to test whether the use of 'concerns' can indeed help us to bring our understanding of product influence further.

Implications for design practice: the tools

Before the design tools are explained in detail to support the act of a short passage is devoted to what we consider social design. Although we argue that a designer/design team should, in fact, always consider long-term and social concerns, we believe that it may be most applicable in these three cases:

1) The designer/design team is championing a social challenge, like social cohesion, safety, unemployment, organ donation, obesity, pollution, or neighbourhood quarrels.

2) The designer/design team is developing a product or service that serves society as a whole, like a tax system, public transport, park furniture, organ-donation systems, or traffic signage and signals.

3) The designer/design team is socially aware and wishes to take responsibility for the possible social consequences of the design.

The first piece of advice we wish to give designers [21] is to start thinking in terms of behaviours, and behavioural changes. Only when behaviour is changed, stimulated, decreased, inhibited, and so on, does a design contribute to social change. Only when people put things into practice in the world do people change this world, for better or worse. For instance, if I hate my neighbour, it only has social implications when my hate leads to gossiping about the neighbour, the exclusion of this neighbour in neighbourhood activities, or actual arguments between him and me. A design that makes me 'love' my neighbour could be an appropriate goal. However, this 'loving' only becomes meaningful in the social realm when it indeed changes my social behaviour. In fact, many other aspects, like cognition, emotion, attitudes, and beliefs may indeed *affect* behaviour. However, when a design only manages to change these, without any behaviour change, the design did not have any social benefit. After all, it is our actions that connect us to others. Additionally, focusing on behavioural change, whether it is clicking on a button or helping out a friend in need, is important for the following reasons:

Behaviour change can be measured
Although it may very well be that behavioural change takes time, a focus on behaviour allows for a structured evaluation of social interventions. To support short-term measurement, we advise the designer to define the desired behaviour as specifically as possible: e.g., 'greeting a neighbour', rather than, 'acknowledging one another'.

Behaviour supports imagination
Social phenomena are often abstract phenomena. What does 'cohesion' look like? And 'safety' sounds nice, but what does it actually mean? By focusing on behaviour, i.e., the actions and interactions of people, abstract and complex phenomena become concrete. It supports designers in envisioning what their design could actually contribute. Behaviour links abstract descriptions of social phenomena to the tangibility of our every-day world.

[21] Or design team. In the interest of easy reading, we will henceforth refer only to 'the designer'.

Behaviour can be an action directly required by design
Although the designer is encouraged to consider both the indirect and direct influence of behaviour by means of a design, a focus on behaviour has the advantage of sometimes simply being activated through the design: products and services can require actions to be used correctly.

Behaviour links collective and individual concerns
We often act because of personal drives. However, our actions have implications for others. A focus on behaviour should encourage designers in adopting both a social and individual perspective. What actions are beneficial to society? And why would people wish or not wish to act in favour of society?

In fact, in social design, the designer is encouraged to define what he or she wishes to contribute on a social scale, i.e., the desired social implication, by means of what specific behavioural change, through what type of influence.

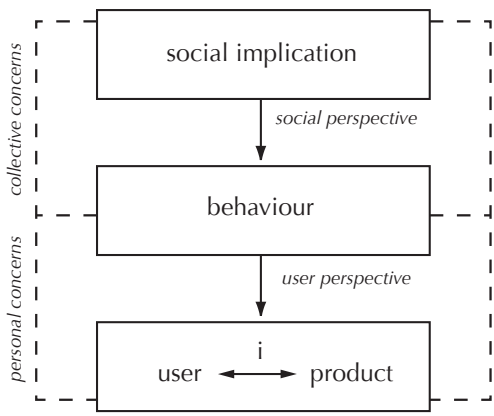


FIGURE 71
THE CORE STRUCTURE UNDERLYING SOCIAL DESIGN

Having explained the basic assumptions of social design, we now explain in more detail the tools used to assist the act of social designing. In doing so, we wish to clarify three things.
First, we explain the tools as part of three design stages. We consider that each of the stages is more or less part of any design project, and globally occur in the presented sequence. In discussing the tools however, we add notes that specifically mention how each relates to the use of the Vision in Product design method.
Second, we wish to stress that during the design process, the designer should feel free to move back and forth as much as needed. In fact, moving to the next step in the process is often the best way of judging whether the previous one has been taken correctly. Hence, the actual process of designing is often less linear than depicted below.
And third, we consider the social design approach suitable for design teams with members who have an affinity with, or are skilled in, thinking in abstraction. As social design is, to a large extent, an exercise in understanding social phenomena and behaviour, thinking about design in these terms before any design has actually been defined requires a substantial amount of abstract thought.

Stage 1: Exploring the domain

Whether it is one's task is to design a police car, or a product to support social cohesion in a multicultural society, the project should start off by exploring the domain in which the design will be used. However, in all cases, the domain should be defined at a social level.

So when the goal of a product is expressed at a product level, we may wonder whose behaviour may it affect and in what social domain does this become meaningful? For instance, in case of the police car, the user of the product is the officer. However, by interacting with criminals, citizens, and colleagues, his actions aim to contribute to safety. Hence, one domain in which this product plays a role is that of 'safety'. In the case of social cohesion, the domain is simply 'social cohesion' or more neutrally defined 'neighbourhood relationships'.

Exploring the domain implies reading documents, browsing the web, interviewing people and experts, watching documentaries, reading scientific papers, observing situations, hosting focus groups, and performing stakeholder analyses: all things that the designer needs to get an in-depth grasp of the domain, in the short and long term.

In exploring this domain, the designer is encouraged to recognize various personal/user/individual concerns, and various collective/group/societal concerns, over both the short and long term, which may or may not be in conflict with each other. Additionally, it is quite important to consider other–seemingly unrelated– personal concerns of people who are part of that domain (Figure 72).

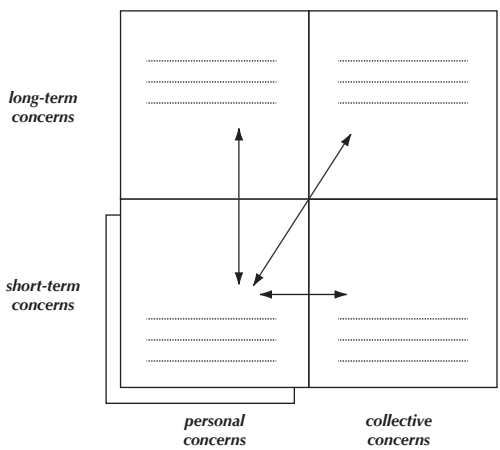


FIGURE 72
UNDERSTANDING THE DILEMMA AT HAND BY MAPPING CONFLICTING CONCERNS BETWEEN PEOPLE'S SHORT-TERM, PERSONAL CONCERNS AND LONG-TERM CONCERNS FOR THE COLLECTIVE

The designer is encouraged to structure all the information gathered in such a way that the designer gains understanding of the conflicts at play. Figure 72 may in fact work as a 'lens' to look at all the information [23].

One may already observe behaviours within that domain and argue why they are undesired or desired from both a personal and social perspective.

[23] In a traditional ViP approach, this tool can help both in searching for relevant factors, as to structure clusters.

In this exploration, the designer will gradually understand the social dilemma at hand, and gain insight in how to counteract this dilemma: resolving, bypassing, or transforming the conflict in concerns (see Figure 73).

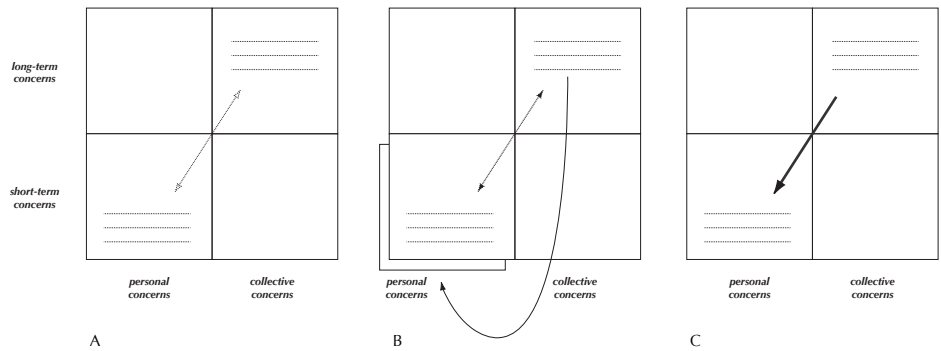


FIGURE 73
A) RESOLVE, B) BYPASS, OR C) TRANSFORM THE DILEMMA

Questions that may help in the process:
Regarding our concern as society, what do we wish to change in the situation at hand, or what do we wish to see in the future?
What behaviours lead to this, or counteract it?
What do individual people care about in these situations? What are their desires, needs, goals and wishes?

Stage 2: Defining the design goal
Throughout the search and ordering of information, the designer should remain rather neutral and objective. In the next step, based on the information gathered about the domain, the designer is asked to make the design goal explicit. Hence at this stage, relevant stakeholders and the client can be consulted. However, we consider it the task of the designer to eventually define the design goal, defend it, and take responsibility for it.

The design goal is composed of three parts, defining what the designer wishes to contribute to society, through what behavioural change, and via what benefit to the user.

'To……, we want to stimulate……..... by……..' [24]

In defining this, the designer/design team is stimulated to play around with the conflicting concerns, or seek other concerns: resolving, bypassing or transforming the conflict. First ideas may already rise. Examples of such design goals are:

[24] In the traditional ViP approach, this design goal is the same as a specific form of the design statement.

'To contribute to women's empowerment, we want to prompt women to present their visions for the future of the company *by ensuring their social connectedness*.' (resolve)

'To contribute to the establishment of (weak) social ties, we want to establish contact between people from different social groups *by addressing individual concerns about being a good parent*.' (bypass)

'To counteract obesity, we wish to encourage people to make healthier choices during lunch *by helping them understand how to balance their choices over time*.' (transform)

Stage 3: Designing the product or service
In designing and embodying the actual influence, the designer is stimulated to 'play around' with concerns. Hence, the final part of the design goal may not be as definite as it might seem. It may be that during ideation, other user concerns are more suitable to treat with a design than those initially defined. It may be the case that extra observations, interviews, or reading needs to be done (stage 1). Hence, the designer is stimulated to move back and forth between the stages of exploring the domain and defining the design goal, to eventually redefine the design goal when needed (stage 2). The ultimate aim is that the designer should be able to argue what behaviour is to be stimulated, why and how.

To actually embody the influence by means of a product or service, the designer can:

- change the dilemma: resolving, bypassing or transforming the conflict (Chapter 10);
- consider the direction of influence (Chapter 3); or
- apply the strategies (Chapter 4).

In the embodiment of the influence, the designer is encouraged to consider both the effectiveness and appropriateness of the influence. Regarding the domain (public, semi-public, or private), the social problem at hand (hard or soft), and the relationship between personal and collective concerns (conflicting or in line), the designer should consider what type of influence is appropriate and effective: coercion, persuasion, seduction, or decision?

Positioning social design practice

In any society efforts are made to create a better world. In both politics and industry, attempts are made to contribute to global or communal wellbeing. A quick overview of these efforts shows how commercial businesses are essentially concerned with economic gain, while governmental institutions and foundations are essentially concerned with social gain. However, some developments within these fields illuminate how both are moving closer together. This movement indicates a possible position for social design as a practice.

Social gain

Government institutions and NGOs are organisations typically concerned with bringing about social improvements, rather than generating economic profit. Politicians are predominantly chosen to act in favour of the public, which means that their aim to realize social gain is (or at least should be) inherent in all their efforts. However, the extent to which politicians and governments can act and make contributions is limited as governmental interventions have a high chance of being perceived as limiting individual freedom . Because we may *know* that paying taxes, obeying to traffic rules or separating waste is something we all benefit from in the end, we might all *feel* incredibly annoyed by it every once in a while and detest such paternalistic interference. In most democratic countries, individual freedom has long been fought for and has become, quite rightly, a highly treasured good.

What might be easier for governments is subsidising social work and interventions developed by non-governmental institutions and foundations. For instance, the creation and maintenance of homeless shelters, neighbourhood centres, or youth activities is often only possible with economic support provided by governments. However, striking an acceptable balance between economic support and social gain depends on the political culture found in a country.

On top of this, social welfare institutions struggle with the evaluation of social innovations in economic terms and often argue that the economic paradigm is not fit to measure social benefit (Howaldt & Schwardz, 2010). On the other hand, there is a growing movement toward developing innovations that are both economically and socially sustainable. For instance, a Dutch initiative called 'Granny's Finest' (2012) is seeking to achieve a form of social impact, and has an economically sound business model. The initiative hopes to tempt young designers into developing designs for scarves, gloves, and even bags that can be produced by local knitting clubs for seniors. The aim of the initiative is to both defeat loneliness among senior citizens and support the flourishing of design talent by selling these products online.

Economic gain

In the realm of commercial industry, the discussion centred on Corporate Social Responsibility (CSR) has a long history. A comparison of various business theories of CSR shows that they may concentrate on a variety of aspects. A corporation's social responsibility may mean that a business carries out activities that 1) meet objectives for long-term profits, 2) use business power responsibly, 3) integrate social demands within its business model, or 4) are ethically correct (Garriga & Melé, 2004) wrote his seminal book Social Responsibilities of the Businessman, the visibility of such policies in consumer markets always takes more time. Gradually, consumer products with labels like 'Fair Trade' and 'ECO' are becoming widely accepted by the public.

Moreover, businesses that direct efforts entirely toward economic gain (e.g., banking) are now explicitly moving into the realm of social responsibility to attract customers. In the Netherlands for example, the bank Triodos, a financial institution that invests only in organizations that create or

maintain sustainability in the environment, has increased in popularity over the years.

Developments in both the social and commercial realm show a movement toward an optimal balance between social and economic gain.
In Figure 74, these movements are depicted graphically. We consider social designers as potentially skilful in developing interventions that embody this optimum between the economic viability of a product on one hand, and its social sensitivity on the other.

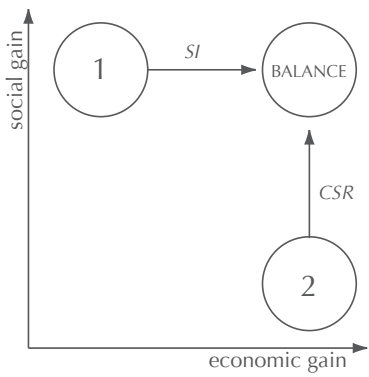


FIGURE 74
HOW VARIOUS MOVEMENTS IN BOTH SOCIAL INNOVATION PRACTICES AND SOCIAL CORPORATE RESPONSIBILITY PRACTICES DESIGNATE AN AREA FOR SOCIAL DESIGN

1 = focus of governmental institutions
2 = focus of business

SI = social innovation
CSR = corporate social responsibility

A note on the ethics of social design

When somebody aims to change behaviour without people being aware of it, several alarm bells start ringing. It basically appears highly immoral to deceive people like this. But additional questions arise as well. Are designers really capable of dealing with this level of responsibility? Should it not be a democratic process in which many stakeholders have a say? Why not completely refrain from this practice of apparent deception and render influence eternally explicit? Understandably, the research presented in this book has led to various discussions about the ethics of the type of design practice we wish to facilitate, support, and even stimulate. Therefore, it is impossible to not touch upon the topic once in the book.

Our fear of hidden influence

Various scholars have often pointed out the hidden influence of design on the way we live our lives (e.g., Latour, 1992; Verbeek, 2005). Many designs, like for instance the overpasses over the parkways on Long Island, New York, have been discussed as influential within the social realm (Winner, 1980; Joerges, 1999, Woolger & Cooper, 1999). These overpasses are extraordinarily low and thereby 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. In such reflections, the design at hand and its role in human experience, behaviour, and even politics is illuminated and discussed. Although these reflections are highly insightful, they provide little to no clue as to how to deal with this moral and often 'hidden' aspect of design.

In fact, this control over a 'hidden' influence of design is discussed relatively infrequently. Fogg (2003) deliberately excludes the 'unintended behavioural consequences of design' from the field of persuasive technology. His stance is that the exploration of interactive technology to change behaviours and attitudes posits a new field in design. In this field, persuasion principles are applied to technological products that exist to stimulate behaviours in the first place: apps to help people quit smoking, websites to sell products, avatars to troubleshoot computer-based work, and games that make gamers physically exercise. Although particular aspects of these products may implicitly affect behaviour, everybody generally understands that they have been designed to do exactly that: change behaviour. Such products are often quite direct in their aim. When deciding to interact with these products, people are therefore aware of the fact that it will or may change their behaviour, and often consciously comply with this. Although some scholars have argued that design is inherently persuasive (e.g., Redstrom, 2006), adopting this stance has enabled many scholars within the field of persuasive technology to refrain from a moral discussion (Torning & Oinas-Kukkonen, 2009).

On the other hand, the introduction of nudge theory by Thaler and Sunstein (2008) has provoked a serious debate on paternalism versus liberalism (Mitchell, 2005; Sunstein & Thaler, 2003). In their work they clearly ask policymakers to understand how the environment 'gently pushes' people into particular choices and behaviours and to use this hidden power for 'the greater good'. Yet, the debate as to what extent policymakers can interfere in human behaviour is a tricky subject in most democracies. The governor of New York, Bloomberg, recently lost a court case regarding this: he attempted to counteract obesity by banning the promotion of XL-sized cups for soda drinks in the city. This illustrates the already precarious position policymakers take when prescribing behaviour, even when they wish to do so in an explicit manner. Hence, the idea that politicians can additionally prescribe behaviours in a more implicit way, by deliberately 'designing' nudges, raises protest. It seems that the safest way out of this discussion is not to engage in this type of practice. However, we really would rather redirect the conversation. We even argue that refraining from the act of deliberately designing the hidden influence of design is in fact immoral.

A daily struggle to do the 'right' thing

Chapter 1 describes how hard it is to act in favour of society or in favour of oneself in the long term when the environment 'gently pushes' us in other directions. We have built a society with an infrastructure, products and services that very successfully address our short-term gain. Yet, we have gradually come to understand how this has contributed to many of the social problems we are currently facing. There are many 'hidden forces' that actually stimulate us to behave in ways that we consider undesirable from a social perspective. Attempting to alter this behaviour by means of explicit

prompts, education, and campaigns may therefore be considered morally correct; it factually places people in a continuous struggle as soon as we do not simultaneously alter our environment. We know by now how hard it is to behave 'correctly' when our environment advocates for other behaviours. Not altering our environment becomes even more immoral when we hold people accountable for undesired behaviours. Can we fine somebody for littering, when we do not place any garbage bins in the environment? Can we raise insurance rates for people who live an unhealthy lifestyle, when this lifestyle is more expensive? Is it ok that people with foreign names have less chance of getting a job because of the way we designed our application procedures?

By attempting to change behaviour explicitly, we do not only put pressure on people to use their willpower to do the right thing, we also ignore the hidden influence that does not vanish by designing explicit influence, and may lead to undesirable consequences for all of us. Hence, when refraining from designing this hidden influence, we ignore the opportunity to create a living environment in which people experience less individual struggle and in which it is simply easier, more comfortable, or more pleasurable to engage in behaviours that are desirable from a social perspective. This is not to say that we should ignore individual and short-term personal concerns, as these too support people's well being. We conclude that many people do in fact want to act on the basis of long-term and collective concerns, if only it was a little easier to do. When we ignore the chance to make this possible, because we wish to avoid a moral debate on paternalism and liberalism, we have abandoned an opportunity to establish an infrastructure that supports the wellbeing of all. Hence, now that we know that this potential exists, refraining from developing it is patently immoral.

'Doing' ethics

In this book, we deepen the discussion on the ethics of design by illustrating how designers may actually consider moral aspects of design and argue for design decisions on the basis of this. Hence, this book provides the tools for designers to actually 'do ethics', and provides design cases for ethicists to actually discuss the ethics of designing, rather than only the ethics of the eventual design.

The tools developed in the book instruct designers in what aspects to consider and how to translate this to design. However, what is good or bad design is to be decided by the designer or design team. We argue that designers should both consider user concerns and collective concerns, and concerns of both the short and longer term. However, we do not assist the designer in deciding *which* concerns to consider or which one to address. Throughout the design process, it is up to the designer to include the experts, users, politicians, trend watchers, or whomever he or she deems relevant or important to the thorough discussion, argumentation and exploration of the concerns at stake. Subsequently, we offered a framework for considering both the effectiveness and the *appropriateness* of the type of influence and the eventual design. In deciding upon the appropriateness of the design, we stressed the need for a holistic approach and suggested arguing for a type of influence in relation to the domain (public, semi-public, or private), the social problem (hard or soft), and the relationship between collective and personal concerns (in conflict or in line).

As we already mentioned in the introduction, a belief that prevails in current discussions on social design is that users should be included in the design process. Alongside the notion that products and services play a hidden role in social and even political processes, it seems most logical to follow a democratic process in the development of these designs. The democratization of design is a development in design that comes in various forms. Some consider it the designer's role to facilitate processes of change in which end-users are involved, to develop designs that address their true but latent needs, or to develop designs that enable the user to 'do-it-himself'. We do agree on the fact that end users, citizens or people in general should be the main focus of any design process, in the sense that a design is to contribute to human well being in some way. In many cases, it may therefore be valuable to include people, talk to them, or observe their current behaviours and practices. However, we disagree with the fact that designing the hidden influence of design implies user *involvement*. The involvement of scientists, artists, or politicians may sometimes be more appropriate, depending on the information one wishes to obtain. On top of this, relying only on user input presents the common pitfall that long-term collective concerns are overlooked. This book stresses that it is the designer's eventual responsibility to consider both the personal and collective, and short- and long-term consequences of a design.

From user-centred to society-centred

Most, if not all, social issues deal with human behaviour. Deliberately affecting behaviour 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 artefacts changes over time, this does not imply that designers should refrain from taking the social implications of their designs seriously. Designers can no longer hide behind the needs and wishes of the consumer; instead, they have to assume the responsibility that comes with being the 'shapers' of society. Doing so entails a shift from a user-centred approach to a society-centred one. In defining desired social implications and behaviour, it is the designer's task to incorporate the relevant experts in the process, 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.

summary

I am sitting in the train and opposite to me a couple is reading the newspaper. Every once in a while one of them looks up, checking me and the other passengers out. We are now passing through a tunnel and I can see myself reflected in the window. I see my hair could use a brushing after the rush I was in when catching the train. I refrain from any action though, as I do not dare show any concern for my looks so blatantly in front of other people. I wish I had taken that single seat that was empty when entering the train; at least it would have given me some privacy.

Although I feel uncomfortable being so sweaty, I am happy I made it, thanks to that gentleman who helped me out with my bicycle. The bicycle rack on the ground floor at the train station was packed, so I had to lift my bike in one of the upper racks. This is a heavy task, and with a bag on each shoulder I probably looked quite helpless, compelling this friendly (and tall) guy to help me out. While recalling this moment, my thoughts are suddenly interrupted by the voice of the conductor asking to check whether I have validated my public transport pass. I instantly feel my blood pumping through my body again and my body temperature rises significantly. 'Did I forget to validate it?' I can't remember, and I reluctantly place my wallet under his scanning device. 'Ok. Have a pleasant journey.' What a relief. Apparently validating my pass has become an ingrained habit by now.

As the conductor is checking the passes of the couple opposite me, I remember I wanted to ask him which platform I need to go to for the next leg of my journey. I try to catch his attention, but he is moving away quickly. I decide to look for the platform number on my iPhone using the Railway app. When I find out that it is the platform opposite of the platform my train will arrive at, I finally calm down. Now I can fully devote myself to my writing.

The things we use, like our furniture, iPhone apps, or the transportation services we take to get to our destination all play a significant role in the way we live our lives. Often without our being aware of it, the designed environment affects how we act in and experience our world, by making certain behavioural options easier, more attractive, or more common than others.

The simple fact that some seats in the train are positioned opposite each other while others are positioned sequentially affects how people behave. Sitting face-to-face probably decreases nose picking and increases small talk. Seating orientation plays a crucial role in the behaviour we display, as illustrated in the example above, where it discouraged me from redoing my hair. And likewise, the design of the bicycle rack described evokes specific

social behaviours. Because the upper-rack system is so incredibly user-unfriendly, it actually provides the ideal opportunity for men to put their physical superiority to use and show politeness toward women. And because in many Western societies we tend to rule out any gender inequality, such acts of politeness may be refreshing at times. Additionally, the anecdote above demonstrates how my iPhone provides superb support in planning and managing my journey, but consequently decreases my motivation to socially interact with the conductor or other passengers. Since every detail of my train journey is 'in the cloud' and can be retrieved by my iPhone, any interpersonal interaction about timetables or train lines becomes redundant. Because talking to a conductor–a person I do not know–in front of other people–whom I do not know either–sets the perfect scene for me to make a fool of myself, the decision to keep silent is easily made. The chairs in the train, the bicycle rack, and the Railway app have all affected my behaviour and that of others, largely without us being aware of it and probably without any deliberate intention by the designers.

Aim of the Thesis

The research in this thesis investigates the implicit and often unintended influence of design on human behaviour, for the purpose of designing it. Designers need this knowledge to enable them to take responsibility for the behavioural and social consequences of their designs, as not all of these may be desirable (neither from a user nor from a social perspective). More central to the thesis however, is the assumption that this type of behavioural influence is unique to design in comparison to other interventions that aim to change behaviour, like policies and campaigns. Since many social problems we are facing (e.g. obesity, the depletion of resources, intercultural tensions, or cybercrime) require behavioural change from people to be addressed effectively, design can offer elegant and effective facilitators of such changes. The thesis consists of three parts to explore, support, and test this social design activity.

Part 1 draws from a range of theories originating from various disciplines to explain the implicit influence of design. By consolidating these disparate theories, the instrumental value of the theories in realizing desired social change through design is discussed. Emphasis is placed on how people may experience design that is behaviour influencing, and how to consider what type of influence will be both appropriate and effective in attaining a specific social goal.

Part 2 develops supportive elements (i.e., a method plus additional techniques) that designers can use to deliberately design products or services that obtain a predefined social effect. We closely examine three design projects in which an initial version of this methodology is used, and we discuss to what extent these supportive elements for designers have increased (social) design performance. The concept designs developed in these projects are examined by social experts, leading to insights regarding both the value and the 'working principles' of the designs.

Part 3 compares design to more common interventions that seek to stimulate pro-social behaviour, such as signs or text. We expected that design's implicit influence would be responsible for its behavioural effects. In a field experiment conducted in a school canteen, we tested this hypothesis by comparing implicit influence with explicit influence in changing behaviour,

in addition to comparing two types of interventions, i.e., product and text. The studies reported were conducted to gain understanding of how to facilitate the design of original products and services that engender desirable social effects. To stimulate these effects, the designer is encouraged to deliberately direct the implicit influence products unavoidably have. Therefore, the thesis has a clear design perspective, intended to deliver actionable insights for designers.

Social Problems, Behaviour & Design

In order to conceptualize the implicit role design plays in the social realm, Chapter 1 explains how existing products have contributed to many of the social problems we are currently facing by implicitly affecting behaviour.

Human beings are social by nature. We have lived in groups since the dawn of our existence, and our individual position in relation to the group is therefore inherent to being human. This means that since the beginning of our collective existence we have always been confronted–explicitly or implicitly–with situations in which we have to make the decision whether to act in favour of the group or in favour of ourselves. Do I share my banana, or do I eat it alone? Today, this is no different, save for the fact that we have established societies with millions of people living together. The wellbeing of a group so large is no longer experienced as closely related to personal wellbeing. Many people may consider our changing climate a problem, but few experience this as a personal problem upon which one should act immediately. Moreover, tackling such global or social problems requires willpower, because it often means giving up comfort, flexibility or efficiency. More abstractly, collective concerns (like sustainability) are not always internalized by the individual, and are not always in line with personal concerns (such as seeking comfort and convenience). This in itself may be a static fact, but the very fact that we have designed an environment so well adapted to our personal concerns means that we sometimes invite behaviours that are detrimental to all of us in the long term. My car offers me a convenient and comfortable means of transport, but we know by now that the emissions produced by it negatively influence climate change in the long term. Many products and services implicitly advocate acting in ways that benefit oneself rather than society. The question therefore arises: how can we design implicit influence that helps users act in favour of society more often?

Part 1 – Understanding The Influence of Design on Human Behaviour

Scholars from a variety of disciplines have studied the influence of products and services on people's actions. A theoretical comparison of six theories underlying this phenomenon shows that product influence can be studied and understood either analytically or synthetically. Behaviour–when affected by design–can be understood as the result of the interaction between user and product (using an analytic approach), or it can be understood as part of a larger context in which other cultural, contextual, and social factors that play a role in shaping this behaviour are examined (using a synthetic approach). We illustrate that the more holistic theories of the latter support designers understanding of what behaviour is best to change; in other words: 'where to intervene.' Analytical theories may then

deliver the knowledge regarding how to actually embody this influence in the design.
Although these theories are explanatory and therefore supportive to design activity, little insight is given into the experiential side of product influence. How do people perceive and experience things that affect their behaviour? To answer this question, we analysed sixty-eight products that were designed to have, or happened to have, an effect on behaviour. This analysis revealed that two dimensions define the type of influence based on user experience: the salience of influence and the force of influence. Products can be more or less explicit and more or less forceful in stimulating behaviour; these respectively correlate to the user's awareness of the influence and having the feeling that one's personal freedom is being limited. Combined, these two dimensions identify four types of influence: coercive, persuasive, seductive and decisive influence. We provide arguments that support the idea that implicit influence is most appropriate and effective at counteracting social problems in which collective concerns are in conflict with personal concerns.

To support the design of products and services with predefined social effects, the insights gained about the implicit influence of design were consolidated into a conceptual framework. The value of this framework is illustrated here through a discussion of six social design projects. We explain how the framework relates to three important steps of the design process: 1) the designer's approach to deciding which behaviour to change, 2) the designer's understanding of the relationship between users' personal and collective concerns, and 3) designing a specific type of influence.

Part 2 - Designing Products and Services with Desired Social Implications

Our framework of product influence in the social realm was integrated into the Vision in Product design method (ViP). This approach, dubbed the Social Implication Design method (SID), stimulates the designer to study the social phenomenon he or she intends to work with, e.g., social ties, emancipation or safety, and recognize relevant and influential (social, cultural, demographical) factors that affect the behaviour currently being displayed. When deciding what behavioural change to aim for, he or she is encouraged to adopt a social perspective and thus incorporate collective concerns. Next, the designer is asked to switch to a user perspective, and consider personal concerns to be addressed by the eventual design that might make the behavioural change meaningful to the user. The designer is encouraged to reflect upon and build an argument for what type of influence is most appropriate and effective, based on the relationship between individual and collective concerns.

Three graduate students applied the SID method in their social design projects. A close examination of their design performance, including an evaluation of the results by social experts, shows that the method appears to support the understanding, consideration, design, and communication of the social implications intended by their designs. Feedback from the experts revealed that effectiveness was mainly ascribed to the implicit power of the design. Designs that were considered most effective by the panel of experts were those that adequately addressed a separate, personal concern; this was perceived as a powerful component of a design's overall ability to evoke

the desired social behaviour. These results underscore our assumption that the method supports the design of implicit influence to bring about a desired social impact. Yet, the extent to which this implicit influence might eventually engender behavioural change in a real-life setting has not (yet) been studied. Although presumably effective, an important drawback of the method is that it appears to demand somewhat artificial and elaborate ways of working. The proposed sequence of activities, i.e., adopting a social perspective to define the desired behaviour first, then taking a user perspective to define how to affect it, did not fit with the integrative thinking many designers adopt. Based on this, the method evolved into a tool to help designers to adopt both these perspectives simultaneously during the design process.

Part 3 - Comparing Design to More Common Types of Intervention

We conducted an experiment to test our assumption that the implicit character of the influence of design may be particularly effective for counteracting social problems. Four separate interventions discouraging littering were carried out in a school canteen. These interventions varied both in terms of the salience of their influence, i.e., either implicit or explicit, and their type, i.e., either a text or a product. Each of the four interventions was deployed in the canteen for one working week (M-F), and their effectiveness was measured by the amount of garbage left behind. An analysis of the results showed that the type of intervention interacts with the salience of influence. In other words, when using text, it seems that being explicit in influence is more effective than being implicit, while the reverse holds true for products. When a product is designed to affect behaviour that results in desired social impact, it seems implicit influence is more effective than explicit influence. Although this interaction effect is significant, the implications of these findings carry with them a certain degree of reserve. The fact that none of the interventions appeared significantly effective at stimulating people to throw away their garbage in comparison to the control condition is remarkable. We explain that the context of the experiment (habitual behaviour, young target group, and passive instead of active littering) in relation to the high aims of the experiment (practical and academic) complicated the set-up of the experiment. We discuss the limited explanatory power of the concept 'salience of influence' in understanding behaviour change, and argue that the concept may be valuable mostly to designers. In aiming for influence that remains unnoticed, it is suggested that designers understand how fundamental human and/or personal concerns may be triggered by design rather than 'forcing' people to internalize collective concerns.

General Discussion

The three parts in this thesis contribute respectively to design philosophy, design methodology, and design theory. The first part extends our thinking about the role design plays in shaping human behaviour, and more specifically its often unintended and unnoticed role. We carefully build a framework that explains this implicit influence of design as it pertains to the social realm. In doing so, we bring various existing perspectives together and complement these with a user perspective. We discuss how the framework relates to the act of designing. In fact, the Part on1 builds up to two hypotheses that have been sequentially tested in Parts 2 and 3 (p.6).

The second part explains the development of a design methodology to support the design of implicit influence that engenders a predefined social effect. This part presents an elaborate evaluation of an initial design method and thereby advances 1) the academic discussion around the origin and purpose of design methods, and 2) our knowledge of how to assess their effectiveness. The research approach taken, a multiple-case study and an expert study with the use of narratives, expands our understanding of design method testing. We illustrate a careful approach in which data from multiple sources are correlated to indications of good design performance. Our results underscore our assumption that the design method supports the design of implicit influence. However, the usability of the method appeared rather poor, for which we decided to replace the method by a set of tools the designer may incorporate within any design method. The main change in doing so is that instead of switching from a 'social' to a 'user' perspective halfway through the project, the designer is encouraged to adopt these two perspectives simultaneously throughout the project.

The last part reports extensively on the set-up of a field experiment to test our assumption that it is the implicit influence of design that is most effective in counteracting social problems. Although our experiment presents an interaction effect, its main contribution lies in examining both the set-up and results of the experiment. We conclude that the experiment wished to study too much with too little means. As design researchers, we are often both concerned with building design theory and with the implications of our findings for design practice. Yet developing interventions that are effective at fostering a behavioural effect requires a different approach than developing interventions to test assumptions that build on design theory. Based on our experiment and its findings, we discuss the value of design theory, and argue that design theory, as a theory of effective embodiment of psychological principles, is a valuable tool to bridge the gap between fundamental and applied social psychology.

'Salience of influence' is a difficult phenomenon to comprehend, and a difficult phenomenon to study. Beyond a discussion of its implications for design practice, and an exploration of how social design could position itself in relation to developments in the domains of social innovation and social corporate responsibility programs, we reflect upon the value of this concept in itself. Future study should be carried out to test its explanatory power, i.e., can salience explain behaviour, rather than merely indicating that an underlying psychological principle has been triggered? A subsequent discussion examines how implicit influence may be an indication that an intervention apparently addressed a user's 'felt' concern. By focusing on fundamental, personal concerns, designers overcome the difficulty of estimating levels of user awareness and recognition of the influence of the product-to-be-designed. By considering all the research reported here from this perspective, we recognize how design may resolve, bypass or transform a conflict between personal and collective concerns. Future studies need to be conducted to find out whether this approach to the unintended and hidden influence of design helps to understand and design this influence responsibly and effectively.

samenvatting

Ik zit in de trein en tegenover mij zit een stelletje de krant te lezen. Eens in de zoveel tijd kijkt een van hen op en werpt een blik naar mij of de andere passagiers. We rijden nu door een tunnel en ik zie mezelf weerspiegeld in het raam. Ik zie dat mijn haar behoorlijk in de war zit door het gehaast. Maar omdat ik het altijd gênant vind om ten overstaan van anderen met mijn uiterlijk bezig te zijn, doe ik er niets aan. Ik wou dat ik toch op die enkele stoel was gaan zitten bij binnenkomst. Dan had ik iets meer privacy gehad.

Hoewel ik me behoorlijk ongemakkelijk voel als ik zo bezweet ben, ben ik blij dat ik de trein heb gehaald, mede dankzij de jongen die me hielp met mijn fiets. De onderste rij van de fietsenstalling met twee verdiepingen zat vol en dus moest ik mijn fiets parkeren in een van de bovenste rekken. Dit is een zware klus, en met een tas aan elke schouder moet ik er hulpeloos hebben uitgezien. In ieder geval onhandig genoeg voor die vriendelijke (en lange) jongen om me te hulp te schieten. Mijn gedachten aan dit moment worden plotseling onderbroken door de stem van de conducteur die vraagt naar mijn vervoersbewijs. Ik voel mijn bloeddruk stijgen en word warm. 'Heb ik wel ingecheckt?' Ik kan het me niet herinneren, en met enige tegenzin houd ik mijn OV pas tegen het scanapparaat van de conducteur. 'Prima, goede reis.' Wat een opluchting. Blijkbaar is het inchecken inmiddels een routinehandeling geworden.

Terwijl de conducteur de vervoersbewijzen van het stel tegenover mij controleert, herinner ik me dat ik hem had willen vragen naar welk spoor ik moet voor mijn overstap. Ik probeer zijn aandacht te trekken, maar hij ziet me niet. Ik besluit daarom maar om mijn iPhone het nummer van het spoor op te zoeken met de NS applicatie. Wanneer ik zie dat ik slechts het perron over hoef te steken voor mijn overstap, kom ik eindelijk tot rust. Nu kan ik me volledig wijden aan het schrijven.

De dingen die we gebruiken, zoals onze meubelen, iPhone apps, of allerhande services om van A naar B te gaan, spelen een belangrijke rol in de manier waarop we leven. Vaak, en vaak zonder ons hier bewust van te zijn, heeft de 'ontworpen' omgeving invloed op hoe we de wereld ervaren alsmede hoe we er in handelen. Door bepaalde gedragingen makkelijker, aantrekkelijker, of 'standaard' te maken, worden we impliciet gestuurd door onze omgeving.

Hoe de stoelen opgesteld staan in de trein heeft invloed op hoe mensen zich gedragen. Wanneer mensen tegenover elkaar zitten zullen ze waarschijnlijk minder geneigd zijn in hun neus te peuteren. Aan de andere kant lokt zo'n positionering gemakkelijker een kort praatje uit dan wanneer mensen in een rij-opstelling zitten. De oriëntatie van de stoelen speelt dus duidelijk een bepalende rol in het gedrag dat mensen laten zien. Zo werd duidelijk in

het voorbeeld dat het mij ontmoedigde om mijn haar te fatsoeneren.
Op eenzelfde manier lokt het beschreven ontwerp van het fietsenrek met twee verdiepingen specifiek sociaal gedrag uit. Omdat het fietsenrek op hoogte zo ongelooflijk ongebruiksvriendelijk is, creëert het eigenlijk de ideale gelegenheid voor mannen om hun fysieke superioriteit te laten zien en om galant te zijn. En omdat in veel Westerse samenlevingen ons streven naar gelijkheid en vrouwenemancipatie soms elk verschil lijkt tussen mannen en vrouwen te willen wegnemen, kan zo'n galante actie verfrissend zijn. Tot slot laat bovenstaande anekdote zien hoe een iPhone perfecte ondersteuning biedt bij het plannen van mijn reis. Echter, het verlaagt daarmee tevens mijn motivatie om contact te zoeken met de conducteur of de andere passagiers en maakt elke sociale interactie over de dienstregeling overbodig. Omdat praten met een conducteur-een persoon die ik niet ken- in het bijzijn van andere mensen-die ik ook niet ken- een uitgelezen situatie biedt om mezelf voor schut te zetten, is de beslissing om te zwijgen snel gemaakt. Dit laat zien dat de stoelen in de trein, het fietsenrek, en de NS app mijn gedrag en dat van anderen beïnvloeden, grotendeels zonder dat we ons daarvan bewust zijn en waarschijnlijk zonder dat de ontwerpers van deze producten en diensten dit voor ogen hadden.

Doel van het proefschrift
De studies in dit proefschrift beschrijven onderzoek naar de impliciete en vaak onbedoelde invloed van design (producten en diensten) op menselijk gedrag, teneinde deze invloed te ontwerpen. Deze kennis is nodig zodat ontwerpers verantwoordelijkheid kunnen nemen voor de gedragseffecten en de sociale gevolgen van hun ontwerpen. Zeker omdat deze lang niet altijd wenselijk zijn (noch voor de gebruiker noch voor de maatschappij). Echter, centraal in dit proefschrift is de aanname dat dit type gedragsbeïnvloeding een unieke kwaliteit is van design ten opzichte van veelgebruikte interventies om gedrag te beïnvloeden, zoals beleid of campagnes. Aangezien veel sociale problemen (zoals obesitas, de uitputting van bronnen, interculturele spanningen, of 'cybercrime') een gedragsverandering van mensen vereisen om effectief gekenterd te kunnen worden, kunnen producten en diensten wellicht elegante en effectieve begeleiders zijn van dergelijke gedragsveranderingen. Het proefschrift bestaat uit drie delen om dit type 'sociaal ontwerpen' te verkennen, te ondersteunen, en uiteindelijk te testen.

Deel 1 put uit een scala van theorieën afkomstig uit verschillende disciplines om de impliciete invloed van design te verklaren. Door deze theorieën naast elkaar te leggen, wordt de instrumentele waarde die elke theorie heeft voor het realiseren van gewenste maatschappelijke verandering door design besproken. De nadruk wordt gelegd op hoe mensen product invloed ervaren, en hoe een ontwerper kan overwegen wat voor soort invloed zowel 'gepast' als effectief is in het bereiken van een bepaald maatschappelijk doel.
Deel 2 beschrijft de ontwikkeling van een methode en tools voor ontwerpers om de invloed van design bewust te ontwerpen om daarmee een vooraf gedefinieerd maatschappelijk effect te verkrijgen. We gaan dieper in op drie ontwerpprojecten waarin een eerste versie van deze methode is gebruikt, en we bespreken in welke mate de methode bijgedragen heeft aan de geleverde ontwerpprestaties. De uitkomsten van de projecten, i.e., de concepten, zijn geëvalueerd met sociaal deskundigen op hun verwachte effectiviteit. Deze

studie biedt zowel inzicht in de waarde van dit type ontwerpactiviteit, als wel in de 'werkingsprincipes' van de ontworpen producten of diensten.
Deel 3 vergelijkt design met meer voorkomende interventies om pro-sociaal gedrag te stimuleren, zoals symbolen of tekst of bordjes. We verwachten dat het impliciete karakter van de invloed van producten of diensten verantwoordelijk is voor de gedragseffecten. In een veldexperiment, uitgevoerd in een schoolkantine, toetsen we deze hypothese door impliciete invloed te vergelijken met expliciete invloed in het bewerkstelligen van gedragsverandering. Tevens vergelijken we de twee soorten interventies, dat wil zeggen product versus tekst.
Alle studies zijn uiteindelijk uitgevoerd om te begrijpen hoe we ontwerpers kunnen ondersteunen om originele producten en diensten te ontwerpen om daarmee gewenste maatschappelijke effecten te realiseren. Om deze effecten te bereiken, wordt de ontwerper gestimuleerd om de impliciete invloed die producten onvermijdelijk hebben doelbewust te richten. In dit proefschrift wordt dus duidelijk een ontwerpperspectief gehanteerd, teneinde bruikbare inzichten te leveren voor ontwerpers.

Sociale problemen, Gedrag & Design

Om de impliciete rol die design in het sociale domein speelt te conceptualiseren, wordt in hoofdstuk 1 uitgelegd hoe bestaande producten hebben bijgedragen aan veel van de maatschappelijke problemen waar we momenteel mee geconfronteerd worden. We laten zien hoe verschillende producten en diensten impliciet gedrag hebben beïnvloed en daarmee hebben bijgedragen aan ongewenste maatschappelijke effecten.

Mensen zijn sociale wezens die altijd in groepen samen hebben geleefd. Het feit dat we een individuele positie hebben ten aanzien van deze groep is daarmee inherent aan het mens-zijn. Dit betekent dat de mens sinds zijn ontstaan als soort geconfronteerd wordt met situaties waarin hij moet kiezen –bewust of onbewust- of hij handelt in eigenbelang of in het belang van de groep. Deel ik mijn banaan, of zal ik hem alleen opeten?

Vandaag de dag is dit niet anders, behalve dat we samenlevingen hebben opgebouwd waarin we samenleven met miljoenen mensen. Het welzijn van de groep, i.e., deze samenleving, wordt daarmee niet meer vanzelfsprekend ervaren als verwant aan het persoonlijk welzijn. Veel mensen kunnen wel begrijpen dat ons veranderende klimaat een probleem is, maar weinig ervaren dit als een persoonlijk probleem waarop onmiddellijk gehandeld moet worden. Bovendien vergt het doorvoeren van persoonlijke veranderingen om deze mondiale of sociale problemen tegen te gaan wilskracht. Want vaak betekent dit dat mensen bereid moeten zijn om comfort, flexibiliteit en efficiëntie op te geven. Meer abstract illustreert dit hoe een maatschappelijk belang (zoals duurzaamheid) niet altijd omarmd hoeft te worden door het individu, en hoe deze in conflict kan zijn met individuele belangen (zoals comfort en gemak). Aan dit gegeven zelf veranderen we niets. Echter, we hebben onze omgeving zo goed afgesteld op onze individuele belangen dat we daarmee soms gedragingen uitlokken die schadelijk zijn voor ons allen op de lange termijn. Mijn auto biedt mij gemakkelijk en comfortabel vervoer, maar we weten inmiddels dat de uitstoot van auto's op de lange termijn negatieve invloed heeft op het klimaat. Veel producten en diensten bepleiten dus impliciet om te

handelen op manieren die ten goede komen aan het individu in plaats van aan de samenleving. Dit werpt de vraag op hoe we de impliciete invloed van producten en diensten zo kunnen ontwerpen dat het gebruikers helpt om vaker te handelen ten gunste van de maatschappij.

Deel 1 - Het begrijpen van de invloed van design op menselijk gedrag

Wetenschappers uit verschillende disciplines hebben de invloed van producten en diensten op het handelen van mensen bestudeerd. Een vergelijking van zes theorieën die dit fenomeen beschrijven toont dat productinvloed kan worden onderzocht en begrepen met een analytische of een synthetische benadering. Gedrag kan worden begrepen als een resultaat van een mens-product-interactie (analytische benadering), of als onderdeel van een grotere context waarin verschillende culturele, sociale en contextuele factoren mede van invloed zijn (synthetische benadering). We laten zien dat deze laatste, meer holistische theorieën ontwerpers kunnen helpen om te begrijpen welk gedrag het beste veranderd kan worden, ofwel: 'waar in te grijpen'. Analytische theorieën kunnen dan de kennis leveren over hoe die invloed vorm moet krijgen in het uiteindelijke ontwerp. Hoewel deze theorieën verhelderend zijn in de rol van producten in gedragsverandering en dus ondersteunend kunnen zijn in het ontwerpproces, geven ze weinig inzicht in de ervaring van productinvloed. Hoe ervaren mensen het beïnvloeding van producten op hun gedrag? Om deze vraag te beantwoorden, hebben we achtenzestig producten geanalyseerd die bewust zijn ontworpen om effect te hebben op gedrag of die onbedoeld effect bleken te hebben op gedrag. Uit deze studie naar productinvloed concluderen we dat twee dimensies, bepalend voor de gebruikerservaring, de type invloed definiëren: de waarneembaarheid van de invloed en de kracht van de invloed. Producten kunnen meer of minder expliciet zijn in hun invloed, en meer of minder druk uitoefenen; wat respectievelijk correleert met de mate waarin de gebruiker bewust is van de invloed en de mate waarin de gebruiker een beperking in persoonlijke vrijheid ervaart. Gecombineerd definiëren deze twee dimensies vier typen invloed: dwang, overtuiging, verleiding en beslissing. We beargumenteren waarom we verwachten dat de impliciete invloed, dus een verleidend of beslissend product, het meest gepast en effectief lijkt bij het tegengaan van maatschappelijke problemen waarbij het collectieve belang in strijd is met het persoonlijke belang.

Om het ontwerpen van een product of dienst met een vooraf bepaald maatschappelijk effect te ondersteunen, zijn de inzichten over de impliciete invloed van design samengebracht in een conceptueel kader. De waarde van dit kader wordt geïllustreerd door zes 'sociaal ontwerptrajecten' te bediscussiëren aan de hand van dit kader. Het kader heeft betrekking op drie belangrijke stappen in het ontwerpproces: 1) de benadering om te bepalen welke gedragsverandering het product dient te faciliteren, 2) het inzichtelijk krijgen van de relatie tussen persoonlijke en collectieve belangen van gebruikers, en 3) het feitelijke ontwerpen van een specifiek type invloed.

Deel 2 - Het ontwerpen van producten en diensten met gewenste sociale implicaties

Het kader uit Hoofdstuk 5, waarin de rol van producten binnen het sociale domein is geconceptualiseerd, is geïntegreerd in de Vision in Product design methode (ViP) om te komen tot de Sociale Implicatie Ontwerpmethode ('Social Implication Design method', SID). Deze methode stimuleert de ontwerper het sociale fenomeen waar hij of zij voor wil ontwerpen, bijvoorbeeld 'sociale banden', 'emancipatie', of 'veiligheid', te onderzoeken en verschillende factoren die van invloed zijn op het gedrag binnen zo'n fenomeen te herkennen, e.g., sociale, culturele, en demografische factoren. Bij het bepalen welke gedragsverandering wenselijk is, wordt de ontwerper aangemoedigd om een sociaal perspectief te hanteren en dus maatschappelijke belangen leidend te laten zijn in deze keuze. Vervolgens wordt de ontwerper gevraagd om over te schakelen naar het perspectief van de gebruiker, en te begrijpen welke persoonlijke belangen geadresseerd kunnen worden om deze gedragsverandering betekenisvol te laten zijn voor de gebruiker. De ontwerper wordt aangemoedigd om na te denken over en te beargumenteren welk type invloed het meest gepast en effectief is, op basis van de relatie tussen individuele en collectieve belangen.

Drie afstudeerders binnen Industrieel Ontwerpen hebben de SID-methode toegepast in hun sociaal ontwerpproject. Door hun proces nauwgezet te volgen en de uiteindelijke resultaten te evalueren met sociaal deskundigen, kunnen we het aannemelijk maken dat de methode de ontwerper helpt in het begrijpen, overwegen, ontwerpen, en communiceren van de sociale implicaties van een ontwerpvoorstel. Uit feedback van de deskundigen is gebleken dat de effectiviteit van hun ontwerpvoorstellen voornamelijk werd toegeschreven aan het impliciete karakter van de invloed. De ontwerpvoorstellen die het meest effectief werden bevonden door het panel waren de ontwerpen die overtuigend een ander, persoonlijk belang adresseerden in interactie; dit werd gezien als een krachtig element van het ontwerp om het gewenste sociale gedrag op te roepen.
Deze resultaten onderstrepen de aanname dat de methode effectief is in het ondersteunen van het ontwerpen van impliciete invloed op sociaal gedrag. Echter, of deze invloed werkelijk niet herkend wordt door gebruikers en of de impliciete invloed uiteindelijk effectief gedragsverandering teweeg brengt in de realiteit, dient nog bestudeerd te worden. Daarnaast is een belangrijk nadeel van de methode gebleken dat het een enigszins kunstmatig en uitgebreide manier van werken vereist. De voorgestelde volgorde om eerst een maatschappelijk perspectief te hanteren en om daarna 'in te zoomen' op de gebruiker en dus over te stappen op een gebruikersperspectief past niet bij het 'integrale' werken van een ontwerper. Op basis hiervan is besloten om de methode om te vormen tot een set van tools die ontwerpers helpen om deze beide perspectieven tegelijkertijd te hanteren gedurende het ontwerpproces.

Deel 3 - Het vergelijken van design met meer gebruikelijke interventies

Een experiment is uitgevoerd om onze hypothese toetsen dat het met name de impliciete invloed van een product is die maakt dat deze effectief gedragsverandering kan faciliteren binnen sociale problemen. Vier afzonderlijke interventies zijn ontworpen om mensen aan te moedigen hun

afval in de afvalbak te deponeren in plaats van achter te laten in de kantine. Deze interventies varieerden zowel in de waarneembaarheid van hun invloed, dat wil zeggen, hetzij impliciete of expliciete invloed, en hun type, dat wil zeggen, hetzij een tekst of een product. Elk van de vier interventies werd ingezet in de kantine voor een werkweek (ma-vr), en hun effectiviteit werd gemeten door de hoeveelheid achtergelaten afval te tellen. Uit een analyse van de resultaten blijkt dat het type interventie interacteert met de waarneembaarheid van de invloed. Met andere woorden, wanneer tekst wordt ingezet om gedrag te veranderen blijkt expliciete invloed effectiever dan dat impliciete invloed, terwijl het omgekeerde geldt voor producten. Wanneer een product is ontworpen om gedrag te beïnvloeden met gewenste sociale implicaties, lijkt impliciete invloed effectiever dan expliciete invloed. Hoewel dit interactie-effect significant is, verdient het trekken van conclusies en het formuleren van mogelijke implicaties een zekere reserve. Het feit dat geen van de interventies significant effectief bleek in het stimuleren van mensen om hun afval weg te gooien (in vergelijking met de controleconditie) is opmerkelijk. Om dit te begrijpen, bediscussiëren we hoe de setting van het experiment (gewoontegedrag, jonge doelgroep en 'passieve' in plaats van 'actieve vervuiling') in relatie tot de meerdere doelstellingen van het experiment (praktische en academische) de opzet van het experiment hebben gecompliceerd. Daarnaast stellen we de waarde van de 'waarneembaarheid van de invloed' in het verklaren van gedragseffecten ter discussie. We betogen dat het concept waardevol is voor ontwerpers om te begrijpen hoe persoonlijke en fundamenteel menselijke belangen aangesproken kunnen worden om gedrag te verandering, in plaats van hen op te dringen collectieve belangen te internaliseren.

Algemene discussie

De drie delen in dit proefschrift dragen respectievelijk bij aan ontwerpfilosofie, ontwerpmethodologie, en ontwerptheorie. Het eerste deel verbreedt ons denken over de rol van producten, en in het bijzonder de vaak ongemerkte en onbedoelde rol, in het vormgeven van menselijk gedrag. Het opgebouwde kader beschrijft deze productinvloed en plaatst het binnen het sociale domein. We brengen daartoe verschillende perspectieven bij elkaar en voegen daar een gebruikersperspectief aan toe. Om een eerste indruk te krijgen van zowel zijn filosofische als zijn instrumentele waarde, bespreken we zes ontwerpprojecten aan de hand van het kader. In feite bouwt deel 1 op naar twee hypothesen, die achtereenvolgens worden getest in deel 2 en 3 (p.6).

Het tweede deel beschrijft de ontwikkeling van een ontwerpmethode voor het ontwerpen van impliciete invloed om een vooraf vastgesteld sociaal effect te bereiken. Dit deel bevat een uitgebreide evaluatie van een eerste versie van deze methode. We dragen hiermee bij aan de vooruitgang van 1) de academische discussie rondom de oorsprong en het doel van ontwerpmethoden, en 2) onze kennis hoe de effectiviteit van ontwerpmethoden beoordeeld kan worden. Onze onderzoeksopzet, de multiple-case studie en de studie op basis van scenario's met sociaal deskundigen, draagt bij aan onze kennis van methode evaluatie. Deze aanpak laat zien hoe data uit meerdere bronnen kunnen worden gecorreleerd aan indicatoren van een succesvolle ontwerpprestatie, en hoe conclusies iets zeggen over zowel de effectiviteit als bruikbaarheid van de methode. De

resultaten onderstrepen onze aanname dat de SID-methode het ontwerpen van impliciete beïnvloeding ondersteunt. Echter, de bruikbaarheid van de methode liet te wensen over, wat ons heeft doen besluiten de methode te vervangen door een set van tools. De belangrijkste verandering daarbij is dat we niet meer halverwege het project overschakelen van een sociaal- naar een gebruikersperspectief, de ontwerper wordt gestimuleerd deze twee perspectieven tegelijkertijd te hanteren gedurende het gehele project. Het laatste deel doet uitgebreid verslag over de opzet van een veldexperiment om onze veronderstelling te testen dat impliciete invloed het meest effectief is in het tegengaan van sociale problemen.

Hoewel ons experiment een interessant interactie-effect laat zien, ligt de belangrijkste bijdrage van het onderzoek in het reflecteren op het ontwerp en de resultaten van het experiment. We concluderen dat we te veel hebben willen onderzoeken met te weinig middelen. Als ontwerponderzoekers zijn we vaak even geïnteresseerd in het opbouwen van ontwerptheorie als in de implicaties van onze bevindingen voor de ontwerppraktijk. Toch vereist het een andere aanpak wanneer we interventies willen ontwikkelen om effectief gedrag te beïnvloeden dan wanneer we interventies moeten ontwikkelen om onze hypothese(s) effectief te toetsen. Op basis van het experiment en deze bevindingen, bespreken we de waarde van ontwerptheorie. We beargumenteren waarom ontwerptheorie, als een theorie van het effectief vorm kunnen geven aan psychologische principes, waardevol is als overbrugging van de kloof tussen fundamentele en toegepaste sociale psychologie.

'Waarneembaarheid van invloed' is een ingewikkeld en lastig te bestuderen fenomeen. Naast het bespreken van de implicaties van dit onderzoek voor de ontwerppraktijk, van de positionering van 'sociaal ontwerpen' als vakgebied naast 'sociale innovatie' en 'maatschappelijk verantwoord innoveren', reflecteren we vooral op de waarde van dit concept. Toekomstig onderzoek zal aan moeten tonen of 'waarneembaarheid van invloed' gedragsverandering kan verklaren, of dat het enkel een indicatie is van onderliggende psychologische principes. We bespreken hoe de waarneembaarheid meer een gevolg kan zijn van het feit dat een product of dienst een 'ervaren' belang adresseert. Door de ontwerper te stimuleren om fundamentele en persoonlijke belangen van mensen te onderzoeken en deze te adresseren met het ontwerp, vermijden we de moeilijkheid om te moeten inschatten of de invloed van een nog-te-ontwerpen product wel of niet opgemerkt zal worden. Door terug te blikken op al de studies in dit proefschrift vanuit dit perspectief, herkennen we drie strategieën om te reageren op het conflict tussen persoonlijke en collectieve belangen: het conflict oplossen, het omzeilen of het transformeren. Toekomstig onderzoek moet aantonen of deze benadering helpt om de impliciete en nu nog vaak onbedoelde invloed van design te ontwerpen.

references

Aarts, H., & Dijksterhuis, A. (2003). The Silence of the Library: Environment, Situational Norm, and Social Behavior. *Journal of Personality and Social Psychology, 84*(1), 18-28.

Abrahamse, W., Steg, L., Vlek, C., & Rothengatter, T. (2005). A Review of Intervention Studies Aimed at Household Energy Conservation. *Journal of Environmental Psychology, 25*(3), 273-291.

Ackoff, R. L. (1994). Systems Thinking and Thinking Systems. *System Dynamics Review, 10*(2-3), 175-188.

Ahmed, S., Wallace, K. M., & Blessing, L. T. M. (2003). Understanding The Differences Between How Novice and Experienced Designers Approach Design Tasks. *Research in Engineering Design, 14*, 1-11.

Akrich, M. (1992). The De-scription of Technical Objects. In W. E. Bijker & J. Law (Eds.), *Shaping Technology/Building Society: Studies in Sociotechnical Change*. Cambridge, Mass.: MIT Press.

Atman, C. J., Chimka, J. R., Bursic, K. M., & Nachtmann, H. L. (1999). A Comparison of Freshman and Senior Engineering Design Processes. *Design Studies, 20*, 131-152.

Bargh, J. A. (2011). Unconscious Thought Theory And Its Discontents: A Critique of The Critiques. *Social Cognition, 29*(6), 629-647.

Bargh, J. A., & Chartrand, T. L. (1999). The Unbearable Automaticity of Being. *American Psychologist, 54*(7), 462-479.

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of Social Behavior: Direct Effects of Trait Construct and Stereotype Activation on Action. *Journal of Personality and Social Psychology, 71*(2), 230-244.

Bargh, J. A., & Ferguson, M. J. (2000). Beyond Behaviorism: On the Automaticity of Higher Mental Processes. *Psychological Bulletin, 126*(6), 925-945.

Baumeister, R. F. (2002). Ego Depletion and Self-Control Failure: An Energy Model of the Self's Executive Function. *Self and Identity, 1*(2), 129-136.

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego Depletion: Is the Active Self a Limited Resource? *Personality Processes And Individual Differences, 74*(5), 1252-1265.

Berger, J., Meredith, M., & Wheeler, C. S. (2008). Contextual Priming: Where People Vote Affects How They Vote. *Proceedings of the National Academy of Sciences,* 105(6), 8846-8849.

Bhamra, T., Lilley, D., & Tang, T. (2008). Sustainable Use: Changing Consumer Behaviour Through Product Design. *Proceedings of Changing the Change: Design Visions, Proposals and Tools, Turin, Italy.*

Bicknell, J., & McQuiston, L. (1977). *Design for Need: The Social Contribution of Design*. London: Pergamon Press & Royal College of Art.

Bitgood, S., Carnes, J., & Thompson, D. (1988). Control of Littering: A Comparison of Three Approaches. *Visitor Behavior, 2*(4), 7-8.

Blessing, L. T. M. (1994). *A Process-Based Approach to Computer Supported Engineering Design*. Doctoral Thesis, University of Twente.

Bowen, H. R. (1953). *Social Responsibilities of the Businessman*. New York: Harper & Row.

Brehm, J. W. (1966). A Theory of Psychological Reactance. In W. W. Burke, D. G. Lake & J. Waymire Paine (Eds.), *Organization Change - A comprehensive reader (2009)*. San Francisco: John Wiley & Sons, Inc.

Brown, D. E. (1991). *Human Universals*. New York: McGraw-Hill.

Brown, T. (2008). Design Thinking. *Harvard Business Review, 86*(6), 84-92.

Brown, T. (2009). *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*. New York: HarperCollins Publishers.

Burns, C., Cottam, H., Vanstone, C., & Winhall, J. (2006). Transformation Design. *RED Paper Design Council*.

Busselle, R., & Bilandzic, H. (2008). Fictionality and Perceived Realism in Experiencing Stories: A Model of Narrative Comprehension and Engagement. *Communication Theory, 18*(2), 255-280.

Chulef, A. S., Read, S. J., & Walsh, D. A. (2001). A Hierarchical Taxonomy of Human Goals. *Motivation and Emotion, 25*(3), 191-232.

Cialdini, R. B. (2001). *Influence Science and Practice* (4th Edition ed.). Boston, MA.: Allyn & Bacon

Cialdini, R. B. (2003). Crafting Normative Messages to Protect the Environment. *American Psychological Society, 12*(4), 105-109.

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A Focus of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places. *Journal of Personality and Social Psychology, 58*(6), 1015-1026.

Cross, N. (1984). *Developments in Design Methodology*. Chichester: John Wiley & Sons.

Cross, N. (2003). The Expertise of Exceptional Designers. In N. Cross & E. Edmonds (Eds.), *Expertise in Design*. Sydney: Creativity and Cognition Press, University of Technology.

Cross, N. (2007). Forty Years of Design Research. *Design Studies, 28*(1), 1-4.

Cross, N., Christiaans, H., & Dorst, K. (1994). Design Expertise Amongst Student Designers. *Journal of Art & Design Education, 13*(1), 39-56.

Cross, N., Naughton, J., & Walker, D. (1981). Design Method and Scientific Method. *Design Studies, 2*(4), 195-201.

Daalhuizen, J., Person, O., & Gattol, V. (2012). The Ambiguous Role of Methods in Design Education: Initial Findings from The Delft Method Study. *Proceedings of the ternational Design Conference, DESIGN 2012, Dubrovnik, Croatia*.

Daalhuizen, J. J., & Badke-Schaub, P. (2011). The Use of Methods by Advanced Beginner and Expert Industrial Designers in Non-Routine Situations: A Quasi-Experiment. *International Journal of Product Development, 15*(1), 54-70.

Davey, C. L., Cooper, R., Press, M., Wootton, A. B., & Olson, E. (2002). Design Against Crime. *Paper presented at the Design Management Institute Conference, Boston, USA*.

Davey, C. L., Wootton, A. B., Thomas, A., Cooper, R., & Press, M. (2005). Design for the Surreal World? A New Model of Socially Responsible Design. *Proceedings of the 6th International Conference of the European Academy of Design, EAD06, Bremen, Germany*.

Dawes, R. M. (1975). Formal Models of Dilemmas in Social Decision Making. In M. F. Kaplan & S. Schwartz (Eds.), *Human Judgment and Decision Processes: Formal and Mathematical Approaches*. New York: Academic Press.

Dawes, R. M. (1980). Social Dilemmas. *Annual Review Psychology, 31*, 169-193.

Dawes, R. M., & Messick, D. M. (2000). Social Dilemmas. *International Journal of Psychology, 35*(2), 111-116.

De Kort, Y. A. W., McCalley, L. T., & Midden, C. J. H. (2008). Persuasive Trash Cans - Activation of Littering Norms by Design. *Environment and Behavior, 40*(6), 870-891.

De Waal, F. B. M. (2008). Putting the Altruism Back into Altruism: The Evolution of Empathy. *Annual Review of Psychology, 59*, 279-300.

De Young, R. (1993). Changing Behavior and Making it Stick : The Conceptualization and Management of Conservation Behavior. *Environment and Behavior, 25*(3), 485-505.

Desmet, P. M. A. (2002). *Designing Emotions.* Doctoral Thesis, Delft University of Technology, Delft.

Desmet, P. M. A., & Hekkert, P. (2007). Framework of Product Experience. *International Journal of Design, 1*(1), 57-66.

Dib, P. (2009, October 18-22). Design as a Tool for Local Transformation. *Proceedings of IASDR 2009, Seoul, South-Korea.*

Dijksterhuis, A., Smith, P. K., Van Baaren, R. B., & Wigboldus, D. H. J. (2005). The Unconscious Consumer: Effects of Environment on Consumer Behavior. *Journal of Consumer Psychology, 15*(3), 193-202.

Dijksterhuis, A., & Van Knippenberg, A. (1998). The Relation Between Perception and Behavior, or How to Win a Game of Trivial Pursuit. *Journal of Personality and Social Psychology, 74*(4), 865-877.

Dorrestijn, S. (2012). *The Design of Our Own Lives: Technical Mediation And Subjectivation After Foucault.* Doctoral Thesis, University of Twente.

Dorst, K. (1997). *Describing Design - A Comparison of Paradigms.* Doctoral Thesis, Delft University of Technology, Delft.

Dorst, K. (2007). Design Problems and Design Paradoxes. *Design Issues, 22*(3), 4-17.

Dorst, K. (2008). Design Research: A Revolution-Waiting-To-Happen. *Design Studies, 29*(1), 4-11.

Dorst, K., & Cross, N. (2001). Creativity in The Design Process: Co-Evolution of Problem–Solution. *Design Studies, 22*(5), 425-437.

Dorst, K., & Dijkhuis, J. (1995). Comparing Paradigms For Describing Design Activity. *Design Studies, 16*(2), 261-274.

Dreyfus, H. L. (2002). Intelligence Without Representation – Merleau-Ponty's Critique of Mental Presentation. *Phenomenology and the Cognitive Science, 1*(4), 367-383.

Dreyfus, H. L., & Dreyfus, S. E. (2005). Peripheral Vision: Expertise in Real World Contexts. *Organization Studies, 26*(5), 779-792.

Dunbar, R. I. M. (1993). Coevolution of Neocortical Size, Group Size and Language in Humans. *Behavioral And Brain Sciences, 16*, 681-735.

Durdan, C. A., Reeder, G. D., & Hecht, P. R. (1985). Litter in a University Cafeteria: Demographic Data and the Use of Prompts as an Intervention Strategy. *Environment and Behavior, 17*(3), 387-404.

Dwyer, W. O., Leeming, F. C., Cobern, M. K., Porter, B. E., & Jackson, J. M. (1993). Critical Review of Behavioral Interventions to Preserve the Environment: Research Since 1980. *Environment and Behavior, 25*(3), 275-321.

Ehrenfeld, J. R. (2008). *Sustainability by Design: A Subversive Strategy for Transforming our Consumer Culture*. New Haven: Yale University Press.

Fallman, D. (2003). Design-Oriented Human-Computer Interaction. *Proceedings of the SIGCHI conference on Human factors in computing systems.*

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

Fogg, B. J., Cuellar, G., & Danielson, D. (2003). Motivating, Influencing, and Persuading Users. In J. A. Jacko & A. Sears (Eds.), *The Human-Computer Interaction Handbook*. Hillsdale, NJ, USA: L. Erlbaum Associates Inc.

Fogg, B. J., & Hreha, J. (2010). Behavior Wizard: A Method for Matching Target Behaviors with Solutions. *Proceedings of Persuasive 2010, Copenhagen.*

Ford, M. E., & Nichols, C. W. (1987). A Taxonomy of Human Goals and Some Possible Applications. In M. E. Ford & D. H. Ford (Eds.), *Humans as self-constructing systems: Putting the framework to work*. Hillsdale, NJ: Erlbaum.

Forlizzi, J., Stolterman, E., & Zimmerman, J. (2009). From Design Research to Theory: Evidence of a Maturing Field. *Proceedings of IASDR 2009, Seoul, Korea*.

Forrester, J. W. (1961). *Industrial Dynamics*. Cambridge, MA: MIT Press.

Frankel, L., & Racine, M. (2010). The Complex Field of Research: for Design, through Design, and about Design. *Proceedings of DRS2010, Montreal, Canada*.

Fricke, G. (1996). Successful Individual Approaches in Engineering Design. *Research in Engineering Design, 8*(3), 151-165.

Friedman, B., Kahn, P. H., & Borning, A. (2002). Value Sensitive Design: Theory and Methods. *Univeristy of Washington technical report,* 02-12.

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

Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., Brewer, L., & Schmeichel, B. J. (2007). Self-Control Relies on Glucose as a Limited Energy Source: Willpower Is More Than a Metaphor. *Journal of Personality and Social Psychology, 92*(2), 325-336.

Gamman, L., & Thorpe, A. (2011). Socially Responsive Design - Open and Participatory Design Led Social Innovation. *Proceedings of IASDR2011, Delft*.

Garriga, E., & Melé, D. (2004). Corporate Social Responsibility Theories: Mapping the Territory. *Journal of Business Ethics, 53*, 51-71.

Gerrig, R. J. (1993). *Experiencing narrative worlds*. New Haven, CT: Yale University Press.

Gerritsen, M., & Van der Noort, W. D. (2004). *The Effectiveness of Governmental Campaigns: The Results of 5 Years of Systematic Research* [De effectiviteit van overheidscampagnes: de resultaten van 5 jaar systematisch onderzoek] Retrieved 21 April 2008, from http://www.moaweb.nl/bibliotheek/jaarboeken/2005/jaarboek-2005-04.pdf

Gibson, J. J. (1979). *The ecological approach to visual perception*. New Jersey: Lawrence Erlbaum Associates.

Gouldner, A. W. (1960). The Norm of Reciprocity: A Preliminary Statement. *American Sociological Review, 25*(2), 161-178.

Green, L., & Myerson, J. (2004). A Discounting Framework for Choice with Delayed and Probabilistic Rewards. *Psychological Bulletin, 130*, 769–792.

Green, M. C. (2004). Transportation Into Narrative Worlds: The Role of Prior Knowledge and Perceived Realism. *Discourse Processes, 38*(2), 247-266.

Green, M. C., & Brock, T. C. (2000). The Role of Transportation in the Persuasiveness of Public Narratives. *Journal of Personality and Social Psychology, 79*(5), 701-721.

Hekkert, P., & Leder, H. (2008). Product Aesthetics. In H. N. J. Schifferstein & P. Hekkert (Eds.), *Product Experience* (pp. 259-283): Elsevier Science Publishers.

Hekkert, P., & Van Dijk, M. (2010). *Vision in Design: A Guidebook for Innovators*. Amsterdam: BIS Publishers.

Hewstone, M., Rubin, M., & Willis, H. (2002). Intergroup Bias. *Annual Review of Psychology,* 53, 575-604.

Horvath, I. (2007). Comparison of Three Methodological Approaches of Design Research. *Proceedings of the International Conference on Engineering Design, ICED'07, Paris, France*.

Howaldt, J., & Schwartz, M. (2010). Social Innovation: Concepts, Research Fields and International Trends. *Studies for innovation in a modern working environment – international monitoring,* (september 2012). Retrieved from http://www.sfs-dortmund.de/odb/Repository/Publication/Doc%5C1289%5CIMO_Trendstudie_Howaldt_Schwarz_englische_Version.pdf

Huffman, K. T., Grossnickle, W. F., Cope, J. G., & Huffman, K. P. (1995). Litter Reduction : A Review and Integration of the Literature. *Environment and Behavior, 27*(2), 153-183.

Jégou, F., & Manzini, E. (2008). *Collaborative Services - Social Innovation and Design for Sustainability*. Milano: Edizioni POLI.design.

Jelsma, J. (2006). Designing 'Moralized' Products: Theory and Practice. In P.-P. Verbeek & A. Slob (Eds.), *User Behavior and Technology Development: Shaping Sustainable Relations Between Consumers and Technologies* (pp. 221-231): Springer.

Joerges, B. (1999). Do Politics Have Artefacts? *Social Studies of Science, 29*(3), 411-431.

Jones, J. C. (1992). *Design Methods*. New York: John Wiley & Sons.

Jones, K. S. (2003). What Is An Affordance? *Ecological Psychology, 15*(2), 107-114.

Kahneman, D. (2011). *Thinking, Fast and Slow*. Farrar, Strays and Giroux.

Kandachar, P., Diehl, J. C., Parmar, V. S., & Shivarama, C. K. (2011). *Designing with Emerging Markets: Design of Products and Services*. Delft: Delft University of Technology.

Kandachar, P., & Halme, M. (2008). *Sustainability Challenges and Solutions at the Base of the Pyramid: Business, Technology and the Poor.* London: Greenleaf.

Kaptein, M., & Eckles, D. (2010). Selecting Effective Means to Any End: Futures and Ethics of Persuasion Profiling. *Proceedings of Persuasive 2010, Copenhagen.*

Kaptelinin, V., & Nardi, B. A. (2006). *Acting with Technology: Activity Theory and Interaction Design*. Cambrindge, MA: MIT Press.

Kay, A. C., Wheeler, S. C., Bargh, J. A., & Ross, L. (2004). Material priming: The influence of mundane physical objects on situational construal and competitive behavioral choice. *Organizational Behavior and Human Decision Processes, 95*, 83-96.

Keitsch, M. (2012). Sustainable Design: A Brief Appraisal of its Main Concepts. *Sustainable Development, 20*, 180-188.

Keizer, K., Lindenberg, S., & Steg, L. (2008). The Spreading of Disorder. *Science, 322*(5908), 1681-1685.

Khaslavsky, J., & Shedroff, N. (1999). Understanding the Seductive Experience. *Communications of the ACM, 42*(5), 45-49.

Kollock, P. (1998). Social Dilemmas: The Anatomy of Cooperation. *Annual Review of Sociology, 24*, 183-214.

Kuijer, L., & De Jong, A. (2009). *A Practice Oriented Approach to User Centered Sustainable Design*. *Proceedings of EcoDesign, Saporo.*

Latour, B. (1992). Where Are The Missing Masses? The Sociology of A Few Mundane Artifacts. In W. E. Bijker & J. Law (Eds.), *Shaping Technology/Building Society: Studies in Sociotechnical Change* (pp. 225-258). Cambridge, Mass.: MIT Press.

Latour, B. (1999). *Pandora's hope: essays on the reality of science studies*. Cambridge, Massachusetts: Harvard Univeristy Press.

Lehman, P. K., & Geller, E. S. (2004). Behavior Analysis and Environmental Protection: Accomplishments and Potential For More. *Behavior and Social Issues, 13*, 13-32.

Leont'ev, A. N. (1974). The Problem of Activity in Psychology. *Journal of Russian and East European Psychology, 13*(2), 4-33.

Liebrand, W. B. G. (1983). A Classification of Social Dilemma Games. *Simulation Gaming, 14*(2), 123-138.

Liebrand, W. B. G., Messick, D. M., & Wilke, H. A. M. (1992). *Social Dilemmas: Theoretical Issues and Research Findings*. Oxford, UK: Pergamon Press.

Lilley, D. (2009). Design for Sustainable Behaviour: Strategies and Perceptions. *Design Studies, 30*(6), 704-720.

Lilley, D., Lofthouse, V., & Bhamra, T. (2005). Towards Instinctive Sustainable Product Use. *Proceedings of the Sustainability creating the culture, Aberdeen, Scotland.*

Little, A. C., Jones, B. C., DeBruine, J., & DeBruine, L. M. (2011). Facial attractiveness: evolutionary based research. *Philosophical Transaction of The Royal Society, 366*, 1638-1659.

Lockton, D., Harrison, D., & Stanton, N. A. (2008). Making the User More Efficient: Design for Sustainable Behaviour. *International Journal of Sustainable Engineering, 1*(1), 3-8.

Lockton, D., Harrison, D., & Stanton, N. A. (2009). The Design with Intent Method: A design tool for influencing user behaviour. *Applied Ergonomics, 41*, 382-392.
Loewenstein, G., & Prelec, D. (1991). Negative Time Preference. *The American Economic Review, 81*(2), 347-352.
Loewenstein, G., & Thaler, R. H. (1989). Anomalies: Intertemporal Choice. *The Journal of Economic Perspectives, 3*(4), 181-193.
Macrae, C. N., & Johnston, L. (1998). Help, I Need Somebody: Automatic Action and Inaction. *Social Cognition, 16*(4), 400-417.
Madge, P. (1993). Design, Ecology, Technology: A Historiographical Review. *Journal of Design History, 6*(3), 149-166.
Manzini, E. (2006). Design, Ethics, and Sustainability - Guidelines for a transition phase. In Y. Sotamaa, E. Salmi & L. Anusionwu (Eds.), *Nantes - Cumulus Working Papers* (pp. 9-15). Helsinki: University of Art and Design Helsinki.
Manzini, E. (2009). New design knowledge. *Design Studies, 30*(1), 4-12.
Manzini, E., & Rizzo, F. (2011). Small Projects/Large Changes: Participatory Design as an Open Participated Process. *CoDesign: International Journal of CoCreation in Design and the Arts, 7*(3-4), 199-215.
Margolin, V. (2007). Design, the Future and the Human Spirit. *23, 3*(4-15).
Mazé, R., & Redström, J. (2008). Switch! Energy Ecologies in Everyday Life. *International Journal of Design, 2*(3), 55-70.
McDonough, W., & Braungart, M. (2002). *Cradle to Cradle: Remaking The Way We Make Things*. New York: North Point Press.
Melnyk, V. (2011). *What is Normal to Do? Social Norms as Determinants of Consumer Decision Making*. Wageningen University, Wageningen.
Messick, D. M., & Brewer, M. B. (1983). Solving Social Dilemmas: A Review. *Review of personality and social psychology, 4*, 11-44.
Michaels, C. F. (2003). Affordances: Four Points of Debate. *Ecological Psychology, 15*(2), 135-148.
Midden, C., McCalley, T., Ham, J., & Zaalberg, R. (2008). Using Persuasive Technology to Encourage Sustainable Behavior. *Paper presented at the Pervasive Persuasive Technology and Environmental Sustainability Workshop, 6th International Conference on Pervasive Computing, Sydney.*
Milinski, M., Sommerfeld, R. D., Krambeck, H.-J., Reed, F. A., & Marotzke, J. (2008). The collective-risk social dilemma and the prevention of simulated dangerous climate change. *Proceedings of the National Academy of Sciences, 105*, 2291-2294.
Miller, R. L., Brickman, P., & Bolen, D. (1975). Attribution Versus Persuasion as A Means for Modifying Behavior. *Journal of Personality and Social Psychology, 31*(3), 430-441.
Mitchell, G. (2005). Libertarian Paternalism Is an Oxymoron. *Northwestern University Law Review, 99*(3), 1-42.
Morelli, N. (2007). Social Innovation and New Industrial Contexts: Can Designers 'Industrialize' Socially Responsible Solutions? *Design Issues, 23*(4), 3-21.
Muraven, M., & Baumeister, R. F. (2000). Self-Regulation and Depletion of Limited Resources: Does Self-Control Resemble a Muscle? *Psychological Bulletin, 126*(2), 247-259.
Nardi, B. A. (1996). Studying Context: A Comparison of Activity Theory, Situated Action Models, and Distributed Cogniction. In B. A. Nardi (Ed.), *Context and Consciousness: Activity Theory and Human-Computer Interaction*. Cambridge: MIT Press.
Niedderer, K. (2007). Designing Mindful Interaction: The Category of Performative Object. *Design Issues, 23*(1), 3-17.
Niedenthal, P. M. (2007). Embodying Emotion. *Science 18, 316*(5827), 1002-1005.
Nolan, J. M., Schultz, P. W., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2008). Normative Social Influence is Underdetected. *Personality and Social Psychology Bulletin, 34*(7), 913-923.

Norman, D. A. (1988). *The Psychology of Everyday Things*. New York: Basic Books.
Ostrom, E. (1998). A Behavioral Approach to the Rational Choice Theory of Collective Action. *American Political Science Review, 92*(1), 1-22.
Ostrom, E. (2000). Collective Action and the Evolution of Social Norms. *The Journal of Economic Perspectives, 14*(3), 137-158.
Özcan, E. (2008). *Product Sounds: Fundamentals and Applications*. Doctoral Thesis, Delft University of Technology, Delft.
Papanek, V. (1984). *Design for the Real World: Human Ecology and Social Change* (second ed.). Chicago: Academy Chicago Publishers.
Pedersen, K., Emblemsvåg, J., Bailey, R., Allen, J. K., & Mistree, F. (2000). Validating Design Methods & Research: The Validation Square. *Proceedings of the ASME Design Theory and Methodology Conference., Baltimore, Maryland*.
Pinker, S. (2002). *The Blank Slate: Modern Denial Of Human Nature*. New York: Viking.
Pollan, M. (2006). *The Omnivore's Dilemma: A Natural History of Four Meals*: Penguin Group.
Radcliffe, D. F., & Lee, T. Y. (1989). Design Methods Used by Undergraduate Engineering Students. *Design Studies, 10*(4), 199-207.
Reckwitz, A. (2002). Toward a Theory of Social Practices: A Development in Culturalist Theorizing. *European Journal of Social Theory, 5*(2), 243-263.
Redström, J. (2006). Persuasive Design: Fringes and Foundations. In W. A. IJsselsteijn, Y. A. W. de Kort, C. Midden, J. H. Eggen & E. Van den Hoven (Eds.), *Persuasive Technology: First International Conference, Persuasive 2006* (Vol. 3962, pp. 112-122). Berlin, Germany: Springer.
Reich, J. W., & Robertson, J. L. (1979). Reactance and Norm Appeal in Anti-Littering Messages. *Journal of Applied Social Psychology, 9*(1), 91-101.
Reiter, S. M., & Samuel, W. (1980). Littering as a Function of Prior Litter and The Presence or Absence of Prohibitive Signs. *Journal of Applied Social Psychology, 10*(1), 45-55.
Richmond, B. (1994). Systems Thinking/System Dynamics: Let's Just Get on with It. *System Dynamics Review, 10*(2-3), 135-157.
Rijnja, G., Seydel, E., & Zuure, J. (2009). Communicating from Context: To Higher Effective Governmental Campaigns [Communiceren vanuit de Context: Naar Effectievere Overheidscampagnes]. In W. L. Tiemeijer, C. A. Thomas & H. M. Prast (Eds.), *People Making Decisions: About The Psychology Behind Choices and Behaviour [De Menselijke Beslisser: Over De Psychologie van Keuze en Gedrag]*. Amsterdam: Amsterdam University Press.
Roeser, S. (2005). Intuitionism, Moral Truth, and Tolerance. *The Journal of Value Inquiry, 29*, 75-87.
Roozenburg, N. F. M., & Cross, N. (1991). Models of the Design Process: Integrating Across the Disciplines. *Design Studies, 12*(4), 215-220.
Ryan, R. M., & Deci, E. L. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology, 25*, 54-67.
Saco, R. M., & Goncalves, A. P. (2008). Service Design: An Appraisal. *Design Management Review*(4), 10-19.
Sangiorgi, D. (2011). Transformative Services and Transformation Design. *International Journal of Design, 5*(2), 29-40.
Schön, D. A. (1983). *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books.
Schultz, P. W., Bator, R. J., Brown Large, L., Bruni, C. M., & Tabanico, J. J. (2013). Littering in Context: Personal and Environmental Predictors of Littering Behavior. *Environment and Behavior, 45*(1), 35-59.
Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The Constructive, Destructive, and Reconstructive Power of Social Norms. *Psychological Science, 18*(5), 429-434.

Scott, K., Bakker, C., & Quist, J. (2012). Designing change by living change. *Design Studies, 33*(3), 279-297.

Segerståhl, K., Kotro, T., & Väänänen-Vainio-Mattila, K. (2010). Pitfalls in Persuasion: How Do Users Experience Persuasive Techniques in a Web Service? *Proceedings of Persuasive 2010, Copenhagen*.

Shanteau, J. (1992). The Psychology of Experts: An Alternative View. In G. Wright & F. Bolger (Eds.), *Expertise and Decision Support*. New York: Plenum Press.

Shapiro, M. A., Barriga, C. A., & Beren, J. (2010). Causal Attribution and Perceived Realism of Stories. *Media Psychology, 13*(3), 273-300.

Shapiro, M. A., & Chock, M. (2003). Psychological Processes in Perceiving Reality. *Media Psychology, 5*(2), 163-198.

Shove, E., Watson, M., Hand, M., & Ingram, J. (2007). *The Design of Everyday Life*. Oxford: Berg.

Sibley, C. G., & Liu, J. H. (2003). Differentiating Active and Passive Littering : A Two-Stage Process Model of Littering Behavior in Public Spaces. *Environment and Behavior, 35*(3), 415-433.

Simon, H. A. (1969). *The Sciences of The Artificial* (First MIT Press Paperback Edition ed.). Cambridge, Massachusetts and London: MIT Press.

Skinner, B. F. (1953). *Science And Human Behavior*. New York: The Free Press.

Sleeswijk-Visser, F. (2009). *Bringing the Everyday Life of People into Design.* Doctoral Thesis, Delft University of Technology, Delft.

Steg, L. (2008). Promoting Household Energy Conservation. *Energy Policy, 36*(12), 4449-4453.

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309-317.

Sterman, J. D. (2000). *Business Dynamics: Systems Thinking and Modeling for a Complex World*. New York: Irwin/McGraw-Hill.

Sunstein, C. R., & Thaler, R. H. (2003). Libertarian Paternalism Is Not An Oxymoron. (21003): 159-1202. *The University of Chicago Law Review, 70*(4), 1159-1202.

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving Decisions about Health, Wealth and Happiness*. New Haven & London: Yale University Press.

Thorpe, A., & Gamman, L. (2011). Design with Society: Why Socially Responsive Design Is Good Enough. *CoDesign: International Journal of CoCreation in Design and the Arts, 7*(3-4), 217-230.

Torning, K., & Oinas-Kukkonen, H. (2009). Persuasive System Design: State of the Art and Future Directions. *Proceedings of Persuasive 2009, Claremont, California*.

Tromp, N., & Hekkert, P. (2009). Design for Society - Bridging User Concerns with Societal Ones through Implication Design. *Proceedings of IASDR 2009, Seoul, Korea*.

Tromp, N., & Hekkert, P. (2010). A Clash of Concerns: Applying Design Thinking to Social Dilemmas. *Proceedings of DTRS8, Sydney, Autralia*.

Tromp, N., & Hekkert, P. (2012). Designing Behaviour. In J. Donovan & W. Gunn (Eds.), *Design Anthropology*: Ashgate.

Tromp, N., Hekkert, P., & Van Dijk, M. (2010). *Toekomstig Mobiel Werken - Een visie vanuit het sociale systeem*.

Tromp, N., Hekkert, P., & Verbeek, P.-P. (2011). Design for Socially Responsible Behaviour: A Classification of Influence Based on Intended User Experience. *Design Issues, 27*(3).

Tulving, E., & Schacter, D. L. (1990). Priming and Human Memory Systems. *Science, 247*(49040), 301-306.

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science, 185*, 1124-1131.

Van Boeijen, A. G. C., & Daalhuizen, J. J. (2010). *Delft design guide*. Delft: Delft Univeristy of Technology.

Van den Hende, E. (2010). *Really New Stories - The Effect of Early Concept Narratives on Consumer Understanding and Attitudes.* Doctoral Thesis, Delft University of Technology, Delft.

Van den Hende, E. A., Dahl, D. W., Schoormans, J. P. L., & Snelders, D. (2012). Narrative Transportation in Concept Tests for Really New Products: The Moderating Effect of Reader–Protagonist Similarity. *Journal of Product Innovation Management, 29*(S1), 157-170.

Van den Hende, E. A., & Schoormans, J. P. L. (2012). The Story Is As Good As The Real Thing: Early Customer Input On Product Applications of Radically New Technologies. *Journal of Product Innovation Management, 29*(4), 655-666.

Van Lange, P. A., Liebrand, W. B. G., Messick, D. M., & Wilke, H. A. M. (1992). Introduction and Literature Review. In W. B. G. Liebrand, D. M. Messick & H. A. M. Wilke (Eds.), *Social Dilemmas: Theoretical Issues and Research Findings*. Oxford, UK: Pergamon Press.

Van Lange, P. A. M., & Joireman, J. A. (2008). How We Can Promote Behavior That Serves All of Us in the Future. *Social Issues and Policy Review, 2*(1), 127-157.

Van Ulden, E., & Heussen, D. (in review). *The Hybrid Zone: Space for Contact*.

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

Verbeek, P.-P. (2011). *Moralizing Technology: Understanding and Designing the Morality of Things*. Chicago: University of Chicago Press.

Verbeek, P.-P., & Kockelkoren, P. (1998). The Things That Matter. *Design Issues, 14*(3), 28-42.

Vermaas, P. E. (2010). Beyond Expert Design Thinking: On General, Descriptive and Prescriptive Models. *Proceedings of DTRS8, Sydney, Autralia*.

Vezzoli, C. (2006). Design for Sustainability: The New Research Frontiers. *Proceedings of the 7th Brazilian Conference on Design, Curtiba, Brazil*.

Vohs, K. D., Mead, N. L., & Goode, M. R. (2006). The Psychological Consequences of Money. *Science, 314*, 1154-1156.

Waelbers, K. (2011). *Doing Good with Technologies: Taking Responsibility for the Social Role of Emerging Technologies* (Vol. 4). Dordrecht: Springer.

Wever, R., Van Kuijk, J., & Boks, C. (2008). User-Centred Design for Sustainable Behaviour. *International Journal of Sustainable Engineering, 1*(1), 9-20.

Whiteley, N. (1993). *Design For Society*. London: Reaktion Books

Whiten, A., Goodall, J., MvGrew, W. C., Nishida, T., Reynolds, V., Sugiyama, Y., Tutin, C.E.G., Wrangham, R.W., & Boesch, C. (1999). Cultures in Chimpanzees. *Nature, 399*, 682-685.

Williams, K. D. (2007). Ostracism. *Annual Review of Psychology, 58*, 425-452.

Williams, L. E., & Bargh, J. A. (2008). Experiencing Physical Warmth Promotes Interpersonal Warmth. *Science, 322*, 606-607.

Wilson, T. D., Lisle, D., Schooler, J. W., Hodges, S. D., Klaaren, K. J., & LaFleur, S. J. (1993). Introspecting about Reasons Can Reduce Post-Choice Satisfaction. *Personality and Social Psychology Bulletin, 19*(3), 331-339.

Winner, L. (1980). Do Artifacts Have Politics? *Daedalus, 109*(1), 121-136.

Woodham, J. M. (1997). *Twentieth-Century Design*. Oxford New York: Oxford University Press.

Woolgar, S., & Cooper, G. (1999). Do Artefacts Have Ambivalence? Moses' Bridges, Winner's Bridges and other Urban Legends in S&TS. *Social Studies of Science, 29*(3), 433-449.

Yin, R. K. (2003). *Applications of Case Study Research*. California: Sage Publications, Inc.

Zimbardo, P. G., & Leippe, M. R. (1991). *The psychology of attitude change and social influence*. New York: McGraw-Hill.

appendix

- Narrative #2 (in Dutch), used in the expert study Chapter 8

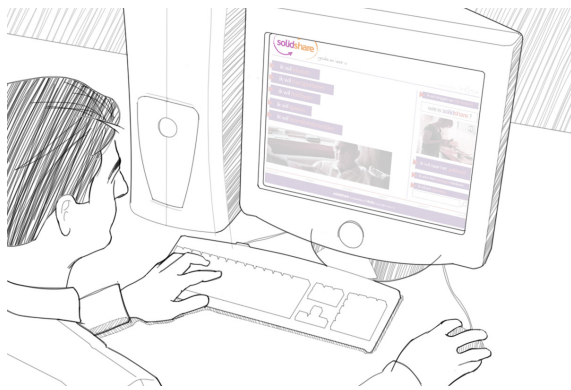
Hoe Kadem vertrouwen kreeg

Chaos in de Afrikaanderwijk
Al sinds Kadem in Nederland is, woont hij in een achterstandswijk. Hij bewoont een klein appartement dat eigendom is van woningcorporatie Vestia. Het is geen fijne buurt, want vaak is er onrust. De ene keer zijn het de buren die elkaar in de haren vliegen, dan weer is het de jeugd die de boel op straat vernielt. De straat is inmiddels een vaste route voor de politie en elke avond patrouilleren er buurtwachters. Kadem is bekend met de spanningen in de straat: hij heeft zelf ook wel eens een klap uitgedeeld. De woningen zijn krap voor de grote gezinnen die er wonen en dat draagt niet bij aan de verdraagzaamheid onderling. Maar sinds Kadems gezin over is uit Turkije, houdt hij zich op de achtergrond. Hij wil het beste voor zijn kinderen en probeert daarom geld te sparen om naar een betere straat te verhuizen. Zijn vrouw Elif is op het moment zwanger van de vijfde en dus zal het huis nog krapper worden. Maar de huizen zijn duur en vaak wordt het geld door urgentere zaken opgeëist. Kadem slaapt er slecht van. Zijn droom om zijn gezin luxe te bieden verwijdert zich steeds verder van de realiteit. Kadem maakt lange dagen in de haven, en 's avonds in bed piekert hij.

Op een avond komt Kadem laat thuis. Een vrachtschip had zijn aankomsttijd niet goed ingeschat en het was Kadem geweest die tot laat moest wachten om te laden en lossen. Hij is uitgeput, wast zich snel, en kruipt dan stilletjes bij Elif in bed. Ondanks zijn vermoeidheid dwalen zijn gedachten weer af naar de komst van zijn vijfde kind. En weer voelt hij die dwingende verantwoordelijkheid het een goed thuis te bieden. Als verhuizen geen optie is, wat blijft er dan nog over? Plotseling schieten zijn ogen open. Hij gaat hoogslapers bouwen! Als het hem lukt om in elke kamer een platje te bouwen, hebben de kinderen een eigen plek terwijl ze toch een kamer delen. Hij is klaarwakker en zijn gedachten razen door. Houthandel Smits heeft misschien nog wel wat restpartijen over die hij voor weinig geld kan overnemen… Hij zal het een en ander moeten regelen, want voor zo'n constructie is goed gereedschap nodig en op een enkele hamer na, heeft Kadem niets. En kopen is natuurlijk geen optie. Wacht, vertelde Elif niet laatst dat haar vriendin zo blij was met het kunnen lenen van een naaimachine? Waar had ze die ook alweer geleend? Hij zal het haar de volgende dag vragen. Opgewonden valt Kadem in slaap.

De volgende ochtend…
Elif reageert verbaasd. Waar heeft Kadem het over? Het is een tijd geleden dat ze hem

vertelde over de naaimachine van haar vriendin. Ze heeft vaak het idee dat haar man maar half luistert naar wat ze vertelt en nu komt ie hier mee aan. En wat wil Kadem dan? Gaat hij kleren naaien? Kadem weidt niet veel uit over zijn plannen, maar blijft wel aandringen: 'Weet je echt niet meer hoe je vriendin aan die naaimachine kwam?' Elif ziet dat het ernst is en wil haar man natuurlijk graag helpen. Ze denkt diep na. 'Het was iets op internet. Maar het was juist zo leuk omdat het ook iets van de buurt was, dacht ik.' 'Had het een naam?' vraagt Kadem . 'Een Engels woord was het geloof ik. Soldshare.. of zoiets.? Nee, je hoefde het juist niet te kopen, dat was het mooie. Het heette vast geen "sold" dan. Misschien solidsharen?' denkt Elif hardop. "Het staat ook op het busje, dat hier wel eens in de straat staat", zegt Elif.



Kadem gaat op zoek naar 'solidsharen' op het Internet. Na even zoeken heeft hij de juiste link gevonden. Het heet 'solidshare' en de site legt helder uit wat het is: 'Solidshare is een dienst van woningcorporatie Vestia. Vestia biedt producten van goede kwaliteit te leen aan, mits bewoners de producten zelf beheren.' Kadem klikt verder. Een hele serie aan producten passeert de revue: koelboxen, ladders, tegelzagers, grasmaaiers, en zelfs een busje. En inderdaad, ook naaimachines. Dat Kadem dit niet eerder wist! Hij besluit even goed op een rij te zetten welk gereedschap hij nodig heeft voor de hoogslapers. In ieder geval een boormachine en een decoupeerzaag. En hij kan het busje lenen om het hout op te halen. Hij reserveert de spullen op een simpele en gebruiksvriendelijke manier. De site bedankt hem voor zijn reservering en bericht hem over de locatie van de spullen. Die worden immers beheerd door de mensen in de buurt en dus zal hij de spullen bij zijn buren moeten ophalen. De zaag ligt bij nummer 55 in de straat, de boor een straat verderop, en het busje is bij zijn overbuurman in beheer. Hij maakt met alle drie een afspraak om de spullen op te halen voor het weekend.

Die vrijdag..
Een voor een haalt Kadem het gereedschap op en elke keer is het een excuus voor een kort praatje. Voor het overnemen van het gereedschap moet even een bonnetje getekend, maar dat verloopt soepel.

Fayyad geeft hem de decoupeerzaag en biedt hem een kop thee aan. Op twee stoeltjes in de zon voor het huis praten ze wat. Die stoelen heeft Fayyad zelf gemaakt. Hij vertelt dat hij van plan is meer te maken en die te verkopen. "Zodra ik er vijf heb verkocht, kan ik een eigen decoupeerzaag kopen." Tot die tijd is hij blij dat Solidshare bestaat. De dienst heeft drie decoupeerzagen in beheer en dus kan hij altijd wel een lenen. Na de thee stapt Kadem op. Hij levert het gereedschap thuis af en besluit dan het busje bij zijn overbuurman op te halen. Dan kan hij direct door naar Houtzagerij Smits.

‘Goeiedag. Ik kom de sleutel van het busje halen’, zegt Kadem . De man is duidelijk niet in zijn beste humeur. Mopperend draait hij zich om en komt na een paar minuten met de autopapieren, een sleutel en de overdrachtsbon aanzetten. ‘Wat ga je doen dan?’ vraagt hij monotoon. Kadem voelt zich niet echt op zijn gemak maar legt uit dat hij hout wil ophalen bij Smits, de houtzagerij op de hoek. ‘Ah, daar werkt een maat van me. Wat ga je doen met dat hout?’ De man praat nog even monotoon en Kadem heeft eigenlijk helemaal geen zin om zijn verhaal te doen. Toch vertelt hij dat zijn vrouw zwanger is van de vijfde en dat hij zijn huis graag bewoonbaar wil maken door twee hoogslapers te bouwen. ‘Mooi plan gast’, zegt de man. ‘Ikzelf bouw dag in dag uit steigers, dus als ik je mot helpen, dan zeg je ’t maar. Kom ik effe klussen deze zaterdag, want veel heb ik toch niet te doen.’ De man geeft de sleutels en papieren en Kadem tekent de bon.

‘Euhh.., graag…’, Kadem zoekt naar een naambordje op de deur.
‘Johnny.’, zegt de overbuurman.
‘Graag Johnny. Mijn naam is Kadem .’
De twee mannen schudden elkaar de hand.
‘Ik woon op…’
‘12, dat weet ik.’
‘O, oké, tot morgen dan.’
Johnny duwt de deur dicht. Kadem draait zich om en loopt verbaasd weg. De man was niet echt vriendelijk en toch had hij aangeboden te helpen. En hoe wist hij waar ik woon? Ah, door Solidshare natuurlijk! Bij zijn reservering had hij ook zijn adres moeten opgeven, daarom wist hij dat Kadem op nummer 12 woont.

Het maken van de hoogslapers
Die zaterdag gaat Kadem met zijn buurman aan de slag. Ze zeggen niet veel tegen elkaar, maar Kadem waardeert de hulp van Johnny erg. Hij heeft veel kennis van zaken en werkt hard door. Het lukt ze makkelijk zo om de bedden in een weekend af te krijgen. Als het eerste bed af is, nodigt Kadem zijn kinderen uit om het te testen.
De kinderen zijn dol enthousiast en beginnen meteen te klauteren. Ook begint direct het gekibbel over wie op het bovenste bed mag slapen. In een mum van tijd is het een kabaal van jewelste. Johnny lacht lichtjes en zegt dat hij weer opstapt. Kadem nodigt hem uit voor het eten, maar Johnny bedankt en loopt naar de deur. Kadem geeft hem een hand. ‘…als ik jou ooit ergens mee kan helpen!’ Johnny knikt en draait zich om.

Kadem kijkt vanaf zijn balkon toe hoe Johnny zijn eigen huis binnengaat en zwaait. Vreemde man, denkt Kadem terwijl ook hij zijn deur sluit. Maar….misschien is deze buurt helemaal zo slecht nog niet…
Kadem zoekt een goede plek voor de zaag en de boor. Hij zal ze nu moeten bewaren tot een ander ze wil lenen.

acknowledgements

Paul–since our first encounter, you've played an important role in my life. Without you, I would not be here, at this point, for many reasons. You have taught me so much about design, science, the art of living, and myself. Thank you for standing by my side, giving me crucial insights when I was lost, but most of all for trusting me to find my own path. I look forward to many more moments, from having arguments to singing karaoke.

Peter-Paul, or P-P–which I have never really dared to call you–your scientific philosophy sparked my fascination for the role of design in human life. Throughout my journey, you have been the crucial other, that different sound. And although Twente may be far, your perspective has been guiding me all along. Thank you for your incredible enthusiasm and support. I truly hope we will continue working together in the future.

Matthijs, thanks for opening my eyes to things I can still barely understand. It is great to work so closely together and explore the intellectual side of design.

Eefje and Jaap–my 'paranimfen', and for a reason: I am certain that you both could defend my thesis. Eefje, thanks for sharing a dream. Your talent for seeing things sharply and differently still amazes and inspires me every time we talk. Jaap, thanks for walking this road with me. Your nuanced view and thoughtful considerations have broadened my scope more than once.

Thomas, I cannot imagine that someone else could have made my PhD time more enjoyable than you. I treasure the moments when you explained statistics, or I embarrassed you at the airport, or when we discussed the challenges of life over a beer. Thanks for your support, from start to end.

There are people and organizations that made it possible to do this research; people who devoted their time, took a risk by getting involved and showed the flexibility needed to organise and finish the research. I firstly would like to thank the Dutch Police LAPV2010 and Estrade/Vestia. Rob Tanis, Kenneth Konigferander, Francisca Jimmink, Arie Moerman, Joost Lobee, and Inger Pons, thank you for your interest in design research and your willingness to explore its relevance to your professional domain. Next to this, I would like to thank all the people who participated in my research,

students and social experts. I want to thank the people who contributed part of their IDE studies to the research. Floor, Amine, Maarten, Inga, Femke, Floris, Sacha, Annet and Lysanne, it has been an honour to be part of your projects and I hope you feel the same about being part of mine. Amine, Maarten, Inga, and Femke, I know it was not easy: I am incredibly grateful for your efforts and devotion. Lysanne, your project is an important piece of the puzzle. Thank you for being a great support in realizing this. I want to thank KVD reframing. Matthijs, Gijs, Michiel, Roald, Femke, Erik, Beatrijs– dear colleagues, I feel so lucky being able to work with you all. Thank you for giving me the time needed to properly finish this thesis. Gijs, Jack-of-all-trades, thanks for showing your confidence in me and making me laugh 'till I cry every once in a while. Roald, thanks for backing me up. Beatrijs, the girl who has an Adobe Illustrator version with a 'make beautiful'-button, thank you for keeping an eye on me, and your incredible support: you are the sweetest!

Somehow, some people pulled an important string, for which I would like to show my gratitude. Jeroen van Erp, thanks for inviting me to join @rdsgnngpolitics and for giving me the platform to present our idea. I experience true happiness when we sit together and discuss future plans. Jianne Whelton, thank you so much for the hard work in making my texts more understandable and readable. Your view has made me enthusiastic for the next stage of our collaboration! Anna Noyons, thanks for taking the plunge with me. I am looking forward to the experiences we will share. Simon Akkaya, thanks for providing the backbone for the layout. I could not have done this without you.

Many people in IDE have made catching this wave an enjoyable and memorable ride. I recall memories like dancing in a Skybox in Rotterdam, glancing at scarcely dressed ladies in a Brazilian restaurant, playing Pictionary too fanatically, having unexpected conversations in the elevator, being part of embarrassing karaoke sessions (multiple!), falling silent due to impressive and excessive fireworks, drinking whiskey at 'PhD at the Sea', sharing annoyances and fun during spring-break cleaning at Studiolab, and of course, being stuck in forced gatherings thanks to our sensitive fire alarm.

Dear section DA, the best is yet to come! Over the past five years, I have felt part of a team that defines and redefines itself continuously and I enjoyed being part of this dynamic. Pieter, Rick, Marieke, and Elif, you are the only ones who accompanied me during the complete journey. Thank you for being examples and teaching me many do's and don'ts. Pieter, I value your sensitive view on things. Marieke, thanks for showing how to stay true to oneself. Elif, thank you for being there. Anna, Gael, Erdem and Bea, we haven't been in touch lately, but you have played a role in my journey: thanks for showing me the way. Nazli, Steven, Jay, Deger, Ruben, Odette, Janneke, Anna, Katinka, Mafalda, Lavender, like I said: the best is yet to come! I feel that we make a great team. I enjoy our laughs and I look forward to our potential collaborations. Nazli, a big kiss for all the nice moments we have shared. Irene, thanks for pulling me away from the thesis every once in a while. Valentijn, Gael and Janneke, thanks for devoting your time and intellect when I needed some serious feedback.

Timo, Erik, Annemiek, Bruno, Carlita, Elmer, Rudolf, Stefan, Renier, Ger, Eva, Damon, Piia, Dicky, Ton, thanks for discussing critiques and for keeping me enthusiastic about the educational side of work.

Studiolabbers, or minglers, dreamers, and writers, you indeed accompanied me pretty much during these three activities. Helma, Walter, Nazli, Aadjan, Gert, Onno, Thomas, Wei, Miguel, Daniel, Jasper, Brian, Reinier, Jasper, Froukje, Caroline, Stella, and Rob, thanks for the nice discussions at the coffee machine, the 'summercue', and the Friday-afternoon drinks. Helma, Jasper, Miguel, and Thomas, yep: in my heart. Jasper, thanks for sharing thoughts on things that do and don't matter. Steven, Ruben, Deger, Nazli, Irene, Fien, Froukje, Sarah, Anna, Natalia, Odette, Menno, Jasper, Marc, Mafalda, thanks for building Dream. Marian and Lenneke, thanks for joining me in this final stage. And Lenneke, thanks for disagreeing with me so often. I value exchanging our different viewpoints on the matter.

Now I feel I am going to forget people… and I apologize for that. It would have been easier to stop here, but I do want to thank some more people. Fleur, Ellis, Hester, Ana, Fernando, thanks for all the enjoyable talks. Daan, thanks for the joy in dancing! Wim, thanks for making me smile. Mirjam, Amanda, Daphne, Monique, Ron, thanks for the help on the procedural side of things. Angeline, Ellen, Jaap, Ivo, Hugo, and Simone thanks for the help in communication and making this fun. Ena, thanks for your support in me.

Dirk Snelders, thanks for your blunt reply to my question whether you wanted to be my graduation mentor. It still works as an incentive to question my own thoughts and opinions. Steven Dorrestijn, thanks for our collaborations around the workshops/ symposium. Dan Lockton, thanks for discussing our work. I hope we find some opportunities to extend these discussions in the future. Kees Keizer, thanks for your valuable feedback. I look forward to exploring some fruitful crossovers between our disciplines.

Tot slot wil ik mijn familie en vrienden bedanken voor alle momenten van steun en afleiding, voor hun vergevingsgezindheid betreffende mijn afwezigheid, voor het vergroten van mijn enthousiasme voor mijn onderzoek, en voor het geven van veel energie en liefde. Lief gezin, papa, mama, Eke, Seth en Onno, ik kan niet uitdrukken hoe trots ik ben dat jullie mijn familie zijn. Papa en mama, jullie manier van in het leven staan, jullie intelligentie en nuchterheid, en het vertrouwen dat jullie me nog altijd geven, hebben mij gemaakt tot wie ik ben. Dank voor alle liefde. Lieve zus, als iemand mijn paranimf van het leven kan zijn, dan ben jij dat. Niets geeft een fijner gevoel dan te weten dat ik altijd bij je terecht kan, en jij bij mij. Lieve Onno en Seth, dank voor alle fijne verkenningen van wat 'het goede leven' is.

Tynke, dank voor wie je bent en dat je er bent.

Lieve David, jouw bijdrage aan dit proefschrift gaat verder dan de ontelbare momenten waarop je er voor me was als ik het even niet zag. Je voedt mijn geest en scherpt mijn gedachten. Ik ben onder de indruk van je, nog elke dag, en het is een feest om samen met jou het leven te (leren) leven.
Ik hou van je.

curriculum vitae

Nynke Tromp was born in Leeuwarden in 1983. After receiving her diploma at the Stedelijk Gymnasium in Leeuwarden, she moved to Delft in 2000 to study Industrial Design Engineering. She received her bachelor degree in 2004 and decided to travel through South-East Africa for eight months before starting her master Design for Interaction in 2005. In 2007 she received her master's degree with honours and started her PhD in 2008.

In her research Nynke aims to develop the knowledge for designers to design the implicit influence of design in order to facilitate pro-social behavior. This knowledge allows designers to contribute positively in counteracting the pressing social problems we face today, like obesity, depletion of resources, or immigration issues. Her multidisciplinary thesis work, bridging design theory, social psychology and philosophy of technology, received national and international acclaim as a pioneering effort to capture the –often implicit- influence products have on our (social) behaviour. Nynke is currently under negotiation with Berg publishers to publish her thesis.

Nynke has presented her work at various international conferences (e.g. IASDR, 2009; DTRS Sydney, 2010; D&E London, 2012) and in several invited lectures for a.o. Design by Fire (2011), HP conference day (2012). Nynke has (co)organised a 3TU PhD-Event and the 'Food for Thought'-symposia, including a debating workshop for PhD students, as part of Promood (2009-2010). Additionally she organised a Product Impact Symposium (2010), and held workshops/master classes related to her research, e.g., at the Design for Usability Symposium (2009) and at the Architectural Institute in Rotterdam (AIR, 2012).

Since 2011 Nynke combines her PhD study with a part-time function as a designer at design agency KVD/reframing in Amsterdam. She has developed products for social challenges like organ donation, political engagement of citizens, and recovery from psychosis.

Nynke is member of 'Redesigning Politics', a creative think tank aiming for redesigning the thinking, institutes, structures and interaction in the field of politics. In 2012 she presented one of their ideas at TEDxDelft in 2012 which was selected by the TED organization as TEDx-talk of the week.

Recently, Nynke initiated the Social Design Community (www.socialdesigncommunity.com), a platform to disseminate knowledge about social design to both academics and practitioners. On this website, she summarizes and criticizes recently published work on social design to professionalize and advance the field.

Tromp, N., Hekkert, P., & Verbeek, P.-P. (2011). *Design for Socially Responsible Behaviour: A Classification of Influence Based on Intended User Experience.* Design Issues, 27(3), 3-19.

Tromp, N., & Hekkert, P. (2012). Designing Behaviour. In J. Donovan & W. Gunn (eds), *Design Anthropology*, Ashgate.

Tromp, N. & Hekkert (2012) *Social Design – Or how products can help us act in favour of society.* Proceedings of the 8th International Design & Emotion Conference 2012, London (UK).

Tromp, N., & Hekkert, P. (2010). *A Clash of Concerns – Applying Design Thinking to Social Dilemmas*. Proceedings of DTRS08, Sydney, Australia, 393-403.

Tromp, N., & Hekkert, P. (2009). *Design for Society – Bridging User Concerns with Societal Ones through Implication Design.* Proceedings of IASDR 2009, Seoul, Korea, 4291-4294.

Vermaas, P.E., Hekkert, P., Manders-Huits, N, & Tromp, N. (in review). Design Methods in Design for Values. In: Van den Hoven, M.J., Van de Poel, I.R., Vermaas, P.E. (eds) *Handbook of Ethics, Values, and Technological Design - Sources, Theory, Values and Application Domains* (2013).

Singh, G., & Tromp, N. (2011). Design, Meanings and Radical Innovation: Designing for An Informed Future Context. Proceedings of IASDR 2011, Delft, The Netherlands

Tromp, N. (2012) *Ontwerpen voor gedragsverandering om bij te dragen aan een betere maatschappij.* Tijdschrift voor Ergonomie 37(2), 5-10.

Tromp, N., Hekkert, P., & Van Dijk, M. (2010). *Toekomstig Mobiel Werken – Een visie vanuit het sociale systeem*. Onderzoek uitgevoerd voor Politie Nederland.