Ethical Challenges in Emerging Applications of Persuasive Technology

Jelte Timmer[(✉)], Linda Kool, and Rinie van Est

Rathenau Instituut, Anna van Saksenlaan 51, 2593HW, The Hague, The Netherlands
{j.timmer,l.kool,q.vanest}@rathenau.nl
http://www.rathenau.nl

Abstract. Persuasive technologies are gaining ground. As they enter into society they are being applied in more situations, and integrated with other technologies in increasingly smart environments. We argue that this development creates new challenges in designing ethically responsible persuasive technologies. Applications in social contexts like work environments raise the questions whether persuasion serves the interests of the user or the employer, and whether users can still voluntarily choose to use the technology. Informing the user and obtaining consent become complicated when persuasive systems are integrated in smart environments. To ensure that the autonomy of the user is respected, we argue that the user and provider should agree on the goal of persuasion, and users should be informed about persuasion in smart environments.

Keywords: Persuasive technology · Ethics · Autonomy · Smart environments

1   Introduction

Over the past years there has been growing interest in design strategies to change people's behavior. Governments are setting up 'nudging units' – such as the UK behavioral insights team – to design tax forms to increase payment rates [1]. And companies like Nike are employing badges and other game design features to stimulate Nike+ members to exercise more.

Such efforts can be described as persuasive technologies, defined by B.J. Fogg [2] as a brand of technologies designed explicitly to influence and change people's behavior or attitudes. Persuasive technology integrates insights derived from psychology and cognitive science into the design of information systems. We encounter persuasive technologies in cars, where ecodrive systems assist users in adapting environmentally friendly driving styles. Or in personal health, where apps like *RunKeeper* encourage users to exercise more. And even in personal finance where software like *You Need a Budget* promote a responsible approach to personal finances.

The use of persuasive technologies has inspired discussions about how persuasive technologies ought to be designed responsibly. The ethics of persuasion has been an important issue in persuasive technology since it's early development [3] Important questions are: who benefits from the employment of a given persuasive technology?

Are persuasion strategies employed considered ethically responsible? As noted by Fogg [2] and others [3,4] there is a tension between persuasion and coercion or even manipulation. Spahn [4] defines this as the fundamental ethical question with regard to persuasive technologies. The relation between persuasion and autonomy is complex and a subject of discussion in many studies on ethics of persuasion [4,5].

To ensure ethically responsible design of persuasive technologies, guiding principles have been put forward by different authors [3,4]. The user should, for instance, always be informed about persuasion and should consent to being subjected to it [4]. Simply stated, as long as the user is 'free' to choose his goals and methods of persuasion of his own accord his autonomy is respected.

These principles hold when the individual has the ability to make an informed decision of his own. However, the ongoing development of persuasive technologies poses a challenge. Persuasive technologies are increasingly applied in a 'collective' setting, in which others, such as employers, stimulate or even mandate the use of persuasive technologies. For example, the oil-company BP has made activity trackers available to its staff [6]. In such collective situations it might be harder for the individual to make an autonomous choice about the goals he is being persuaded to, or whether he consent to the use persuasive technologies.

The expansion of persuasive technologies to new forms and contexts of application gives rise to new questions for designing ethically responsible persuasive technologies. We will discuss the application of persuasion in collective situations like the work environment (which we call **proliferation**), and discuss the **integration** of persuasive technologies with ambient intelligence and the internet of things [7].

We will describe the proliferation and integration of persuasive technologies using a number of examples. These examples show how persuasive technologies are used in different contexts, and can be used to explore the social and ethical impacts of these emerging applications of persuasion. We will conclude with a discussion of what is needed to safeguard autonomy in these new applications of persuasive technology.

2   Proliferation

As persuasive technologies move from research applications to the market, the range of contexts in which they are employed expands. Use scenarios of persuasive technologies tend to focus on the interaction between the user and the technology – i.e. an individual driver being persuaded to drive safer. But when we move to the market, the social context becomes more important. We cited the example of BP that has made Fitbit activity trackers available to its staff as part of its wellness program. Employees were challenged to join the 'Million Step Challenge' to earn wellness points which could be used for cuts in health insurance expenses [6]. BP is not alone; an increasing number of companies is stimulating the use of activity trackers by their employees and health insurers have initiated insurance schemes that promote the use of persuasive activity trackers for lower premiums. Compen, Ham & Spahn [5] describe an example of a persuasive technology for energy saving employed in a collective setting. Daimler Fleetboard is a system that uses GPS in trucks to enable fleet managers

to analyze fuel consumption and driving style. This information is fed back to the truck drivers to persuade them to drive more fuel efficient. However, the fleet manager can also access the information for other goals than fuel saving [5].

In these new social contexts the provider of the technology (the employer or insurer) plays a crucial role when we want to assess whether the autonomy of the user is respected. In the case of BP, the fact that the user is offered the Fitbit as part of the company wellness program has influence on the users decision whether or not to use that technology, and on the extent to which he is able to choose his own goals.

These applications of persuasive technologies in a collective rather than an individual context, show that the proliferation of persuasive technologies gives rise to new questions. Who defines the goal and who benefits from the persuasion? Can the user still make an autonomous choice regarding the use of persuasive technology? This translates to the discussion of two dimensions in this paper: 1) the degree in which users agree to the goal of persuasion, and 2) the degree to which he can freely choose to use persuasive technology, see Table 1. We will argue that as we move to the bottom right corner of the table, persuasion becomes ethically problematic.

Table 1. Two dimensions of issues in emerging persuasive technologies

	Agreement on goal	No agreement on goal
Voluntary		
Mandatory		

2.1   Goals

To design an ethically responsible persuasive system, Spahn [4] notes that it should grant as much autonomy to the user as possible. For instance through setting his own goals, or by determining the persuasive strategies a system is allowed to use. In our two examples it becomes clear that in a collective situation the user will not always be able to determine his own goals. Rather, the provider – in this case the employer or fleet manager – determines the goals for the user.

The user and provider may share the same goals. The employee partaking in the wellness program will most likely be looking for ways to improve his health. And the driver using Fleetboard may have a shared interest in reducing his carbon footprint. Ideally, both parties would then profit equally, but their interests might also diverge. The actual goal of the fleet manager might not so much be reducing the carbon footprint, but saving money by maximizing fleet efficiency. What is promoted to the driver as a technology to increase sustainability, can be employed for other uses, like monitoring the behavior of the driver, his breaks and downtime [5]. This is also called *function creep*, a system put into place for one goal is repurposed for another goal. Had the driver known the Fleetboard system would also be used to monitor his behavior, he might not have consented to it.

When user and provider don't share the same goals, it is important whether the user is can refrain from using the persuasive system. For the Fleetboard driver this means that he would be able to stop participating in the program if he disagrees with the goals

set by the provider. However if an employer would mandate its use, this would mean a violation of his autonomy. Persuasion would shift towards coercion since the user is persuaded to a goal he doesn't agree with. This brings us to our second dimension: the degree to which the use of a persuasive system is voluntary (2.2).

2.2   Voluntariness

When persuasion is offered in a collective setting this may affect the degree to which a user can voluntarily choose for persuasion. In the example of BP, the wellness program and the "Million Step Challenge" are voluntary. However, factors such as group pressure in a work environment, or implicit norms can influence the degree in which the user is truly able to make an autonomous choice. The inherent asymmetric power relationship between employers and employees impacts the user's level of autonomy. In addition, Morozov [10] asks if wellness programs with the added bonus of cuts in health expenses, can really be considered voluntary. He explains that for people on a tight budget it might not be much of a free choice, since they need to participate in order to qualify for indispensable health benefits.

As outlined above it is conceivable that a provider would mandate the use of a persuasive technology. An employer could mandate participation in the corporate wellness program, or a government could mandate a persuasive smart metering system. This can be considered an infringement of the autonomy of the user. This is especially problematic when the user and provider do not agree on the goal of persuasion. The question is whether the benefits are such that the infringement is justifiable. Where persuasion is mandated by a central agent – e.g. an employer, a health insurer or government body – critical scrutiny is necessary, as well as careful consideration of the ways in which autonomy can be respected. Mandatory persuasion should not be considered lightly. The Dutch Council for Social Development recently published an advice for the Dutch government in which it states that collective applications of persuasion or nudging should be approached cautiously, and require transparency about the methods of persuasion and an open discussion about the goals being pursued [9].

3   Integration

When considering emerging applications of persuasive technologies we also have to be aware of other developments in technology that intersect with persuasive technology. In 2003 Aarts and Marzano [10] projected their vision for the future of information technology entitled ambient intelligence. Technology would integrate with our surroundings and fade into the background. Everyday technologies would be able to communicate with each other and intelligently interact with users. Following their vision technology would become: embedded; environmentally aware; personalized; anticipatory; and adjustable to environment and user.

Developments around what is referred to as the Internet of Things are bringing the ambient intelligence vision a step closer to reality. The consumer market is seeing more 'smart' devices that are able to connect to the internet, are equipped with sensors,

and can interact with the user or other devices. Examples are Philip Hue Lightbulbs, Nest Thermostats, smart TV's, and Apple's software platform HomeKit.

Persuasive technology can integrate or hatch on to these smart environments. This means they will also move into the background and become less explicit to the user. The networked nature of smart devices also enables persuasive technologies to connect and interact with these devices, enabling feedback to become multimodal. A scenario could be a persuasive system that is designed to help a user sleep better, it could comprise of an app and wristband measuring sleep quality, and could interact with the smart TV and smart lighting. Giving feedback via TV that the user should prepare to get to bed, and adjusting the lighting to a more sleep-inducing color.

The integration of persuasive technology with ambient intelligence raises new questions for ethically responsible persuasion. Maan et al [11] have shown that it is possible to influence people using low-cognitive light feedback. These types of *ambient persuasion* can enable situations in which the user is being influenced without consciously being aware of it. This limits the capability of the user to evaluate and reflect on the persuasion and its goals and whether he consents to those.

When things happen effortlessly and in the background, there are fewer naturally occurring moments of interaction between the user and the system to ensure the users consent. Therefore keeping the user informed is very important [12]. For instance when data transfers happen in the background it is important to inform the user about how data is collected and shared with other applications in a smart environment. Transparency requires extra effort in these situations.

This is not only important in securing consent and respecting the users autonomy, it is also important in keeping the system understandable for the user. The fact that technology becomes networked and these processes operate in the background can make a system hard to understand and to trust. Research in virtual training software suggest that designing technology as an *explaining agent* might help to inform users and establish trust [13].

4   Conclusion

We have discussed how the proliferation and integration of persuasive technology create challenges for the design of ethically responsible persuasive technology. We conclude that the social context in which persuasive technology is employed is becoming more important. When thinking about the ethics of persuasion we need to move beyond scenarios of user and technology and include the context of the provider of the technology. Methods like Value Sensitive Design and Participatory Design could provide a valuable way of taking these stakeholders into account [14].

As we have seen the provider is able to define goals or mandate the use of a persuasive technology, giving rise to new ethical dilemmas. We assert that mandatory persuasion should be avoided or approached cautiously. Open discussion and agreement on goals, methods and interests of user and provider should be ensured. Transparency about the interests of different stakeholders involved is essential. Compen, Spahn and Ham [5] plea for an 'information leaflet' to inform the user of methods and goals of a

persuasive system. As more collective applications of persuasive technologies emerge - for instance in healthcare and insurance - research is needed on the role of these third parties as providers of persuasion and how they impact the users autonomy. Both designer and provider will have a responsibility here.

The integration of persuasive technology with ambient intelligence offers new possibilities for multimodal persuasive systems, but also create a more complex environment in which persuasion moves into the background. This complicates conscious deliberation and reflection by the user. In order to remain trustworthy a challenge lies in creating systems that can inform and explain their behavior to the user.

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