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Reinforcing the Attitude-Behavior Relationship in Persuasive Game Design

Four Design Recommendations for Persuasive Games for Societal Interventions

Annebeth Erdbrink(✉), Rens Kortmann, and Alexander Verbraeck

Delft University of Technology, Jaffalaan 5, 2628 BX Delft, The Netherlands
a.e.erdbrink@tudelft.nl

Abstract. Persuasive games for societal interventions aim to shape, reinforce or change players' attitudes and behavior to help solving complex societal issues. In earlier work, we explored how persuasive game mechanics may contribute to the formation of attitudes in persuasive games. As a follow-up, this paper presents four design recommendations that could increase the chance that these attitudes will actually lead to the desired behavior shown by players after the game: viz., these attitudes require the right conditions to become a predictor of the desired, post-game behavior.

In order to arrive at these recommendations we looked at relevant work from the field of social psychology. Next we linked our insights to the context of persuasive game design. This yielded four conceptual design recommendations for maximizing the likelihood for an attitude influenced by a persuasive game to result in the desired behavior in the real world;

1. aligning the degree of specification of a game's message and the desired behavior
2. emphasizing the function of the attitude to be influenced
3. enabling players to reflect on their internal states
4. emphasizing personal relevance of an attitude to a behavioral choice

So far, these recommendations are still theoretical in nature. We therefore discuss how future work should empirically examine these, including their implications for the effective use of persuasive game mechanics.

Keywords: Persuasive games · Societal interventions · Persuasive game design · Attitude-behavior relationship

1 Introduction

Policymakers at all different levels are concerned with grand societal challenges such as public health, food safety, climate change, clean energy and smart transport [1]. In order to tackle these challenges public administration has three different types of strategies at its disposal: regulatory (rights and prohibitions), financial (taxes, levies, subsidies) and communicative (information and public campaigns) [2]. A notable

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application within this communicative strategy is the use of games to increase awareness amongst involved stakeholders concerning certain challenges in complex systems [3]. These games can effectively contribute to the process of social problem solving because they can produce interactive learning environments [4].

An increased interest exists in games that aim for more than just informing about complex societal issues; they aim to influence the attitude or behavior of its players concerning these matters [5]. From changing the attitude towards homeless people [6] to improve home energy behavior [7]. These games are generally referred to as 'persuasive games', since they are explicitly designed with the goal to shape, reinforce or change players' attitudes and behavior that exists beyond the gaming session [8].

In the pursuit of secure, inclusive, and reflective societies, it seems only logical that persuasive games often aim to reach a broad variety of citizens. In that way persuasive games can support civic engagement, which is considered "instrumental to democracy" [9]. However, unfortunately their accurate design still involves many ambiguities [10, 11].

According to Bogost [12] games can persuade due to the rhetoric that is embedded in a game's system and rules. Further analyzing the dynamics of persuasive game design beyond this proceduralist view, De la Hera [8] presented a more holistic view of persuasive elements. In her conceptual model several persuasive "dimensions" are described through which games can channel persuasion; such as through sounds, text, narrative and emotions.

Although this research is very valuable for game analysis, from a more practical point of view there are still a lot of unanswered questions concerning the effective design for persuasion through games [11]. Next to the fact that some useful methods are proposed for the overall design process [10, 13], there is still notably little practical knowledge on how to effectively implement persuasive game mechanics in the design [13]. Since game mechanics can be considered the key drivers of a game's success [14], new knowledge on persuasive game mechanics will benefit the discipline by reducing the risk of their ineffective or even counterproductive implementation [15]. As there is still limited empirical evidence available to prove the overall effectiveness of persuasive games, this focus of research seems to be even more relevant [16].

Previously we already explored how persuasive game mechanics can either enhance or reduce the motivation and/or ability of the player to comprehensively evaluate the persuasive message of the game [17], based on the Elaboration Likelihood Model [18]. Expanding these insights concerning persuasive game design and attitude formation, this paper subsequently focuses on design recommendations concerning the right conditions under which attitudes become predictors of the desired behavior after the game.

Because one cannot assume that a persuasive game that effectively generates a desired attitude formation automatically leads to the subsequent desired (long-term) behavior. The influence of attitudes on behavior is in fact by no means simple and direct [19]. According to the well-known Theory of Planned Behavior [20] for example attitudes can help predict someone's intention to behave in a certain way, which in turn is related to performing that behavior. Besides the relationship between attitudes and behavior is unfortunately by no means always demonstrable [21].

This paper therefore focuses on the formulation of design recommendations that could increase the attitude-behavior relationship of persuasive games for societal interventions. Through a literature study in the field of social psychology (with attitude/behavioral change as a key research area), several possible predictors of the attitude-behavior relationship were identified. Next we linked these psychological insights to the context of persuasive game design in order to provide four conceptual design recommendations for maximizing the likelihood for a (new) attitude to result in the (long-term) desired behavior in the real world. Finally conclusions, as well as limitations and suggestions for future research are discussed.

2 Four Design Recommendations to Reinforce the Attitude-Behavior Relationship

To a large extent persuasive games can be considered as part of Persuasive Technology, a class of technologies "*intentionally designed to change a person's attitude and/or behavior*" [22]. Remarkably this 'and/or' part is rather undefined and unsubtle. It therefore seems that the substantial attitude-behavior relationship that is inherent to long-term persuasion seems ignored in Persuasive Technology [11]. Within persuasive game design it is also often not specifically described and explained if the design of a persuasive game aims to influence a certain attitude, certain behavior or even both and why this is the case. This seems a rather unfortunate situation, because this indiscriminate vision could influence the design choices and thus eventually lead to potentially disappointing results concerning the often intended long-term outcomes of the game session(s).

In response to this issue we claim that the design of persuasive games should in principle focus on shaping, reinforcing or changing the attitude of the players concerning the persuasive message of the game. In persuasion theory and research persuasion is in fact conceived as fundamentally involving attitude change [19]. So even if the ultimate goal of a persuasive game is specific long-term behavioral change to occur after the gaming session, one cannot ignore the formation of the subsequent attitude that goes with that desired behavior. Additionally from a more practical perspective Jacobs [23] even argues that persuasive games should specifically focus on attitude formation because they are "*inherently incapable of physically forcing players to perform behaviors, not during play sessions and afterwards*".

With our legitimate focus on attitude formation, we conducted a literature review in the field of social psychology as a theoretical basis for our design recommendations. Before these recommendations are described in the following paragraphs of this section we firstly specify how we conducted this literature study in the next paragraph.

2.1 Review Methodology

In order to formulate design recommendations that could increase the attitude-behavior relationship of persuasive games for societal interventions, we conducted a literature review in the field of social psychology (with attitude/behavioral change as a key

research area) to extract several possible predictors of the attitude-behavior relationship.

Search Strategies. Two different search strategies were used: a conventional database search and backwards snowballing. For the database search we compiled relevant search terms regarding the right conditions under which attitudes become possible predictors of the desired behavior after the game. These search terms were based on personal knowledge. For the second search strategy we searched for relevant references and citations in other papers.

Databases and Keywords. For the review the databases of Delft University of Technology and Scopus were used. The following keywords and combinations were used for the database search: ("attitude-behavior" AND "relationship")/("attitude-behavior" AND "consistency")/("attitude" AND "predictor" AND "behavior").

Selection Criteria. Literature was selected based on the following criteria:
1. it described social psychological studies/theories 2. it contained empirical findings concerning the conditions under which attitudes could become predictors of behavior 3. findings seemed to be applicable in a persuasive game design context 4. it was published post-1970. 5. it was written in English.

As expected, our initial search with the above described keywords and combinations provided thousands of articles. However, based on selection criteria 2 and 3, we concluded that the majority of these articles were not relevant for the specific focus of this paper and were thus excluded from this literature study. Within the remaining selection of literature lots of overlap was found; the same principles and researchers were repeatedly referred to. This convinced us that there is a fairly small group of possible predictors of the attitude-behavior relationship, but each with a strong argumentation. Based on the selection criteria we eventually selected only 7 relevant papers and 3 books for the theoretical foundation on the basis of which the aimed recommendations could be drawn up. This review finally resulted in the following four conceptual design recommendations based on the psychological insights we collected, as described in the next paragraphs of this section.

2.2 Aligned Degree of Specification of Game's Message and Desired Behavior

The first insight concerns the correspondence between attitudinal and behavioral measures. This might sound like an open door, but it is often easily overlooked in the design of persuasive games. Whether one finds consistency between an attitudinal measure and a behavioral measure depends in part on the nature of the measures involved [19]. According to the *correspondence principle* [24] close attitude-behavior correlations can only be expected if both measures agree in their degree of specification. In other words, specific attitudes predict equally specific behaviors.

When applied in the context of persuasive game design, this principle shows that the level of the persuasive message of the game (that should influence the attitude) should be presented at the same specific level as the intended behavior to occur after the game. An example: when one designs a persuasive game that aims to positively

influence the attitude of players concerning the sustainable consumption of energy, one has to be very clear about what specific behavior concerning this consumption is desired and the specific attitude and thus message that goes with it. The goal of the game for example could be to persuade people to wash their clothes less often than they are used to. In that case, simply positively influencing the general attitude of sustainable energy use with a corresponding general persuasive message in the game would probably not achieve the desired result according to this principle. Simply because the degree of specification of the game's message is not aligned with the desired behavior. In this case, the recommendation would then be to adjust the game's message from a general one about sustainable energy use into one that specifically says that one should wash their clothes less often than they are used to.

2.3 Emphasizing the Function of the Attitude to Be Influenced

In order to effectively change a particular attitude is it useful to know which specific function it serves. Two main attitude functions that can be seen as the essence of different theoretical approaches are: 1. serving knowledge organization and guiding approach and avoidance (utititarian) 2. serving higher psychological needs (value expressive, social adjustive) [21].

Attitudes and behavior are more closely related if those aspects of the attitude that are highly accessible at the time of attitude measurement are also accessible at the time the behavior is performed, also known as *functional matching hypothesis* [25]. This implies that attitudes will more strongly predict behavioral intention if the emphasized attitude function matches the function that is normally associated with the attitude object. If we apply these insights in the context of persuasive game design, this could imply that the relevant function of the attitude must be made salient in the game. This is only possible if you actually know what that function is (through for example target group research). In some cases this is easier than in others. Besides an attitude can have several functions at the same time and the functions can also differ per individual [21].

But if we look again at the example of the persuasive game concerning the sustainable consumption of energy this could mean that emphasizing the knowledge function of the attitude towards sustainable energy consumption would not increase the likelihood of the desired sustainable behavior as much as making the value-expressive function of that attitude salient in the game (through the persuasive message of the game). If, of course, indeed the great value that someone attaches to a sustainable world is more salient than new knowledge about sustainable energy consumption at the moment the sustainable behavior should be performed.

2.4 Enabling Players to Reflect on Their Internal States

There are several personality traits that have been linked to individual differences in attitude-behavior consistency. In our earlier work [17] we already mentioned the role of the trait *need for cognition* in attitude formation and change. People high in need for cognition are believed to form stronger attitudes that are highly resistant to change and predictive to behavior because they tend to think more deeply about things and therefore put more effort in processing a persuasive message [26]. We concluded

however that within the context of persuasive game design no design mechanic could indirectly enhance the motivation of the player to elaborate on the persuasive message of the game by influencing the *need for cognition*, being a personal trait. But interestingly the effects of two specific traits; *self-monitoring* and *self-awareness,* can function as an implication for effective persuasive game design. They are both namely considered to affect the relative importance of attitudes in guiding behavior. People low in self-monitoring, whose social behavior is generally more reflective of their internal states [19, 27], show higher attitude-behavior correlations than people in high self-monitoring. The latter are more guided by situational demands and the expectation of others. For people high in self-awareness a closer attitude-behavior relation is found as well [28]. They also tend to focus more on their internal states, including their attitudes. Therefore their attitudes are more likely to be accessed and used for decisions concerning the related behavior.

In terms of persuasive game design this could mean that the relation between the aimed attitude formation by the game and the desired resulting behavior after the gaming session would be stronger in case the game enables the players to reflect on their internal states, including their attitudes. In the context of the prior example of the persuasive game that aims to positively influence the sustainable consumption of energy that would imply that the game should enable players to think about their current energy consumption and to what extent it is sustainable (like "*What types energy am I using?*/"*For what purposes and how often?*"/"*To what extent are my choices sustainable?*" etc.) and make them reflect on their current attitude towards this topic (like: "*How important is sustainable consumption of energy for me?*"/"*What do I think about my current consumption of energy?"* etc.).

2.5 Emphasizing the Personal Relevance of an Attitude to a Behavioral Choice

Whether one will act consistently with their attitudes depends in part on whether those attitudes are perceived as relevant to their behavioral choices [19]. So one last factor influencing the attitude-behavior relationship that will be described is the perceived relevance of the attitude to the action.

According to the Elaboration Likelihood Model [18] high motivation and ability support the formation of attitudes through effortful processing of all potentially relevant detail information, whereas either low motivation or low ability leads to lower effort in processing the persuasive message and thus evaluations based on simple rules. Earlier we concluded that persuasive games should focus on the first so called 'central route' to attitude formation because attitude change is considered to be the most resistant and enduring via this route [17]. These different routes however have also been linked to different degrees of attitude-behavior consistency [21]. Attitudes that are formed via the central route are considered more predictive of behavior than those via the so called peripheral route [18].

Specifically the role of personal relevance plays an important role here. Attitudes of people who process a persuasive message under conditions of high personal relevance are considered more predictive of behavior than those of people who process under conditions of low relevance [29]. In general, "*it may be only when individuals explicitly*

define their attitudes as relevant and appropriate guides to action that they can be expected to turn their general attitudinal orientations for guidance in making their behavioral choices" [30].

So for a persuasive game it seems important to make the player aware of the personal relevance of the concerned attitude to the desired action. This implies that a persuasive game should emphasize the personal relevance of the (possibly already existing) attitude to a behavioral choice. Like with the earlier example of the persuasive game about sustainable energy consumption, this implies that the game should emphasize the personal relevance of the player concerning sustainable energy consumption. If this is not emphasized in the game, it could be possible that although the player might belief sustainable energy is important for society, he/she will still not personally make sustainable choices concerning energy use since the personal relevance it not made salient.

3 Conclusion, Discussion and Future Work

In this paper we aimed to formulate conceptual design recommendations that could increase the attitude-behavior relationship of persuasive games for societal interventions. Through a literature study in the field of social psychology, several possible predictors of the attitude-behavior relationship were identified and then linked to the context of persuasive game design. In this way, the following design recommendations for maximizing the likelihood for an attitude influenced by a persuasive game to result in the (long-term) desired post-game behavior were presented:

1. aligning the degree of specification of a game's message and the desired behavior
2. emphasizing the function of the attitude to be influenced
3. enabling players to reflect on their internal states
4. emphasizing the personal relevance of an attitude to a behavioral choice

These design recommendations can contribute to the overall effectiveness of a persuasive game because through their application they enable the right conditions for the attitude to be influenced by the game to become a predictor of the desired, post-game behavior. So far persuasive game design is often based on insights from Persuasive Technology [22], where the substantial attitude-behavior relationship that is inherent to long term persuasion seems to be ignored. With this paper we aim to contribute to a broader, nuanced view on the effective design of persuasive games for societal interventions.

It should be highlighted however that in this paper we specifically focused on improving the persuasive effects of a persuasive game through reinforcing the attitude-behavior relationship and left out the engaging aspects that might also contribute to the overall persuasive power of the game.

We also realize that the attitude-behavior relationship is very complex and therefore very difficult to control. In this paper we only looked at increasing the chance that attitudes influenced by a persuasive game could lead to the desired behavior after the game. But we must emphasize that not only attitudes can be predictors of the desired behavior, other factors play a role in this process as well; like norms and expectations

of the social environment, the extent to which people think they can carry out the desired behavior and affective determinants of the behavior [19]. This means that a persuasive game for a societal intervention can never guarantee to result in the desired societal change alone, but should be deployed as part of a larger intervention next to other strategies to tackle grand societal challenges.

Although this paper provides interesting insights from social psychology to the field of persuasive game design, we must also stress that so far this work is limited through its theoretical nature. Future work should therefore consist of empirical studies where the proposed conceptual design recommendations are applied in different persuasive games for societal interventions, with pre- and post-attitude measurements and post-game long-term behavior measurement. Automatically within these future studies it could be investigated what these design recommendations imply for the effective implementation of popular persuasive mechanics such as *simulation*, *comparison*, *suggestion* or *customization* [31]. For example *comparison* could potentially be used to emphasize a possible social adjustive function of an attitude and *customization* for emphasizing the personal relevance of an attitude to a behavioral choice. Results from this empirical research should ultimately contribute to the overall effectiveness of persuasive games for societal interventions, so these games can become impactful tools to reach a broad variety of citizens and enable civic engagement.

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