

# An Avatar Creator as a Tool for Constructing a Personalized Persuasive Profile

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## Abstract.

Several scholars have argued that it can be more effective to tailor the persuasive approach to different individuals, by personalizing the way by which a system attempts to influence user's behavior. Here we discuss how gamification can be used to construct a user profile that predicts the susceptibility of the user to different social influence approaches. We describe the design concept and the experimental evaluation of an avatar creator application which collects data on susceptibility of users to Cialdini's principles of influence to enable personalization of persuasion.

**Keywords:** Social influence, Gamification, Persuasion profiling, Tailored persuasion, Individual differences

## 1 Introduction

The effectiveness of self-monitoring and quantified-self applications designed to support healthy living and health interventions depend upon sustained engagement with the application (e.g. [1]). Ensuring engagement is thus a key challenge for designers of such systems and arguably one of the grand challenges for research in the field of persuasive technology. To achieve this aim researchers turn to theories such as social cognitive theory [2] [3], behavioral change theory [4] or decision making theory [3] to draw users into regular and long-term use. This approach has produced some encouraging results, like in case of use of well-timed or pleasantly worded reminders [5] or employment of goal setting [6]. Theories and models of behavior change and persuasive communication are known to be effective overall, meaning that in a given population they produce a positive effect on average. However, it has been noted how for a particular individual any one of these approaches may not work or may even produce the opposite effect to what was intended by the designer [7]. Personalization and tailoring the motivational approach to each individual user could be the way to address these individual differences.

There are many frameworks on which a personality profiling can be based. Following the work of Kaptein et al., [8] we exploit the framework proposed by Robert

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Cialdini [9] which identifies six influence strategies, a much shorter list than the frameworks provided by Fogg [10], Kellermann and Cole [11], or Rhoads [12]. Cialdini's six principles of influence, which are very popular, specifically in the domain of electronic retail, can be summarized as follows:

- Authority - having more trust in things that are recommended by an expert or other authority
- Consensus - having more trust in things that are popular or endorsed by people that we like
- Consistency and commitment - tendency to stick with something which we already have chosen or committed to do
- Scarcity - being drawn by things that are hard to get or are hard to come by
- Liking - tendency to comply with requests made by people we like
- Reciprocity - the need to pay back what we received from others

Following the approach by Kaptein et al. [8] a persuasion profile models how likely a user is to be persuaded by each of the six strategies above. A system aiming to support behavior change can personalize its persuasive approach by tailoring persuasive messages to fit this profile. For example, if a user is more susceptible to persuasive attempts using the consensus principle then the system might attempt to persuade this user by mentioning that other users are also engaged in the desired behavior.

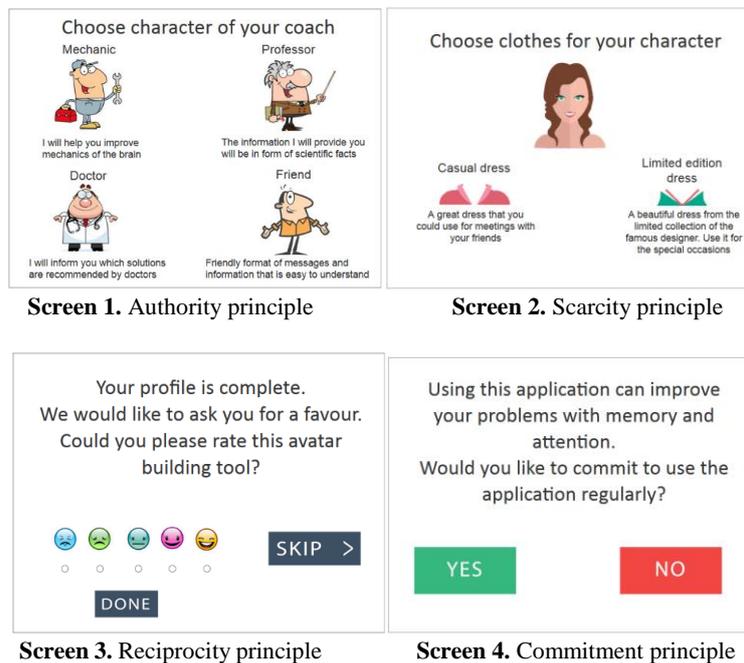
The simplest way to measure users' susceptibility to influence principles is with the use of a classic psychometric survey. Kaptein [7] developed the Susceptibility to Persuasive Strategies questionnaire (from now on STPS) that measures susceptibility to each of Cialdini's principles. The problem of this approach, which is inherent to questionnaire instruments, is the respondents' lack of engagement with questions – surveys can be perceived as boring and various phenomena such as satisficing or social desirability bias may lead to erroneous responses.

In order to make explicit profiling more pleasant and thus avoid these phenomena we examine how to make explicit user profiling a more engaging and playful experience. Specifically we examine whether the profiling can be presented to users in the playful form of an avatar creation tool. By configuring an avatar of a coach/guide that will be featured in the coaching application and an avatar of himself/herself, indirectly provides self-report data on his/her susceptibility to Cialdini's principles. We report how the transformation from the STPS into an avatar creation tool was conducted through a user-centered design process that seeks to enhance the engagement with a coaching application addressing mild-cognitive impairment in the elderly. The rationale behind the avatar creation tool is twofold: a) increasing engagement with the STPS questionnaire through gamification, b) increasing engagement with the coaching application by introducing avatars. Research indicates that for certain groups of users, particularly the elderly, the avatars of a coach and of the user promote regular use through increased engagement with the application and by creating a bond with the avatar characters [13–16].

## 2 Design of a persuasion profiling avatar builder

The concept of an avatar-building tool, as a way of constructing persuasion profiles, has been conceived as part of a larger project aiming to create a coaching application for elderly users with mild cognitive impairment. The aim of this application is to provide alternative strategies to memorize information. While the persuasion profile is intended for the specific coaching application, it can be applied in different contexts where persuasion profiling in terms of the susceptibility to Cialdini's six influence strategies can be useful.

The core idea behind the tool is that the user by making choices pertaining to the avatar of a coach or of an avatar of himself/herself, or by answering related questions, will provide data on his/her susceptibility to persuasion. The core concept of the avatar of a coach is covered by a screen in which the user is asked to choose an avatar of the guide that will appear in the remaining parts of the application. Choices of the avatars reflect Cialdini's authority principle (Fig.1 Screen 1). Then the user chooses the avatar of herself/himself - choices for the avatar's clothes correspond to the principles of susceptibility and scarcity principle (Fig. 1 Screen 2.). Reciprocity, consensus and commitment (here represented by Fig.1 Screen 3 and 4) are represented by ancillary questions that follow the choice of avatars.



**Fig. 1.** Example screens from the avatar creator tool. **Screen 1** and **Screen 2** represent choice tasks and **Screen 3** and **Screen 4** represent questions.

### 3 Methods

In order to validate the avatar as a persuasion-profiling tool, we conducted a survey using crowdsourcing that aimed to establish how choices made during the construction of the avatar correlate with corresponding responses to the STPS inventory. 150 participants were recruited through Microworkers crowdsourcing platform. Crowdsourcing was selected as a recruitment strategy due to the fact that correlation analysis requires a high number of participants and crowdsourcing offers possibility of recruiting large sample in a very short time frame. The participants were paid \$0.55 for completing the task, which took approximately 10 minutes.

A prototype avatar creator application was created using Axure. The prototype was then uploaded onto a crowdsourcing platform called Microworkers to test whether responses obtained with the avatar creator correlate with the survey responses from the classic STPS questionnaire. In the prototype only five of Cialdini's principles were gamified as the principle of liking proved to be too difficult to transpose effectively in the avatar creator context.

The crowd workers participating in the study were first asked to complete the avatar creator and then to fill in the STPS questionnaire. The data collected was used for correlation analysis between the replies from the avatar creator questions for each principle and average score calculated from the group of questions covering each principle in the STPS questionnaire.

Inside the avatar creator tested subjects were asked to either complete choice tasks or answer questions. Examples of the choice tasks and questions are shown in Fig. 1.

### 4 Results

For the whole dataset Cronbach's  $\alpha = 0.859$  (coefficient omega = .852, 95% CI [.80, .89]), which indicates high reliability of data. When analyzed per persuasive principle, most had Cronbach's  $\alpha > 0.7$  (coefficient omega  $> 0.7$ ). Only the principle of scarcity was below this level with Cronbach's  $\alpha = 0.579$  (coefficient omega = .596, 95% CI [.47, .69]).

The scarcity principle also proved to be problematic when analyzed through exploratory factor analysis: When all principles were included, the factors were far from the grouping of principles. When the scarcity principle was removed the grouping matched closer to the grouping by principles. We tested data for correlations between choices made with the avatar creator and the corresponding subscale scores obtained through the STPS. Prior to the analysis data from the STPS questionnaire was tested for normality. Only scarcity was normally distributed, all the other principles significantly deviated from normality. Therefore, the Spearman correlation test was performed on the authority, reciprocity, commitment and consensus principles and Pearson correlation test on the scarcity principle.

**Table 1.** Results of correlation analysis between the replies from the avatar creator questions for each principle and average score calculated from the group of questions covering each principle in the STPS questionnaire.

| Principle   | No. of questions | Correlation Test | Question in the avatar creator | Correlation r | Significance p |
|-------------|------------------|------------------|--------------------------------|---------------|----------------|
| Authority   | 2                | Spearman         | Authority1                     | 0.185         | 0.026          |
|             |                  |                  | Authority2                     | 0.236         | 0.004          |
| Scarcity    | 2                | Pearson          | Scarcity1                      | 0.080         | 0.336          |
|             |                  |                  | Scarcity2                      | 0.058         | 0.487          |
| Reciprocity | 2                | Spearman         | Reciprocity1                   | 0.102         | 0.220          |
|             |                  |                  | Reciprocity2                   | -0.015        | 0.859          |
| Commitment  | 3                | Spearman         | Commitment1                    | 0.145         | 0.081          |
|             |                  |                  | Commitment2                    | 0.167         | 0.044          |
|             |                  |                  | Commitment3                    | 0.172         | 0.038          |
| Consensus   | 2                | Spearman         | Consensus1                     | -0.038        | 0.651          |
|             |                  |                  | Consensus2                     | 0.260         | 0.001          |

## 5 Discussion

The results of this experiment confirmed only partly the design rationale of the avatar creator. The core concept behind the avatar creator tool was that the user will choose the avatar of a coach that will guide the user in the further parts of the application. The choice task (Authority1) and the question covering this core concept (Authority2) correlate with the STPS scores.

Choices regarding the avatar of the user (attempting to cover scarcity principle) did not correlate with the STPS data for the scarcity principle as had been expected by the designers. There are two possible reasons for this. Scarcity data from the STPS questionnaire is not reliable as shown by low Cronbach's  $\alpha$  and results of exploratory factor analysis, and also noted in the original study by Kaptein [7]. Another explanation for the lack of correlation for the scarcity principle is that the gamified questions do not pertain to the same construct of scarcity as in the questions of the STPS survey. In the current design users choose clothes/accessories for their avatar and scarcity hints are related to some items; however there is a possibility that choices are made on the appearance or other reason and not because of the scarcity hint given. Ongoing iterative design of the avatar builder is aimed at removing this possibility.

As for the other principles, reciprocity also cannot be measured by the current version of the tasks in the avatar creator. The reason why reciprocity did not correlate could be due to the nature of the questions. The questions were based on the praise/gift idea followed by a request for a favor. There are many possible explanations for why participants did not perceive it as similar to the questions in the STPS questionnaire. The major explanation is that the value of favor was higher than the value of praise/gift to the participant. New ideas covering this principle should be tested in the next iteration.

The commitment and consensus had one uncorrelated question each. However, the questions that correlate are sufficient to be used for the purpose of creating a profile of susceptibility to influence principles.

## 6 Conclusions

Despite the fact that some of the questions in the avatar creator do not correlate with the average score for each subscale of the STPS questionnaire, there is encouraging evidence regarding the concept of using an avatar creator tool as a gamified substitute of this questionnaire. The majority of the gamified principles (authority, commitment and consensus) significantly correlate with the STPS questionnaire. For the commitment and consensus variable, one question did not correlate with the average score from the STPS questionnaire but it is still possible to conclude whether the user is susceptible to these principles or not. Additionally the key questions covering the core concept of choosing an avatar of a coach in the applications is also correlated. To improve the general concept, another iteration of the design shall test new avatar elements for gauging susceptibility to different influence strategies. Further we are aiming to improve the scarcity subscale of the STPS so that the questionnaire also can provide data with higher reliability.

The avatar creator solution is in line with current trends of concealing classic questionnaires and alternatively presenting them in a more visually engaging form. The problem with standard surveys is a high likelihood of the respondents' lack of engagement with questions, a phenomena that may lead to erroneous responses. Gamification, can be a plausible solution to this problem. With our concept, an attempt to make the classic survey more appealing was pushed even further, aiming to embed self-report in game mechanics, and more specifically the construction of avatars that will be featured during game play. This approach seemed particularly appropriate for the context of a tablet application for coaching elderly with mild cognitive impairment, which is the design context in which this investigation has taken place. This target group is less technically savvy and can benefit from the guidance with the use of the application.

The idea behind the avatar creator is not limited to this project and to the context of a memory training application or a game. The concept can be easily extended to other applications or games that require some data collection about the user.

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