MASTER THESIS

THE RELATIONSHIP BETWEEN PERSONALITY AND PERSUASIVE TECHNOLOGY

A STUDY ABOUT THE INTENTION TO USE SOCIAL SUPPORT DESIGN PRINCIPLES IN A MOBILE APPLICATION PROMOTING PHYSICAL ACTIVITY IN RELATION TO PERSONALITY STYLES

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Voorwoord

Na veel schrijven, schrappen, herschrijven en slapeloze nachten heb ik mijn master thesis voltooid. Het is nog steeds niet zoals ik had gehoopt, maar ik ben blij dat het afgerond is. Mijn dank gaat uit naar Annemarie Jansen, de professor van Universiteit Twente die mij heeft begeleid tijdens het uitvoeren en schrijven van dit onderzoek. Zij was degene die altijd bleef geloven in mijn kunnen, ook wanneer ik zelf de moed opgegeven had. Daarnaast wil ik docente Hanneke Kip bedanken, voor de tijd die zij voor mij wilde vrijmaken in de laatste maanden van mijn studiejaren en de nuttige feedback die daaruit voortkwam.

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Felicity Shuttleworth

Abstract

Background: eHealth interventions provide an opportunity to deliver more health care to the public. The effect of eHealth interventions is influenced by several factors, a big one of which is adherence. However, adherence to eHealth interventions is low. Persuasive technology has positive effects on adherence and therefore, experts say persuasive technology needs to be personalized to the individual user.

Research objective: The aim of this master's thesis was to investigate the relationship between Big Five personality traits and intention to use persuasive technology. The participants' scores on all five traits were compared to their intention to use persuasive feature elements from the Persuasive System Design model's 'social support' design category.

Methods: The research had a cross-sectional design, using a survey to measure personality traits (Dutch version of Big Five Inventory) and storyboards depicting the five social support design principles in an mHealth application that stimulates exercise. The researcher, inspired by a similar study, designed the storyboards. Participants (N=148) were asked to rate their intention to use on a 5-point Likert scale and with whom they would want to share the social support design principles. The participants were grouped for each trait, depending on whether they had scored relatively low or high on that trait. After coding the responses in SPSS, all analyses were executed using the Chi-Squared test and Mann-Whitney U test (both tested against an alpha of 0.05). The low scoring group and high scoring group of each trait were compared to each other.

Results: There was no significant difference found between the scores on the personality trait groups and the intention to use the social support design principles. The only personality trait groups yielding significant results were the low scoring and high scoring participants on the trait neuroticism. Participants scoring high on neuroticism used social media networks more often and wanted to share the social support design principles social comparison, recognition, social facilitation and competition less than the group who scored low on neuroticism.

Conclusion: Reasons for the lack of significant results could be methodologically, seeing as there were no official cutoff scores for BFI, creating a possible false division of personality traits scores. Also, the sample size was quite small in combination with the chi-squared test. The current study made a start in making a full

personalization design inventory based on the Persuasive Design Model, and thereby in the improvement of effectiveness of eHealth interventions. Future research should avoid limitations made in this study, by choosing a random and larger sample and using a personality inventory that has cutoff scores to increase the validity of the findings.

Abstract (Dutch)

Achtergrond: eHealth interventies bieden een mogelijk om meer en effectievere zorg te bieden aan een groeiende groep mensen. De effectiviteit van eHealth interventies wordt beïnvloed door meerdere factoren, waarvan een van de belangrijkste adherentie is. Persuasieve technologie heeft positieve effecten op de adherentie aan eHealth interventies. Experts op het gebied van persuasieve technologie vinden derhalve dat persuasieve technologie gepersonaliseerd moet worden om deze positieve effecten te vergoten.

Onderzoeksdoel: Het doel van deze master thesis was om de relatie tussen de Big Five persoonlijkheidstrekken en de intentie tot gebruik van persuasieve technologie (zijnde de persuasieve elementen van de Social Support Design categorie sociale vergelijking, herkenning, sociale facilitatie, sociaal leren, en competitie uit de Persuasive System Design model) te onderzoeken.

Methoden: Het onderzoek had een cross-sectioneel design, waarbij een survey is gebruikt om de data te verzamelen. De survey bestond uit de Nederlandse versie van de Big Five Inventory en storyboards waarop de vijf social support functies werden uitgebeeld. The storyboards zijn gebaseerd op die uit een vergelijkbare studie. Aan participanten (N=148) werd gevraagd om hun intentie tot het gebruik van deze functies aan te geven op een 5 punts-Likert schaal en met wie ze deze functies zouden willen delen. De participanten zijn in groepen verdeeld naar hun score op de persoonlijkheidstrekken, waarbij de participant steeds in een ‘lage score’ groep of ‘hoge score’ groep zat voor iedere persoonlijkheidstrek. Na het coderen van alle data in SPSS, zijn de analyses uitgevoerd middels Chi-kwadraat toetsen en Mann-Whitney U toetsen (beiden tegen alpha 0.05). De laag en hoog scorende groepen zijn per persoonlijkheidstrek met elkaar vergeleken.

Resultaten: Er zijn geen significante verschillen gevonden tussen de Big Five persoonlijkheidstrek-groepen en de intentie tot gebruik van de social support design principes. De laag scorende en hoog scorende groep op neuroticisme hadden een aantal andere significante verschillen. Participanten met een hoge score maakten vaker gebruik van social media en wilden daarnaast de social support design principes social comparison, recognition, social facilitation en competition minder vaak delen dan participanten met een lage score op neuroticisme.

Conclusie: Dit onderzoek kent een aantal methodologische beperkingen. Aangezien er geen officiële cutoff scores zijn voor de BFI, kan de verdeling van scores in dit onderzoek vertekend zijn. Daarnaast was de sample redelijk klein om te gebruiken met een chi-kwadraat toets. Met dit onderzoek is een start gemaakt richting een verzameling van personalisatie design richtlijnen gebaseerd op het Persuasive Design Model, waarmee de verbetering van het effect van eHealth interventies gestimuleerd wordt. Met vervolgonderzoek kan een grotere sample verkregen worden en een persoonlijkheid meetinstrument gekozen worden waarbij wel cutoff scores zijn, om zo de validiteit van de bevindingen te vergroten.

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1. Introduction

1.1 eHealth

The ageing of society poses a problem on today's health care. People are growing older, extending the time in which they use health care facilities. The proportion of elderly people across the globe is rising, making the ratio of health care workers and patients more and more uneven. The world has to provide quality health care to a growing number of people, while the health care industry is not growing fast enough to keep up. A possible solution to this problem lies in the use eHealth (Ossebaard & van Gemert Pijnen, 2013). This concept is by Eysenbach (2001) as:

"An emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking to improve health care locally, regionally, and worldwide by using information and communication technology."

This definition emphasizes that it is not just an employment of technology, but rather a change in the attitude of health care practitioners and the general public in using of and merging eHealth in health care. An example of a eHealth intervention is SPARX, a computerized self help intervention for adolescents seeking help for depression (Merry, Stasiak, Shepherd, Frampton, Fleming, & Lucassen, 2012), but there are also many eHealth interventions that are focused on lifestyle factors such as diet and physical activity (Norman et al., 2007).

eHealth interventions are becoming more commonly employed in health care, as they have several notable advantages. They provide better access to care, more efficiency and better quality of care, more patient centered care, and eHealth may even reduce costs of health care (Black et al., 2011; Ossebaard & van Gemert-Pijnen, 2013; Griffiths, Lindemeyer, Powell, Lowe & Thorogood, 2006). However, the effects as a result of eHealth interventions vary considerably and it is important to know why these results are instable (Kelders et al., 2012).

1.1.1 Adherence to eHealth interventions

Though eHealth is a promising development in realizing the potential of technology in health care improvement, a big problem reduces effect of an eHealth intervention. This is the problem of non-adherence (Kelders, Kok, Ossebaard & van Gemert-Pijnen, 2012). Adherence can be defined as the actual use of system and content, related to intended use, and adherence to eHealth is lower than expected (Ossebaard & van Gemert-Pijnen, 2013). Non-adherence is not always necessarily a bad thing, as the intervention is no longer needed by the user and therefore can be seen as an indicator of success (Wangberg et al., 2008). However, not using a system in the desired and intended way may lead to reduced effectiveness. In order to get the maximum effect of eHealth interventions, adherence has to be stimulated. This can be done with the use of persuasive technology.

1.2 Persuasive technology in eHealth

A key element in changing behavior is persuasion (Oinas-Kukkonen, 2010). This is why persuasive technology is often used in eHealth interventions to stimulate and improve adherence. Van Gemert-Pijnen and Kelders (2013) define persuasive technology as: "Strategies or techniques to influence people's attitudes, behaviors and rituals through technologies like computers, mobile devices and ambient technologies which refer to technologies that use information and intelligence that is invisible and embedded in the environment that surrounds people".

1.2.1 Persuasive System Design Model

In order to explain and categorize the types of persuasive technology, the Persuasive System Design (PSD) model was developed by Oinas-Kukkonen and Harjumaa (2009). It is a model for designing, developing and evaluating persuasive systems. The PSD model contains a description of specific persuasive system design principles. These principles are divided into four categories: Primary task support, Dialogue support, System credibility support, and Social support. The category Primary task support encompasses features that enable the carrying out of the user's primary tasks. Dialogue support consists out of features that aid computer-human dialogue by giving some sort of (system) feedback. System credibility support helps the system come across as more trustworthy and professional, thus persuading a user to stay engaged. Finally, Social support principles incorporate different kinds of social stimulants into

a system. All four categories taken together, the specific features have one common goal: to help users keep moving towards their own (behavior) goals by using the system in the intended way, thereby increasing adherence.

1.2.2 The effect of adherence and persuasive technology

The influence of persuasive technology has been the topic of several studies from which the findings indicate that persuasive technology does indeed seem to persuade. In a review of 95 studies on online (eHealth) interventions and gamification that applied persuasive technology in their design, Hamari, Koivisto and Pakkanen (2014) found that more than half of the studies yielded overall positive results. Another one third of the studies yielded partially positive results (Hamari, Koivisto & Pakkanen, 2014). However, this review did not specify which persuasive techniques were related to specific outcomes. In another study, researchers looked at the effect of social persuasive technology in a mobile application to stimulate physical activity. The use of social persuasive technology (here, sharing the amount of steps, creating a form of comparison and competition) led to a significant increase in physical activity (Khalil & Abdallah, 2013). To conclude, these studies show evidence of a positive relationship between the use of persuasive technology, adherence and the effect of eHealth interventions.

1.3 Personalizing Persuasive Technology

Experts in the eHealth domain believe the positive effect that persuasive technology has on adherence to eHealth interventions, can be enlarged by personalizing the persuasive technology elements to the individual user (Kaptein, Lacroix, & Saini, 2010; Kaptein & Eckles, 2010; Berkovsky, Freyne, & Oinas-Kukkonen, 2012; Kaptein, de Ruyter, Markopoulos, & Aarts, 2012; Andrews, 2012; Busch, Schrammel, & Tscheligi, 2013). Oinas-Kukkonen (2010) puts emphasis on the importance of understanding the individual user in designing persuasive systems. He states, “specific target audiences may request very different kind of software features” (Oinas-Kukkonen, 2010). Berkovsky, Freyne and Oinas-Kukkonen (2012) plead for more personalization to enhance the effect of and adherence to persuasive technologies. They believe that a one-size-fits-all approach is not a way to optimize the effect of eHealth interventions. They see three opportunities for applying personalization in

persuasive technologies: personalized assistive features, messages and strategies. Assistive features can focus on monitoring and presenting information about topics and aspects important to the user. Personalized messages are to be tailored in content, look and feel of the information in order to meet the users' preferences of communication. The last opportunity lies in personalized strategies. Here, the focus is on responding to a user's susceptibility to persuasive technology methods. Berkovsky, Freyne and Oinas-Kukkonen (2012) state the following: "A core area, which has been thus far under-investigated, is that of personalized persuasive strategies, where the type of intervention itself is adapted to a user's personality, behavior, and susceptibility to various forms of persuasion."

1.3.1 Effects of personalization in eHealth interventions

Several studies have indicated a positive effect of personalizing persuasive technology on effect and adherence. Dijkstra (2006) investigated the effect of personalized information messages in an eHealth intervention to quit smoking. After four months, the group of people who received personalized messages had significantly higher levels of smoking cessation than the group that received non-personalized messages. Kaptein, de Ruyter, Markopoulos and Aarts (2012) studied a persuasive system that aimed to reduce snacking behavior in its participants. The persuasive messages were sent as mobile text messages. These messages were adapted to the participants' persuadability, which the researchers measured through self-report questionnaires beforehand. The results indicated that the personalized messages were effective more often than the non-personalized messages.

Thus far, several studies concerning personalized persuasive technology in eHealth interventions are discussed. However, those studies have not taken personality traits into account when investigating personalized persuasive technology. Personality traits seem like logical factors to include in research, seeing that they are stable over time and can be measured in valid ways (Costa & McCrae, 1995; Goldberg, 1990).

1.3.3 Personalizing by personality

The persuasive technology element called 'personalization' is part of the Primary Task Support design category of the PSD. It entails that personalized content or services have a greater capability for persuasion than do non-personalized content or

messages (Oinas-Kukkonen & Harjumaa, 2009). However, it is not clear how one should personalize content. There is no categorization of what is 'personalization'. Personality could fill this gap and play a role in personalizing persuasive technology. The Oxford Student's dictionary of English (2003) defines personality as "the different qualities of a person's character that makes him/her different from other people". Today it is widely accepted that an individual's personality is portrayed by the relative presence or absence of traits that are conceptualized in the 'Big Five' (Costa & McCrae, 1995; Goldberg, 1990; Goldberg, 1992; Digman, 1990). The Big Five consists out of five basic personality traits, each trait having six facets (McAdams, 2009):

- Extraversion [warmth, gregariousness, assertiveness, activity, excitement seeking, and positive emotions]
- Neuroticism [anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability]
- Openness to experience [fantasy, aesthetics, feelings, actions, ideas, and values]
- Agreeableness [trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness]
- Conscientiousness [competence, order, dutifulness, achievement striving, self-discipline, and deliberation]

Few studies have introduced personality traits as factors that a possibility to personalize eHealth. Andrews (2012) aimed to design a system that would portray a certain personality type (extraversion – introversion) and looked into its persuasive effects in human-computer dialogue. The computer was set to produce statements to which the participants had to respond. The computer's messages were either extravert or introvert in their nature. The results indicated that when the computer's message was perceived as being extravert in nature, the participant was persuaded to believe its message more often if the participant was extravert too (Andrews, 2012).

Halko and Kientz (2010) investigated the possible relationship between personality and persuasive technology in health promoting mobile applications, using storyboards that visually depict situations in which a form of persuasive technology is used. The storyboards illustrate eight strategies in four general persuasive approaches:

instruction style (authoritative and non-authoritative), social feedback (cooperative and competitive), motivation type (extrinsic and intrinsic), and reinforcement type (negative and positive reinforcement). Each storyboard was accompanied by a questionnaire about the participant's enjoyment, likelihood of use, perceived helpfulness, impact on quality of life, ease of use, and estimated time saved thanks to the persuasive technology strategy. The outcomes of the questionnaires were then compared to the individual participant's personality traits, which were measured according to the Big-Five traits using the BFI. Several significant relations were found, with neuroticism having interesting outcomes (Halko & Kientz, 2010). Neuroticism showed positive correlations with 'enjoyment of negative reinforcement' and decrease in their opinions on 'quality of life' for cooperative strategies. This indicated that people who score high on neuroticism are more likely to want to work alone in order to achieve their goals. Though this research shows promising results for a relationship between personality and persuasive technology, the study has some flaws. First of all, another design and format of the storyboards could have led to different feedback from the users (Halko & Kientz, 2010). If the storyboards were drawn differently, used other colors, etc. the participants may have felt different about the storyboards because of their aesthetic preferences (Halko & Kientz, 2010). Also, no theoretical background has been given for the use of the eight persuasion strategies, making it hard to generalize the findings to a broader theory or model.

From the study of Halko and Kientz (2010) a few methodological learning points rise for the current study. The use of storyboards or other visual aids to represent a certain feature of persuasive technology may be a good solution to create equality among a diverse participant population (e.g. different levels of literacy may impact understanding of a description) and to illustrate and isolate the persuasive features being studied. However, different designs or formats may yield different results, even if they aim to depict the same scenario. It is therefore important to create storyboards with the least possible distractions from the feature being visualized, to ensure that all participants see and encode the scenarios in a similar fashion. Second, using features from a persuasive technology model like the PSD model, instead of using general persuasive approaches, to investigate the relationship between personality and persuasive technology, may clarify results by specifying which design principle works for whom. It also gives a change to enhance the PSD model with empirical findings.

1.4 Personalization with Social Support Design Principles

To investigate personality as a potential means to personalize persuasive technologies, the PSD model's design categories can be used as a way to clearly conceptualize the term 'persuasive technology'. Literature on personality traits and technology focus a lot on the differences between personality styles and social behavior on the Internet. With this information at hand, the elements of the PSD design category 'Social support' are therefore interesting to use as elements of persuasive technology. The social support design category consists out of seven elements: social learning, social comparison, normative influence, social facilitation, cooperation, competition, and recognition. Below, the elements and the principles and ideas behind them are stated (quoted from: Oinas-Kukkonen & Harjumaa, 2009):

- *Social learning*: "A person will be more motivated to perform a target behavior if (s)he can use a system to observe others performing the behavior."
- *Social comparison:* "System users will have a greater motivation to perform the target behavior if they can compare their performance with the performance of others."
- *Normative influence*: "A system can leverage normative influence or peer pressure to increase the likelihood that a person will adopt a target behavior."
- *Social facilitation*: "System users are more likely to perform target behavior if they discern via the system that others are performing the behavior along with them."
- *Cooperation*: "A system can motivate users to adopt a target attitude or behavior by leveraging human beings' natural drive to co-operate."
- *Competition:* "A system can motivate users to adopt a target attitude or behavior by leveraging human beings' natural drive to compete."
- *Recognition*: "By offering public recognition for an individual or group, a system can increase the likelihood that a person/group will adopt the target behavior."

Also, a framework has to be chosen in order to portray the persuasive elements. Given the rise and popularity of fitness application (mHealth), and the importance of physical activity for a healthy life, the "target behavior" of the eHealth framework

will be to exercise. The following paragraphs provide more information on how personality traits are related to online social behavior and to exercise behavior.

1.4.1 Personality traits in relation to online behavior

Several studies have examined the relationship between personality traits and social, online presence and features (for example: Correa, Hinsley, & Zúñiga, 2012; Ross, Orr, Sisic, Arseneault, & Orr, 2009; Gosling et al., 2011; Zywica & Danowski, 2008). The use and frequency of use of social media (in most studies, Facebook) shows significant positive correlation with the traits extraversion and openness to experience and significant negative correlation with the trait neuroticism (Correa, Hinsley, & Zúñiga, 2012; Ross, Orr, Sisic, Arseneault, & Orr, 2009; Gosling et al., 2011; Zywica & Danowski, 2008). Extraversion seems to play the biggest role amongst the traits when it comes to use of social media. Not only do people who are more extravert communicate more with friends via social media (Correa, Hinsley, & Zúñiga, 2012; Seidman, 2013), they also tend to share their activities and events on their social media page more often than people with who score low on extraversion (Correa, Hinsley & Zúñiga, 2012; Gosling et al., 2011). People who have high agreeableness scores also tend to post information about themselves and their activities more often (Moore & McElroy, 2012). Even though the investigated social media features do not necessarily always overlap with the social support design principles, the findings do give indications for the current research. It was found that people's personalities as portrayed in social media accounts, served as an extent of their offline personalities, thereby suggesting that one's online personality is an accurate representation of that same person's offline personality (Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011; Wilson, Gosling, & Graham, 2012). This means that findings from these studies can be used to guide the current study hypotheses.

1.4.2 Personality in relation to exercise

Many relations between personality traits and exercise have already been established (O'Sullivan, Zuckerman, & Kraft, 1998; Courneya & Hellsten, 1998; Hausenblas & Giacobbi, 2004; Egloff & Gruhn, 1996; Courneya, Bobick, & Schinke, 2010). It is important to briefly look at these relations, as they may mediate the relationship between personality traits and effect of persuasive technology in a fitness application. Extraversion has predominantly been related to more frequent and intense exercise

behavior and adherence to exercise regimes (Courneya & Hellsten, 1998; Egloff & Gruhn, 1996; Courneya, Bobick, & Schinke, 2010). Also, people who score high on extraversion are more prone to becoming exercise dependent or addicted (Hausenblas & Giacobbi, 2004). A trait that is consistently negatively correlated to frequency and intensity of exercise is neuroticism (O'Sullivan, Zuckerman, & Kraft, 1998; Courneya & Hellsten, 1998; Courneya, Bobick, & Schinke, 2010).

1.4.3 Personality in relation to the Social Support Design principles

Given the outcomes of previous research into the relationship between personality traits, social media use and exercise, certain relationships between the Big Five personality traits and (intention to) use social support design principles in a mobile application promoting physical activity can be hypothesized. Firstly, it is expected that people who score high on extraversion, will use and be intended to use the social support design principles more often than people scoring low on extraversion. This is based on the presence of extraversion online and their proneness to exercise. A high score on neuroticism indicates a negative relation with exercise and a lower use of social sharing online. This leads to the expectation that people scoring low on neuroticism will (intent to) use the social support elements in a mobile application promoting physical activity more often than people scoring high on neuroticism. Because of the explorative nature of the current research, hypotheses will not be formed and tested. Instead, the previous information gives ground to the idea that there might be a difference between personality styles and the use of social support design principles.

1.5 Research question

Main research question

Is there a difference between the Big Five personality traits of (potential) users of a mobile technology application promoting physical activity in their relation to their intentions to use persuasive feature elements from the social support design category (being social comparison, recognition, social facilitation, social learning and competition)?

Sub questions

1. a) To what extent would participants use the persuasive features social comparison, recognition, social facilitation, social learning and competition?
1. b) With whom would participants share the persuasive features social comparison, recognition, social facilitation, social learning and competition?

2. a) Is there a difference between Big Five personality traits of people in relation to their current use of social media?
2. b) Is there a difference between Big Five personality traits of people in relation to their intentions to use the persuasive features social comparison, recognition, social facilitation, social learning and competition?
2. c) Is there a difference between Big Five personality traits of people in relation to their intentions to share the persuasive features social comparison, recognition, social facilitation, social learning and competition,?

3. a) To what extent does frequency of exercise have a relation with current use of a mobile technology application promoting physical activity?
3. b) To what extent does frequency of exercise have a relation with intention to use the persuasive features social comparison, recognition, social facilitation, social learning and competition?

2. Methods

2.1 Participants

Participants for this study were recruited via convenience and snowball sampling. One part of all participants consisted of students from the faculty of behavioral sciences at University of Twente (Netherlands). Recruitment of these participants was done via e-mail, flyers in the faculty's building, and via the university's SONA system. Participation was voluntary, though the students could receive points if they took part in the study. These so-called "subject points" are credits given to students who participate in scientific research and all students of the faculty have to obtain a certain amount of points during their bachelor education. All other participants were recruited via snowball sampling. The researcher posted a request on Facebook, asking her acquaintances to fill out the online survey and to share this request with their own friends.

2.2 Procedure

The research had a cross-sectional survey design. The surveys were conducted via the Internet from the 26th of May to the 24th of June 2015. Prior to filling out the questionnaire, the participants were given informed consent about the research and the anonymous data processing. By continuing and filling out the questionnaire, they confirmed that they had been fully informed about the research and its purposes. Completing the questionnaire cost the participant approximately 20 minutes.

2.3 Materials

The questionnaire (appendix B) consisted out of three parts. The first part of the questionnaire concerned several demographic variables of the participant (gender, age, education). It also covered current exercise behavior (type of physical activity and average hours of exercise per week), the use of a smartphone and sport-related (mHealth) applications, social media use, and questions concerning whether, why and which sport-related achievements the participant shares via social media.

The second part of the questionnaire concerned the personality traits of the participant. Personality was measured with the Big Five Inventory (BFI), which has excellent levels of reliability and validity (John & Srivastava, 1999; Gosling, Rentfrow, & Swann Jr., 2003; Hofmans, Kuppens, & Allik, 2008). A Dutch version was used, which has shown to have high levels of internal consistency and both

internal and external validity too, making the psychometric quality equal to that of the original English version (Denissen, Geenen, van Aken, Gosling, & Potter, 2008). For each trait, there are a number of items that are supposed to measure that trait. In the current research, the items have shown good reliability for measuring the individual traits, with Cronbach's alpha ranging from 0.72 to 0.87 (table 1).

Table 1
Cronbach's alpha: internal consistencies of personality trait scales indicating reliability

Trait scale	Cronbach's alpha*
Extraversion	0.84
Agreeableness	0.72
Conscientiousness	0.78
Neuroticism	0.87
Openness	0.76

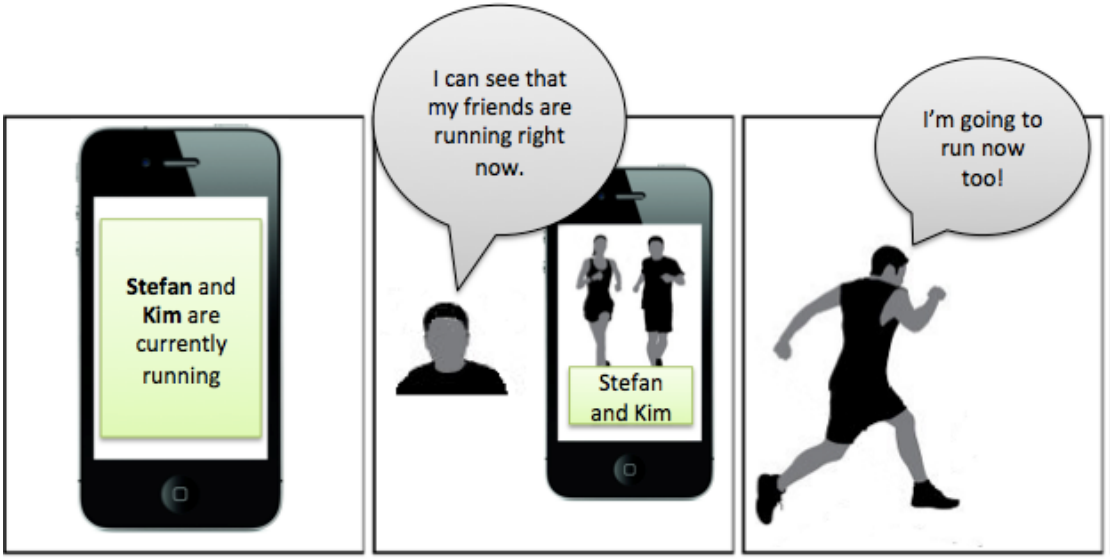
* Cronbach's alpha > 0.7 is a sign of good reliability

The BFI consists out of 44 items, which are statements of characteristics based on the Big Five personality types. Every item starts with "I see myself as someone who…", followed by a characteristic. Items are rated on a five point Likert scale (1, disagree strongly, to 5, agree strongly). An example is item 1: "I see myself as someone who… is talkative". For the BFI, no official cut off scores are verified. It is mostly advised to base the cut off scores for a research on the known scores of a general population (John, Naumann & Soto, 2008). See appendix A for all items of the English BFI.

The third part of the questionnaire concerned the intention to use and share social support design principles in a (fictive) running application. Five of the social support design principles –*social comparison, recognition, social facilitation, social learning*, and *competition*- were portrayed in five simple storyboards. The storyboards were inspired by the storyboards made by Halko and Kientz (2010) in their study of persuasive technology and personality. They depicted a person with a smartphone that showed only the most basic form of persuasive technology, so the participants would understand the function of the portrayed technology. The current storyboards were made in PowerPoint 2011. The design of these storyboards was kept as simple as possible, to not distract the participant from the persuasive principle the storyboard is portraying (Figure 1 shows an English version of the principle of *social facilitation,* to illustrate the type of storyboards being used). Before the storyboards were presented to the participant, he or she was asked to imagine that he or she were to use a mobile

application for running. After each scenario, the participant was asked to rate a statement on a five-point Likert scale (1= certainly not, 2 = probably not, 3 = maybe or maybe not –not sure-, 4 = probably, 5 = certainly). The statement was: "I would use this function". After this statement, the participant was asked with whom they would share this function (answer options: 'everyone', 'only close friends', 'only friends', 'friends and acquaintances', 'I don't want to share this function').

Figure 1. English version of the storyboard portraying Social Facilitation



2.4 Data analysis

The survey yielded categorical data (ordinal and nominal), which means that nonparametric tests had to be used. The research questions regarding differences in nominal data were answered using Pearson's chi-squared test of independence (X^2 against α=0.05). The research questions regarding ordinal data (Likert scale answer options) were answered using the Mann-Whitney U test (U against α=0.05). Participants were excluded from the research if they had not completed the entire questionnaire.

2.4.1 Descriptive statistics

All data derived from the surveys was transferred into SPSS 21.0 for statistical analyses. The sample of participants was described with an overview of the sample's demographic variables, use of smartphone, social media and use of mHealth applications promoting physical activity. The participants' intentions to use and share the social support design principles were described per principle and answer category.

2.4.2 BFI analysis

To analyze the data from the BFI, the scores on the negatively keyed items were first reversed. For the BFI, no official cut off scores are verified. It is mostly advised to base the cut off scores for a research on the known scores of a general population or to use the mean score from the current sample (John, Naumann & Soto, 2008). The latter was used in this research and these mean scores are also compared to mean scores per age group as indicated by Srivastava, John, Gosling and Potter (2003). The cutoff scores resulted in a dichotomous representation of the personality trait groups, with one scoring either 'low' or 'high' on a specific trait ('low' < mean ≥ 'high'). The personality trait categories were coded as "0" (low score on the trait) or "1" (high score on the trait). For all analyses that followed, differences were tested between the 'low' and 'high' groups for every trait individually. This means that differences between different traits were not tested.

2.4.3 Frequency of exercise

Participants were grouped by their frequency of exercise. The groups were defined as either 'low' or 'high' in frequency of weekly exercise by groups' mean of the hours of exercise per week ('low' ≤ mean > 'high'). The 'frequency of weekly exercise' categories were coded as "0" (low frequency of weekly exercise) or "1" (high frequency of weekly exercise).

2.4.4 Research questions 2a, 2b and 2c

The first question (2a) to be answered is whether there is a difference between the Big Five personality traits of people in relation to their current use of social media. The differences between the Big Five personality traits and use of social media were determined using a chi-squared test (tested against an alpha of 0.05). For each personality trait, the 'low' and 'high' categories of these traits were compared with the use of social media (Facebook, Twitter, Instagram and other platforms), frequency of social media use, and sharing of information on social media.

The second question (2b) regards the difference between the Big Five personality traits of people in relation to their intentions to use the five persuasive elements. To determine the difference between personality trait scores and the intention to use the social support design principles, a Mann-Whitney U test was used (tested against an alpha of 0.05). All options from the Likert scale of the intention to

use social support design principles were compared with the personality trait categories. This entails 25 analyses: five personality traits scores ("low" or "high") in relation to the intention to use five persuasive elements.

The third question (2c) regards the difference between Big Five personality traits scores of people in relation to their intentions to share the five persuasive elements. To see if there is a difference between personality trait scores and with whom the participants would share the functions of the social support elements, a chi-squared test was used (tested against an alpha of 0.05). All options from the sharing question were compared with the personality trait categories, resulting in 25 analyses.

2.4.5 Research questions 3a and 3b

The first question (3a) concerns the extent in which frequency of exercise has a relation with current use of a mobile technology application promoting physical activity. A chi-squared test (against an alpha of 0.05) was used to determine this relation. All participants were grouped as "low frequency of weekly exercise" or "high frequency of weekly exercise". With a chi-squared test, it was calculated whether one of these groups significantly used a sports application more often than the other group.

The second question (3b) regarded the relation between the frequency of exercise groups and the intention to share the persuasive elements. This was tested with a Mann-Whitney U test (against an alpha of 0.05), which resulted in 10 analyses: two 'frequency of exercise' groups ("low" or "high") in relation to the intention to use five persuasive elements.

3. Results

3.1 Participants

Table 2 provides an overview of the research sample's socio-demographic information, their physical activities and use of social media. In total, 186 people filled out the questionnaire. Of those people, 148 filled out the questionnaire completely, bringing the research sample to N=148. The mean age is 32.3 years (SD=13.2), with a fairly equal gender distribution (male N=71, female N=77). The participants engage in 4.6 hours (SD=3.2) of sports per week on average. Social media use was high in the research population, with 135 participants using one or

more social media platforms. Of those 135 participants, 87% was on Facebook, making this the most popular social media platform in the research sample. Most participants (90%) indicated that they visit and are active on social media sites daily and only 5% of participants stated that they do not share information with anyone on social media.

Table 2

Research sample defined by the participants' age, gender, education level, exercise, and social media use

Variable	***Unit of measurement***	
Age	**M (SD)**	
In years	32.3 (13.2)	
Gender	**N (%)**	
Male	71 (48)	
Female	77 (52)	
Education level	**Highest finished N (%)**	
No education	0	
Middle/High school	53 (36)	
Community college	29 (20)	
Bachelor's education	46 (31)	
Master's education	20 (14)	
Hours of exercise per week	**M (SD)**	
Hours	4.6 (3.2)	
Type of sport	**N (%)**	
Running	59 (40)	
Cycling	58 (39)	
Other	74 (50)	
Ownership of...	**N (%)**	
Smartphone	139 (94)	
Sport application	77 (52)	
Use of social media platforms	**N (%)**	
Facebook	128 (87)	
Twitter	43 (29)	
Instagram	48 (32)	
Other	13 (9)	
None	13 (9)	
Information sharing on social media with…	**N (%)**	***(N=135)***
Everyone	17 (13)	
Friends and acquaintances	44 (33)	
Friends	55 (41)	
Close friends	12 (9)	

No one	7 (5)	
Frequency of use of social media	**N (%)**	***(N=135)***
Daily	121 (90)	
Less frequent than daily	14 (10)	

Participants filled out the BFI. For each participant, his or her mean score per trait was calculated. After this, the mean scores per trait were calculated for the entire sample. Table 3 shows the mean scores, their standard deviations and the lowest and highest mean scores in the sample. These scores are comparable to global average mean scores of the age groups 21 years to 60 years, as measured by Srivastava, John, Gosling and Potter (2003; entire list of descriptive statistics, see appendix C). In comparison, the current sample scored slightly higher on extraversion, and slightly lower on neuroticism and openness.

Table 3
Mean rank scores for the BFI items per trait in the research sample (N=148)

Trait	**M**	**SD**	**Min**	**Max**
Extraversion	3.59	0.67	1.63	5.00
Agreeableness	3.61	0.55	2.22	4.78
Conscientiousness	3.51	0.60	2.11	4.78
Neuroticism	2.81	0.79	1.13	4.88
Openness	3.58	0.59	1.80	4.70

Each participant belonged to the 'low' or 'high' scoring group for each trait. The division was made on the group's mean score on each trait, dividing the total sample roughly by half. For every analysis that follows, these 'low' and 'high' scoring groups were compared for every trait, meaning that no analyses between traits were carried out.

3.2 Intention to use and sharing of the social support design principles

An overview of the intention to use and share the social support design principles in the research sample is found in tables 4 and 5. Approximately 34% of the participants indicate that they would use the design principles *social comparison* and *social learning*. This is a noticeable difference from the intention to use the other social support design principles, where 18% of participants indicate they would use the principle of *recognition* and 21% would use the principle of *social facilitation*.

Table 4
Intention to use the social support design principles

Intention to use	Social comparison n (%)	Recognition n (%)	Social facilitation n (%)	Social learning n (%)	Competition n (%)
Certainly / probably not	71 (48)	97 (66)	84 (57)	65 (44)	72 (49)
Maybe or maybe not	25 (17)	24 (16)	33 (22)	32 (22)	34 (23)
Probably / certainly	52 (35)	27 (18)	31 (21)	51 (34)	42 (28)

Approximately 40% of participants of this study indicate that they would not share any of the social support design principles (table 5). Between 20% and 25% of participants would only share the social support design principles with close friends.

Table 5

Intention to share the social support design principles

Intention to share with…	Social comparison n (%)	Recognition n (%)	Social facilitation n (%)	Social learning n (%)	Competition n (%)
Everyone	8 (5)	7 (5)	6 (4)	7 (5)	7 (5)
Friends and acquaintances	17 (12)	18 (12)	18 (12)	21 (14)	17 (12)
Friends	27 (18)	28 (19)	32 (22)	32 (22)	34 (23)
Close friends	38 (26)	34 (23)	30 (20)	30 (20)	31 (21)
No one	58 (39)	61 (41)	62 (42)	58 (39)	59 (40)

3.3 Differences between the Big Five personality traits

3.3.1 Big Five personality traits and the use of social media

Significant differences between Big Five personality traits and use of social media were found for the low and high scoring groups on the trait *neuroticism*. Table 6 shows the use of social media per personality trait category. As almost all participants used Facebook (87%), the participants using Facebook will be compared with participants using no social media whatsoever (9%). Participants who use Facebook are significantly more likely to score high on neuroticism (X^2= 12.59, P=0.01) than participants who do not use any social media.

Table 6

Big Five personality trait categories in relation to social media use

Traits*	**E**	**A**	**C**	**N**	**O**

		Low N	High N	Low N	High N	Low N	High N	Low N	High N	Low N	High N
Facebook	N=128	55	73	52	76	63	65	55*	73*	63	65
No social media	N=13	9	4	3	10	6	7	10*	3*	3	10
Sharing information on social media with… (N=135)	Everyone	6	11	7	10	6	11	12	5	5	12
	Friends and acquaintances	18	26	20	24	23	21	17	27	18	26
	Friends	21	34	21	34	29	26	23	32	29	26
	Close friends	7	5	4	8	8	4	4	8	8	4
	No one	5	2	3	4	1	6	4	3	6	1
Frequency of social media use (N=135)	Daily	48	73	48	73	59	62	54	67	57	64
	Less frequent than daily	9	5	7	7	8	6	6	8	9	5

* significant against α=0.05

** Big Five personality traits abbreviations: E (extraversion), A (agreeableness), C (conscientiousness), N (neuroticism), O (openness)

3.3.2 Big Five personality traits and intention to use social support design principles

There are no differences found between the low and high scoring groups on each of the Big Five traits and the intention to use the social support design principles. Table 7 shows the mean rank scores for the group scoring low on a certain trait, the mean rank score for the group scoring high on a certain trait, the Mann-Whitney U results from the analyses and the corresponding significance level P.

Table 7

The intention to use social support design principles in relation to personality trait scores

	Mean rank for group scoring low on trait	Mean rank for group scoring high on trait	Mann-Whitney U	P
Extraversion				
Social comparison	74.2	74.7	2688.5	0.94
Recognition	77.0	72.5	2539.0	0.50
Social facilitation	72.7	76.0	2587.5	0.64
Social learning	79.0	70.9	2407.5	0.24
Competition	75.7	73.6	2628.0	0.76
Agreeableness				
Social comparison	70.6	78.6	2439.5	0.24
Recognition	77.4	71.4	2515.5	0.38
Social facilitation	70.0	79.2	2394.5	0.18
Social learning	75.9	73.0	2628.5	0.67
Competition	76.2	72.7	2604.5	0.60
Conscientiousness				

Social comparison	78.4	70.7	2455.5	0.26
Recognition	80.3	68.9	2317.5	0.09
Social facilitation	77.1	72.0	2551.5	0.46
Social learning	76.3	72.8	2610.0	0.62
Competition	77.3	71.8	2532.0	0.42
Neuroticism				
Social comparision	79.5	69.5	2365.0	0.14
Recognition	80.4	68.6	2304.5	0.08
Social facilitation	78.2	70.8	2466.5	0.28
Social learning	74.2	74.8	2714.5	0.93
Competition	79.1	70.0	2401.5	0.18
Openness				
Social comparison	77.5	71.9	2520.5	0.42
Recognition	77.6	71.8	2514.5	0.40
Social facilitation	71.4	77.3	2508.5	0.39
Social learning	76.6	72.7	2581.0	0.57
Competition	77.4	72.0	2528.5	0.44

3.3.3 Big Five personality traits and sharing of social support design principles

Significant differences for the Big Five personality traits and sharing of social support design principles were found for the low and high scoring groups on the trait neuroticism in relation to sharing of the social support design principles social comparison (X^2=17.09, P<0.01), recognition (X^2=13.08, P=0.01), social facilitation (X^2=12.98, P=0.01) and competition (X^2=12.48, P=0.01) (for all results, see table 8). Higher neuroticism scores were related to a lower intention to share these four social support design principles in comparison to the intention of the people with lower neuroticism scores. For the other Big Five personality trait groups, no significant differences were found.

Table 8

Chi-squared test results from the relationship between Big Five personality trait groups ('low' and 'high' per trait) and sharing of social support design principles

Sharing of feature	**Extraversion**		**Agreeableness**		**Conscientious-ness**		**Neuroticism**		**Openness**	
	X^2	p	X^2	p	X^2	p	X^2	p	X^2	p
Social comparison	4.98	0.29	3.66	0.45	8.05	0.09	17.09	0.01*	1.75	0.78
Recognition	2.77	0.60	0.89	0.93	5.95	0.20	13.08	0.01*	0.76	0.94
Social facilitation	2.28	0.68	2.04	0.73	7.28	0.12	12.89	0.01*	0.24	0.99
Social learning	3.63	0.46	2.42	0.66	4.98	0.29	7.09	0.13	1.44	0.84
Competition	3.46	0.49	0.87	0.93	7.66	0.11	12.48	0.01*	0.77	0.94

*significant against α=0.05

3.4 The relation between frequency of weekly exercise, mHealth sport application use and intention to use social support design principles

3.4.1 Frequency of weekly exercise and use of an mHealth sport application

Participants were divided by their weekly frequency of exercise in hours ('low' ≤ mean > 'high'). The mean hours of exercise in the sample was 4.6 hours per week. There were 82 participants who exercise fewer hours or the exact mean hours of 4.6 per week. For the further analyses, these participants are looked at as a group called 'low frequency of weekly exercise'. The remaining 66 participants exercise more than the mean of 4.6 hours on a weekly basis and therefore form the group called 'high frequency of weekly exercise'.

Approximately half of the research sample (52%) indicates that they currently use an mHealth application that promotes physical activity. Three participants did not answer the question and will not be taken into the next analysis (missing N=3). A chi-squared test between the groups and their use of application was conducted, giving $X^2 = 16.78$, with p-value < 0.01. In other words, people who sport more frequently (i.e. more hours per week on average) are statistically more likely to use an application to support physical activity, than people who sport less frequently (table 10).

Table 9
Relation between use of sport application and the groups low and high frequency of weekly exercise

Frequency of weekly exercise	Use of application N	No use of application N	P
Low (N=81)	31	50	
High (N=64)	46	18	
			0.00*

*significant against α=0.05, medium effect size (V=0.34)

3.4.2 Frequency of weekly exercise in relation to intention to use social support design principles

Participants who belonged in the group 'high frequency of weekly exercise' have a greater intention of using the principles social comparison (U=1858.0, P<0.00) and competition (U=2097.5, P=0.02), than do the participants who belonged in the group

'low frequency of weekly exercise'. Table 10 shows the mean rank scores for the group 'low frequency of weekly exercise', the mean rank score for the group 'high frequency of weekly exercise', the Mann-Whitney U results from the analyses and the corresponding significance level P.

Table 10

Relation between the intention to use social support design principles and the groups low and high frequency of weekly exercise

	Mean rank for group 'low frequency of exercise' (N=82)	**Mean rank for group 'high frequency of exercise' (N=66)**	**Mann-Whitney U**	**P**
Social comparison	64.2	87.4	1858.0	0.00*
Recognition	69.6	80.5	2307.5	0.11
Social facilitation	69.4	80.8	2289.5	0.10
Social learning	68.6	81.8	2224.0	0.06
Competition	67.1	83.7	2097.5	0.02*

*significant against α=0.05

4. Discussion and conclusion

No differences have been found between the low and high scoring participants on the five personality traits and their intention to use the social support design principles. The willingness to share the social support design principles was significantly different for low and high scoring participants on the trait neuroticism. Participants scoring low on neuroticism want to share the design principles with more people than participants scoring high on neuroticism would. The low and high scoring groups of the trait neuroticism are also different in using of social media. Participants scoring high on neuroticism use a social media platform [Facebook] more often than do participants scoring low on neuroticism.

4.1 Discussion of the results

No differences were found between the Big Five personality trait scores and the intention to use the social support design principles. Participants who score high on neuroticism are less inclined to share the social support design principles. Due to previous research about the online behavior of people scoring high on neuroticism (Correa, Hinsley, & Zúñiga, 2012; Ross, Orr, Sisic, Arseneault, & Orr, 2009; Gosling et al., 2011; Zywica & Danowski, 2008), this was an expected result. People scoring

high on neuroticism would, according to the literature, be less inclined to be active in a social online environment. This information can be used to enhance the PSD model with personalization efforts: someone scoring high on neuroticism may not want to even see "sharing" options or other social elements. Therefore, these elements should be eliminated or replaced for these people in order to get maximum effect from the eHealth intervention.

4.1.1 Exercise as a possible mediator

It must be taken into account that the research sample consisted out of very sportive people. The greater part of the sample (87%) indicated that they engage in weekly exercise and over half (52%) use a sports application. The participants that belonged to the 'high frequency of weekly exercise' group, stated that they exercise five hours or more per week. Given the results, exercise could be a possible mediator in this research. People scoring high on the trait neuroticism are significantly less likely to be in the 'high frequency of weekly exercise' group, and they are also less likely to want to share the social support design principles. However, exercise as a variable could not be statistically corrected for if is indeed a mediator. There were too little participants with no or low physical exercise for any statistical analysis.

4.2 Limitations of this study

The current study has a few methodological limitations. First of all, snowball and convenience sampling were used, which led to a sample that is not representative for the 'normal' population per se. Also, the sample size was rather small for using the statistical chi-squared test. Sometimes, groups were too small to be analyzed and therefore there could not be a conclusive answer. Second, in the statistical analyses, dichotomous representations of the results were used. There is no basis for cut off scores for the BFI, and therefore the researcher chose for a mean rank score split approach. This gives a rather 'black or white' representation, even though the results might be more nuanced.

Due to the fact that many participants engage in exercise frequently and also use an mHealth application, it may also be possible that they (subconsciously) took aesthetics of the storyboards into their opinion about the social support design principles being pictured. Since they are probably used to fancy application layout

and functions, the storyboards could have been ‘too simplistic’ or ‘boring’ in their view.

4.3 Strong points of this study

Methodologically, the use of storyboards to illustrate the function of the social support design principles is a strong point, as they were created to be as simple as possible, with virtually no distractions from the principle portrayed. This is an advantage over the storyboards used in the study of Halko and Kientz (2010). Also, this was the first study, known to the researcher, in which persuasive design principles from Oinas-Kukkonen’s PSD model (2009) were used as a basis for the research on the relationship between personality and persuasive technology. A beginning has been made toward creating a full inventory on the personalized design possibilities that the design principles of the PSD postulate. This study contributes to the science of persuasive technology by adding new information to the field of personalizing persuasive technology. This is important, since the effect of eHealth interventions can be enlarged when using personalized persuasive technology (Berkovsky, Freyne, & Oinas-Kukkonen).

4.4 Recommendations

To further investigate the relationship between personality and persuasive technology, it is recommended that the PSD model and it’s persuasive design principles are used as a basis, so the research field can slowly grow towards a full inventory of the relations between personality and persuasive technology, creating a personalization index for designers of eHealth. In order to be able to generalize the results to a larger public, a randomized sample method would be more appropriate. Moreover, it is wise to use a personality trait inventory that has cutoff scores, when it is not possible to generalize the sample to a wider population. This way, the distribution of the scores on the personality traits would be based on a valid instrument instead of being dependent on the scores of the research sample.

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7. Appendix

Appendix A: The Big Five Inventory

Items of the Big Five Inventory

I see myself as someone who…	
_1. is talkative	_23. tends to be lazy
_2. tends to find fault with others	_24. is emotionally stable, not easily upset
_3. does a thorough job	_25. is inventive
_4. is depressed, blue	_26. has an assertive personality
_5. is original, comes up with new ideas	_27. can be cold and aloof
_6. is reserved	_28. perseveres until the task is finished
_7. is helpful and unselfish with others	_29. can be moody
_8. can be somewhat careless	_30. values artistic, aesthetic experiences
_9. is relaxed, handles stress well	_31. is sometimes shy, inhibited
_10. is curious about many different things	_32. is considerate and kind to almost everyone
_11. is full of energy	_33. does things efficiently
_12. starts quarrels with others	_34. remains calm in tense situations
_13. is a reliable worker	_35. prefers work that is routine
_14. can be tense	_36. is outgoing, sociable
_15. is ingenious, a deep thinker	_37. is sometimes rude to others
_16. generates a lot of enthusiasm	_38. makes plans and follows through with them
_17. has a forgiving nature	_39. gets nervous easily
_18. tends to be disorganized	_40. likes to reflect, play with ideas
_19. worries a lot	_41. has few artistic interests
_20. has an active imagination	_42. likes to cooperate with others
_21. tends to be quiet	_43. is easily distracted
_22. is generally trusting	_44. is sophisticated in art, music, or literature

Extraversion: items 1, 6, 11, 16, 21, 26, 31 and 36

Agreeableness: items 2, 7, 12, 17, 22, 27, 32, 37 and 42

Conscientiousness: items 3, 8, 13, 18, 23, 28, 33, 38 and 43

Neuroticism: items 4, 9, 14, 19, 24, 29, 34 and 39

Openness: items 5, 10, 15, 20, 25, 30, 35, 40, 41 and 44

Appendix B: Dutch questionnaire

Online vragenlijst persuasieve technologie onderzoek

Dit is een vragenlijst voor een onderzoek naar de relatie tussen persoonlijkheidstrekken en persuasieve technologie. Het invullen van de vragenlijst zal ongeveer 20 minuten duren. Vul de vragen zo eerlijk mogelijk in: er zijn geen goede of foute antwoorden, het gaat puur om wat u vindt! De resultaten zullen anoniem worden verwerkt. Mocht u vragen hebben over het onderzoek, dan kunt u contact opnemen met de student die het onderzoek uitvoert via f.a.shuttleworth@student.utwente.nl. Alvast bedankt voor uw medewerking!

Socio-demografische gegevens

1. Geslacht: man / vrouw

2. Leeftijd: … jaar

3. Hoogst afgeronde opleiding:
   - Middelbare school (VMBO, HAVO en VWO)
   - MBO (jaar …)
   - HBO (jaar …)
   - WO (jaar…)
   - N.v.t.

4. Huidige opleiding:
   - Middelbare school (VMBO, HAVO en VWO)
   - MBO (jaar …)
   - HBO (jaar …)
   - WO (jaar…)
   - N.v.t.

5. Welke sport beoefent u? (meerder antwoorden mogelijk)
   - Hardlopen
   - Fietsen (wielrennen / mountainbiken)
   - Andere sport, namelijk: …
   - Ik sport niet (ga door naar vraag 7)

6. Hoeveel uren sport u gemiddeld per week?
… uur

7. Heeft en gebruikt u een smartphone?
   - Ja
   - Nee (ga door naar vraag 10)

8. Gebruikt u een applicatie, zoals bijvoorbeeld RunKeeper/Garmin/Nike+, om uw sportprestaties bij te houden?
   - Ja, namelijk …
   - Nee (ga door naar vraag 10)

9. Van welke functies in de applicatie maakt u gebruik? (meerdere antwoorden mogelijk)
- GPS tracking om mijn sportsessie(s) vast te leggen
- Persoonlijke doelen stellen
- Persoonlijke voortgang vastleggen
- Sportprestaties delen met anderen
- Anders, namelijk: …

10. Van welke social media maakt u gebruik? (meerdere antwoorden mogelijk)
- Facebook
- Twitter
- Instagram
- Anders, namelijk: …
- Geen (sla vraag 11 t/m 17 over en ga door naar het volgende onderdeel)

11. Met wie deelt u informatie via social media?
- Iedereen
- Alleen goede vrienden
- Alleen vrienden
- Vrienden en kennissen
- Niemand / alleen ik

12. Hoe vaak maakt u gewoonlijk gebruik van social media?
- Meerdere keren per dag
- Eén keer per dag
- Een aantal keren per week
- Eén keer per week
- Eén keer per maand
- Minder dan één keer per maand

13. Deelt u uw sportprestaties via social media?
- Ja, altijd
- Ja, soms
- Nee, nooit (sla vraag 14 t/m 17 over en ga door naar het volgende onderdeel)

14. Met wie deelt u uw sportprestaties via social media?
- Iedereen
- Alleen goede vrienden
- Alleen vrienden
- Vrienden en kennissen

15. Als u uw sportprestaties deelt via social media, via welk netwerk doet u dat dan? (meerdere antwoorden mogelijk)
- Facebook
- Twitter
- Instagram

- Anders, namelijk …

16. Welke gegevens over uw sportprestaties deelt u op social media?
…

17. Waarom deelt u uw sportprestaties op social media?
…

Big Five Inventory (BFI)

Geef, met een cijfer van 1 tot 5, aan in hoeverre de onderstaande stellingen op u van toepassing zijn.

1 = Sterk mee oneens
2 = Beetje mee oneens
3 = Mee eens noch mee oneens
4 = Beetje mee eens
5 = Sterk mee eens

Ik zie mijzelf als iemand die…

1. Spraakzaam is
2. Geneigd is kritiek te hebben op anderen
3. Grondig te werk gaat
4. Somber is
5. Origineel is, met nieuwe ideeën komt
6. Terughoudend is
7. Behulpzaam en onzelfzuchtig ten opzichte van anderen is
8. Een beetje nonchalant kan zijn
9. Ontspannen is, goed met stress kan omgaan
10. Benieuwd is naar veel verschillende dingen
11. Vol energie is
12. Snel ruzie maakt
13. Een werker is waar men van op aan kan
14. Gespannen kan zijn
15. Scherpzinnig, een denker is
16. Veel enthousiasme opwekt
17. Vergevingsgezind is
18. Doorgaans geneigd is tot slordigheid
19. Zich veel zorgen maakt
20. Een levendige fantasie heeft
21. Doorgaans stil is
22. Mensen over het algemeen vertrouwt

23. Geneigd is lui te zijn
24. Emotioneel stabiel is, niet gemakkelijk overstuur raakt
25. Vindingrijk is
26. Voor zichzelf opkomt

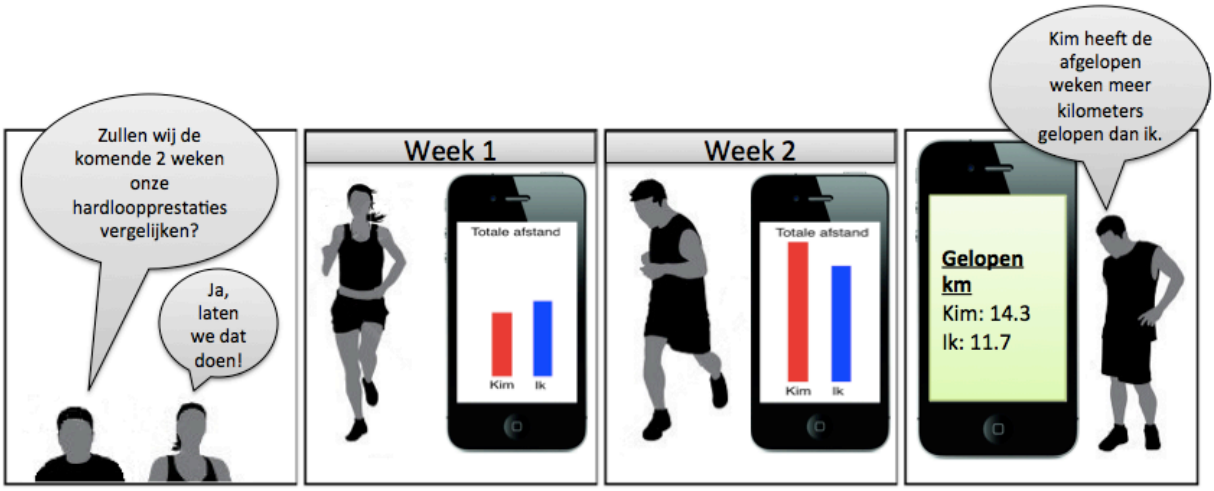
27. Koud en afstandelijk kan zijn
28. Volhoudt tot de taak af is
29. Humeurig kan zijn
30. Waarde hecht aan kunstzinnige ervaringen
31. Soms verlegen, geremd is
32. Attent en aardig is voor bijna iedereen
33. Dingen efficiënt doet
34. Kalm blijft in gespannen situaties
35. Een voorkeur heeft voor werk dat routine is
36. Hartelijk, een gezelschapsmens is
37. Soms grof tegen anderen kan zijn
38. Plannen maakt en deze doorzet
39. Gemakkelijk zenuwachtig wordt
40. Graag nadenkt, met ideeën speelt
41. Weinig interesse voor kunst heeft
42. Graag samenwerkt met anderen
43. Gemakkelijk afgeleid is
44. Het fijne weet van kunst, muziek of literatuur

Vragen persuasieve technologie: social support

In veel (mobiele) applicaties wordt gebruik gemaakt van bepaalde sociale elementen. In de onderstaande stripverhalen worden verschillende situaties afgebeeld, waarin de hoofdpersoon gebruik maakt van een mobiele applicatie voor het hardlopen. Deze applicatie heeft meerdere functies, waarvan een aantal in de afgebeelde situaties voorkomen. ***Ik wil u vragen zich in te beelden dat u deze applicatie ook gebruikt bij het hardlopen, ook als u in het dagelijks leven niet hardloopt.***

De applicatie geeft de gebruiker de mogelijkheid om het hardlopen te delen met vrienden via social media (zoals Facebook, Twitter, Instagram, of Myspace) of enkel binnen de applicatie, met vrienden die de applicatie ook gebruiken.
Wanneer u iets deelt met uw vrienden op social media, zal het bericht op uw social media pagina verschijnen.
Wanneer u iets deelt met uw vriendin die de applicatie ook gebruiken, zal het bericht op uw profiel van uw applicatie-account verschijnen en alleen zichtbaar zijn voor uw vrienden binnen de applicatie.

Functie 1:



In het bovenstaande stripverhaal, ziet u dat twee mensen via een applicatie hun sportprestaties met elkaar vergelijken. Geef, met een cijfer van 1 tot 5, aan in hoeverre de onderstaande stelling op u van toepassing is.

1 = Zeker niet
2 = Waarschijnlijk niet
3 = Misschien wel, misschien niet
4 = Waarschijnlijk wel
5 = Zeker wel

1) Ik zou van deze functie gebruik maken.
1 - 2 - 3 - 4 - 5

2) Ik zou deze functie delen met:
- Iedereen
- Alleen goede vrienden
- Alleen vrienden
- Vrienden en kennissen
- Ik deel geen sportprestaties

Functie 2:

In het bovenstaande stripverhaal, ziet u dat iemand de titel 'Sporter van de week' wilt worden. Geef, met een cijfer van 1 tot 5, aan in hoeverre de onderstaande stelling op u van toepassing is.

1 = Zeker niet
2 = Waarschijnlijk niet
3 = Misschien wel, misschien niet
4 = Waarschijnlijk wel
5 = Zeker wel

1) Ik zou van deze functie gebruik maken.
1 - 2 - 3 - 4 - 5

2) Ik zou deze functie delen met:
- Iedereen
- Alleen goede vrienden
- Alleen vrienden
- Vrienden en kennissen
- Ik deel geen sportprestaties

Functie 3:

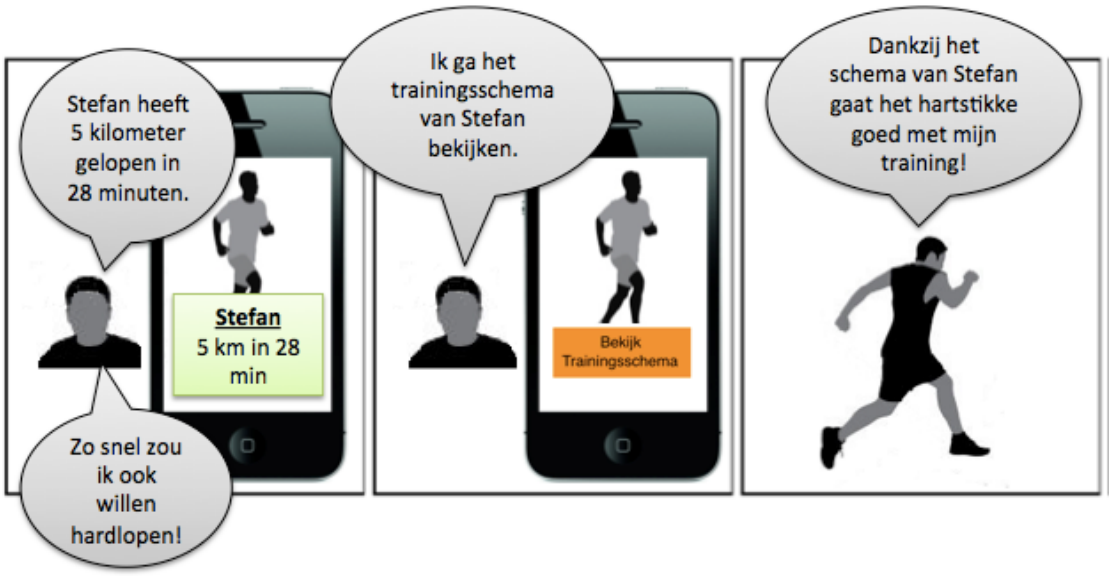
In het bovenstaande stripverhaal, ziet u dat iemand via een applicatie kan zien wie er nog meer aan het sporten zijn. Geef, met een cijfer van 1 tot 5, aan in hoeverre de onderstaande stelling op u van toepassing is.

1 = Zeker niet
2 = Waarschijnlijk niet
3 = Misschien wel, misschien niet
4 = Waarschijnlijk wel
5 = Zeker wel

1) Ik zou van deze functie gebruik maken.
1 - 2 - 3 - 4 - 5

2) Ik zou deze functie delen met:
- Iedereen
- Alleen goede vrienden
- Alleen vrienden
- Vrienden en kennissen
- Ik deel geen sportprestaties

Functie 4:



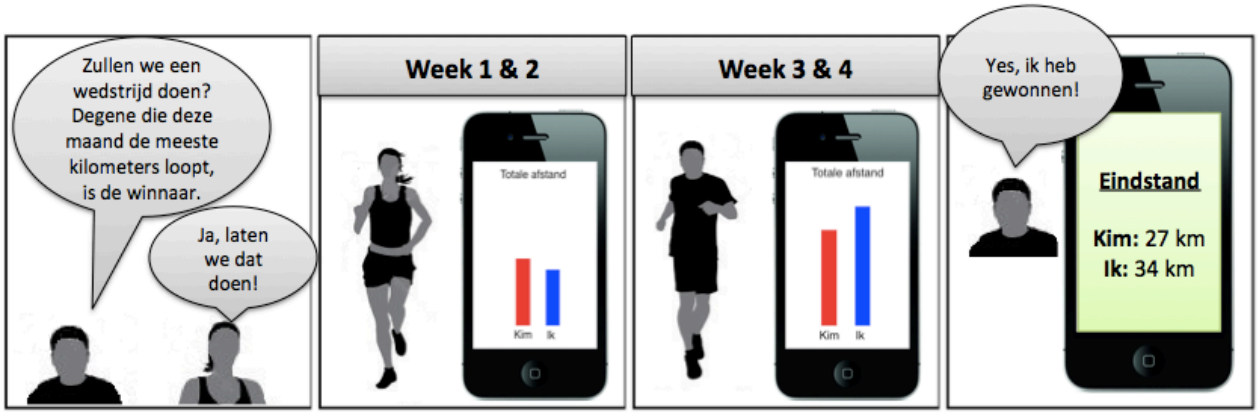
In het bovenstaande stripverhaal, ziet u dat iemand via een applicatie het trainingsschema van een ander gebruikt. Geef, met een cijfer van 1 tot 5, aan in hoeverre de onderstaande stelling op u van toepassing is.

1 = Zeker niet
2 = Waarschijnlijk niet
3 = Misschien wel, misschien niet
4 = Waarschijnlijk wel
5 = Zeker wel

1) Ik zou van deze functie gebruik maken.
1 - 2 - 3 - 4 - 5

2) Ik zou deze functie delen met:
- Iedereen
- Alleen goede vrienden
- Alleen vrienden
- Vrienden en kennissen
- Ik deel geen sportprestaties

Functie 5:



In het bovenstaande stripverhaal, ziet u dat twee mensen via een applicatie met elkaar een wedstrijd aangaan. Geef, met een cijfer van 1 tot 5, aan in hoeverre de onderstaande stelling op u van toepassing is.

1 = Zeker niet
2 = Waarschijnlijk niet
3 = Misschien wel, misschien niet
4 = Waarschijnlijk wel
5 = Zeker wel

1) Ik zou van deze functie gebruik maken.
1 - 2 - 3 - 4 - 5

2) Ik zou deze functie delen met:
- Iedereen
- Alleen goede vrienden
- Alleen vrienden
- Vrienden en kennissen
- Ik deel geen sportprestaties

: Descriptive statistics regarding mean scores on the BFI

on Sample: Means and Standard Deviations for Big Five Inventory (John & Srivastava, 1999) by Age

	Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
N	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
6076	3.25	.90	3.64	.72	3.45	.73	3.32	.82	3.92	.66
5014	3.26	.89	3.64	.72	3.50	.72	3.30	.82	3.94	.65
4828	3.30	.89	3.64	.70	3.52	.70	3.28	.82	3.94	.66
4494	3.28	.89	3.67	.70	3.55	.71	3.29	.82	3.95	.65
4499	3.31	.91	3.66	.71	3.58	.71	3.27	.83	3.96	.66
3683	3.31	.91	3.66	.70	3.57	.71	3.28	.83	3.95	.66
3529	3.28	.91	3.68	.69	3.60	.71	3.26	.82	3.95	.66
3497	3.29	.92	3.67	.70	3.61	.71	3.23	.83	3.94	.66
3213	3.29	.91	3.67	.70	3.61	.70	3.25	.83	3.93	.67
3007	3.28	.90	3.67	.69	3.63	.72	3.22	.84	3.94	.67
2307	3.31	.90	3.68	.71	3.63	.72	3.24	.83	3.92	.67
2111	3.27	.89	3.72	.68	3.63	.72	3.21	.84	3.93	.67
1907	3.26	.92	3.75	.68	3.65	.72	3.20	.83	3.91	.67
1735	3.29	.93	3.73	.69	3.66	.73	3.19	.84	3.92	.67
1760	3.29	.91	3.75	.68	3.68	.73	3.19	.85	3.90	.68
1509	3.24	.91	3.78	.68	3.65	.74	3.19	.86	3.87	.70
1541	3.26	.92	3.82	.68	3.72	.72	3.15	.84	3.88	.69
1406	3.23	.90	3.84	.66	3.74	.71	3.13	.85	3.87	.69
1269	3.23	.91	3.83	.67	3.75	.71	3.17	.84	3.88	.69
1393	3.30	.89	3.81	.67	3.74	.72	3.14	.84	3.88	.69
1115	3.25	.91	3.87	.66	3.76	.71	3.15	.87	3.86	.65
1244	3.25	.90	3.89	.65	3.76	.74	3.11	.86	3.90	.69
1064	3.22	.93	3.90	.66	3.75	.70	3.14	.88	3.88	.72
1051	3.26	.88	3.86	.66	3.79	.70	3.11	.87	3.93	.65
1135	3.22	.89	3.88	.67	3.77	.69	3.10	.87	3.90	.70
900	3.23	.91	3.93	.68	3.81	.73	3.05	.87	3.85	.75
856	3.25	.89	3.90	.67	3.84	.68	3.06	.90	3.92	.75
809	3.24	.91	3.90	.62	3.80	.69	3.09	.87	3.88	.69
735	3.21	.89	3.91	.63	3.83	.72	3.05	.90	3.89	.72
791	3.26	.90	3.97	.66	3.85	.71	2.98	.89	3.90	.70
600	3.29	.94	3.96	.65	3.88	.67	3.02	.92	3.91	.67
563	3.30	.87	3.91	.67	3.85	.71	3.05	.92	3.90	.72
456	3.25	.92	3.99	.64	3.82	.72	3.04	.90	3.91	.66
328	3.17	.91	4.01	.67	3.84	.69	3.03	.93	3.86	.75
346	3.25	.85	3.91	.65	3.87	.66	2.93	.83	3.89	.71
317	3.26	.85	3.93	.66	3.88	.71	2.96	.83	3.86	.71
246	3.12	.91	3.96	.68	3.84	.69	2.94	.95	3.85	.73
210	3.18	.89	4.02	.66	3.93	.73	2.98	.85	3.79	.73
161	3.13	.89	3.90	.66	3.88	.74	3.06	.96	3.80	.70
162	3.10	.85	3.99	.68	3.86	.71	2.92	.99	3.80	.73