Visual Priming in Online Dating: The effect of background cues on attraction

Layla van den Heuvel
SNR: 2051222

Master's Thesis
Communication and Information Sciences
Business Communication and Digital Media

School of Humanities and Digital Sciences
Tilburg University, Tilburg

Supervisor: Dr. A.P. Schouten
Second reader: Dr. J. Schilperoord

31-05-2021

Abstract

The aim of this study was to examine if background cues affect perceived introversion/extraversion and if this positively affect the profile owners' attractiveness alongside physical attractiveness of the profile picture. Based on literature it was expected that background cues were used to form an impression about the profile owner, which in turn contributed to a positive effect on the profile owners attractiveness. To investigate this the study employed a 3 (introvert background cues / extravert background cues / no background cues) x 2 (attractive profile picture / unattractive profile picture) mixed design, with background cues as a between-subject variable and physical attractiveness of the profile picture as a within-subject variable. The results of this study, however, indicate that there was no direct effect of background cues on the perception of introversion/extraversion and attractiveness. However, the perception of introversion/extraversion does partially mediate the effect of physical attractiveness on physical/romantic and social attraction of the profile owner. Next to that, a small effect of background cues, although not significant, was found when the profile picture was unattractive but had an extravert background. In sum, the current study provides evidence for the initial attraction in online dating, which appears to be determined by the physical attractiveness of the profile owner, and is not based on additional cues given in the background.

Keywords: online dating, personality perceptions, physical attraction, romantic attraction, social attraction, introversion, extraversion

Introduction

Photographs are an important element on dating profiles as they have the ability to portray a person's physical attractiveness, which is important in online dating (e.g., Sritharan et al., 2009; Fiore et al., 2008). To increase the chance of finding a romantic partner online it is therefore important to complete one's dating profile with a photo of oneself. People that have a dating profile with attractive photos are oftentimes seen as physically more attractive and preferred to date over people with less attractive pictures (Hitsch et al., 2010). Physical attractiveness seems to be so important, that in some cases less attractive people enhance their photographs to appear more attractive to catch the attention of a possible romantic partner (e.g., Toma & Hancock, 2010).

However, photographs do not only have the ability to portray physical attractiveness, they can also contain information about someone's interests, social status, and personality (Degen & Kleeberg-Niepage, 2021). For example, facial expressions and body language can tell something about personality (James, 2008), the accessories or clothes worn in the picture, cars, or holiday destinations can tell something about social status, and sports, books or activities can tell something about interests. These are all kind of different cues that could tell a story about the person displayed in the picture, in addition to physical attractiveness, which can help to define if the person in the picture could be a possible match.

Prior research has already looked into the effect of profile pictures on impression formation based on cues other than physical attractiveness. For example, Liu et al. (2016) analyzed Twitter profile pictures, to estimate if the user's personality could be predicted based on the facial features of the picture chosen by the profile owner. They found significant results for differences in the choice of a profile picture and personality, and that personality can be predicted with accuracy based on the profile picture. Wu et al., (2015) studied the motivations behind the choice of Facebook profile pictures. They found that the users' personality

influenced the choice for a profile picture, and that the profile picture reflects their personality. Finally, Celli et al., (2014) studied if personality traits and interaction styles could be recognized automatically based on Facebook profile pictures. They found that profile pictures convey a lot of information about the profile owner, which is connected to impression formation and identity management. The results of these studies show that people are indeed able to establish inferences about the profile owner's personality based on other cues given in the photograph, and that these inferences are quite accurate.

Prior research on online dating, however, did not look into whether people make inferences about a profile owners personality based on a picture, and if this influences the profile owners attractiveness, next to appearance. If people make inferences based on other cues given in the photo, it may also be this has an impact on how the profile owner is seen. These minimal cues can help to form a better overall impression of the person displayed. Thus, if the background of a picture presents a well-organized workplace or a university campus, this may lead you to infer that the person displayed is conscientious and intelligent (Denissen et al., 2017; Martin et al., 2007). Thus, if cues given in a photo affect perceived personality (Goslin et al., 2002), they most likely have an effect on perceived attractiveness as well (Paunonen, 2006). Prior research in other fields already focused on the fact that we use certain cues in profile pictures to predict someone's personality. Therefore, it would be logical that we use these cues on dating profiles as well. However, prior research mainly focused on the physical attractiveness of the person presented in the profile picture, but it never looked into the effect of background cues on perceived personality, and therefore, the effect on perceived attractiveness.

The main goal of this study is to find out if the background of a photograph can contribute to how a profile owner is assessed in online dating. More specifically, it will look into the effect of background cues on perceived introversion/extraversion, and the effect of

personality and physical attractiveness on attractiveness, by investigating (a) whether background cues affect perceived introversion/extraversion. And (b), whether perceived introversion/extraversion affect attractiveness on top of physical attractiveness. To do so, participants will be shown dating profiles with backgrounds that give cues about extraversion, introversion, and no cues at all, and vary in their score of physical attractiveness. Extraversion is one of the most discernible personality traits, and is also strongly related to attractiveness. Therefore, this study will focus on background cues that portray extraversion and introversion. This leads to the following research question:

RQ: Do background cues affect perceived introversion/extraversion and does this positively affect the profile owners attractiveness next to physical attractiveness?

Theoretical framework

Self-presentation

In face-to-face communication, there are many different factors that contribute to forming an impression of the person you are communicating with. One of these factors is the way in which people present themselves. People try to manage these impressions by controlling information that influences how they are seen by others (Schlenker, 2012). The act of impression management is also called self-presentation. Self-presentation according to Goffman (1959) is a dramaturgical performance in which people present themselves in front of an audience consisting of observers. When we present ourselves, we use a set of actions to communicate with, in order to create a desired impression about ourself. Literature related to self-presentation examines how people try to shape attitudes and behaviors of their communication partners. Self-presentation theories suggest that this is done by information a communication partner provides about oneself, and the way it is perceived by the audience (Schlenker, 2012). Thus, we are able to manipulate the way in which people we communicate with will perceive us, by strategically choosing the way we present ourselves.

Self-presentation online

Online, people are also able to manage their impressions and provide others with certain signals in order to convey an impression. Different tools that are used in computer-mediated communication to present the self are photos and biographies, that tell personal information about the profile or website owner (Schau & Gilly, 2003; Dominick, 1999). Managing impressions in an online environment is even more convenient than in an offline environment, as the profile owner has the ability to manage interactions more strategically, and therefore, has greater control over their self-presentation. This is due to the emphasis on verbal and linguistic cues that are more controllable than nonverbal cues in face-to-face communication (Ellison et al., 2006).

Impression formation (given vs given off)

Goffman's theory (1959) suggests that an individual is constantly engaged in a performance to deliver impressions to others that communicate information. The impression an observer forms is based on expressions that are intentionally given to them, and expressions that the individual gives but where he or she is not completely aware off, expressions given and expressions given off. Given expressions is mostly behavior that is expressed with the explicit intent to transfer information, language for example. Expressions given off are all kinds of subtle, oftentimes nonverbal, behavioral, cues that are seemingly expressed without the explicit intent of the performer (Mills et al., 2010).

The impression others form about a person are therefore based on both expressions given (e.g., spoken communication) and given off (e.g., nonverbal communication cues). Goffman (1959) argues that expressions given, could be used as a mask, and therefore not always be true to the real self. Expressions given off, thus, are perceived as most important when forming an impression.

Impression formation online (warranting)

Impression formation online is complex because people tend to present their ideal self (Ellison et al., 2006). This can easily lead to misrepresentations in online environments. When people form impressions online, information that could not be manipulated by others is therefore more important than information that is self-described. Walther and Parks (2002) described this effect as warranting. People will look for cues that are hard to mimic or govern in order to form an impression.

Therefore, when people form impressions in an online environment, they seek for warrants. These warrants are usually information that is generated by others on a social media profile, such as descriptions of the profile owner by others, or wall posts from friends (Tong et al., 2019; Hall et al., 2014; Gosling et al., 2011). The concept of warranting (Walther & Parks, 2002) is closely linked to the theory of dramaturgy (Bullingham & Vasconcelos, 2013; Goffman, 1959), where people form their impressions based on cues given and cues given off. Cues we give, are cues that can easily be manipulated, cues given off are oftentimes unintended, and therefore not manipulated. The cues people give about themselves online, are less certain and easier to manipulate than in face-to-face communication (Walther et al., 2009; Walther & Parks, 2002).

Online dating

Nowadays, people increasingly rely on online dating when it comes to finding a romantic partner. In online dating, the internet or apps are used to search for a date, partner, relationship, or sex partner. In online dating, people use profiles that contain pictures and personal descriptions of the profile owner, which can be used to base an impression on. Although oftentimes a detailed self-description of the profile owner is available, research found that profile pictures are most important, and mainly used to form an impression on (Ward, 2016;

Sritharan et al., 2009; Fiore et al., 2008), which highlights the importance of physical appearance.

The explanation for the importance of the profile picture is that first impressions are oftentimes mainly based on someone's appearance. Prior research has shown that it takes approximately 39ms for someone to form a first impression of a person, only from the facial features that are visible on a picture (Oosterhof & Todorov, 2008; Bar et al., 2006; Willis & Todorov, 2006). People are able to recognize and extract information from other people based on how they look (Little, 2014; Little et al., 2011; Willis & Todorov, 2006). But these impressions based on appearance are mostly relating to the theory of sexual selection (Little, 2014; Little et al., 2011), which postulates that certain physical traits are valued over others when it comes to mate selection, because they contribute to the success of procreation (Jones & Ratterman, 2009).

Facial attractiveness is oftentimes the main focus of a profile picture when it comes to impression formation, but the profile picture has the ability to give a lot more information about the profile owner. For example, someone's personal environment contributes to the way in which he or she is perceived. Bedrooms and workplaces of a person are good estimators to predict someone's personality (Gosling et al., 2002), as well as attributes the person possesses (Verhoeven et al., 2007; Burroughs et al., 1991). This is important, as this is helpful to asses if the person owning the dating profile is a valuable potential partner. If we accurately predict someone's personality based on their bedroom, we can also use their website, social media, and thus, dating profile to form an impression about their personality.

There are less cues available in online dating profiles than in traditional face-to-face communication. To accurately predict someone's personality in an online dating environment people may therefore use cues given off, which have a higher warranting value (Hall et al., 2014; Gosling et al., 2011). People try to find meaning in small cues, as spelling errors or the

last log-in date, because they are not easy to manipulate, and therefore, more likely to be true (Ellison et al., 2006). Thus, the theory of impression formation, which postulates that people base their impressions on expressions given and expressions given off, is used, and this holds true for impressions based on online dating profiles in the form of cues given (e.g., profile pictures or self-described ambitions) and cues given off (e.g., spelling errors).

Background

A profile picture is mainly used to provide information about someone's appearance, but it can also provide information about someone's personality. According to the study of semiotics, a photograph can express the ideas and values of the person depicted in the picture, through wat is represented. Semiotics is the study of semiosis which includes any activity in which a sign is used to communicate a meaning (Van Leeuwen & Jewitt, 2001). Semiotics has two layers, the layer of denotation and the layer of connotation. The first layer is the layer of who or what is being depicted in the image, the second layer is the layer of what is being expressed in the picture through what is presented and the way in which it is presented (Van Leeuwen & Jewitt, 2001). The background of a picture is an example of the connotation layer, and can add an extra layer of information to the image that could give additional cues about the person presented in the picture. Backgrounds can be easily adapted to the preferences of the profile owner, but they can also be altered in a way that they could have an informative function. The background will be seen as an unintentionally given cue, and will therefore have a higher value when it comes to warranting.

The relevance of extraversion vs introversion

When people create a dating profile, they want their profile picture to look conscientious, extraverted, and agreeable, because these are personality traits that are generally seen as attractive (Figueredo et al., 2006). Both men and women have standards for the desired personality traits for their potential romantic partner. For example, heterosexual women desire

their potential partners to score higher on agreeableness, conscientiousness, and emotional stability (Valentova et Al., 2016; Furnham & Tsoi, 2012; Buss, 2010; Furnham, 2009), but their partners also have to be more extraverted than for heterosexual men (Valentova et al., 2016). Non-heterosexual women desire partners higher on agreeableness and openness (Valentova et al., 2016). In general, both men and women desire partners that are more conscientious, extraverted, and agreeable (Figueredo et al., 2006).

Personality can be broadly divided into five traits according to the Big Five Model or Five-Factor model, also known at the OCEAN theory (McCrae & John, 1992). The five personality traits that can be distinguished are: Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness. These traits can be measured with the Big Five Inventory (BFI) (John & Srivastava, 1999). People who are agreeable show compassion, cooperativeness, and empathy for others (Graziano & Eisenberg, 1997). Conscientious people, are people who have great self-discipline and awareness of their responsibilities to others, they work hard and are well organized (Roberts et al., 2009). People that are seen as extravert are oftentimes self-confident, enthusiast, and enjoy the company of other people (Wilt & Revelle, 2009). Neuroticism is characterized by anxiousness, depression, and anger (Widiger, 2009). Neurotic people worry a lot, and get upset easily. The last character trait is openness, people who are seen as open to experiences are adventurous, imaginative, curious, and perceptive (McCrea, 2009; Hoyle et al., 2009).

Of the five personality traits, extraversion is the most discernible personality trait. Warrants for extraversion seem to be perceived most accurate by other observers (Tskhay & Rule, 2014; Hall et al., 2013; Back et al., 2010; Gosling et al., 2007). And because extraverted people are considered better romantic partners due to their social desirability (Bäckström & Björklund, 2012), this study will be focussing on the effect of extraversion on attractiveness. Extraverted people are oftentimes full of energy and are actively seeking for attention from

other people. They are very competitive and much involved in social circles. Ways to present this in the background are for example pictures taken at a festival, or pictures with a motorbike. Like agreeable people, extraverts are seen as very social. Words that can describe this type of person are: Gregariousness, Assertiveness, Activity, Excitement-seeking, Positive emotions, and Warmth (John & Srivastava, 1999). The assumption that extraverts are better romantic partners leads to the following hypothesis:

H1a: *Profile pictures with background cues that indicate an extraverted personality will lead to higher rates of perceived extraversion than profile pictures with background cues that indicate an introverted personality.*

H1b: *Profile pictures with extravert and introvert background cues will lead to higher rates of perceived extraversion and introversion, respectively, than profile pictures without background cues.*

Physical attractiveness

One's physical appearance is a personal characteristic that is visible to others in all social interactions. Attractive people are oftentimes judged as more socially desirable and more likely to have prestigious jobs, happy marriages, and more fulfilling social lives, and are perceived as better parents. This is also called the "What is beautiful is good" stereotype (Dion et al., 1972).

Research has shown that people do desire certain personality traits more in a partner than others (Valentova et al., 2016; Furnham & Tsoi, 2012; Furnham, 2009; Figueredo et al., 2006). Although it is not always true that people who are more attractive are more successful and socially desirable (Dion et al., 1972), this is oftentimes what people think. Extraverted people are found to be more socially desirable (Bäckström & Björklund, 2012), and might

therefore, be better potential romantic partners. Therefore, it could be expected that physically attractive people are perceived as more extraverted.

H2: *Physically attractive people will be perceived as more extraverted than physically unattractive people.*

The importance of physical characteristics is emphasized by theories of romantic and social attraction (e.g., Dion et al., 1972; Walster et al., 1966). These studies have shown that people will easier be romantically and socially attracted towards individuals that are physically attractive. The feelings of social and romantic attraction are strongly associated with physical attractiveness (e.g., Stroebe et al., 1971). Thus, earlier research indicates that physical attractive people are seen more positively than less physically attractive people, and this leads to the following hypotheses:

H3: *People are attracted more to physically attractive people than to physically unattractive people.*

If physical attractiveness will lead to the perception of extraversion, and physical attractiveness will have a direct effect on attractiveness (e.g., Dion et al., 1972; Stroebe et al., 1971). It is therefore likely to expect that perceived extraversion will be perceived as more attractive. This effect of perceived extraversion on attraction of the profile owner would then be a mediating effect.

H4: *When extraverted background cues are used, the profile owner is perceived as extravert and will therefore score higher on perceived attractiveness than when introvert background cues/no background cues are used.*

Finally, when physically attractive people are perceived as more attractive, as H3 suggest, it will be likely to expect that the effect of perceived extraversion on attractiveness, H4, will be bigger for physically unattractive people than for physically attractive people. When

a profile picture is attractive, there is oftentimes enough information available to form an impression instantly. Therefore, no additional cues are needed to base an impression on. However, when the profile picture is less attractive, the picture may not provide enough information to form an impression on. This may cause the viewer to pay more attention to additional cues that can be used to from their impression on (e.g., Willis & Todorov, 2006). This leads to the following hypothesis where the interaction effect between perceived introversion/extraversion and physical attractiveness is explained.

H5: *The effect of background cues related to the profile owners personality leading to a higher perception of attractiveness in comparison to no background cues related to the profile owners personality, is bigger when the profile owner is unattractive than when the profile owner is attractive.*

Method

Participants

A total of 273 men and women were recruited for this study. However, data from 97 individuals was excluded because they did not complete the survey or did not give consent to use their data. Hence, data of 176 participants (43 male and 133 female) was left for further analysis. The participants were aged between 19 and 35 years old ($M = 24.63$, $SD = 3.47$). 154 of the 176 participants were European, other participants were American or Asian. Most participants, 69.3% had obtained a university degree, 21% completed higher vocational education, 2.3% completed intermediate vocational education, and 7.4% completed secondary school. 36.9% of all participants were single, 56.8% were in a relationship, 5.1% of participants said their relationship status was complicated, and 1.1% did not wish to answer the question. 71% of all participants had used online dating before. From the participants that are currently single, 53 used or had used online dating. 62 participants that were in a relationship had used

online dating, and all participants that stated their relationship was complicated used online dating.

Design

This experiment had a 3 x 2 mixed design with background cues (extravert / introvert / no background) as a between-subject variables and physical attractiveness of the profile picture (attractive / unattractive) as a within-subject variables. Participants selected the gender of their preference and were presented with a total of four dating profiles, two from each condition. The dating profiles only consisted of a profile picture.

Participants were shown four different profiles, and therefore, attraction could not be kept as a within-subject variable. Hence, the data was restructured so that each assessment of a dating profile was seen as one case, and thus each respondent contributed four cases to the data. This causes the cases in the dataset to be non-independent. Therefore, as an additional analysis, we performed a multilevel model controlling for non-independence. This, however, yielded similar results as the regular analysis of variance. In the thesis, we therefore present the non-controlled analyses.

Stimuli

Background cues. In order to select backgrounds that communicated introversion and extraversion, we first selected fourteen backgrounds. To determine which background belonged to which category a pre-test was conducted in which 28 participants (15 women, 13 men*)* rated the level of introversion/extraversion of each picture. The pictures were selected from free stock sites Pixabay and Pexels, as well as personal photos from the researcher. The backgrounds were selected based on following requirements for extraversion: backgrounds included cues of social activities (e.g., festivals or parties), or excitement-seeking activities (e.g., riding a bike), or bright colors. For introversion the backgrounds were selected based on following criteria:

Neutral colors, landscapes, activities that could be performed without others, and books and magazines.

Participants had to rate the background pictures on their level of introversion/extraversion. After each picture was shown, the participant was asked:"*How introvert/extravert do you think this background is?"*. The introversion/extraversion scores for the background pictures were measured on a ten-point scale, ranging from 1 (introvert) to 10 (extravert). Scores for the seven extravert backgrounds were between 5.25 and 9.25 with an average score of 7.52 (*SD* = 1.12) and the seven introvert background pictures scored between 1.50 and 5.50 with an average score of 3.07 (*SD* = 0.96). For extraversion the four pictures that scored highest were selected (*M* = 7.52, *SD* = 1.12, Median = 7.75) and for introversion the four that scored lowest were selected (*M* = 3.07, *SD* = 0.96, Median = 3.07) To test whether the difference between extravert backgrounds and introvert backgrounds was significant, a paired samples t-test was performed. The results of this analysis showed that the extravert backgrounds significantly differed from the introvert backgrounds $t(27) = 16.669$, $p < .001$.

Image 1. Example of Extravert background   *Image 2*. Example of Introvert background

Physical attractiveness. In order to determine which pictures belonged to the category of physically unattractive profile pictures and which belonged to category of physically attractive profile pictures, a pre-test was conducted. 27 participants (15 women, 13 men) rated the physical attractiveness of 36 individuals of their preferred sex, on a ten-point scale. We first

selected 18 male and 18 female profile pictures. The pictures were selected from the free stock image sites Pixabay, and Pexels. The people displayed in the photographs were selected based on following criteria: The person displayed in the picture should not exhibit any outward characteristics of a subculture that might influence attractiveness beyond physical attractiveness, the pictures were taken from the front with the eyes looking straight into the camera, the background had to be neutral, the person displayed in the picture should have a positive facial expression, and no facial piercings, tattoos, heavy makeup, and revealing clothing should be visible.

Participants had to rate the profile pictures on their level of physical attractiveness. After each picture was shown, the participant was asked: *"To what extent do you find the person in the profile picture attractive"*. The attractiveness scores for the profile pictures were measured on a ten-point scale, ranging from 1 (unattractive) to 10 (attractive). Mean scores for the 18 male pictures ranged between 2.15 and 7.00 with an average score of 4.34 ($SD = 1.27$) and the 18 female pictures scored between 2.67 and 7.93 with an average score of 5.28 ($SD = 0.92$). For both sets of pictures, the four pictures that scored highest were selected as the attractive pictures (male pictures: $M = 6.75$, $SD = 1.68$, Median = 7.50; female pictures: $M = 7.45$, $SD = 1.12$, Median = 7.50), and the four that scored lowest were categorized as the unattractive pictures (male pictures: $M = 2.39$, $SD = 1.15$, Median = 2.25; female pictures: $M = 2.92$, $SD = 1.36$, Median = 2.75). To test whether the difference between attractive and unattractive pictures was significant, a paired samples t-test was performed. The results of the analysis showed that the attractive pictures significantly differed from the unattractive pictures, men: $t(12) = 9.665$, $p < .001$, women $t(14) = 9.962$, $p < .001$.

Image 3. Example of attractive profile owner
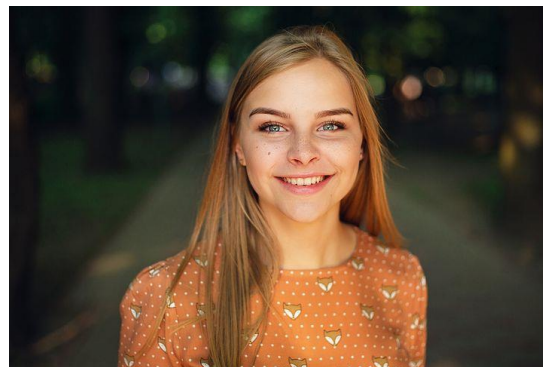
Image 4. Example of attractive profile owner

Image 5. Example of unattractive profile owner

Image 6. Example of unattractive profile owner

Procedure

The data was collected via Qualtrics in the form of an online questionnaire. Participants were recruited via social media platforms, for example Facebook and LinkedIn, and via SurveySwap. Participants were able to complete the questionnaire on a laptop, smartphone, or tablet.

First, a brief explanation of the study was given to the participants, and they were asked to give their consent by signing the consent form. The experiment started with the question about the participants' preference for a romantic partner. All other demographic questions, as age, gender, and education, were asked at the end of the questionnaire to avoid that participants would feel uncomfortable to answer the questions due to their romantic preferences. After the participants specified their romantic preference, they were randomly assigned to one of the background conditions, and were shown two attractive and two unattractive profile owners, each followed by a questionnaire with the dependent variables.

Eight backgrounds and sixteen profile pictures (male: 4 attractive + 4 unattractive, female: 4 attractive + 4 unattractive) from the pre-test have been selected for the experiment. For both male profiles and female profiles, the same backgrounds were used (4 introvert and 4 extravert backgrounds). For each condition eight dating profiles were developed, which in total was (6 x 8 =) 48 dating profiles, with all possible combinations of profile pictures and backgrounds. Sixteen profiles contained introvert background cues, sixteen profiles contained extrovert background cues, and another sixteen profiles contained no background cues. All conditions consisted of four male profiles and four female profiles. Each participant was randomly assigned to a background condition and shown 4 dating profiles (2 unattractive profiles, 2 attractive profiles). Although the assignment to the conditions was random, a background or person was never shown twice to the same participant. After each profile a set of questions assessing perceived introvert/extravert, and romantic, physical, and social attraction were asked.

Since it takes approximately 39ms to form an impression based on visual features on a picture (Oosterhof & Todorov, 2008; Bar et al., 2006; Willis & Todorov, 2006), the button to go to the next part of the questionnaire became visible after the profile had been shown for three seconds. This time was given to make sure the participant would not skip to the next page before taking a good look at the profile. After all the profiles were viewed and rated, the participants were asked to answer the general demographic questions about their gender, age, education, relationship status, and use of online dating. If all questions were answered and the questionnaire was ended, the aim of the study had been explained to the participants, and they were thanked for taking part in the experiment.

Operationalization

Perceived introversion/extraversion. To measure introversion/extraversion the big five personality inventory (BFI) was used (John & Srivastava, 1999). The BFI consists of 44

questions, but only the 8 questions related to extraversion were used, and they were changed slightly to reflect the assessment of the profile owners' level of introversion/extraversion based on a profile picture. For example: *"I see myself as someone who.."* the question was changed to: "*I think the person in the profile picture is someone who…"*. All items were measured on a five-point scale ranging from 1 (*strongly disagree)* to 5 (*strongly agree)*. The questions used to measure extraversion were: "*I think the person in the profile picture is someone who is talkative","* I think the person in the profile picture is someone who is reserved"," I think the person in the profile picture is someone who is full of energy"," I think the person in the profile picture is someone who generates a lot of enthusiasm", "I think the person in the profile picture is someone who tends to be quiet", "I think the person in the profile picture is someone who has an assertive personality", "I think the person in the profile picture is someone who is sometimes shy, inhibited", and "I think the person in the profile picture is someone who is outgoing, sociable"*. The reliability of this scale was assessed using Cronbach's Alpha. This showed a good reliability for the personality scale ($\alpha = .859$)

Attractiveness measures. The impressions of attractiveness were measured with the interpersonal attraction scale, based on three subscales that each cover a dimension of perceived attractiveness: social attraction, physical attraction (McCroskey & McCain, 1974), and romantic attraction (Campbell, 1999). All dimensions were measured on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Items that were used for measuring social attraction were: *"I think this person is pleasant to hang out with", "I think this person and I could be friends", "I think I could become good friends with this person", "I think this person would fit in well with my circle of friends"*. The items used to measure physical attraction were: *"I think this person handsome", "I think this person is good looking", "I think this person is physically attractive"*. The items used to measure romantic attraction were: *"I would like to have a relationship with this person", "I would like to go out with this person", "I am attracted*

to this person", and *"I would swipe this person to the right"*. Together these ratings indicated the perceived attractiveness.

To test whether the three subscales of attractiveness could be combined in a single scale, a principal axis factor analysis (FA) was conducted on the 11 items. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = 0.923, and all KMO values for individual items were greater than 0.89, which is well above the acceptable limit of 0.5 (Kaiser & Rice, 1974). An initial analysis was run to obtain eigenvalues for each factor in the data. Two factors had eigenvalues over Kaiser's criterion of 1 and in combination explained 75.5% of the variance. The Rotated Component Matrix showed that there were two subscales. All items related to physical attraction and romantic attraction scored above 0.77, and the items related to social attraction did not score above 0.33 in the first component. The second component showed that all items related to social attraction scored above 0.77, whereas the items for physical attraction and romantic attraction did not score above 0.39. The reliability of both scales was good (physical/romantic attraction: α = .949, social attraction: α = .874). Therefore, for all other analysis physical and romantic attraction will be combined as one dependent factor, and social attraction will be used as a separate dependent factor.

Statistical analysis

All statistical analyses were conducted using SPSS. To test H1a, H1b, H, and H5, a Multivariate General Linear Model analysis (MANOVA) was conducted. The dependent variables used for this analysis are mean introversion/extraversion, mean physical/romantic attraction, and mean social attraction. Fixed factors were background and attractiveness. To test H4, Hayes' PROCESS macro was used to conduct a mediation analysis (Hayes, 2012), with perceived introversion/extraversion as mediating factor.

Results

Main results

To test H1a, H1b, H2, H3 and H5, a Multivariate General Linear Model analysis was performed. There was significant skewness and kurtosis in the distribution of the perceived personality scores in the three groups (two of the six z-scores were significant), and there was significant skewness in the distribution of the attractiveness scores in one of the two groups, which indicates that the assumption of normality was not met. However, given the sample size was good, with more than 40 observations per cell, the Multivariate GLM will be fairly robust against this violation. Nevertheless, the results should be treated with caution.

Levine's test (mean extraversion: $F(5, 698) = 1.765$, $p = .118$, mean physical/romantic attraction: $F(5, 698) = 1.309$, $p = .258$, mean social attraction: $F(5, 698) = 3.338$, $p = .005$) showed that there was a significant difference in the variances of mean social attraction. However, looking at the variance ratio of the mean social attraction score (1.08), the ratio is below 2, this suggests that the assumption of homogeneity of variance is met.

Tabel 1

Mean Scores and Standard Deviations per Condition

	Social Attraction		Romantic/Physical Attraction		Introversion/Extraversion	
	Attractive	Unattractive	Attractive	Unattractive	Attractive	Unattractive
Introvert	*M* = 3.45, *SD* = 0.66	*M* = 2.87, *SD* = 0.78	*M* = 3.50, *SD* = 0.81	*M* = 2.06, *SD* = 0.80	*M* = 3.41, *SD* = 0.60	*M* = 2.90, *SD* = 0.74
Extravert	*M* = 3.31, *SD* = 0.74	*M* = 2.93, *SD* = 0.83	*M* = 3.40, *SD* = 0.81	*M* = 2.31, *SD* = 0.76	*M* = 3.45, *SD* = 0.70	*M* = 3.03, *SD* = 0.65
No background	*M* = 3.47, *SD* = 0.65	*M* = 2.94, *SD* = 0.81	*M* = 3.30, *SD* = 0.87	*M* = 2.11, *SD* = 0.82	*M* = 3.40, *SD* = 0.62	*M* = 2.80, *SD* = 0.68

Background cues. H1a posed that extravert background cues in a profile picture would lead to higher rates of perceived extraversion than profile pictures with introvert background

cues would, and H1b posed that when background cues were used in profile pictures, this would lead to higher rates of perceived introversion/extraversion than when there are no background cues used. The Multivariate GLM revealed non-significant effects of the different type of backgrounds on perceived introversion/extraversion, $F(2, 698) = 1.07$, $p = .292$, $\eta^2 = .004$. This means that participants did not use the background cues to form an impression of introversion/extraversion. Thus, hypothesis 1a and 1b are not confirmed.

Picture attractiveness. In accordance with H2, physically attractive people were perceived as more extravert than physically unattractive people, $F(1, 698) = 81.62$, $p < .001$, $\eta^2 = .105$. In general, people with attractive profile pictures were rated as more extravert ($M = 3.41$, $SD = 0.69$) than people with unattractive profile pictures ($M = 2.95$, $SD = 0.67$). According to these results hypothesis 2 can be accepted.

Results also showed significant effects of physical attractiveness of the profile picture on physical/romantic attraction of the profile owner, $F(1,698) = 392.78$, $p < .001$, $\eta^2 = .360$, and social attractiveness of the profile owner, $F(1,698) = 76.35$, $p < .001$, $\eta^2 = .099$. People with physically attractive profile pictures score higher on physical/romantic attraction ($M = 2.95$, $SD = 0.83$), and social attraction ($M = 3.42$, $SD = 0.68$) than people with physically unattractive profile pictures score on physical/romantic attraction ($M = 2.15$, $SD = 0.78$), and social attraction ($M = 3.42$, $SD = 0.68$). Thus, hypothesis 3 can be accepted.
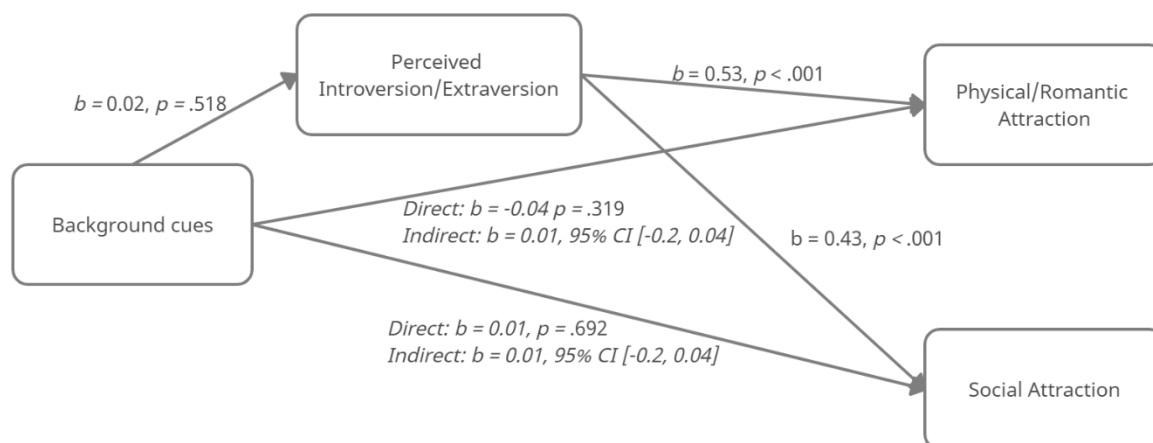
Interaction effect

No significant results were found for H5, that suggested an interaction effect of background cues and physical attractiveness of the profile picture, $F(2, 698) = 0.79$, $p = .454$, $\eta^2 = .002$. This means that the effect of background cues on the perception of introversion/extraversion is not stronger or weaker when the profile picture is physically unattractive/attractive. Thus, hypothesis 5 can be rejected.

Mediation analysis

To find out whether perceived introversion/extraversion explains the relationship between the independent variable background cues and the dependent variables physical/romantic attraction and social attraction, two mediation analyses were performed using Hayes' PROCESS macro with perceived introversion/extraversion as mediator, background cues as the predictor, and physical/romantic attraction and social attraction as outcome variables. This has been bootstrapped with a frequency of 5000.

The mediation analyses revealed no significant direct effect of background cues on physical/romantic attraction ($b = -0.04$, $SE = .042$, $p = .319$), or social attraction ($b = 0.01$, $SE = .032$, $p = .692$). Next, the mediation analysis revealed no significant indirect effect on physical/romantic attraction ($b = -0.01$, $SE = .016$, 95% BCa CI [-0.020, 0.044]), and social attraction ($b = -0.01$, $SE = .014$, 95% BCa CI [-0.019, 0.036]). To illustrate these results, see figure 5.

Figure 1. Model of background cues as predictor of physical/romantic attraction and Social attraction, mediated by perceived introversion/extraversion. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

To find out whether perceived introversion/extraversion explains the relationship between the independent variable physical attractiveness of the profile picture and the

dependent variables physical/romantic attraction and social attraction, again two mediation analyses were performed using Hayes' PROCESS macro with perceived introversion/extraversion as mediator, attractiveness of the profile picture as the predictor, and physical/romantic attraction, and social attraction as outcome variables. This has been bootstrapped with a frequency of 5000.

The mediation analyses revealed significant direct effects of attractiveness of the profile picture on physical/romantic attraction ($b = $ -1.12, $SE = $ .064, $p < $ .001), and social attraction ($b = $ -0.35, $SE = $ .057, $p < $ .001). Next, the mediation analysis revealed a significant indirect effect on physical/romantic attraction ($b = $ -0.123, $SE = $ .026, 95% BCa CI [-0.177, -0.075]), and social attraction ($b = $ -0.159, $SE = $ .027, 95% BCa CI [-0.218, -0.106]), which means that the relationship of attractiveness of the profile picture on physical/romantic attraction and social attraction of the profile owner is explained by the mediator perceived introversion/extraversion. However, background cues are not used to determine the profile owners level of introversion/extraversion and therefore, the perception of introversion/extraversion does not mediate the effect of background cues on the attractiveness of the profile owner. Thus, hypothesis 4 can be rejected, although we should take into consideration that when a profile owner is perceived as more extravert, he or she scores higher on attraction. To illustrate these results, see figure 2.
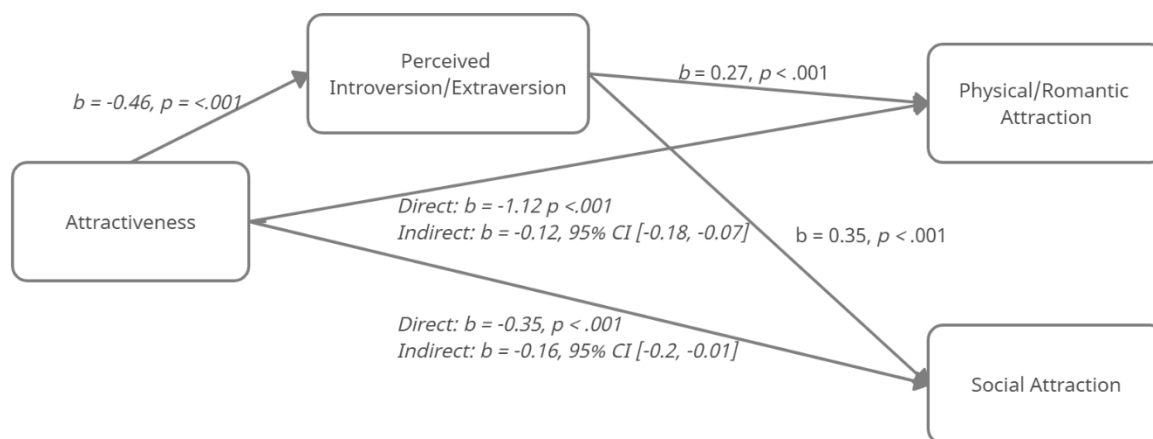
Figure 2. Model of background cues as predictor of physical/romantic attraction and social attraction, mediated by perceived introversion/extraversion. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

Additional analysis

Although no significant interaction effect was found for perceived introversion/extraversion, descriptive statistics revealed that unattractive profile owners were rated slightly more extravert with an extravert background ($M = 3.03$, $SD = 0.65$), than unattractive profile owners presented with an introvert background ($M = 2.90$, $SD = 0.74$), and unattractive profile owners without background cues ($M = 2.80$, $SD = 0.68$). Although this effect was not significant, $F(2, 698) = 0.790$, $p = .454$, $\eta^2 = .002$, results did show an almost significant effect when the profile picture was unattractive but showed extravert background cues compared to introvert background cues ($Mdif = 0.159$, $p = .074$). The analysis also revealed an almost significant effect for background cues on physical/romantic attraction, $F(2, 698) = 2.567$, $p = .077$, $\eta^2 = .007$, which showed that extravert background cues will lead to higher rates of physical/romantic attraction for unattractive profile owners ($M = 2.31$, $SD = 0.08$), compared to introvert background cues for unattractive profile owners ($M = 2.06$, $SD = 0.07$). This effect was only found for physically unattractive people, and not for physically attractive

people ($Mdif = 0.245$, $p = .025$). No interaction effect for social attraction was found, $F(2, 698) = 1.11$, $p = .330$, $\eta^2 = .003$.

Discussion

This study investigated how online dating profiles that contain pictures varying in attractiveness with introvert, extravert, and without background cues affect the perception of introversion/extraversion of the profile owner, and if this influences the impressions of the profile owner's attractiveness. The main goal of this study was to find out if background cues affect the perception of introversion/extraversion and if this positively affect the profile owners attractiveness next to physical attractiveness of the profile picture. This goal was based on the theory of self-presentation (Goffman, 1959), and the theory of warranting (Walther & Parks, 2002), which both propose that individuals are looking for information that is less easy to manipulate to form impressions. It was assumed that background cues would be seen as unintentionally given cues, cues given off, with a higher warranting value. To investigate this, perception data was gathered with an experiment.

The results of the experiment revealed that when the profile picture communicates cues in the background that give information about the personality of the profile owner (introvert background / extravert background), this does not contribute to the perception of introversion/extraversion. Although earlier research found that backgrounds, and attributes in photographs are used to predict someone's personality (Verhoeven et al., 2007, Gosling et al., 2002, Burroughs et al., 1991), this does not apply for backgrounds of the profile picture on an online dating platform. Therefore, the answer to the main research question is, that background cues do not significantly contribute to the perception of the profile owner's personality in online dating. However, a positive effect of perceived extraversion on the attractiveness of the profile owner could be confirmed.

Results on the perception of introversion/extraversion revealed that there was no effect of background cues on the perception of introversion/extraversion. Therefore, H1a and H1b are not supported. This could be due to the importance of physical attractiveness in online dating (Toma & Hancock, 2010). The "What is beautiful is good" hypothesis suggests that attractive people are considered to have many positive qualities (Brand et al., 2012). Thus, in an online dating environment, people might pay more attention to the physical attractiveness of the profile owner when they form their first impression, and therefore forget to pay attention to the cues given in the background.

This is in line with the results for H2, which showed that physically attractive people are perceived as more extravert than physically unattractive people. Physically attractive people are oftentimes seen as socially desirable and more successful in life (Dion et al., 1972), as are extraverts (Bäckström & Björklund, 2013). This also explains the results that confirmed H3. Attractive profile owners are found to be more attractive than unattractive profile owners. This applies for both physical/romantic attractiveness, as social attractiveness. As people value social desirability and successfulness, this explains the relationship, that is partially mediated by the perception of extraversion, between physical attractiveness of the profile picture, and physical/romantic attraction and social attraction (Dion et al., 1972, Stroebe et al., 1971, Walster et al., 1966). Although H4 was not confirmed, since there was no effect of background cues on perceived introversion/extraversion, we did find a positive effect of the perception of extraversion that mediated the effect of physical attractiveness on physical/romantic and social attraction of the profile owner. This again highlights the importance of physical attractiveness of the profile picture, as it leads to the perception of extraversion, which contributes to the perception of attractiveness.

There was no significant interaction effect found that confirmed H5. However, an additional analysis revealed that there were small differences in the perception of extraversion

when an unattractive profile picture had extravert background cues that led to a more positive score for physical/romantic attraction, than when an unattractive profile picture had introvert background cues. Although this effect was not significant, it was leaning into the direction of significance. This suggest, that although the differences were small, people do pay attention to the cues displayed in the background, particularly when a profile owner is unattractive. The additional analysis did show a significant effect for background cues on physical/romantic attraction, where extravert background cues lead to higher rates of physical/romantic attraction compared to introvert background cues, for physically unattractive profile owners. This effect was only found for unattractive profile owners. This suggests that the use of extravert background cues, can help unattractive profile owners to appear more attractive.

Implications

The current study adds to the literature on online dating and provides a better understanding of attraction in online environments. This study is the first to examine the effect of background cues alongside physical attractiveness in an online dating setting. The results indicated that the direct effect of physical attractiveness of the profile picture on physical/romantic attraction and social attraction is the most important. Next to this, physical attractiveness of the profile picture influences the perception of introversion/extraversion which indirectly effects physical/romantic and social attraction as well. Physically attractive people are found to be more extravert than physically unattractive people. This perception of extraversion contributes to how much you like someone (social attraction) and how attractive you think the profile owner is (physical/romantic attraction), based on their profile picture. However, this study did not reveal significant results for the effect of background cues on the perception of introversion/extraversion. This implies, that for a first impression physical attractiveness is valued over additional background cues.

Although people do not use background cues to base their first impression on, it may be that background cues affect attractiveness in a later phase. It is possible, therefore, that once a match is made, and people start talking, these cues become more important. People could use the background cues later on to confirm information the profile owner gave about oneself. Further research should be undertaken to investigate the effect of background cues in later phase of online dating.

Another important implication of this study is the possibility that unattractive people may benefit from the use of extravert background cues. The results have shown that unattractive people with extravert background cues score higher on physical/romantic attraction than unattractive people with introvert background cues. Although this effect was not significant, it leaned into the direction of significance. These results may be explained by theories of impression formation (e.g., Walther & Parks, 2002, Goffman, 1959). If a profile owner is unattractive, people have less certainty about positive characteristics of the profile owner. Therefore, they will pay more attention to other cues that provide information about the profile owner, to base their impression on. This may add to the Theory of Warranting (Walther & Parks, 2002), that when the profile picture itself does not provide enough information to base the first impression on, people will look for additional cues. Although H5 could not be confirmed, these results were in line, with the expectation that the effect of background cues would be of bigger influence when a profile owner is unattractive.

These findings raise intriguing questions regarding the nature and extent of additional cues we use to base an impression on, rather than physical attraction. It seems possible that personality, and in the case of this study, introversion and extraversion, is not the first thing we pay attention to when it comes to impression formation in online dating. It could also be that other personality traits are more important for a first impression, or that it is not only introversion or extraversion, but a combination of the big five personality traits, openness,

conscientiousness, agreeableness, extraversion, and neuroticism, that is used to form an impression on. Note, that these personality traits could play an important role in impression formation, next to introversion/extraversion. In future work, it may be useful to look into the effect of the different personality traits on impression formation in online dating, to find out if there are other personality traits that are valued over introversion/extraversion.

Another possible explanation could be that people do not look at the background to find cues that indicate a profile owner's personality, but that they do extract personality cues from the foreground. For example, apparel, since clothes are able to communicate information as well. Studies have shown that the way we dress at work, influences the way others perceive us (Entwistle, 2020; Raj et al., 2017), as well as that clothes are a reflection of a persons' identity (Chrimes et al., 2019; McNeil, 2017; Baumeister, 1982). Therefore, it could be that other cues can be derived from apparel or personal care, and are used for impression formation in online dating. Further studies that include other factors that may influence impression formation, such as apparel, will need to be undertaken, to find out if it contributes to personality perceptions, next to physical attractiveness, and if this has a direct effect on physical/romantic and social attraction in an online dating environment. Alternatively, if it only contributes to perceptions of status and power, and does not affect a profile owners attractiveness.

Limitations and future directions

To begin with, this study has limitations in terms of external validity, as almost 70% of the sample was highly educated. The results might be different if there would have been more variation in the sample, as it could be that people with different study background pay attention to different cues. Future research should consider a sample that holds a sufficient share of lower educated people and equal groups for all background conditions, in order to generalize the findings to a wider population.

Moreover, participants were only presented with fictional profiles without biography, that only presented one picture of the fictional profile owner which they were asked to evaluate. If the dating profiles would contain more than one picture of the profile owner, this would reflect a more realistic setting, as online dating profiles generally contain multiple pictures. The effect of background cues and physical attractiveness would then, not be solely based on one picture, but on several pictures that vary in the way they are taken. It is, however, unknown if similar effects would have been found if profiles consisted of more than one picture, compared to the effects that were found based on single picture profiles.

Furthermore, the actual manipulation was not successful. Although the pre-test showed significant differences in the level of introversion/extraversion of the background pictures used for the manipulation, the backgrounds seemed to have no effect when combined with the profile picture. Therefore, no convincing effect of background cues could be found. It could be, that certain backgrounds did not work for certain people, due to the way they were dressed or their position in the picture. This is an important issue for future research, and can be solved by pre-testing the actual manipulation before running the experiment. A second solution to highlight the background is to add a control question to the questionnaire, to make sure people will notice the background.

In addition, the study did not take into account specific preferences someone has, when looking for a match. Therefore, it might be possible that the participant would not have liked the person shown in the experiment when he or she would come across the profile on a dating platform, and thus did not pay attention to other cues in the picture. Future research should take into account the participants mate preferences and characteristics, to find out if this actually has an effect on the cues we pay attention to.

Finally, further research might explore the effect of background cues on other criteria people use in mate selection. Desired traits in mate selection are for example that a person likes

animals or children, is trustworthy and understanding, and has a nice car or career (e.g., Rehman, 2020; Li et al., 2013). Likewise, the other four big five personality traits, agreeableness, conscientiousness, openness and neuroticism, should be taken into account as well. The other personality traits can be linked to other traits that are used for mate selection. For example, animals as background cues that represent agreeableness, or cues about someone's career to represent conscientiousness.

Conclusion

In sum, the aim of the present study was to examine if background cues affect perceived introversion/extraversion and if this positively affect the profile owners' attractiveness alongside physical attractiveness of the profile picture. The results of this study indicate that there is no direct effect of background cues on the perception of introversion/extraversion and attractiveness. However, the perception of introversion/extraversion does partially mediate the effect of physical attractiveness on physical/romantic and social attraction of the profile owner. Also, a small effect of background cues, although not significant, could be found when the profile picture was unattractive but had an extravert background. Summarized, the current study provides evidence for the initial attraction in online dating, which appears to be determined by the physical attractiveness of the profile owner, and is not based on additional cues given in the background.

References

Back, M. D., Stopfer, J. M., Vazire, S., Gaddis, S., Schmukle, S. C., Egloff, B., & Gosling, S.
D. (2010). Facebook profiles reflect actual personality, not self-idealization.
Psychological Science, *21*(3), 372–374. https://doi.org/10.1177/0956797609360756

Bäckström, M., & Björklund, F. (2012). Social desirability in personality inventories:
Symptoms, diagnosis and prescribed cure. *Scandinavian Journal of Psychology*, *54*(2),
152–159. https://doi.org/10.1111/sjop.12015

Bar, M., Neta, M., & Linz, H. (2006). Very first impressions. *Emotion*, *6*(2), 269–278.
https://doi.org/10.1037/1528-3542.6.2.269

Baumeister, R.F. (1982). 'A self-presentational view of social phenomena', *Psychological
Bulletin*, 91 (1), 3-26.

Brand, R. J., Bonatsos, A., D'Orazio, R., & DeShong, H. (2012). What is beautiful is good,
even online: Correlations between photo attractiveness and text attractiveness in men's
online dating profiles. *Computers in Human Behavior*, 28(1), 166–170.
https://doi.org/10.1016/j.chb.2011.08.023

Bullingham, L., & Vasconcelos, A. C. (2013). 'The presentation of self in the online world':
Goffman and the study of online identities. *Journal of Information Science*, *39*(1),
101–112. https://doi.org/10.1177/0165551512470051

Burroughs, W. J., Drews, D. R., & Hallman, W. (1991). Predicting personality from personal
possessions: A self-presentational analysis. *Journal of Social Behavior and
Personality*, *6*(6), 147–163. Retrieved from

https://www.researchgate.net/publication/232444129_Predicting_personality_from_pe

rsonal_possessions_A_self-presentational_analysis/citations

Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses

tested in 37 cultures. *Behavioral and Brain Sciences*, *12*(1), 1–14.

https://doi.org/10.1017/s0140525x00023992

Campbell, W. K. (1999). Narcissism and romantic attraction. *Journal of Personality and

Social Psychology*, *77*(6), 1254–1270. https://doi.org/10.1037/0022-3514.77.6.1254

Celli, F., Bruni, E., & Lepri, B. (2014). Automatic personality and interaction style

recognition from Facebook profile pictures. *Proceedings of the 22nd ACM

International Conference on Multimedia*, 1101–1104.

https://doi.org/10.1145/2647868.2654977

Chrimes, C. N., Boardman, R., McCormick, H., & Vignali, G. (2019). 164 The dress and the

self: how dress styles express identities.

Degen, J. L., & Kleeberg-Niepage, A. (2021). Profiling the self in mobile online dating apps:

A serial picture analysis. *Human Arenas*, 1–25. https://doi.org/10.1007/s42087-021-

00195-1

Denissen, J. J. A., Bleidorn, W., Hennecke, M., Luhmann, M., Orth, U., Specht, J., &

Zimmermann, J. (2017). Uncovering the power of personality to shape income.

Psychological Science, *29*(1), 3–13. https://doi.org/10.1177/0956797617724435

Dion, K., Berscheid, E., & Walster, E. (1972). What is beautiful is good. *Journal of

Personality and Social Psychology*, *24*(3), 285–290. https://doi.org/10.1037/h0033731

Dominick, J. R. (1999). Who do you think you are? Personal home pages and self-presentation on the world wide web. *Journalism & Mass Communication Quarterly*, *76*(4), 646–658. https://doi.org/10.1177/107769909907600403

Ellison, N., Heino, R., & Gibbs, J. (2006). Managing impressions online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication*, *11*(2), 415–441. https://doi.org/10.1111/j.1083-6101.2006.00020.x

Entwistle, J. (2020). 'Power dressing' and the construction of the career woman. In *Fashion theory* (pp. 285-296). Routledge.

Figueredo, A. J., Sefcek, J. A., & Jones, D. N. (2006). The ideal romantic partner personality. *Personality and Individual Differences*, *41*(3), 431–441. https://doi.org/10.1016/j.paid.2006.02.004

Fiore, A. T., Taylor, L. S., Mendelsohn, G. A., & Hearst, M. (2008). Assessing attractiveness in online dating profiles. *Proceeding of the Twenty-Sixth Annual CHI Conference on Human Factors in Computing Systems - CHI '08*, 797–806. https://doi.org/10.1145/1357054.1357181

Furnham, A. (2009). Sex differences in mate selection preferences. *Personality and Individual Differences*, *47*(4), 262–267. https://doi.org/10.1016/j.paid.2009.03.013

Furnham, A., & Tsoi, T. (2012). Personality, gender, and background predictors of partner preferences. *North American Journal of Psychology,* 14(3), 435–454. Retrieved from https://www-proquest-com.tilburguniversity.idm.oclc.org/docview/1287407077?accountid=14338

Goffman, E. (1959). *The Presentation of Self in Everyday Life* (1st ed.). London, United

    Kingdom: Anchor.

Goffman, E., & Berger, B. (1986). *Frame Analysis: An Essay on the Organization of*

    Experience (Later Reprint ed.). New Hampshire, Amerika: Northeastern University

    Press.

Gosling, S. D., Augustine, A. A., Vazire, S., Holtzman, N., & Gaddis, S. (2011).

    Manifestations of personality in online social networks: Self-reported Facebook-

    related behaviors and observable profile information. *Cyberpsychology, Behavior, and*

    Social Networking, *14*(9), 483–488. https://doi.org/10.1089/cyber.2010.0087

Gosling, S. D., Gaddis, S., & Vazire, S. (2007). Personality impressions based on Facebook

    profiles. *Icwsm*, *7*, 1–4. Retrieved from https://icwsm.org/papers/3--Gosling-Gaddis-

    Vazire.pdf

Gosling, S. D., Ko, S. J., Mannarelli, T., & Morris, M. E. (2002). A room with a cue:

    Personality judgments based on offices and bedrooms. *Journal of Personality and*

    Social Psychology, *82*(3), 379–398. https://doi.org/10.1037/0022-3514.82.3.379

Graziano, W. G., & Eisenberg, N. (1997). Agreeableness. *Handbook of Personality*

    Psychology, 795–824. https://doi.org/10.1016/b978-012134645-4/50031-7

Hall, J. A., Pennington, N., & Lueders, A. (2013). Impression management and formation on

    Facebook: A lens model approach. *New Media & Society*, *16*(6), 958–982.

    https://doi.org/10.1177/1461444813495166

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable

    mediation, moderation, and conditional process modeling

Hitsch, G. J., Hortaçsu, A., & Ariely, D. (2010). What makes you click?: Mate preferences in online dating. *Quantitative Marketing and Economics*, *8*(4), 393–427. https://doi.org/10.1007/s11129-010-9088-6

Hoyle, R. H., Leary, M. R., & Widiger, T. A. (Eds.). (2009). Neuroticism. In *Handbook of Individual Differences in Social Behavior* (1st ed., pp. 129–146). New York, NY: The Guilford Press.

James, J. (2008). *The Body Language Bible*. London, United Kingdom: Vermilion.

John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of Personality: Theory and research* (Vol. 2, pp. 102–138). New York, USA: Guilford Publications.

Jones, A. G., & Ratterman, N. L. (2009). Mate choice and sexual selection: What have we learned since Darwin? *Proceedings of the National Academy of Sciences*, *106*(Supplement_1), 10001–10008. https://doi.org/10.1073/pnas.0901129106

Kaiser, H.F., & Rice, J. (1974). Little jiffy, mark 4. *Educational and Psychological Measurement, 34(*1), 111-117

Li, N. P., Yong, J. C., Tov, W., Sng, O., Fletcher, G. J. O., Valentine, K. A., Jiang, Y. F., & Balliet, D. (2013). Mate preferences do predict attraction and choices in the early stages of mate selection. *Journal of Personality and Social Psychology*, 105(5), 757–776. https://doi.org/10.1037/a0033777

Little, A. C. (2014). Facial attractiveness. *Wiley Interdisciplinary Reviews: Cognitive Science*, *5*(6), 621–634. https://doi.org/10.1002/wcs.1316

Little, A. C., Jones, B. C., & DeBruine, L. M. (2011). Facial attractiveness: evolutionary based research. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *366*(1571), 1638–1659. https://doi.org/10.1098/rstb.2010.0404

Liu, L., Preotiuc-Pietro, D., Riahi Samani, Z., Moghaddam, M. E., & Ungar, L. (2016). Analyzing personality through social media profile picture choice. *Proceedings of the International AAAI Conference on Web and Social Media*, 211–220. Retrieved from https://ojs.aaai.org/index.php/ICWSM/article/view/14738/14587

Martin, L. R., Friedman, H. S., & Schwartz, J. E. (2007). Personality and mortality risk across the life span: The importance of conscientiousness as a biopsychosocial attribute. *Health Psychology*, *26*(4), 428–436. https://doi.org/10.1037/0278-6133.26.4.428

McCrae, R. R. (2009). Openness to experience. In R. H. Hoyle, M. R. Leary, & A. R. Sutin (Eds.), *Handbook of Individual Differences in Social Behavior* (1st ed., pp. 257–273). New York, NY: The Guilford Press.

McCrae, R. R., & John, O. P. (1992). An introduction to the Five-Factor model and its applications. *Journal of Personality*, *60*(2), 175–215. https://doi.org/10.1111/j.1467-6494.1992.tb00970.x

McCroskey, J. C., & McCain, T. A. (1974). The measurement of interpersonal attraction. *Speech Monographs*, *41*(3), 261–266. https://doi.org/10.1080/03637757409375845

McNeill, L.S. (2017). 'Fashion and women's self-concept: A typology for self-fashioning using clothing', *Journal of Fashion Marketing and Management: An International Journal*, 22 (1) 82-98.

Mills, A., Durepos, G., & Wiebe, E. (2010). Encyclopedia of case study research. *Encyclopedia of Case Study Research*, 850–852. https://doi.org/10.4135/9781412957397

Naumann, L. P., Vazire, S., Rentfrow, P. J., & Gosling, S. D. (2009). Personality judgments based on physical appearance. *Personality and Social Psychology Bulletin*, *35*(12), 1661–1671. https://doi.org/10.1177/0146167209346309

Oosterhof, N. N., & Todorov, A. (2008). The functional basis of face evaluation. *Proceedings of the National Academy of Sciences*, *105*(32), 11087–11092. https://doi.org/10.1073/pnas.0805664105

Paunonen, S. V. (2006). You are honest, therefore I like you and find you attractive. *Journal of Research in Personality*, *40*(3), 237–249. https://doi.org/10.1016/j.jrp.2004.12.003

Raj, P., Khattar, K., & Nagpal, R. (2017). " Dress to impress": The impact of power dressing. *IUP Journal of Soft Skills*, 11(3).

Rehman, S. (2020). Desired traits in mate selection: A survey of Hispanic-American female students. *Journal of Gender and Power*, 23.

Roberts, B. W., Jackson, J. J., Fayard, J. V., Edmonds, G., & Meints, J. (2009). Conscientiousness. In R. H. Hoyle & M. R. Leary (Eds.), *Handbook of Individual Differences in Social Behavior* (1st ed., pp. 369–381). New York, NY: The Guilford Press.

Schau, H. J., & Gilly, M. C. (2003). We are what we post? Self-presentation in personal web space. Journal of Consumer Research, 30(3), 385–404.. https://doi.org/10.1086/378616

Schlenker, B. R. (2012). *Self-presentation.* In M. R. Leary & J. P. Tangney (Eds.), *Handbook of self and identity* (p. 542–570). The Guilford Press.

Sritharan, R., Heilpern, K., Wilbur, C. J., & Gawronski, B. (2009). I think I like you: Spontaneous and deliberate evaluations of potential romantic partners in an online dating context. *European Journal of Social Psychology*, *40*(6), 1062–1077. https://doi.org/10.1002/ejsp.703

Stroebe, W., Insko, C. A., Thompson, V. D., & Layton, B. D. (1971). Effects of physical attractiveness, attitude similarity, and sex on various aspects of interpersonal attraction. *Journal of Personality and Social Psychology*, *18*(1), 79–91. https://doi.org/10.1037/h0030710

Toma, C. L., & Hancock, J. T. (2010). Reading between the lines. *Proceedings of the 2010 ACM conference on Computer supported cooperative work - CSCW '10*, 5–8. New York, USA: ACM Press. https://doi.org/10.1145/1718918.1718921

Tong, S. T., Corriero, E. F., Wibowo, K. A., Makki, T. W., & Slatcher, R. B. (2019). Self-presentation and impressions of personality through text-based online dating profiles: A lens model analysis. *New Media & Society*, *22*(5), 875–895. https://doi.org/10.1177/1461444819872678

Tskhay, K. O., & Rule, N. O. (2014). Perceptions of personality in text-based media and OSN: A meta-analysis. *Journal of Research in Personality*, *49*, 25–30. https://doi.org/10.1016/j.jrp.2013.12.004

Van Leeuwen, T., & Jewitt, C. (2001). *The Handbook of Visual Analysis* (First ed.). Thousand Oaks, California: SAGE Publications Ltd. https://dx.doi.org/10.4135/9780857020062

Valentova, J.V., Štěrbová, Z., Bártová, K., & Corrêa Varella, M. A. (2016). Personality of

ideal and actual romantic partners among heterosexual and non-heterosexual men and

women: A cross-cultural study. *Personality and Individual Differences*, *101*, 160–166.

https://doi.org/10.1016/j.paid.2016.05.048

Verhoeven, J., Rompay, T. V., & Pruyn, A. (2007). Let your workspace speak for itself: The

impact of material objects on impression formation and service quality perception.

ACR North Americal Advances, 669–674. Retrieved from

https://www.acrwebsite.org/volumes/12716/volumes/v34/NA-34

Ward, J. (2016). Swiping, matching, chatting. Self-presentation and self-disclosure on mobile

dating apps. *Human IT: Journal for Information Technology Studies as a Human

Science*, *13*(2), 81–95. Retrieved from https://humanit.hb.se/article/view/516/579

Walster, E., Aronson, V., Abrahams, D., & Rottman, L. (1966). Importance of physical

attractiveness in dating behavior. *Journal of Personality and Social Psychology*, *4*(5),

508–516. https://doi.org/10.1037/h0021188

Walther, J. B., & Parks, M. R. (2002). Cues filtered out, cues filtered in. In J. A. Daly & M. L.

Knapp (Eds.), *Handbook of Interpersonal Communication* (3rd ed., pp. 529–563).

Thousand Oaks, California: SAGE Publications, Inc.

Walther, J. B., Van Der Heide, B., Hamel, L. M., & Shulman, H. C. (2009). Self-generated

versus other-generated statements and impressions in computer-mediated

communication. *Communication Research*, *36*(2), 229–253.

https://doi.org/10.1177/0093650208330251

Widiger, T. A. (2009). Neuroticism. In M. R. Leary & R. H. Hoyle (Eds.), *Handbook of individual differences in social behavior* (p. 129–146). The Guilford Press.

Willis, J., & Todorov, A. (2006). First impressions. *Psychological Science*, *17*(7), 592–598. https://doi.org/10.1111/j.1467-9280.2006.01750.x

Wilt, J., & Revelle, W. (2009). Extraversion. In M. R. Leary & R. H. Hoyle (Eds.), *Handbook of Individual Differences in Social Behavior* (1st ed., pp. 27–45). New York, NY: The Guilford Press.

Wu, Y.-C. J., Chang, W.-H., & Yuan, C.-H. (2015). Do Facebook profile pictures reflect user's personality? *Computers in Human Behavior*, *51*, 880–889. https://doi.org/10.1016/j.chb.2014.11.014

Appendices

Appendix A: Pre-test questionnaire

Beste deelnemer,

Fijn dat je de tijd wilt nemen om deze vragenlijst in te vullen. Jouw deelname helpt ons met onze afstudeeronderzoeken aan Tilburg University. Het onderzoek gaat over profielfoto's, profielteksten en fotoachtergronden. Er zijn geen goede of foute antwoorden en de resultaten worden anoniem verwerkt. Deelname aan de vragenlijst duurt ±10 minuten. Als je vragen hebt over jouw deelname, neem dan contact op met m.j.a.kanters@tilburguniversity.edu. Door op het pijltje te klikken start de vragenlijst en ga je akkoord met deelname en het gebruik van de anonieme gegevens.

Met vriendelijke groet,
Layla van den Heuvel
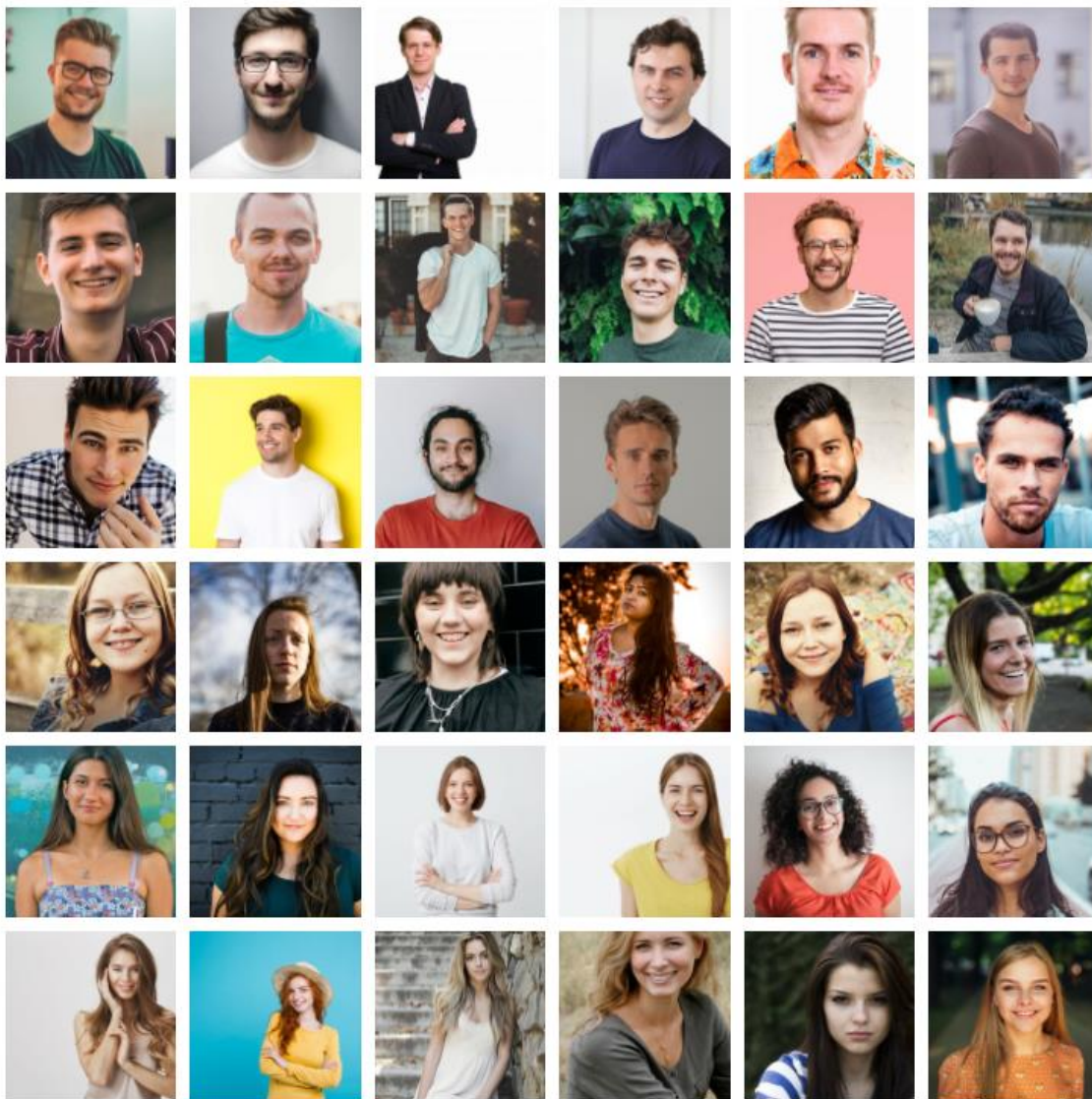Pien Joosten
Michelle Kanters

Q2 Tot welk geslacht voel jij je aangetrokken?

- o Man
- o Vrouw
- o Wil ik liever niet zeggen
- o Anders

Q3-Q39 Je gaat zometeen verschillende profielfoto's van verschillende vrouwen zien. Aan jou de vraag om de persoon op de foto te beoordelen op basis van aantrekkelijkheid.

In hoeverre vind je bovenstaande persoon op de profielfoto aantrekkelijk?

	Onaantrekkelijk	Aantrekkelijk
	1 2 3 4 5	6 7 8 9 10

| 1 | |

Q40 – Q52Op de volgende pagina's worden verschillende dating profielteksten getoond. Lees de tekst goed door. In de tekst is de naam van de desbetreffende persoon vervangen door XX. Aan jou de vraag om de tekst te beoordelen op basis van aantrekkelijkheid.

In hoeverre vind je bovenstaande profieltekst aantrekkelijk?

	Onaantrekkelijk								Aantrekkelijk
	1	2	3	4	5	6	7	8	9	10

1	──────────●──────

ey hey, ik ben XX en ik ben werk het vmbo-school als docent. Ik n sociaal en ik sta altyd klar om der te helpen. Ik heb een reik cial leven mar ik miss nog ieman n mijn zei. In mine vrije tijt ben i vinden in de zwembad waar ik ter poloo speel. Ik zoek naar een ortiev persoon waar mee ik leuk gen kan doen.

ben XX en ik ben zelfstandig dernemer. Ik ben een hondenmei ik maak graag lange indelingen. Ik woon dicht bij de e dus als het goed weer is, ben ik vinden op het strand met mijn nden. Ik ben een echt familiemei met mijn broertjes ga ik graag o d om iets leuks te doen. Ben jij n charmant, leuk persoon, laten v n snel afspreken.

Ik ben XX en ik ben een echte wereldrijziger. altijd opzoek nar avontuur en nix is me te gek. Op dit moment ben ik weer in nederland en kijk ik oet naar mijn voolgende bestemmingen. Ik ben freelance (web) designer waar door ik het reizen goed kan Kombineren met mijn werk. Als het even kan ben ik ook in de sport School te vinden want ik vind het belangrijk om fit te zijn Ga jij met me meee op rijs?

Hey! Leuk dat je op mein proviel kijkt, ik ben XX en ik ben van italiaanse af komst. Ik werk in het restaurante van mijn ouder waar het heel family een hand mee helpdt. Tiramisu maken is mijn spechiaaliteit en ik hoop dat jij dit ook lekkur vind. Een leuk weedt je over mij is dat ik vijf vremde talen spreek. wie weeet tot snel.

k ben XX, 26 jaar en ik houdt van okken en baakken. mijn pastas zijn le lekkerte. ik ben altijd te vinden in iet keuken dus als je nog een goede esept hebt dan kunnen we amenkokken. Daar naast werkt ik ij de gemeenten, ben ik gek op ockie en ben ik een kat.. Ben jij chezellig en hout jij van pontaane dingen doen, dan ben ik le match.

ben zelfstandigondernemer ik he XX. Ik graag willen Lange ndelingen maken ik ben honden ns. Ik woon dicht bij een Zee du het goed Weer is ben ik te vind het Strandt met mijn Honde. Ik n een echt famieli mens en met jn broertjes ga ik graag op paad o s leuks te doen. Ben jij een irmandt persoon laten we dan sn spreken?

k ben XX, 26 jaar jong en ik houd an koken en bakken. Ik ben altijd te inden in de keuken en pasta is mijn pecialiteit. Als jij nog een goed ecept hebt, kunnen we samen oken. Daarnaast werk ik bij de gemeente, ben ik gek op hockey en eb ik een kat. Ben jij gezellig en houd jij van pontane dingen doen, dan denk ik lat wij een match zijn.

Jey hey, ik ben XX en ik werk op en VMBO-school als docent. Ik en sociaal aangelegd en ik sta altijd laar om anderen te helpen. Ik heb en rijk sociaal leven maar ik mis log iemand aan mijn zijde. In mijn rije tijd ben ik te vinden in het wembad waar ik waterpolo speel. k ben opzoek naar een sociaal, portief persoon waarmee ik leuke lingen kan doen.

Ik ben XX en ik ben een echte wereldreiziger. Altijd op zoek naar avontuur en niks is mij te gek. Op dit moment ben ik weer in Nederland en kijk ik uit naar mijn volgende bestemmingen. Ik ben freelance (web)designer waardoor ik het reizen goed kan combineren met mijn werk. Als het even kan ben ik ook in de sportschool te vinden want ik vind het belangrijk om fit te zijn. Ga jij met mij mee op reis?

Hey! Leuk dat je op mijn profiel kijkt, ik ben XX en ik ben van Italiaanse afkomst. Ik werk in het restaurant van mijn ouders waar de hele familie een handje mee helpt. Tiramisu maken is mijn specialiteit en ik hoop dat jij dit ook lekker vindt. Een leuk weetje over mij is dat ik vijf vreemde talen spreek. Ik ben op zoek naar iemand die van lekker eten houdt en grappig is zodat we samen hard kunnen lachen. Wie weet tot snel.

Hi, ik ben XX en ik ben stewardess in opleiding. Ik ben zorgzaam en ik maak het anderen graag naar hun zin. Naast dat ik veel reis vind ik het heerlijk om thuis te zijn en een Netflix serie te kijken onder het genot van iets lekkers zoals chips en een biertje. Ik kijk er naar uit om thuis te komen en iemand vraagt hoe mijn dag was. Ben jij die persoon, dan mag je mij altijd een berichtje sturen.

Hi, ik ben XX en ik ben Stewardess n Opleiding. Ik ben zorgzaam en ik naak het ander graag naar hen zijn. Naast dat ik veel reis vind ik het eerleik om huis te zijn en een Netfliks series te kijken onder het genot van iets lekkers zoals cheps en en hiertjes. Ik kijk er naar uit om huis te komen en iemand vragt hoe nijn dag was.

Q53 Op de volgende pagina's worden verschillende achtergronden getoond. Aan jou de vraag om deze achtergronden te beoordelen op introversie en extraversie.
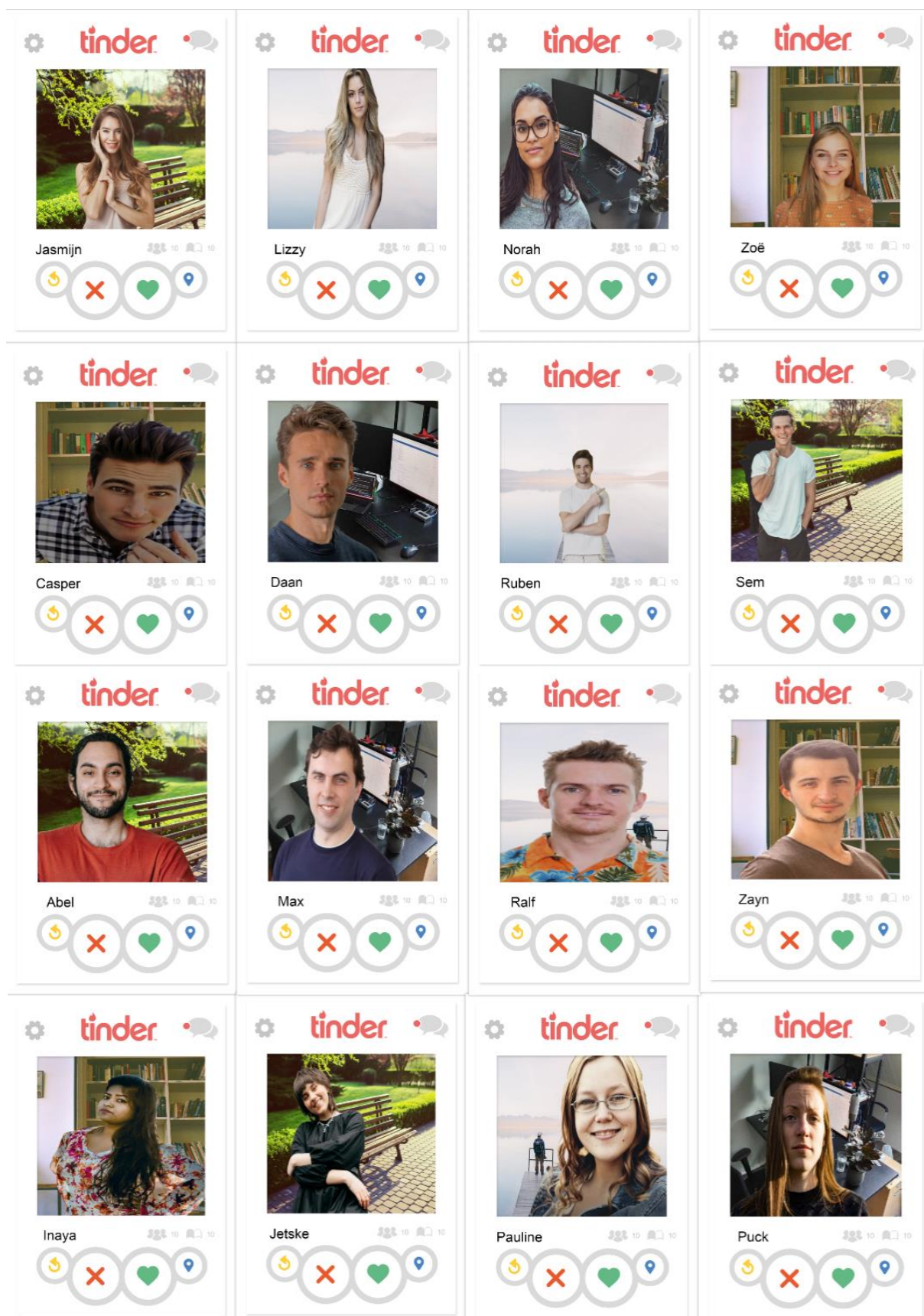
Introvert wordt gezien als: gesloten, terughoudend, behoedzaam en in zichzelf gekeerd.
Extravert wordt gezien als: open, spontaan, levendig en avontuurlijk.

Hoe introvert/extravert vind je bovenstaande achtergond?

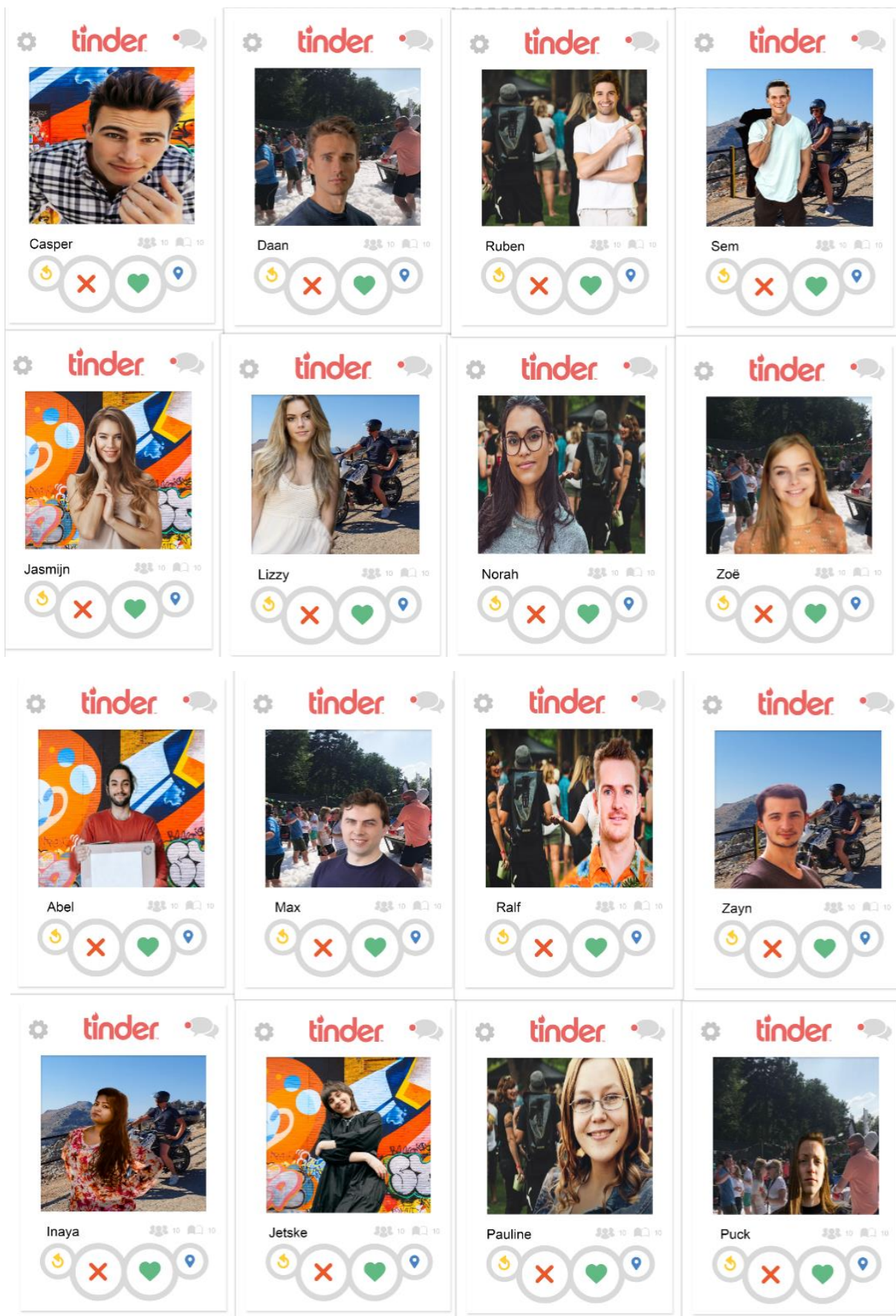|	Introvert						Extravert			
	0	1	2	3	4	5	6	7	8	9	10

| 1 | |
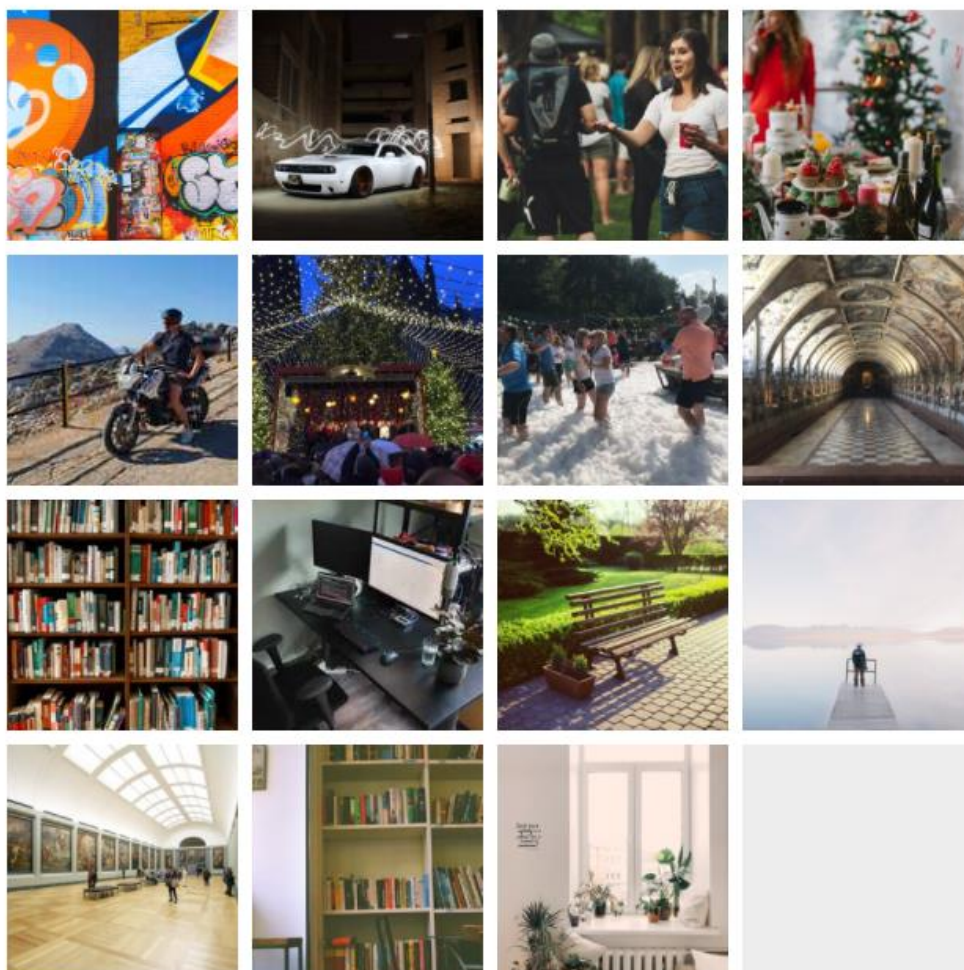
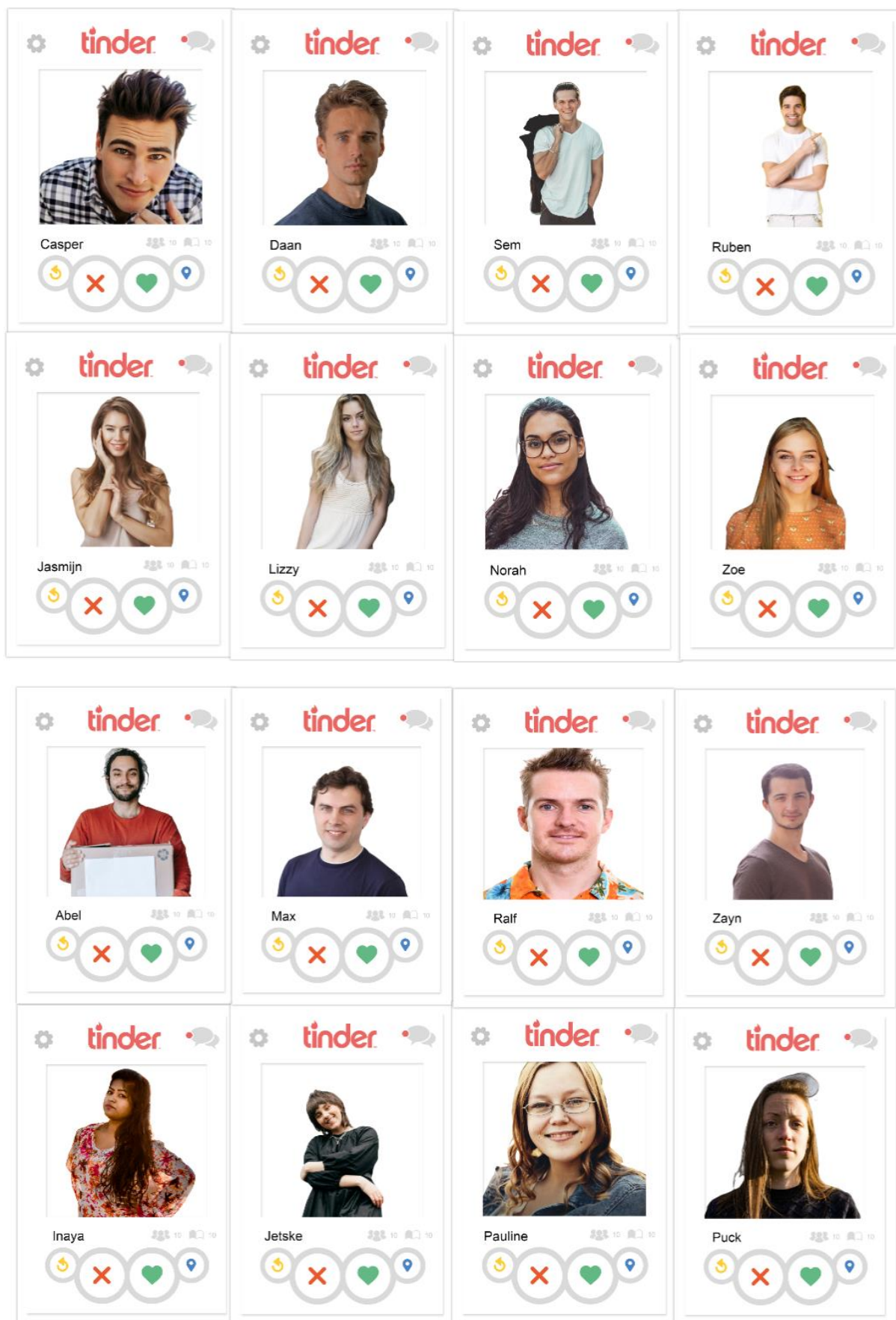## Appendix B: Stimuli introvert background cues

Appendix C: Stimuli extravert background cues

Appendix D: Stimuli no background cues

Appendix E: Experiment questionnaire

Dear participant,

Welcome, and thank you for taking the time to participate in this research.
This experiment is conducted for a graduation project of the Master Communication and Information Sciences at Tilburg University.

This is a study that looks into online dating. After signing the consent form, four different dating profiles will be shown to you. After each profile you will be asked to answer 19 statements regarding the person owning the dating profile.

The survey will take you approximately 10 minutes to complete. Participation in this research is completely voluntary and anonymous. The data collected for this research will be stored in accordance with the guidelines of Tilburg University*. Please feel free to contact Layla van den Heuvel, at l.e.a.vdnheuvel@tilburguniversity.edu, if you have any further questions about this research or your participation in it.

By signing this consent form you confirm that:
·   You have read the information about the study and have been given the opportunity to ask questions about the study
·   You are aware that study participation is entirely voluntary,that you have the right to decline to participate and withdraw from the research once participation has started, without any negative consequences, and without providing any explanation.
·   You give permission to process the anonymous/coded data asmentioned in the information letter.

By clicking on the "Agree" button below you give your consent and confirm that
-You have read the information above
- You voluntarily agree to participate
- You are 18 yours or older

- o   I agree, continue with survey
- o   I do not agree

Q1 Which gender do you feel romantically attracted to?
- o   Male
- o   Female
- o   Both male and female
- o   I prefer not to say

In the next part of this survey you will be shown four dating profiles. After each profile you will be asked to answer questions related to the person shown in the dating profile.

Q2-Q5 Please answer the statements below about the person in the dating profile you have just seen

1. Strongly disagree	2. Disagree	3. Neither agree nor disagree	4. Agree	5. Strongly agree
◯	◯	◯	◯	◯

1. I think the person in the profile picture is someone who is reserved
2. I would like to have a relationship with this person
3. I think this person is handsome
4. I think the person in the profile picture is someone who is talkative
5. I would like to go out with this person once
6. I think this person and I could be friends
7. I think this person is good looking
8. I think the person in the profile picture is someone who is full of energy
9. I am attracted to this person
10. I think I could become good friends with this person
11. I think the person in the profile picture is someone who generates a lot of enthusiasm
12. I would swipe this person to the right
13. I think the person in the profile picture is someone who tends to be quiet
14. I think this person would fit in well with my circle of friends
15. I think the person in the profile picture is someone who has an assertive personality
16. I find this person physically attractive
17. I think the person in the profile picture is someone who is sometimes shy, inhibited
18. I think this person is pleasant to hang out with
19. I thin the person in the profile picture is someone who is outgoing, sociable

In the next part of this survey I would like to ask you to fill out some general questions about yourself

Q6 What gender do you identify with?

- o   Male
- o   Female
- o   Other
- o   Prefer not to say

Q7 What is your age in numbers?

Q8 What is your nationality?

Q9 What is your highest level of education?

- Primary school
- Lower vocational education (vmbo)
- School for higher general secondary education (havo)
- Pre-university (vwo)
- Intermediate vocational education (mbo)
- Higher vocational education (hbo)
- Bachelor degree (wo)
- Master degree (wo)

Q10 Do you use, or have you ever used online dating?

- Yes
- No

Q11 Are you currently in a relationship?

- Yes
- No
- It is complicated
- Do not wish to say