

PERSONALITY BIAS IN USER CENTRED DESIGN

John Magnus ROOS (1, 2), Thomas NILSSON (2), Ellen WHEATLEY (2)

1: University of Gothenburg, Sweden; 2: Veryday, Sweden

ABSTRACT

Personality theorists divide people along traits as extraversion, agreeableness, conscientiousness, emotional stability and openness. The present study investigates to what degree personality traits of participants in two separate user studies (e.g. craftsmen and high-frequent gamblers) are representative for respective target group of end users. Our findings indicate that some traits are significantly ($p < .05$) overrepresented among participants in user studies, e.g. extraversion, emotional stability and openness, which bias our user insight findings.

Potentially this bias negatively affects the gathered user insights and derived user knowledge. Fewer and biased insights are most certainly a liability to the design and development processes and equally the final success of any innovated product or service. If we commence upon considering personality traits in the recruitment process, we will create the conditions necessary for the identification of novel user insights and maximize the potential of the design outcome.

Keywords: personality, user centred design, inclusive design, research methodology

Contact:

Dr. John Magnus Roos
Veryday, University of Gothenburg
Research Department, Centre of Consumer Science
Göteborg
411 22
Sweden
magnus.roos@veryday.com

1 INTRODUCTION

Designers know that it is impossible to fully map and understand the different behavior and needs of the plethora of users they design for. This is why they need to approach users in the design process and through observations; interviews and workshops capture true design requirements. Recruitment agencies and design companies recruit test participants according to the intended final user group of the product or service. Enrollment is usually self selective and may for instance involve any of the following:

- Recruitment through advertising.
- Questionnaires distributed by mail or email.
- Registration on the webpage of the recruitment agency.
- Standing on a busy corner during rush hour and asking people who pass by.

According to Biemer and Lyrberg (2003) this is also called “Haphazard sampling” and gives little guarantee that the sample is representative of the entire target population (2003). The present study highlights some consequences of using haphazard sampling in design research. Self selective recruitment has the potential of producing biased results and may not be representative to the user group as a whole.

Nowadays, more and more effort is spent on research, trying to understand the different needs and desires of users when interacting with products, services, systems and environments. This is due to companies’ increased understanding of the benefits associated with a more user centered approach. Our company has been in the business of user centred design for over 40 years and our methods are well documented (see for instance Benktzon, 1993; Coleman, Clarkson, Dong and Cassim, 2003; Dong et al., 2007). With our long experience of performing design research we have discovered a hidden dilemma - not all types of users allow us to interact with them.

Because the success of our designed products and/or services depend upon the availability of good design research we have started to look closer at the causes to why some users are less willing than others to participate in user-studies. At first glance we found the obvious variables such as time available, level of incentive etc. – i.e. the extrinsic factors. But what really caught our attention was one important intrinsic factor; people’s personality traits. In short, your personality will make you more or less willing to participate in design research activities. This implies that design researchers potentially lose a lot of important input from users with certain kind of personalities that do not voluntarily participate, but still are end users and very much part of the target group.

2 AIM

The aim of this paper is to investigate to what degree personality traits of users that participate in user centred studies represent personality traits of the final target populations, in our cases general craftsmen and people that gamble at least once a week.

3 THEORY

The term ‘user centred design’ (USD) became widely used after the publication of “*User Centred System Design: New Perspectives on Human-Computer Interaction*” (Norman and Draper, 1986). Norman (1988) built further on the UCD concept in his book *The Psychology of Everyday Things*. In this book he recognizes needs and interests of users and focuses on the usability of design. In 2004 Norman extended yet again on the UCD concept with the book “*Emotional Design. Why we love (or hate) everyday things*”. Here he goes beyond usability and emphasized the role of emotions in user centred design. According to him, emotional design (even more than functional and cognitive design) must consider subjectivity across individuals:

Personality theorists divide people along such dimensions as extraversion, agreeableness, conscientiousness, emotional stability, and openness. To designers, this means that no single design will satisfy everyone (Norman, 2004)

Norman (2004) refers to the Five-Factor Model or the Big Five. The Big Five is heavily endorsed by personality psychologists and is used in a variety of research designs and applied settings (Larsen and Buss, 2005)

The Big Five was originally coined by Fiske (1949). During the 50ths, 60ths and 70ths, several independent research teams took slightly different routes at arriving to the same results - most human personality traits can be boiled down into five broad dimensions of personality traits, regardless of language and culture (Larsen and Buss, 2005). The five factors have been replicated in every decade since 1949, suggesting that the Big Five structure is also replicable over time. In scientific spheres, the Big Five is now the most widely accepted and used model of personality (Holmberg and Weibull, 2010). According to Larsen and Buss (2005), key markers of the Big Five are as follows:

1. **Extraversion (versus introversion).** Extroverts love to party, they engage in frequent social interaction, take the lead in livening up dull gatherings, and enjoy talking a lot. Introverts are more shy and quiet, and tend to be more like wallflowers.
2. **Agreeableness (versus disagreeableness).** Agreeable individuals get along well with others, are well liked, avoid conflicts, strive for harmony, while disagreeable people are aggressive, unsympathetic and seem to get themselves into a lot of social conflicts.
3. **Conscientiousness (versus spontaneity).** Conscientious individuals are industrious and think ahead. They are organized, neat and prompt, while spontaneous people are more careless and disorderly.
4. **Emotional stability (versus emotional instability).** Emotionally stable individuals are calm, relaxed and stable, while emotionally unstable individuals are moody, anxious and insecure.
5. **Openness (versus reticence).** Open individuals are open for innovations, different cultures and the emotions of other people, while closed individuals are more conservative and closed for the emotions of other people.

4 METHOD

The data is a comparative analysis of personality traits between participants in two different projects undertaken at our company and the target populations of the respective projects. The two projects will be referred to as Study 1 and Study 2. Our knowledge regarding the target populations is based on a Swedish national representative survey – the SOM survey 2011. The SOM survey 2011 included a random sample of 3000 individuals, aged 16-85. Each questionnaire consisted of 20 pages. The field work started the 9th of September 2011 and, following a series of reminders distributed via post and telephone, ended the 13th of Feb 2012. The answering frequency was 57 % (Vernersdotter, 2011).

The SOM survey 2011 measured the Big Five through an instrument called the HP5. (Gustavsson, Jönsson, Linder and Weinryb, 2008). We have used the same version of the HP5 in our user studies as was used in the SOM survey 2011. This is the shortest validated version of the HP5 and consists of only 15 items; three items measuring each trait (Appendix 1) (Holmberg and Weibull, 2010). The scale used for each item was a four-level scale; completely agree (coded as 1), partly agree (coded as 2), partly disagree (coded as 3), completely disagree (coded as 4).

A certain personality trait is calculated through the mean of the three items measuring that specific trait (Appendix 1). This implies that each trait varies from 1 to 4. We have used independent t-tests in order to determine if the two means (e.g. participants in respective user study versus target population estimated through the SOM-survey) are significantly ($p < .05$) different from one another.

4.1 Study 1

The users in the first project were Swedish craftsmen (Figure 1). Through an external recruitment agency we recruited 10 craftsmen. The participants were recruited through inquiries distributed by mail and email, as well as through self registration on the agency's homepage. We requested that the recruitment agency select a variety of professional craftsmen as well as an even spread of age.

The SOM survey 2011 included an open question about profession/occupation; “*What is/was your profession? If you not work for the moment, mention your last profession.*” (The respondent might also select the alternative “Never worked”). We have defined the following professions as craftsmen: welders, construction workers, maintenance technician, menders, electricians, carpenters, industrial workers, turners, tool-men, metalworkers, sewers, canners and grease monkeys. In total, 247 respondents were classified as craftsmen.

The Big Five personality traits of craftsmen in our user study have been compared to the same traits among Swedish craftsmen according to the SOM survey 2011.



Figure 1. Craftsmen in Study 1 (to the left) and gambler in Study 2 (to the right).

4.2 Study 2

The users in the second project were Swedish citizens that frequently [at least once a week] gambled or bet money on lotteries and/or horse racing (Figure 2). Through advertisements in the daily press we recruited 40 participants that gambled at least once a week. The participants were selected in order to include a variety of Swedish gamblers with regards to age and gender.

The SOM survey includes a question about gambling; “*How often during the last 12 months have you gambled/bet on horse racing/bought a lottery ticket etc.*” The frequencies were measured through 7 fixed answering alternatives: (1) “several times a week”, (2) “once a week”, (3) “once a month”, (4) “once a quarter”, (5) “once a half-year”, (6) “once a year” (one time), (7) “no time”. In total, 316 persons reported that they were gambling at least once a week.

The Big Five personality traits of high-frequent gamblers in our user study have been compared to the same traits among high-frequent gamblers according to the SOM survey 2011.

5 RESULT

5.1 Study 1

The craftsmen in our user study were more extrovert than the craftsmen answering the SOM-survey. Regarding other personality traits, there were no significant ($p < .05$) differences between the two groups (Table 1).

5.2 Study 2

The high-frequent gamblers in our user study were more extrovert, emotionally stable and open, than the high-frequent gamblers answering the SOM-survey. Regarding conscientiousness and agreeableness, we were not able to find any significant ($p < .05$) differences between the two groups (Table 2).

6 DISCUSSION

As the results indicate, certain types of personality profiles seem to be less keen to participate in user studies i.e. users with a low degree of extraversion, emotional stability and openness (Figure 2). These findings interestingly correspond to our initial instinct and gut-feeling, acquired when performing user studies.

Table 1. Means and standard deviations (within brackets) for personality traits among craftsmen in the user study and the target population.

Personality trait	User study (n=10)	Target population (n=274)
Extraversion*	1.60 (.52)	1.95 (.44)
Agreeableness (r)	2.67 (.52)	2.65 (.63)
Conscientiousness (r)	2.73 (.52)	2.98 (.64)
Emotional stability (r)	2.93 (.38)	2.81 (.64)
Openness (r)	2.89 (.55)	2.83 (.66)

Note. The scale consists of four levels; completely agree (1), partly agree (2), partly disagree (3), completely disagree (4). † [reverse scale] implies that the HP5 actually measures disagreeableness, spontaneity, emotional instability and reticence. * = $p < .05$

Table 2. Means and standard deviations (within brackets) for personality traits among high frequent gamblers in user study and the target population.

Personality trait	User study (n=40)	Target population (n=316)
Extraversion*	1.51 (.48)	1.87 (.52)
Agreeableness (r)	2.77 (.64)	2.66 (.76)
Conscientiousness (r)	2.86 (.69)	2.88 (.73)
Emotional stability (r)*	3.27 (.54)	2.81 (.73)
Openness (r)*	3.28 (.55)	2.83 (.66)

Note. The scale consists of four levels; completely agree (1), partly agree (2), partly disagree (3), completely disagree (4). † [reverse scale] implies that the HP5 actually measures disagreeableness, spontaneity, emotional instability and reticence. * = $p < .01$

During the course of the two projects, we have had the opportunity to meet the actual users behind the quantitative personality score. We noticed that extrovert craftsmen and gamblers focus more on social aspects in their experiences of products and services. Introvert people, on the other hand, focus more on specific details during the experience or use (e.g. a hammer handle or a betslip design). Interestingly, introvert gamblers are more into collecting and analyzing historical results in order to find patterns for predicting the future. Emotionally stable gamblers desire efficient services and focused primarily on core features during the interviews, while more emotionally unstable gamblers talk more about so-called expected and augmented features (Kotler and Armstrong, 2010), such as how to remember the pin code regarding online gambling and how to receive a receipt in a secure way.

Exactly as Norman (2004) stated, it seems users have different needs and desires depending on their personalities. Thereby, personality bias might in the end imply that the resulting design solutions are biased towards the profiles that are more willing to participate in design research; i.e. extrovert, open

and emotionally stable persons (Figure 2). Consequently designers, whom naturally design to meet the user needs, will unintentionally miss the target of delivering design for all.

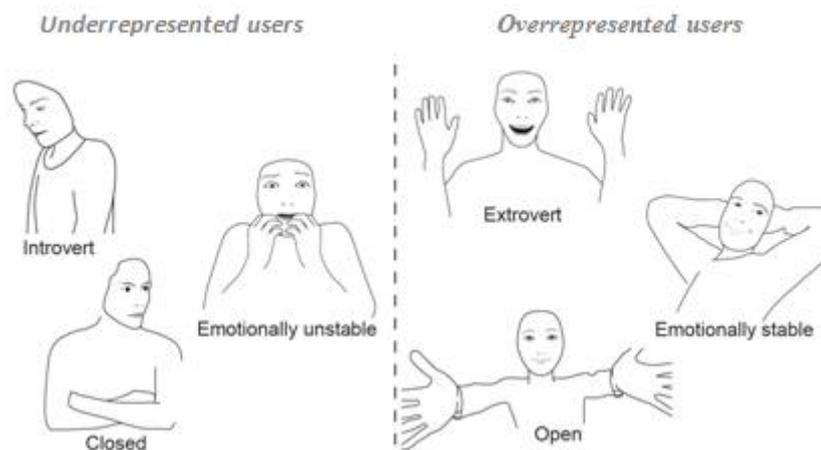


Figure 2. Underrepresented and overrepresented users in user studies. Note. The figures are derived from a non-verbal personality scale (Roos, 2012a; 2012b).

In order to overcome this bias, we suggest that personality traits are used in the design research recruitment process, in order to provide a more representative sample of users to engage with. We also think that the awareness of this bias in itself will create an understanding among designers that their user-studies only partially extract needs and desires among the people they in the end would like to design for, and therefore help designers to think beyond their findings.

Finally, we would like to discuss some limitations with our studies. Although the small sample size of 10 craftsmen [Study 1] is representative to several of the projects in the design business, limited by time and budget, the sample size is not satisfying regarding statistical inference. A rule of thumb is that each group should at least include 20 individuals when applying independent t-tests.

Another issue is, of course, the representativeness of the SOM-survey with regards to our target populations. We have assumed that the craftsmen and high-frequent gamblers that participated in the SOM-survey are representative to the Swedish population of craftsmen and high-frequent gamblers as a whole. However, we know that 43 percent of the potential respondents, for one reason or another, dropped-out of the SOM-survey 2011 (the drop-out proportion among craftsmen and high-frequent gamblers is unknown). It is reasonable to assume that those people differ regarding personality traits from the people that chose to participate.

Despite those limitations, we suggest that the result should be taken very seriously. As our ambition is to design for well-being and happiness for all users equally the present study highlights a flaw that we must address in order to succeed in our mission. Especially as the user profiles that we never meet potentially are in greater need of support and guidance through design (for well-being and happiness) than others (Figure 2). According to Diener and Lucas (1999), high degree of extraversion and emotional stability are associated to subjective wellbeing (Diener and Lucas, 1999).

As always, designers need to consider the target group(s) they design for. The personality bias will be larger if the target group consists of introvert, closed and/or emotionally instable users and the recruitment process is conducted according to traditional methods.

Recruitment based on personality traits provides us a wider view upon end-users, one that might result in better products and services, especially from an inclusive and universal design perspective. Potentially, this new insight might also be used for developing market niches, in order to satisfy needs and desires of those that, so far, have been taken less into account.

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APPENDIX

The HP5 Big Five personality test

	Completely agree	Partly agree	Partly disagree	Completely disagree
1) I often feel exhilarated [E]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) I often feel uncomfortable and ill at ease [Es, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) I often make sarcastic commentaries [A, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) I usually act on the spur of the moment [C, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) I usually enjoy life [E]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) I often feel pressure when I have to speed up [Es, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) I usually behave vengefully if I am treated badly [A, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) I often throw myself too hastily into things [C, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) I think emotions many times are exaggerated [O, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) I am usually in a good mood when I socialize [E]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) I often have muscles so tense that I get tired [Es, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12) I usually come up with piercing and malicious answers [A, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) I usually talk before I think [C, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14) I often have difficulties to understand other's feelings [O, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15) Normally, I avoid getting involved in others problem [O, r]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E = Extraversion, A = Agreeableness, C = Conscientiousness, Es = Emotional stability, O = Openness. r = reverse scale. The signs are not visible for the respondents/participants.