

Who am I - and if so, where? An Experiment on Personality in Online Virtual Realities.

Aas, Benjamin Gregor

Rozenstraat 174
1016 PA Amsterdam
The Netherlands
aasbenjamin@gmail.com,

Meyerbröker, Katharina

Roetersstraat 15
1018 WB Amsterdam
The Netherlands
K.Meyerbroker@uva.nl

&

Emmelkamp, Paul M. G.

Roetersstraat 15
1018 WB Amsterdam
The Netherlands
P.M.G.Emmelkamp@uva.nl



Abstract

Virtual realities form a new technical platform, raising scientific questions about the human mind, communication and identity (Bainbridge, 2007). In recent studies it appears that users of virtual realities behave closer to their ideal self (Bessi re, Seay & Kiesler, 2007), are more confident in negotiation tasks (Yee & Bailenson, 2007) in comparison to their behavior in real life and that Dutch students keep bigger interpersonal distance towards an Arabic avatar than a Caucasian one (Wigboldus, 2006). Despite the evident difference in behavior in real life versus virtual life, there is hardly any scientific research on

the influence of a virtual reality on the identity perception and the personality of a user of these virtual realities. The present study attempts to contribute to filling this gap by assessing the potential difference between real-life personality and the 'virtual' avatar personality using the online 3D world of Second Life. 34 Dutch participants were asked to use their own avatar or create a new avatar within this online virtual reality, to communicate with other avatars and finally to fill in the Big Five personality questionnaire 5 *Persoonlijkheids Factoren Test* (5PFT) via a virtual interactive testing screen within Second Life. The virtual 5 PFT scores were compared to pencil and paper scores of the same questionnaire, which was filled in by all 34 participants during a first-year undergraduate test battery, seven months prior to the virtual testing. The results show no difference for any of the five subscales (extraversion, friendliness, conscientiousness, neuroticism, development) between the pencil and paper and the virtual version, implying that users of virtual realities do not create a 'virtual' personality for their avatar. Furthermore, high scores of internal consistency and high test-retest correlations between the two versions were found, which are in turn very similar to the original test-retest scores of the 5PFT (Elshout & Akkerman, 1975). These findings show the potential of virtual realities as new platforms for reliable (psychological) testing and future clinical applications.

Personality in virtual reality

In recent years technological development has enriched our daily lives with a wide range of new possibilities. Personal computers, the internet and other means of information technology are rapidly changing communication and thereby people's lives, maybe even as much as the invention of language, writing and printing did (Baecker, 2007).

One of the most intriguing experiences, and at the same time most controversial discussed topics, is the phenomenon of virtual realities. Second Life

is the biggest free available virtual reality, with 15 million people currently registered, while approximately 500.000 people are online in Second Life at least once during one week (Linden Research, Inc., 20 October, 2008). At any moment somebody with an avatar can join the Second Life world to meet people, build objects and do whatever he/she likes. In fact, in Second Life there is an online world developing that has pretty much the same features as the real world.

One difference important difference between the real world and virtual worlds is that contacts are always established via the technical use of the computer. Avatars approach each other in virtual places, but to disappear it only takes a mouse click. There is for example the possibility to fly and teleport, meaning that at any time the avatar can directly be transferred to any other place within Second Life, except some restricted private areas. By wearing the virtual mask of the avatar and by always having the chance to leave without being known or questioned, a user of the virtual reality finds himself confronted with questions as “what am I going to tell?” and “am I going to tell the truth?”. This anonymity can lead to a sense of de-individuation and disclosure, which in turn has influence on the identity perception of the user (McKenna & Bargh, 2000). Users of the online role game ‘World of Warcraft’ are found to create their avatar more closely related to their ideal self, than to their real self (Bessi re, Seay & Kiesler, 2007). This finding is supported by an experimental study, in which the true self (the inner concept of the participant’s self) is found to be more available cognitively during internet interactions, while during face-to-face interaction the actual self (the ‘outer’ concept of the participants self) shows to be more accessible (Bargh, McKenna & Fitzsimons, 2002). One could argue that people communicating via internet or virtual reality try out behavior which they do not dare to express in real life. The avatar could for example be much more open, telling his deepest thoughts. S/He could also be less friendly, because

there is no need of being polite as in the real world, which in turn can also be interpreted as being more honest. In fact, each person could have his/her own differences compared to the real life. It is even possible that one is maintaining several avatars with different personality styles, for example a cute little fox which is friendly and everybody likes and besides that a rough-looking guy being direct and extraverted. In the end, one could also use the avatar just to be as s/he is in real life; all directions of change or no change at all are possible, resulting in a question what the influence of online virtual realities on the user’s personality is.

‘Personality’ is generally defined as the stable and unchangeable concept of the sum of the attributes of a person (Mischel, 1999). The most widely known theory of personality is the so-called ‘Big Five’, a theory that tries to describe personality by using five basic continuous traits, namely extraversion, openness, conscientiousness, agreeableness and neuroticism. These traits are supposed to be stable across time and situations. Modern theories nevertheless view personality as a whole set of different adaptive modes for different situations (Turkle, 1997). People behave very differently at home, at work or at the first dinner with their new parents-in-law. In other words, people use a variety of different personality-patterns according to a specific situation. Therefore it seems plausible that people may also create a ‘special’ personality which they use in Second Life. To put it short: Richard David Prechts philosophical question on personality: “Who am I - and if so, how many” expands with virtual realities to: “Who am I – and if so, where?” (Precht, 2007)

Current literature strives the above mentioned question, but has a number of shortcomings.

One first shortcoming is that scientific papers are often more theoretically than empirically oriented. For example the work of Turkle (1997) or McKenna and Bargh (2000) give an overview on the implications of the internet and virtual reality on people’s

lives and their personality, though without transcending their theoretical framework to a more experimental level.

Second, a few studies make use of massively multi player online role playing games (MMORPG's) like 'World of Warcraft', in which the main aim is, in contrast to Second Life, to fulfill missions of a preset plot and not on social interaction (Bessi re et al. 2007, Bainbridge, 2007). The emphasis in these studies is on people's personalities in real-life, rather than on how personality undergoes changes during such role-playing games.

Third, a lot of researchers interested in virtual realities are not interested in the aspect of personality in virtual settings (De Nood & Attema 2006). Although they use experimental designs, interest lies on behavioral aspects like virtual distance between avatars (Yee & Bailenson, 2007). A few researchers use reaction time tasks to assess actual and true self in virtual realities, but do not make any claims about the content of these selves and the differences between them (e.g. Yee & Bailenson, 2007; Bargh et al. 2002).

The present study will try to overcome the shortcomings of the mentioned studies by using psychological questionnaires in an experimental-correlation setup and answer the research question: **How stable are personality-traits when entering a virtual reality?**

To assess this potential difference between personality in real life and virtual life, personality is measured twice with the same tool, namely the *5 Persoonlijkheids Factoren Test* (5PFT, Elshout, 1999). This pencil and paper questionnaire is regularly taken by first year undergraduate psychology students during the so-called 'testweek', in which the students have to participate as an obligatory part of their undergraduate program. The 5PFT is supposed to be a fairly stable measurement of the previously mentioned five personality attributes: extraversion, friendliness, conscientiousness, neuroticism and development (Elshout, 1999). In the present study, the 5PFT questionnaire is filled in a

second time via an interactive virtual tool in Second Life. The participants use their avatar to approach the testing screen, where all questions of the 5PFT are presented one after another. If the comparison of the two 5PFT versions shows differences for the real life condition and the virtual condition, this can be accounted for by a real difference of how participants experience and act within the two worlds. To control for mediating factors, 'absorption' and 'presence' will be measured. People who are being 'sucked' in or absorbed by all kinds of situations (the plot of a play or a story) might get more involved in their avatar and therefore show different results on 'absorption' than people that keep a distance towards the virtual world. Presence tries to measure whether the participant feels present in the online virtual reality and whether this world appears to the participant as if it was real. Again, it is possible that participants that feel more present in the virtual world (immersion) behave differently from participants who are not feeling present.

With this approach, the present study transcends the discussion about personality in virtual realities from a theoretical level to a scientific level. Using the scientific method, which entails 'blind' participants, a laboratory setting, scientific data analyses et cetera, will make it possible to give an informed answer to hypothetical and non-scientific beliefs on how people 'are' in virtual realities as they circulate in press, internet forums and blogs. Finally, using the platform of Second Life has, in contrast to MMORPG's, the advantage that the emphasis lies on 'virtual', hence relatively 'normal' social contact instead of following a role-play objective.

On the basis of the flexible view on personality it should be expected that a difference between virtual and real life can be identified. On the other hand personality is, in contrast to Turkle (1997), widely seen as a stable concept that does not vary across different situations (Mischel, 1999); from this perspective there is no reason to predict a difference between the real life and the virtual setting. Due to a lack of existing

scientific experimentation, it is not possible to predict an outcome on the question whether there is a difference between virtual personality and real personality, so an explorative setup will be applied.

METHOD

Participants

Psychology students of the University of Amsterdam were informed and could register for participation via wallpapers. Potentially, every psychology student who has participated in the 'testweek' could also take part in the study, as during this prior testing correspondent results of the 5PFT had already been produced. As compensation, participants could earn up to 2 ½ 'participation hours' or 17 Euros, depending on whether or not they had a previously existing avatar. Participants flagging not to have taken part in the 'testweek' could not take part.

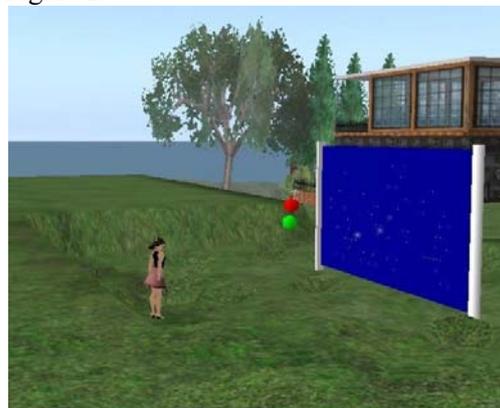
Materials

5 Persoonlijkheids Factoren Test

To assess the personality structure of the participants the *5 Persoonlijkheids Factoren Test* (5PFT) has been used, which consists of 70 items. This is the first ever produced questionnaire to assess the Big Five personality structure, consisting of the scales extraversion, friendliness/sociability, conscientiousness, neuroticism/emotionality and development (Elshout & Akkerman, 1973; Elshout 1999). This questionnaire is included in 'testweek' tests on a routine basis; therefore, each participant had filled in the 5PFT with pencil and paper before. Between the two versions of the 5PFT ('testweek' and virtual), for each participant there was a delay of at least 6 months for each participant, ensuring that nobody had insight into the real purpose of the study, namely the comparison of the two 5PFT versions. In fact, no participant mentioned recognizing the 5PFT from earlier testing. To measure the avatar's personality, this test was administered in the present study by using a virtual interactive screen within the virtual reality of Second Life, as can be seen in Figure 2. The participant started the

questionnaire by clicking on the blue screen. Subsequently, the avatar was welcomed personally by its avatar name and the screen showed the introduction of the 5PFT. Finally, after being introduced, the screen showed each question one by one and the participant could respond by clicking on one of seven 'answer-buttons', ranging from 'helemaal niet van toepassing' ('absolutely not of relevance') until 'helemaal van toepassing' ('absolutely of relevance'). After the participant's response, the next question was loaded. As an example, the first question is as follows: "Sprakzaam. Praat veel, tegen iedereen." ("Talkative. Talks a lot, to everybody").

Figure 2.



Avatar in front of the interactive survey screen

Absorption

The second questionnaire, which was taken as a pencil and paper test after the avatar had been logged out, participants were asked to fill in a questionnaire that tries to measure *Absorption* (Tellegen & Atkinson, 1974). This absorption list is nowadays included as a subscale of the *Multidimensional Personality Questionnaire* (MPQ), which is also taken during the 'testweek' (Tellegen, Lykken, Bouchard, Wilcox, Segal & Rich, 1988). In the present study *Absorption* is measured to control how much participants are open to absorb new situations and are open to self-altering experiences. This test consists of 34 items, each to be answered on a 5 point scale

ranging from “Dit is nauwelijks op mij van toepassing” (“This is barely of relevance”) to “Dit is heel erg op mij van toepassing” (“This is of very high relevance”). The first question is for example: “Soms beleef ik dingen net zoals toen ik een kind was” (“Sometimes I experience things just the way I did as a child”). Furthermore the ‘testweek’ results of the MPQ also yield scores on *time* needed to fill in, as well as two validity scales, namely the *Variable Response Inconsistency* (VRIN) and the *True Response Inconsistency* (TRIN) (Patrick, Curtin & Tellegen, 2002). The VRIN controls whether participants fill in the MPQ “randomly”, while the TRIN flags participants’ tendency to have a specific positive or negative answering style, respectively. These three scales are used in the present study to exclude participants that filled in the ‘testweek’-MPQ too fast, too randomly or with a too strong specific answering pattern.

Igroup Presence Questionnaire

To control the manner in which participants experienced a sense of presence in the virtual reality, the *Igroup Presence Questionnaire* (IPQ) was used (Schubert et al., 1999, 2001). In this 14 item strong test, which was taken as a pencil and paper questionnaire, participants answered questions on a 7 point Likert-scale, ranging from -3 to +3 (“Helemaal niet” to “Heel erg”; “absolutely not” to “very strongly”), like: “Ik had het gevoel aanwezig te zijn in de computerwereld” (“I had the feeling of being present in the virtual reality”). The IPQ subdivides into the three subscales of spatial presence, involvement and experienced realism.

Computer competence

Finally, another 5 self produced pencil and paper questions on *computer competence* were administered. The answer possibilities ranged from “heel slecht of nooit” (“very bad or never”) to “heel goed of dagelijks of vaak” (“very good or daily or often”). Questions were for example: “Hoe vaak gebruikt U een computer?” (“How often do you use a PC?”).

Procedure

Participants were first asked, whether they had previously been participating in the ‘testweek’. The laboratory itself is based at the psychology faculty of the University of Amsterdam and consists of 5 working places. Each working place was equipped with a PC on which the computer program Second Life, version 1.19.1, was already installed (Linden Research, Inc., April 2, 2008). In case of technical problems the instructor, who was situated in the same room, could be asked for help. If participants agreed to sign an informed consent, they were asked whether they already owned an avatar in Second Life. If they did **not** have an avatar yet, participants were asked to open the website of Second Life and create their own avatar. Participants then logged in to Second Life with their new avatar and ran the Second Life tutorial, which took about 60 minutes. In this tutorial provided by Second Life, participants learned how to move, communicate and change the appearance of their avatar. After finishing the tutorial a new appointment was scheduled with the participant, taking place one week after the first use of Second Life.

In the second session both groups of participants, namely those who had created their avatar one week earlier in the first session, as well as those who had an avatar already before starting the experiment, had to follow the following procedure: First, the participant was asked to log in to Second Life and teleport to ‘Groningen’ via the Second Life search option. Then the participants were asked to walk around and talk to at least two random avatars and find as much as possible out about these avatars. By communicating with other avatars it was supposed that participants identified with their own avatar more and in a short period of time. When walking around in the virtual world, the avatar might be used as a mere tool for navigation. The introduced processes of trying out new ways of being oneself and being approached by somebody else through the virtual appearance come the most into play in communication with others. After 30 minutes of conversation, the

participants were told to teleport from Groningen to the area where the testing screen was situated (Monowai 111/207/62) and follow the instructions written on the screen, starting with welcoming the participant by the avatar name. After finishing the virtual 5PFT questionnaire, the participants were asked to log out of Second Life and fill in the questionnaires ‘Absorption’, ‘IPQ’ and ‘computer competence’. Finally, some questions concerning demographic data (age, gender et cetera) had to be filled in. The participants were then asked to sign an allowance form to couple the results of the Second Life study to the ‘testweek’ results and were then debriefed about the real purpose of the study. After signing the debriefing the compensation was given to the participant of the study.

RESULTS

Participants and exclusions

In total, 57 persons (30 women/ 27 men) intended to take part in the study, two of whom had their own pre-existing avatar. Due to not being psychology students and therefore not having taken part in ‘testweek’, seven persons could not take part in the study. Another four participants had to be excluded, because no matching 5PFT ‘testweek’ results could be found. Due to technical problems of the website www.secondlife.com, four participants could not create an avatar. From the 42 remaining participants the results of two persons could not be included in the analyses due to a too big number of missing values in the Second Life 5PFT version. When participants had more than seven missing values, which was calculated by 1/10 of the total 70 questions, they were excluded. The missing values of the remaining 40 participants ($M = 1.94$; 2.7% of 70 5PFT answers per participant) were replaced by the calculated mean of the group on the respective question.

On basis of the ‘testweek’ MPQ results, participants were controlled for time, TRIN and VRIN scores. According to

Patrick et al. (2002), an exclusion criteria of two standard deviations above and below mean was used. On the basis of time scores two participants had to be excluded ($M = 1269$, $SD = 338$), whereas VRIN ($M = 10.7$, $SD = 2.4$) and TRIN ($M = -1.14$, $SD = 3.86$); each led to exclude one participant.

Two more participants were taken out of the statistical analysis due to corresponding low scores on the conscientiousness scale of the 5PFT in both versions. It is possible that participants with low scores on this trait do not seriously participate in experiments in general, so they were excluded from data analyses. Finally, 34 datasets were included in the statistical analyses.

Reliability

The present study used *Cronbach’s α* to assess the internal consistency of the different scales of the 5PFT. In fact, all scales reached acceptable *Cronbach’s α* in both, ‘testweek’ and virtual settings, as can be seen in Table 1. Both settings managed to yield reliable results for the 5PFT. Furthermore, *Cronbach’s α s* are highly similar to the *Cronbach’s α s* found in the original version (Elshout & Akkerman, 1975).

Tabel 1

Cronbach’s α reliability coefficients for ‘testweek’-, virtual and original version of the 5PFT per subscale (Elshout & Akkerman, 1975)

Subscale	Testwee k ¹	Virtua l ¹	Origin al ²
Extraversion	.80	.76	.85
Friendliness	.76	.69	.77
Conscientiousness	.76	.67	.80
Neuroticism	.83	.87	.87
Development	.73	.74	.82

¹ $N = 34$; ² $N = 37$

Exploratory results

Using *paired-samples t-tests*, significant differences were **not** found for any pair of the corresponding scales of the 5PFT ‘testweek-’ and the virtual-version, as

Table 2

Mean, standard deviation and t-test results for the ‘testweek’- and virtual version of the 5PFT

Subscale	Testweek		Virtual		t-test		
	Mean	SD	Mean	SD	t	df	p
Extraversion	61.5	9.5	59.8	9.3	1.72	33	.10
Friendliness	69.0	8.1	70.6	7.2	-1.36	33	.18
Conscientiousness	60.5	8.9	60.8	7.7	-.33	33	.75
Neuroticism	47.6	9.8	47.3	11.9	.27	33	.79
Development	65.6	7.8	66.7	8.1	-1.08	33	.29

can be seen in Table 2. The notion that there is no difference between the virtual and the paper and pencil 5PFT scores is further supported by the fact that among all participants the difference between the total score per subscale of the virtual version subtracted by the ‘testweek’ total score per subscale is close to zero (difference-extraversion: $M = 1.74$, $SD = 5.90$; difference-friendliness: $M = 1.61$, $SD = 6.904$; difference-conscientiousness: $M = 0.35$, $SD = 6.201$; difference-neuroticism: $M = 0.31$, $SD = 6.50$; difference-development: $M = 1.12$, $SD = 6.04$). These difference

scores are all (except neuroticism) normally distributed according to *Kolmogorov-Smirnov tests* (difference-extraversion: $D(34) = .121$, $p > .2$; difference-friendliness: $D(34) = .071$, $p > .2$; difference-conscientiousness: $D(34) = .126$, $p = .185$; difference-neuroticism: $D(34) = .158$, $p = .031$; difference-development: $D(34) = .103$, $p > .2$). Even the absolute difference for each participant across the whole test does not exceed a mean of 24.81 ($SD = 7.802$)

with a maximum of 45.16, which are both very low with regard to the fact that the 5PFT consists of 70 questions with a range of 1 to 7. In other words, the mean participant (avatar) filled in a mean question only about 0.35 points different compared to the first time as subject in the context of the test week.

Very high *Pearson Correlation coefficients* were found for all couples of the virtual versus real setting scales, meaning that there is a positive relationship between the scores obtained in the ‘testweek’ and scores obtained in Second Life for the five scales respectively.

All other possible combinations of subscales for both versions showed no significant correlations, except the correlation between neuroticism and friendliness scores of the ‘testweek’ ($r = -.35$, $p = .043$). These test-retest reliability results are in fact similar to the results Elshout and Akkerman find in their original test-retest analyses for the 5PFT, which had a delay of one year between the two test sessions, as shown in Table 3 (1975). Only the correlation for the subscale of neuroticism differs substantially between the present study and the original results (neuroticism: present study: $r = .84$; Elshout & Akkerman, 1975: $r = .37$).

Table 3

Test-retest correlations per subscale of the 5 PFT for the ‘testweek’ vs. virtual version and as tested by Elshout and Akkerman (1975)

Subscale	Testweek vs. virtual version* (N=34)	Elshout & Akkerman (1975)** (N=37)
Extraversion	.81	.73
Friendliness	.61	.52
Conscientiousness	.73	.76
Neuroticism	.84	.37
Development	.72	.72

*: 7 month between test and retest; **: 12 month between test and retest

In order to control the influence of absorption and presence on the virtual 5PFT scores, difference scores between 'testweek' and virtual 5PFT scores were calculated and correlated with absorption and presence scores. There were no correlations found, neither for the subscales spatial presence, involvement and experienced realism of the IPQ presence measure, nor for the absorption questionnaire, meaning that the way a participant absorbs and feels present in the virtual reality does not predict a difference in personality scores. Computer competence was not a moderating factor either.

DISCUSSION

The main intention of the present study was to explore the stability of personality-traits when entering a virtual reality. With respect to the 5 Persoonlijkheids Factoren Test, results are stable when the version completed in the test week and the version completed seven month later by the avatar in Second Life are compared. High correlations of the personality traits extraversion, friendliness, conscientiousness, neuroticism and development are found for each subscale of the two versions respectively. In other words, the personality traits of participants do not differ between the real world setting and the virtual world setting. In light of these results the answer for the research question (How stable are personality-traits when entering a virtual reality?) seems to be that the usage of virtual environments does not have an influence on the personality traits of the user; people do not create a special 'virtual' personality for their avatar. Also, strong correlations between the real life setting and the virtual setting on the one hand and the similarity of these correlations compared to the test-retest correlation attained by Elshout and Akkerman (1975) on the other hand, can be interpreted as supporting evidence that questionnaires can be administered in virtual settings as reliable as in real life settings. Furthermore, neither presence, the feeling of being present in the virtual reality, nor

absorption, the tendency to completely absorb and being 'sucked' in by new situations, has-moderating influence on the personality measure.

These findings support the notion that personality can be seen as a very stable concept that is not disturbed when entering a 'new' world such as Second Life. This sheds rather critical light on some blogs on the internet, which are trying to detect the difference between avatars' and peoples' personality. The differences in personality found by these must be accounted for by the poor operationalization of asking participants directly whether they perceive a difference, and not by a real difference in personality-style.

In psychological research one big problem is to find participants for experiments. It is common use to make participation in psychological research an obligatory part of undergraduate psychology programs. This group is very specific in age, interests, educational level etc., all flaws to the validity and generalizability of scientific experimentation. Besides that, the costs of running laboratories are immense, need supervision and are mostly situated at universities, which are not easily accessible for everyone. A virtual laboratory, in contrast, could run 24 hours a day without any supervision needed and assess people from all around the world (Bainbridge, 2007). This virtual group is not a heterogeneous group representing the whole population either (PC, internet and a program for running the virtual world are necessary), but as a recent study on the demographics among Dutch users of Second Life shows, this group has a big variance in age, education, gender and financial background (de Nood & Attema, 2006). The fact that high reliability scores are found for the real life version and the virtual version as well and that these are very similar to the original reliability scores (Elshout & Akkerman, 1975), shows that virtual realities could function as new reliable platforms to assess participants for psychological research. The mere fact that it was possible to run the present study within

a virtual reality, without having too much dropout, running at low expenses and yielding reliable results, shows the high potential and usability of virtual laboratories.

Although the present study yields promising findings, there are clearly some shortcomings at hand. First, the fact that no difference in personality is found might be due to the stability of the questionnaire that has been used. Being built on the idea of a stable personality within the tradition of the Big Five personality theory, the SPFT instrument might be un-useful to detect differences of personality within the participants. Second, the stability of personality itself could be the reason for the stability in scores. It might be that less stable psychological aspects like self-concept, mood or emotions function differently, when entering a virtual environment. Third, this study can be viewed as a pseudo experiment, while personality is the dependent variable and real/virtual setting the independent. This operationalization has its shortcomings in having no control group. Fourth, most participants (except two) of the present study are not in possession of an avatar beforehand. It can be hypothesized that it takes quite some time to develop a 'virtual' personality, which might be found in people using virtual realities on a regular basis. Some participants asked the instructor, if they were supposed to fill in the personality questionnaire as themselves or as their avatar, which was answered by advising to carefully read the instruction. Apparently, some participants perceived their avatar as partly distinct from themselves, otherwise they would not have asked how to fill in the questionnaire.

Future research should try to overcome these shortcomings to enable future applications of virtual realities for clinical psychological interventions (Westerhoff, 2007). Classically, therapy takes place in a therapist-client(s) setting, in which direct contact is an essential part of the therapy. Nevertheless, new technologies present new methods even in this field. Interapy, for example, uses the internet to

give writing therapy without face to face contact between therapist and client, showing promising results (Wagner & Lange, 2008). One could think of expanding classical therapy into virtual realities and by doing so, ease the first step to start therapy. Thinking one step further one could try to implement 3-D worlds in therapeutic avenues that use exposure techniques, as first pilot studies, approaching the use of virtual worlds in the therapy of specific phobias, have been taken (Powers & Emmelkamp, 2008). In this study, fear is induced by wearing a 3-D toggle and virtually walking up a skyscraper or virtually sitting in an airplane. Even though people know that they are not on a skyscraper and in no danger of falling, they do experience symptoms of fear. These symptoms can form the starting point of different ways of therapy, like gradual exposure in vivo, where people are step by step confronted with stronger fear stimuli. Subsequently they learn to handle the fear. Patients with post traumatic stress disorders e.g. are being helped by using their imagination to relive the traumatic event. In virtual worlds this reliving could be brought on a 'virtually' real yet still controllable level and thus give a new technique to help patients. Even in more complex anxieties, like social fear or agoraphobia, virtual realities like Second Life could be used (Gallego, Botella, Banos & Guillen, 2008). People e.g. experience virtual realities as being freer to begin and end conversations with others (McKenna & Bargh, 2000). A socially phobic patient could, as a first step of intervention, step into Second Life and experience social situations behind his/her PC. The experience of communication and the training of social skills could then subsequently transfer to real life. Knowing that people show no difference in personality, psychologists could develop specific intervention programs within virtual settings.

Against the background of the present study, there is reason to believe that the client is 'him-/herself' in the virtual world, so the intervention is not applied to a

'virtually' influenced client, but to the 'normal' client in a virtual world, a process termed augmentation (Boelstorff, 2008, Turkle, 1997). The psychologist not only has control over the virtual environment, which helps to find out which part of an intervention is most helpful and makes it possible to personalize the setting for each patient. It is also possible to compose virtual settings that are too expensive in real life, like getting on a plane to fight fear of flying, or that are not possible at all, like the reliving of a traumatic event, as it is used in treatment of post-traumatic stress disorder.

One possibility of future research would be to use other realms of human psychology. Personality is, as shown, a fairly stable concept even across virtual worlds. In contrast, emotional processing is a more flexible concept that could react on virtual realities much more than personality. Classical experiments within the field of social identity theory manipulate mood or emotion rather than that they assess personality. If it was possible to find participants that use virtual realities and their avatar on a regular basis and administer them to a mood changing manipulation in real life and/or in virtual life, the differences between these two groups could much more thoroughly answer the question, whether people 'are' different in real world compared to virtual worlds.

REVIEWS

Review 1

Overall rating: 3 (strong accept)

Confidence: 2 (medium)

Relevance to the conference: 5 (excellent)

Importance/Originality of topic(s): 4 (good)

Significance of conclusions: 4 (good)

Quality and depth of research: 5 (excellent)

Paper presentation, organization, and writing quality: 5 (excellent)

Review:

The paper focus on the analysis of differences between real-life and virtual-life personalities. The author describes his work and presents it in a rigorous way. The paper

is well written and the conclusions are supported with the data from the field study. It delivers important conclusions regarding the differences in personality.

But, as the author refers, a limitation of the conclusions is related with the fact that most of the participants were not regular SL users, therefore some limitations must be addressed.

It would be interesting to see a similar study applied to regular SL users.

Review 2

Overall rating: 0 (borderline paper)

Confidence: 2 (medium)

Relevance to the conference: 4 (interesting)

Importance/Originality of topic(s): 4 (good)

Significance of conclusions: 2 (poor)

Quality and depth of research: 3 (fair)

Paper presentation, organization, and writing quality: 5 (excellent)

Review:

The question of the research is interesting, the focus is new, and a good starting point for the research on psychology on virtual worlds.

However, the method seems not to be accurate with the research question, and there are very few persons for a quantitative research. The application of the same test on paper and then in-world is just a change of the format, but it's the same person answering, so the results show the same personality.

That's why there are no differences in the results. The method doesn't allow to find the "virtual" personality of the avatar, maybe other tests or a qualitative methodology would help better.

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