The effect of the Empty Chair Method on Future Self Connection in Vivo and in Virtual Reality

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Abstract

Studies have already shown that the Empty Chair Method, using virtual reality in therapy and future-oriented thinking have various advantages. However, there are no studies on whether and how these concepts are related. To address this gap, this study examines the effect of the Empty Chair Method on future self-connection in vivo and in virtual reality. Therefore, a quasi-experimental design was employed (pre questionnaire – experiment – post questionnaire) containing three conditions: Empty Chair (EC), Empty Chair Virtual Reality (ECVR) and Virtual Reality (VR). Participants (N = 68) carried out a practical task in a laboratory of the University of Twente, in which they had a conversation with their 10-year-older future self about an achieved goal. The results showed, there was no statistical significance that the experiment in all conditions caused a difference in future self-connection (FSC). However, there was a significant difference between pre and post FSC in ECVR. Further results showed, there was a significant correlation between presence and post FSC, and that presence was significantly higher in EVCR than VR. The paper concludes by discussing limitations that may affect these results and providing ideas for future studies.

Keywords: Virtual reality, Future self, Future self-connection, Empty Chair Method, Presence

In today's society, it's not easy to make decisions. On the one hand, we live in a world in which we lack nothing and in which there are virtually no limits. Almost nothing is impossible, and we can do almost everything at any time and anywhere. On the other hand, the number of possibilities we face, such as ‘Do I cook healthy or do I order food?’, ‘Do I do sports or do I watch Netflix?’, ‘Do I save the money or do I spend it now?’, ‘Do I help the needy person across the street or do I hurry to get the train?’ does not make it easy for us. This can be daunting because, at every point in our lives, we make decisions that can have a decisive impact on the lives of the people we will be in the future. And unfortunately, we often make decisions our future self regrets rather than advocates (Gilbert, 2014).

Quoidbach, Gilbert and Wilson (2013) conducted a study in which they asked half of their participants to estimate how their values, personality, dislikes, preferences etc. would change within the next 10 years. The other half should describe how their values etc. have changed over the last 10 years. The predictions of the 18-year-olds were compared with the retrospectives of the 28-year-olds, and so on, across all ages from 18 to 68. The assumption was confirmed that changes in intrapersonal values, preferences and so on slow with age. However, not nearly as slow as most people think. In each age group, the participants underestimated how much they would have changed in 10 years. The reason for this misconception is that people are more likely to remember something that was 10 years ago, but they find it hard to imagine what will happen 10 years ahead (Gilbert, 2014). Therefore, people often make decisions that are profitable for their present self and less focused on their future self.

However, research shows that the more connected one feels to the future self, the more likely one makes decisions that promote physical and psychological well-being (Rutchick, Slepia, Reyes, Pleskus & Hershfield, 2018). There are also studies showing that people can be encouraged to think about their connection to themselves over time and that they can also visualize certain health and well-being decisions they need to make to improve their long-

term quality of life (Rutchick, Slepia, Reyes, Pleskus & Hershfield, 2018). This is what is called future self-continuity. There are many different definitions of future self-continuity, but most of them overlap in maintaining the sense of personality, beliefs, ideals, preferences, values, etc. between the present and the future self (Rutchick, Slepia, Reyes, Pleskus, Hershfield & 2018).

Studies have shown that when people think about their future self, the thought processes are similar or just as if they were thinking of a stranger (Urminsky, 2017; Rutchick, Slepia, Reyes, Pleskus & Hershfield, 2018; McCuey, McCormack, McElney, Alto & Feeney, 2019; Hershfield 2019). For example, if one would ask a person what their birthday will look like in 10 years, the person usually talks about the situation from the point of view of a third person instead of a first-person perspective.

Empty Chair Method

The Empty Chair Method originates from Gestalt Therapy, belongs to Experimental Therapy and is a kind of role-play (Pugh, 2018). Nowadays it is used in many different forms of therapy to treat different mental disorders, for example, eating disorders (Pugh, 2018). The ‘empty chair method’ or ‘chairwork’ helps to step out of one’s own mindset and to change perspective. In this process, one can learn to better understand the emotions, thoughts and behaviour of another person or oneself by looking at it from a different perspective (Pugh & Salter, 2017; Pugh, 2018; Kolmannskog, 2018). For this purpose, two chairs are placed in the room, on one of which the client takes place and the other remains empty. The empty chair is a substitute for another person, feelings, roles or other relevant parts of the client's life. The client then begins a conversation which is directed to the empty chair. This could also be applied in this manner, by imagining the future self to be in the opposite chair and engage in a conversation with them. During this conversation, the client keeps changing chairs. If the client sits down on the empty chair, they put themself in the imagined person, feeling, etc. The client can immerse themself deep into the matter, for example, they can change their

voice, posture etc. The more they empathize with the other person, situation, etc., the better they can get emotionally involved, take the other's perspective, and reflect on it (Pugh & Salter, 2017; Pugh, 2018; Kolmannskog, 2018).

However, for some people, such a type of role-playing game can be rather difficult to perform (e.g. due to lack of imagination). Therefore, the idea is proposed to consider what assistance might be offered to these individuals in order to facilitate their dialogue with their future self. One idea of such a tool was the use of virtual reality. VR has the potential to transcend the boundaries of physical reality by altering the senses of the body to create, at best, a new place feeling, in a non-invasive way (Slater, 2009). Furthermore, virtual reality is a medium in which people can react with their whole body and perceive the situation as if it were in the real world. Immersion and presence are two concepts that are found to support such experience in the virtual world (Slater, 2009).

Immersion and Presence

Immersive virtual reality (IVR) minimizes a user's awareness of the real world and maximizes the perception of the virtual world (van Gelder, Otte & Luciano, 2014). Van Gelder, Otte and Luciano (2014) explain this concept as follows, "If the sensory inputs of the real world are blocked, it may give the impression that one has actually entered the virtual environment, an illusion of engagement with the artificial world" (p. 1). The degree of immersion is determined solely by the physical properties of the system, that is, the function and presentation of the entire physical virtual reality and that of the computer system (Slater, 2009). How good or bad the immersion succeeds is crucial to the next concept, called presence (Slater, 2009).

Presence is the 'feeling of being in' the illustrated environment of the virtual reality system (Slater, 2009). Presence refers exclusively to a subjective 'feeling of being there', meaning the place represented by the virtual reality and not the physical place where the user's body is actually located. The user tends to respond to the virtual events and the

environment as if they were real. In this sense, presence and immersion are strongly related. A higher level of immersion is also likely to create a higher presence feeling (van Gelder, Otte & Luciano, 2014). While immersion refers to the technological aspects of building virtual reality, according to van Gelder, Otte and Luciano (2014), presence "refers to a psychological state that reflects the emotional, physical and cognitive engagement with the VE" (p. 2).

Applications of Virtual Reality

VR technologies are already integrated into some forms of therapy, especially within Cognitive-Behavioural Therapy (CBT). One common treatment form of CBT is exposure therapy that aims at treating anxiety disorders. On this occasion, it is investigated whether one can treat such disorder with the use of VR technology (North & North, 2016; Freeman et al., 2018). An advantage here is for example that external factors can be better controlled in the virtual world than in the real world and thus individually adapted to the needs of the patient. (North & North, 2016; Botella, Alvarez, Guillen, Palacios & Banos, 2017). Furthermore, it has been used as additional therapy in the treatment of demented patients. Patients are virtually brought into the past world. The main advantage here of using VR is that the patient is right in the middle of the action, they are, to a certain extent, actively involved, unlike when they only look at a two-dimensional image (Eisapour, Cao, Domenicicucci & Boger, 2018; Sayma, Tuijt, Cooper & Walters, 2019). Using VR technology can also reduce the need for therapeutic availability, costs and time (Donker, Cornelisz, van Klaveren, van Straten, Carlbring, Cuijpers, & van Gelder, 2019).

The Present Study

In this study, the basic idea is during the chairwork to interact with one's future self about an achieved goal to increase the connection between the present- and future self. Based on this, the effect of the empty chair method on future self-connection (FSC) in vivo and in virtual reality will be examined, by addressing different questions. The first question that will be addressed is whether FSC increases after the experiment, the second one is whether the

difference between pre and post FSC is higher in VR than in EC and ECVR and VR and lastly whether there is a correlation between presence and future self-connection. Answering these questions is important because it might help to find out which method is best and which components are important that will contribute to a good connection to the future self, ultimately helping people feel more connected to their future self and thus making better decisions in regard to their future.

In this respect, the three different components will be combined (EC, FSC and VR), which allows users to engage in a dialogue with their future self in a different dimension. There will be three conditions. The first is the classic empty chair method (EC). The second condition is a combination of the classic method combined with VR technology (ECVR). Instead of sitting in the real world (in vivo) and executing the classic empty chair method, the user is put into a virtual world using VR glasses. Through an animated figure (an avatar), a user can move in the virtual world and record and interact with virtual objects on the way (van Gelder, Otte & Luciano, 2014). The third condition (VR) also takes place in virtual reality but with another expansion. Instead of the empty chair, the user sits facing another avatar (the face morphed future self) with whom they can have a direct dialogue.

Method

Participants

In this study, a quasi-experimental (pre- and post) design was employed. It contained the three conditions Empty Chair (EC), Empty Chair Virtual Reality (ECVR) and Virtual Reality (VR), to which participants were randomly assigned. A total of 91 national and international male students (M*age* = 22, range: 18-40 years of age), all Bachelor or Master students from the University of Twente, in the Netherlands, participated. They were recruited through the university's SONA recruitment system, through flyers with a link and QR-Code to sign-up for the study and by personally addressing students on the university campus. Of all participants, 68 (75%) completed all parts of the study. For taking part in the study,

participants were rewarded with 1.5 SONA credit points or a 10€ Gift Voucher. Additionally, all participants were entered into a raffle and given a chance to win a 50€ VVV Voucher. The study was approved by the BMS Ethics Committee (#191255).

Materials

Survey materials. There were two questionnaires for the study, one completed before the experiment (pre-questionnaire) and the other after the experiment (post-questionnaire). To sign-up for the study, participants used an electric device (smartphone, tablet, laptop etc.) with an internet connection. After signing up, participants received a pre-experiment questionnaire via email. Since the questionnaire belongs to a bigger research project with several researchers, it contained 34 questions. For the present study, however, only the questions about connectedness and future goals were relevant. Therefore, only these will be described in more detail.

In order to measure future self-connection, the participants had to select a pair of circles from seven different pictures (Figure 1). Each picture showed two circles (one circle representing the present self and the second circle representing the future self) that showed different degrees of overlap. Picture one, showed both circles very far apart (representing a low feeling of connectedness between the present self and future self) and picture seven showed the circles very close together (representing a high feeling of connectedness) (see Figure 1). This design was derived from Hershfield (2011) to measure how connected the participant feels towards themselves 10 years into the future. Another key question was about a specific goal that participants would like to accomplish in the upcoming years: *"If everything is possible than in the upcoming years, I would like to accomplish: […]".* Formulating this goal is an important part of the study because the conversation with the future self builds on it thematically.

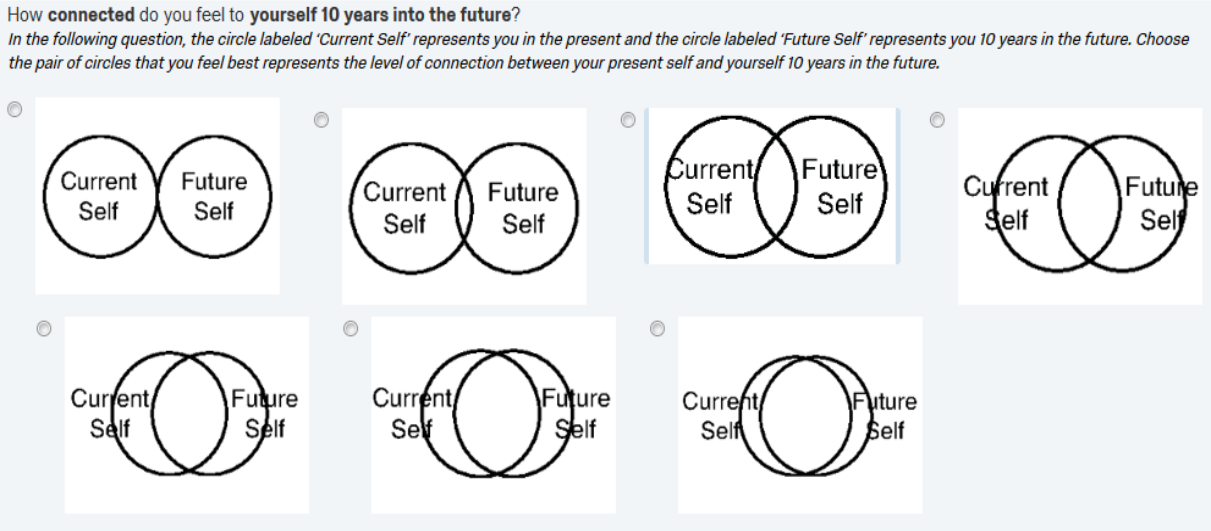

Figure 1. Visual representation of the connection between present and future self.

After the experiment, participants filled out a post-experiment questionnaire. Again, because the questionnaire belongs to a bigger research project with several researchers, it contained 29 questions. However, for the present study, only the questions about future self-connectedness and the feeling of presence were relevant. In order to measure the presence, the Spatial Presence Experience Scale (SPES) was used (Hartmann et. al, 2015). Participants answered 10 questions on a 7-point Likert scale (ranging from *strongly disagree* to *strongly agree*). Sample items are '*I felt like I was actually there in the virtual environment*' and '*It was if my true location had shifted into the virtual reality environment*' (see Appendix A). The mean score of all questions represents the level of experienced presence during the conversation with the future self, ranging from 10 to 70, with higher scores indicating higher presence. The SPES shows to have reliability and validity of (α =.88).

Experimental Manipulation. ***EC Condition.*** This condition was the traditional version of the Empty Chair Method. Two chairs were placed opposite each other in the room, one of which was the participant and the other was empty (see Figure 2). To make the conversation more dynamic and realistic a recording and playback device was used to record and play questions and answers. In front of the participant were placed four Tutorial Cards and 10 Question Cards. Furthermore, technical devices for this condition were the Button Box

program, the Devine M-Mic USB microphone for voice recording, the Sound Blaster AXX for audio play also the Button Box to manage the audio recording and play.

Figure 2: Setting for the EC condition.

ECVR Condition. This condition is the extension of the classic empty chair method with the transfer into the virtual world (see Figure 3). The starting point is similar to the classic version (two chairs, one of which is empty), with the difference that the participant is in the virtual world. For condition ECVR one chair for the participant to sit was used, the program *FutureU* version 21, the HD Microsoft webcam for taking a picture of the participant, the HTC VIVE Pro VR goggles, the VIVE VR hand-trackers and two VALVE Steam VR base stations.

Figure 3: Virtual Space of the program FutureU.

VR Condition. This condition, in turn, is an extension of the ECVR condition. The participant is again in virtual reality, but this time there is no empty chair opposite but an avatar that is supposed to represent the participant's future self. For this, a photo was made of the face of the participant and aged 10 years with the help of the FutureU program (see Figure 4). Other technical aids were the same as in the ECVR condition.

Figure 4: Example picture of a participant’s present self and phased morphed future self.

All conditions. In all conditions, the participant must formulate a concrete goal, which achievement they would like to celebrate in the next 10 years. Moreover, for practising the execution of the task, four Tutorial Cards have been provided, with the questions '*Future self (FS), what did you have for breakfast today?'*, '*FS, do you eat that every day?*', '*FS, where are you going on vacation this year?*', '*FS, how much will this vacation cost?*' and 10 Question Cards for the actual conversation, containing questions like '*FS, how are you feeling today?*', '*FS, What are you celebrating? Who is coming?*', '*FS, What does it feel to finally achieve this?*', '*FS, what where some difficulties and how did you overcome these?*', '*FS, what one lessons did you learn from these experiences?*' (see Appendix B). Further technical devices for all conditions were a computer with an internet connection and the audio recording program Audacity.

Procedure

All conditions. After participants had registered for the study, they received the first questionnaire via email. This questionnaire needed to be completed, preferably at least one day before the experiment. When the participant showed up for the practical part of the study in the laboratory of the University of Twente, they were welcomed and invited into the room by the researcher. The researcher then asked about the participant's welfare to make them feel comfortable. Thereafter, the researcher asked whether they could remember the goals they wanted to achieve in the future, which is an important step because one of these goals is a central point in the execution of the experiment.

After the goal was determined as well as the scenario of a celebration, the researcher briefly explained the Empty Chair method. The main features of this description were that it is kind of a 'role play', that is about stepping out of one's own present perspective into a future one, and the researcher shows that it is an active method of switching chairs, listening and speaking out loud. The researcher then explained that the participant is going to have a conversation with their future self in 10 years.

EC condition. If the participant was in the Empty Chair condition, the researcher had placed two opposing chairs next to a table. On the table, and in the middle of these two chairs, was the 'Button Box', the USB microphone and the soundbox, as well as a printed paper pile of the 10 questions and four tutorials cards. Audacity and the 'Button Box System' was started on the computer. The researcher explained to the participant the procedure of what they had to do and how the experiment works, which was as follows, the participant sat on one of the two chairs as their present self they picked up a tutorial card, pressed the red button to record the audio, asked the question to their future self (the empty chair), then pressed the red button again to stop recording, switched seats and then pressed the green button to time travel and hear the audio recording. This procedure was repeated by the participant once or twice with the tutorial cards until they understood how it works. In the execution of the experiment, the 10 question cards were used, and it was important that the participant asked these questions to their future self in the right order from one to 10.

Before the experiment started, the participant wrote on a blank paper their name and the current date on one page and their name and the date in 10 years on the other page. This paper was also placed on the table and served as a guide for the participant if they did not know during the experiment on which chair their present and their future self was sitting. After this, the researcher gave the participant an Informed Consent about the study to read, fill in and sign. This consent was also signed by the researcher and both got a copy of it. If the participant agreed and signed the consent, the experiment could start. Before the researcher left the room, they explained one more time that all data will be treated anonymously, and that the participant could interrupt or cancel the study at any time.

ECVR and VR Condition. In the Empty Chair Virtual Reality and in the Virtual Reality condition, the participant was first told that they would be using VR techniques in the experiment and that therefore the researcher will take a picture of their face. Before the researcher took the picture, they gave the Informed Consent to the participant. The participant

read the part about taking the picture and if they agreed, the researcher took a picture of their face with a webcam in the *FutureU Avatar Creation Tool* program. Therefore, the participant sat close to the camera and in front of a grey wall (the wall was used because of lighting conditions). The look for this picture must be neutral. Thereafter, the researcher gave the participant the complete Informed Consent to read, fill in and sign. Meanwhile, the researcher adjusted the avatar for the participant. When the participant was done with the Informed Consent, they sat the middle of the room, faced to a wall.

The researcher then gave the VR glasses and the VR hand trackers to the participant and the participant was asked to do some exercises like "*Please, put your hands on your thighs.*" or "*Please stretch your arms out like a bird*", thus, the researcher can adjust the avatar. Depending on the condition, the participant saw either an empty chair (ECVR) opposite them or their older-looking Future-Self (Avatar made older in VR). As with the EC condition, there was also a red and green button in the ECVR and VR, as well as 10 questions and four tutorial cards. Here, as in the EC condition, the participant first practised the exercise with the tutorial cards, pressed the red button, asked the question, pressed the red button again and then the green button for 'time travel' and to hear the recorded voice. This was repeated with the tutorial cards until it was certain that the participant understood the procedure.

All Conditions. For all three conditions, before the researcher left the room, Audacity was started, and the researcher asked the participant again about the chosen goal and the celebration scenario for the conversation. The researcher told the participant that they should answer the questions at their own pace and whenever they were done with the questions, they could leave the room at any time and the researcher was outside waiting. When the participant was done, the researcher came back into the room and briefly asked the participant what they experienced and if any problems had arisen. After a brief conversation about this, the researcher asked the participant to complete the second questionnaire. In the end, the

researcher thanked the participant for their participation and informed them that they will soon receive their €10 VVV Voucher or the 1.5 SONA credit points.

Data Analysis

The collected data from Qualtrics was analyzed with IBM SPSS Statistics 25. First, the data set was cleaned and 23 of the 91 participants were excluded. 19 participants were excluded because they did not complete the pre- and the post-questionnaire, another three did not answer the questionnaire seriously, for example by giving the exact same answer to all questions, and one participant was excluded because of disabilities that affected the experiment. Thus, in total 68 participants were included in the analyses.

First, to examine whether future self-connectedness increases after the experiment (H1), a paired sample t-tests were conducted, with pre FSC as the independent variable and post FSC as the dependent variable. Furthermore, to test whether the difference between pre and post FSC is higher in VR than in EC and ECVR (H2), a paired sample t-test was conducted for each condition. Moreover, it was investigated whether there is a correlation between the feeling of presence and future self-connection (H3). Therefore, a bivariate correlation analysis was conducted, with the variables presence and FSC. In connection with this, lastly, with an independent sample t-test, it was also tested whether there was a difference in the feeling of presence between ECVR and VR.

Results

H1: Future self-connectedness increases after the experiment

To examine whether future self-connectedness increases after the experiment, a paired sample t-test was conducted. The average FSC after the experiment (M = 4.69; SD = 1.61) was higher than the FSC before the experiment (M = 4.34; SD = 1.82). The difference was not significant (t (67) = -1.58, p = .12). Therefore, hypothesis one is rejected because there is no significant difference in future self-connection after the experiment.

Table 1

Means, Standard Deviations, Change Scores of FSC Pre and Post Experiment in all Conditions (EC, ECVR,VR and Total)

		Pre-Experiment		Post-Experiment		
Condition	N	Mean	SD	Mean	SD	Change
EC	21	4.95	1.717	5.19	1.569	0.24
ECVR	23	3.70	1.690	4.91	1.564	***1.21**
VR	24	4.42	1.909	4.04	1.546	-0.38
Total	68	4.34	1.825	4.69	1.614	0.35

* Significant at $p = .05$ level

H2: The difference between pre and post FSC is higher in VR than in EC and ECVR.

To examine whether the difference between pre and post FSC is higher in VR than in EC and ECVR., a paired sample t-test was conducted for each condition. The average post FSC in EC ($M = 5.19$; $SD = 1.56$) was higher than pre FSC ($M = 4.95$; $SD = 1.71$). The difference was not significant (t (20) = -. 67, $p = .50$). The average post FSC in ECVR ($M = 4.91$; $SD = 1.56$) was higher than pre FSC ($M = 3.70$; $SD = 1.69$). The difference was significant (t (22) = -3.14, $p = .01$). The average post FSC in VR ($M = 4.04$; $SD = 1.54$) was lower than pre FSC ($M = 4.42$; $SD = 1.90$). The difference was not significant (t (23) = -1.09, $p = .29$). Therefore, hypothesis two can be rejected, because the difference between pre and post FSC is not significantly higher in VR than in EC and ECVR.

H3: There is a correlation between presence and future self-connection.

To examine whether there is a correlation between the presence and post future self-connection, a bivariate correlation analysis was conducted. There is a significant moderate positive correlation at the $p < .05$ level between presence and post FSC ($r = .30$; $p = .042$; $N = 47$). Thus, hypothesis three can be accepted.

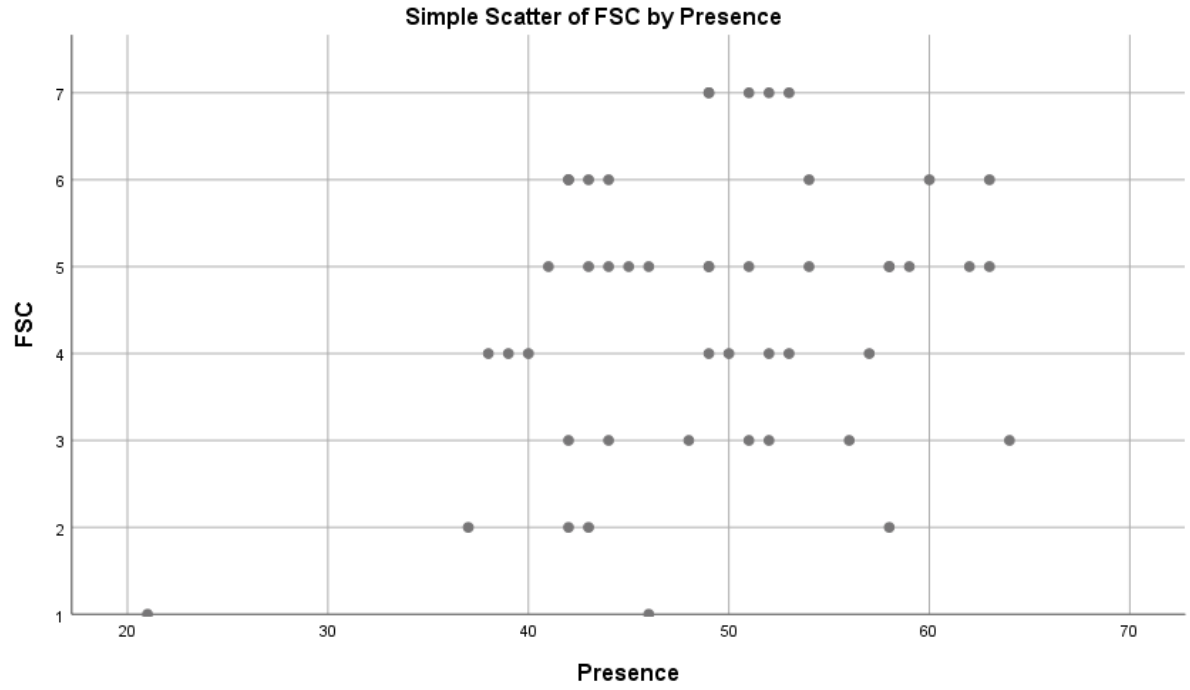

Figure 5. Simple scatter plot of presence and post FSC in ECVR and VR.

Based on that the results showed a significant correlation between presence and post FSC, with an independent sample t-test, it was also tested whether there was a difference in the feeling of presence between ECVR and VR. Results showed, the average feeling of presence in ECVR (M = 52; SD = 8.25) was higher than in VR (M = 46.25; SD = 7.53). At the $p < .05$ level the difference was significant (t (45) = -2.49, p = .02).

Discussion

Findings of the study

In this study, it was tested whether the interaction with one's future self about an achieved goal makes a difference in how connected participants felt towards their future self. This was carried out in three different conditions (EC, ECVR and VR), to find out which of the conditions contribute to a good FSC and which factors are involved. With this knowledge, one could develop a technique that can help people to feel more connected to their future self and thus to make better decisions in regard to their future.

It was previously hypothesised that in all conditions future self-connection increases after interacting with one's future self. However, the results showed that after the experiment participants did not feel more connected to their future self in all conditions. A reason for this insignificant result could be the small sample size of 68 participants. Furthermore, it was examined whether the difference between pre and post FSC is higher in VR than in EC and ECVR. Results showed that participants did not feel more connected after the experiment in VR compared to the other two conditions. But further results showed that there was a significant difference between pre and post FSC in ECVR. Participants in ECVR felt more connected to their future self after the experiment.

One reason for this could be that the quality of the avatar was too poor and thus created a feeling of disconnection in VR, meaning that the participant did not perceive the avatar as their(future)self. Or the avatar was realistic in that it was perceived as another person, but not as the participant's future self. As mentioned at the beginning, it is difficult for people to imagine themselves in the future and people tend to ascribe traits to their future selves in ways similar as they do to third persons (Urminsky, 2017; Rutchick, Slepia, Reyes, Pleskus & Hershfield, 2018; McCuey, McCormack, McElney, Alto & Feeney, 2019; Hershfield 2019). In this case, it could have happened, that the participants may have had the impression that they were talking to a third, independent person.

Lastly, it was tested whether there is a correlation between the feeling of presence ('being there'), and future self-connection after the interaction and whether there is a difference in the feeling of presence between ECVR and VR. Results of the study showed that there was a significant difference in the feeling of presence between ECVR and VR. Participants in ECVR felt more present than participants in VR. In addition, results showed that there was a significant correlation between presence and post FSC. Meaning, participants who had a higher feeling of presence also had a higher connection to their future self. Or the other way around, participants who felt less present had a lower FSC.

Limitations and strengths

One limitation of this study was the small sample size, which made it difficult to achieve significant results. Another limitation was the layout and quality of the avatar which might have led to that the participant did not perceive the avatar as their(future)self but as another person. As mentioned before, it is difficult for people to imagine themselves in the future and people tend to ascribe traits to their future selves in ways similar as they do to third persons. A positive aspect of this study was that this constellation of different methods and concepts (EC, FSC and VR) has not been examined in any other study so far. In this respect, this study could serve as a starting point for future studies examining these concepts and their relationship with each other more in detail.

Implications for future research

Future studies could benefit from a further developed technology which remains more realistic, so that the avatar, on the one hand, looks even more realistic, but also of such high quality that the participants recognize themselves in it and thus identify with it. Furthermore, more features could be added to the avatar, such as the ability to move legs or walking around in the virtual environment. So far, the functions are only that the upper body, arms, head and mouth can move, which makes the avatar less realistic. In addition, the movements of avatar and participant should be even more synchronized so that the participant has the feeling that they really are the avatar and thus also their future self and then in the best way feel the connection to it. If the resources are available, one could acquire additional equipment for future studies that also include the other senses, such as feeling or smell, in order to make the scenario even more realistic and to strengthen immersion and presence.

Conclusion

This study investigated the effect of the empty chair method on future self-connection in vivo and in virtual reality. In summary, the study has shown that the use of the VR technique helps participants feel more connected to their future self after interacting with

them compared to the classic empty chair method. However, this was only the case in the ECVR, but not in the VR condition. Participants felt less present and less connected to their future self in VR than in ECVR Part. This shows that the function of the face morphed avatar in this setting was rather counterproductive for increasing the participant's FSC.

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Appendices

Appendix A

10 items in the Post-Experiment Questionnaire about Spatial Presence Experience

Please think back on the conversation you had with your future self in virtual reality and tell us how well you agree with the following statements.

Range: Strongly disagree; Disagree; Somewhat disagree; Neither agree nor disagree; Somewhat agree; Agree; Strongly agree

1. I felt like I was actually there in the virtual environment.

2. It seemed as though I actually took part in the action.

3. It was if my true location had shifted into the virtual reality environment.

4. I felt as though I was physically present in the virtual environment.

5. The objects in the virtual environment gave me the feeling that I could do things with them.

6. I had the impression that I could be active in the virtual environment.

7. I felt like I could move around among the objects in the virtual environment.

8. It seemed to me that I could do whatever I wanted in the virtual environment.

9. Even though the body I saw might not physically look like me, I felt that the virtual body I saw when I look down towards myself is my body.

10. Even though the body I see might not physically look like me, I feel that the virtual body I see reflected in the mirror is my body

Appendix B

10 Question for the conversation with the future self

1. "Future self, how are you feeling today?"

2. "Future self, what are you celebrating? Who is coming?

3. "What does it feel like to finally achieve this?"

4. "Future self, what did you do or change in the last years that helped you achieve this?"

5. "What were some difficult experiences you overcame and how did you deal with them?"6.

6. "What one lesson did you learn from these experiences?"

7. "Future self, what is one daily habit that I should begin to achieve this goal?"

8. "Future self, what are the best parts about being you?"

9. Future Self, are you happy?

10. "Think of a question you would like to ask you future self and ask it. Start the questions with Future self..."