The match between the intervention *Rookvrij Leven combi* and its' users by reviewing qualitative adherence variables and persona's

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Abstract

Background. Smoking is still a common health problem in the Netherlands. Smoking increases the chance of lung cancer and COPD. Besides this, smoking induces high costs for society. Many options are available when it comes to treating smoking addiction, namely: medication treatment, face-to-face sessions, group based treatment, web-based treatments and alternative treatments. Success factors differ per treatment. Blended therapy is about combining face-to-face sessions and web-based treatment. In this study, the match between patients and a blended treatment (Rookvrij Leven combi) will be analyzed, the focus will be on adherence and user characteristics. Our hypothesis is that three user groups can be distinguished based on the data.

Method. Interviews were conducted by previous researchers. These interviews were analyzed in this study by creating a coding system and coding the interviews. A priori, a division of respondents was made. They were divided in groups to review the type of user they represent. This division was done separately by two researchers; the Inter-rater reliability was .90. After this, essential quotes of the respondents were analyzed.

Results. Most respondents do not seem to have lot of technological skills. Further, it can be seen in this study that a lot of respondents had health complaints and that five out of ten respondents quit smoking after or during the treatment. The face-to-face sessions are evaluated as stimulating by most, the web-based part is overall reviewed as being repetitive and boring. The suitable user group has a positive attitude towards technology, has average computer skills, is not influenced by smokers in surroundings, overall quitted smoking after treatment, and reviews more positive element of the face-to-face elements. The potential group has: different experiences with technology in general, not quit smoking, no feeling of social support, a preference of face-to-face over web-based treatment, a negative opinion about the web-based part. The non-suitable group has a negative attitude about technology, a different experience in social support, a negative experience with the web-based part and a mostly negative opinion about the face-to-face treatment.

Discussion. It can be seen that most respondents who quitted smoking received social support. The most who were adherent did quit smoking. We found a basis for two distinctive groups, or personas. So, our hypothesis about having three user groups was not confirmed.

Introduction

Smoking is still a common health problem in the Netherlands. It seems that smoking is the cause of lung cancer for 91% of the cases. For COPD patients, this percentage is 85%. According to Panhuis-Plasman et al. (2012), male smokers die on average 2.1 years earlier than male non-smokers. This tendency can also be seen for women; they die 1.3 year earlier than female non-smokers. On a global level, smoking remains an undertreated health problem which is accountable for six million deaths and its costs burden of half a trillion dollars annually (World Health Organization). Also, it is reported by Hughes, Keely and Naud (2004) that only 3-5% of the people who try to quit smoking themselves, will succeed. This number indicates the need of using new methods that prevent people to start smoking and new methods that help people quit smoking, especially focused on long term cessation. According to Fiore et al. (2008), success of smoking cessation treatments differs from the intensity of the amount of counseling in the treatment. Also, the number and length of the sessions and the different types of interventions have also influence on the success. When interventions offered a minimal of counseling, the success factor was 8.5% and when intensive counseling was offered, this rate of success was 27.6% (Christenhusz, 2006; Christenhusz et al., 2012).

Treatment of smoking addiction

One of the most effective methods of treating smoking addiction, is face-to-face counseling. Besides face-to-face counselling, pharmacotherapy, group therapy and nicotine replacement patches are being used for smoking cessation. Traditionally, treatment for smoking cessation is offered in face-to-face counseling. This individual counseling enhances the chance of being able to quit smoking (Lancaster & Stead, 2008). The disadvantage of offering a face-to-face treatment solely, is that it has a low reach (Raw & Mcneill, 1994).

Not only face-to-face sessions are being offered to patients who want to quit smoking. With the rise of the internet, web-based treatment offers an alternative effective way of treating smoking addiction. These web-based interventions are potentially very cost-effective, mainly because of their applicability on broad scale (Murray, 2008). In addition, web-based sessions do not require attendance at a clinic, this saves times for both the therapists and the patient, according to Mansson et al. (2013). Also, it is claimed that web-based interventions are more tailored to the personal characteristics of the participant, compares to face-to-face treatments. This shows the additional value of providing web based help to patient in their process to quit smoking. However, a clear disadvantage is the poor engagement of participants to the intervention, which is stated by Graham et al. (2016).

A clear advantage in face-to-face sessions, is that the therapist can customize the treatment to the wishes and needs of the patient (Mansson et al., 2013). Also, patients can be encouraged to play an active role in the treatment by addressing this topic in the face-to-face sessions (Thommas & Schlehofer, 2008). In contrast, also disadvantages can be mentioned about offering solely face-to-face session. Patients' no show to sessions, travel costs and the drift of a therapist are examples of disadvantages (Mansson et al., 2016).

E-Health

Web-based interventions are valuable opportunities to patients wanting to quit smoking. This type of offering online healthcare is called e-Health. Eysenbach (2000) gave the first comprehensive definition of e-Health: *'e-Health is an emerging field in the intersection of medical informatics, public health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a development, but also a state of mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide using information and communication technology.'* This is a very broad definition, but it shows the range of possibilities in the use of e-Health.

e-Health has already shown promising results in numerous mental health treatments (Richards & Richardson, 2015). Especially, e-Health offers the user opportunities for a long period of self-management. The fact that care is offered on distance (with or without guided care from a counsellor) makes it a good alternative to basic face-to-face treatments (Mansson, Skagius, Gervind & Anderson, 2013), and with positive outcomes to the effect of most treatments.

Another advantage of e-health interventions is that communication between patient and healthcare worker can be offered more efficiently, according to Kreps and Neuhauser (2010). Additionally, when having more contact with a healthcare worker, it clearly shows that healthcare costs can be cut, mainly because more care can be delivered in a shorter amount of time (Eysenbach, 2001). In line with this, more target groups can be reached because of the online treatments that are being offered, these are mostly groups who cannot be reached with a classic intervention (Trimbos institute & GP association, 2016).

Blended therapy

As mentioned, treatment for smoking addiction is offered in a face-to-face counseling form and in a web-based form. When combining both these treatments, it can be called blended treatment, according to Wentzel, Vaart, Bohlmeijer, and Gemert-pijnen (2016). Offering this type of combination treatment can have several advantages over offering either a face-to-face or a web-based treatment. First, the patient can receive more feedback and is not dependent on the face-to-face moments to receive support. In this way the patient will supposedly be more engaged to the treatment. Second, by having both the web-based treatment and the face-to-face treatment, the treatment can be tailored more effectively to the wishes and capabilities of the patient (Postel et al., 2013). Moreover, a patient's records can be tracked and evaluated by the counselor, in order to provide more systematic feedback about the progress in the treatment. The counselor can, for example, see the activity of a patient in the web-based part and elaborate on this in the face-to-face part. In this way, a more dynamic treatment can be given from which the patient can benefit. Another advantage is highlighted in the study of Kooistra et al. (2014). They clearly show that offering blended treatment is cost saving, in comparison to face-to-face sessions. The health care system can obviously benefit from this type of therapy.

In contrast, there are also drawbacks about the use of offering a blended treatment. Handling confidential information and the risk management that comes with this, is probably the most important one to manage. This is a risk to be handled well, according to Richards and Simpson (2015). An example of this can be the risk seen when these data will be hacked or leaked accidentally.

When it comes to following a blended treatment, several conditions have to be met, in order to be fully engage in the treatment. Besides practical conditions, social support (e.g. a partner or a beloved one) is essential for a successful treatment. Additionally, being motivated and willing to complete the intervention are all elements which are important for following a blended treatment (Kemmeren et al., 2016).

Adherence

Most studies regarding blended treatment focus more on the effectiveness of an intervention, instead of the underlying factors of treatment success. Adherence is one of those factors. According to López-Torrecillas, Rueda, López- Quirantes, Santiago and Tapioles (2014), adherence is the extent to which a user or patient complies with health- related

recommendations received from experts. In other words: to what extent will the user follow the interventions the way it is designed.

The importance of adherence in regard to smoking cessation can be seen in the adherence to the treatment as a whole, but also to specific parts of the treatment. This was mentioned in the study of Westman, Behm, Simel, and Rose (1997). Moreover, Kelders, Kok, Ossebaard and Van Gemert-Pijnen (2012) showed in their study that poor adherence is a major drawback for the total effectiveness of an intervention. This indicates that adherence is an important variable to take into account when offering a web-based intervention. However, the difficulty is that only little is know about adherence to blended treatment.

According to Melville, Casey and Kavanagh (2010), the dropout (not finishing the intervention) is relatively high in health care interventions. Especially in online treatments in which there is no face-to-face contact with a healthcare worker, the dropout rate is somewhere near 35%. It should be noted that this rate is mostly about several psychological diseases. Besides this, in the research of Ter Weijde and Croes (2015), it becomes clear that when engaging in a stop smoking intervention, only 10% of the participants who tries to quit actually succeeds of doing so.

Importantly, the question arises: what makes that a patient of an e-health intervention will be adherent? This is mostly about the characteristics of the patient who follows an online intervention. First, self-efficacy is an essential characteristic in being adherent. Omar (2015) indicates that self-efficacy in smoking related context is about the strength and belief of a person's ability to quit smoking. Self-efficacy towards quitting in the beginning of the treatment, predicts adherence to a face-to-face part of the further treatment, according to Asfar et al. (2014), and Heffner et al. (2013). Second, besides demographic variables, internet skills are essential to complete an online intervention. Patients with good internet skills are more likely to show 75% adherence than patients who do not possess these skills (Mathew, Morrow, Frierson, & Bain, 2011). In addition to this, being adherent increases when a patient has a negative attitude towards smoking and has a high level of motivation to quit at the baseline (Asfar, Al Ali, Rastam, Maziak & Ward, 2014; Heffner, Lewis & Winhusen, 2012). Also, a lower nicotine dependency at the baseline and few withdrawal symptoms after quitting are indicators for a higher level of adherence, according to Taleb, Ward, Asfarm, Bahelah and Maziak (2015).

User centered design and experience

Not only adherence, but also the total experience the user receives when following a web-based treatment is of great importance. This total experience is also referred to as user experience. This experience is mostly taken into account when designing a web-based intervention. User experience represents a general attitude towards the design in which the user plays a central role (Veryzer & Borja de Mozota, 2005; Vredenburg et al., 2002).

Three categories of factors affecting user experience can be distinguished, namely: 1. the context, 2. the user and 3. the system, this division has been made by Roto et al. (2011). First, the context which influences the user experience is a mix of one's social context (e.g. family, support from friends, colleagues et cetera); physical context (online vs. face-face sessions, being online at work or home); task context (e.g. whether the task is obligatory or optional); and technical and information context (technical guidelines, internet, export data et cetera).

Second, the user characteristics play also an essential role. Especially someone's motivation to use the treatment, their expectations at the baseline, their resources: mental and physical and their mood while participating in the treatment are most important when it comes to the experience of a user.

Third, the system-related factors which influence user experience refer to the properties the users can add or change (e.g. a personal profile, tailoring interventions, change settings et cetera), the properties of the treatment itself (e.g. intervention techniques, aesthetics, psycho-education et cetera) and the image of the treatment (e.g. how the intervention looks). All in all, Roto et al. (2011) made clear that user experience is a broad concept. It entails what "the user encounters, undergoes, or lives trough while using, interacting with, or being confronted passively with systems".

In addition to the three factor model of user experience, another model can be described in terms of user experience. The Web Acceptance Model is an expansion of the technology acceptance model (Ma & Liu, 2004; Koufaris, 2002). This Web Acceptance Model is about the perceived ease of use of a website or web-based treatment in this case. So, when a user finds the web-based part easy to use, it becomes more likely that he or she will return to it and use it again.

Personas

As described in the previous paragraph, the level of adherence is amongst other things, dependent on specific user variables and characteristics. To provide a more structured

overview of these user characteristics, designers of interventions use personas can be used. Personas are '*fictitious, specific, concrete representations of target users'* (Pruitt & Adlin, 2006: p 11).

Cooper (1999) was the first to introduce personas. These personas are nowadays often used in the design process of a product or service. Mostly, personas are archetypes of real persons and are being described as if they are real persons. According to Pruitt and Adlin (2006), personas provide concrete information to designers in the process and clarify human behavior and motivation in terms of product usage.

In this light, personas can be used to provide useful information about the motivational aspects of users. They can also represent the specific user needs when it comes to using an intervention or product. Often, a persona is described in a narrative way. This means that it starts with a description of the individual who is the persona, his or her likes and dislikes, motivation, educational background et cetera (Miaskiewicz & Kozar, 2011). This narrative has two goals: (1) to make the persona seem like a real person, and (2) to provide a vivid story concerning the needs of the persona in the context of the product being designed. Designers often start to indicate the likes and dislikes of persona, its' occupation and personal characteristics. According to Cooper (1999) and Grudin & Pruitt (2002), these personal details are bringing a persona to life. After this stage, the specific needs and personal goals of a persona in the context of the product being designed are described. This part of the narrative helps to inform the design decisions.

In practical terms, mostly, between one and seven personas is created to cover all the aspects of potential users in the design phase. Additionally, personas can also be used to evaluate user experience. Swallow, Blythe and Wright (2005) explored in their research the user experience of everyday phone use. They found out more about the user characteristics which were the base of their design for a new intervention. In this way, the original design process is reversed, in order to apply user based information to construct a new product or service.

Rookvrij leven combi

The blended care intervention "Rookvrij leven combi" will be reviewed in this study. This intervention is a combination of the Tactus Addiction Treatment in Enschede in collaboration with MST Hospital quit smoking outpatient clinic in Enschede. The treatment for smoking addiction consists of ten sessions, five online and five face-to-face with a trained

counsellor, in the MST hospital. The web-based part is available for patients trough the website www.rokendebaas.nl, this is developed by Tactus Addiction Treatment.

Research question

The purpose of this study is to evaluate the match between the users and the treatment Rookvrij leven combi. This blended way of offering treatment to clients who want to quit smoking will be reviewed by analyzing the experience of these users.

This study especially focuses on the level of adherence of the users who received both face-to-face counseling and followed the web-based treatment. Adherence is an important predictor of the amount of quitters and it has to do with the experience of the users and their level of engagement. That is why the research question in this study is: *How can the match be described between the blended therapy intervention of 'Rookvrij leven combi and its users, by analyzing adherence and user characteristics?*

Our hypothesis is that, on the basis of the data, three respondent groups can be distinguished. These groups represent the different personas, in regard to their plausible match to the treatment. The first group represents the suitable users, the second group represents the potential users, the third group the users for whom there is not a good fit with this type of blended treatment.

Method

Participants

In total, ten respondents participated in this study and completed the intervention 'RookvrijLeven Combi', from which three women and seven men. They did all speak fluent Dutch, this was necessary in order to complete the intervention.

Study design

In this study, ten interviews with participants of the intervention 'RookvrijLeven Combi' were analyzed and a new coding system was created. The interviews were delivered in a word document, later they were transferred to ATLAS TI. This study is a secondary analysis which uses the interviews for our research question. A coding system was created by the current researchers to evaluate the match between the users and the intervention in light of their level of adherence, this was the main focus of this study. After the coding list was completed, the interviews were coded.

Development of coding system

In order to analyze the data from the transcribed interviews, an evaluation was made about the previous study, namely that of Patrinopoulos Bougioukas (2017). New codes were created in order to offer a new perspective on the data. The earlier studies focused more on the description of the respondents in general. After this evaluation, our new codes were introduced. By brainstorming we especially wanted to shed a light on the underlying factors of adherence. These variables were used as basis for the new code list. After this, it was discussed whether these new codes covered the full content from the interview.

Importantly, the codes were mainly aimed at covering relevant information about the adherence of the users. After this, both researchers applied the first version of the code list on one participant, in order to see the level of agreement we had. The final version of the code list and the description of the codes is listed in the Appendix (A).

Inter-rater reliability

In order to guarantee the quality of the codes used in this study, inter-rater reliability (Cohen's Kappa) was used before applying the final code list. This coefficient reflects the level of agreement between two raters using the same coding list. It should be overcome that there is a level of randomness in applying the same codes, according to (Howitt & Cramer, 2010). The value of Kappa is mostly higher than 0 with the maximum of 1. A value of 0 means that there is no agreement, 1 means that there is a perfect level of agreement. Landis and Koch (1977) gave their insights about the required level of agreement between two raters, namely: .41-.60 means an average level, .61-.80 is a substantial level and 81-1 is almost perfect. It should be noted that amounts of codes that are being used, will influence the height of the coefficient. The Kappa will be lower, when the amounts of codes will increase (Sim & Wright, 2005). In this study, we strived for a minimum value of .70, because this is a good indicator of the inter-rater reliability.

By indicating the Kappa in this research, we used the formula of Gwet (2002). The inter-rater reliability was 0,9. This level of agreement can be called almost perfect.

Developing of Personas

A brainstorm session was organized in order to discuss our first impressions regarding different user types in the interviews. An overview was made about the plausible groups in the data. It was expected that within the data, three specific user types could be distinguished. A draft was made about the plausible personas, namely: suitable users, non suitable uses and potential suitable user. This distinction was made based on a first glance at the data, mostly taking several personality traits in mind of the interviewees. After the data was coded, the first description of the codes was compared with the outcome of the analysis. This was done, in order to answer the research question, regarding the match between the user and the intervention, taking specific user types in mind.

Data analysis

As described before, the interviews were coded and analyzed. The way the codes were given, was done by applying both the deductive and inductive method. In this research, selective coding was done. Only parts of the interviews that were relevant in the eyes of the researcher in regard to the research question were coded and reported. After this was done, it was opted to link the quotes to each other in a way that Dubois and Gadde (2002) described in their research. This is called the abductive method. In this way, the purpose was to report the relevant quotes and to review these in depth to give an overview of the experience of the respondents of the participation in 'RookvrijLeven Combi'.

Classification of respondents

Based on their personal characteristics, we made a classification about whether this particular respondent is suitable for this type of blended treatment. This classification has come together after reviewing the data. Each researcher independently made a distinction whether a respondent is suitable for the treatment, has potential to be suitable or is not suitable for 'RookvrijLeven Combi'. After this review, the results were compared and listed in Table 1 as can be seen below. This classification was based on the fact whether respondents were adherent and finished the treatment. Attitude towards the web-based part was also essential in this classification. Below, a brief description of the different types of user is given.

User types

We briefly discussed the characteristics of each group, to see whether our expectation about the division would be correct. The suitable user will be adherent to the treatment and will be committed to doing all the exercises and be present at the face-to-face conversations. Besides this, this user type had basic technology skills to complete the web-based part of the treatment. It was expected that a user in this group was determent to quit.

Potential users were the ones who were not completely adherent and had difficulty to quit smoking. The respondents in this group are not expected to be able to quit smoking.

Non suitable users were expected to be non adherent to especially the web-based treatment. They lack interest in technology, which results in the fact that they do not favor the web-based part. In addition, they had limited resources to quit smoking and therefore did not succeed in this.

Table 1 Classification type of user

Respondent	Researcher 1	Researcher 2	Explanation
1 Ra 10	Not Suitable	Not Suitable	Difficulties with web-based part. Did not finish this. Favors face-to-face.
2 Ra 12	Not Suitable	Not Suitable	Favors face-to-face. Did finish the treatment.
3 Ra 75	Suitable	Not suitable*	Adherent, finished the treatment
4 Ra 27	Not Suitable	Not Suitable	Not adherent, did not finish the treatment. Negative attitude towards face-to face and web based part.
5 Ra 509	Potential	Potential	Did not finish web-based, by lack of time. Did find it user friendly.
6 Ra 34	Potential	Potential	Has good computer skills, but not adherent.
7 Ra 25	Potential	Potential	Finished the treatment, preference for face-to-face, could manage web-based part.
8 Ra 14	Suitable	Suitable	Positive attitude towards web-based part, finished the treatment.
9 Ra 53	Suitable	Suitable	Was open minded about all parts of treatment, finished it.
10 Ra 106	Suitable	Suitable	Adherent, slight preference for face-to-face or via mobile phone.

* As can be seen in the table, only one difference can be found regarding the classification of the respondents. After comparison, we agreed that the respondent Ra 34 was indeed suitable, based on the fact that he was adherent, and therefore suitable for following the treatment.

Results

In this part of the study, the results will be presented. The quotes related to specific topics will be reviewed. First, the determinants of adherence will be introduced, which were found in the interviews. Second, variables about the treatment will be presented. Third, the overall group experience of the treatment will be provided.

Determinants of adherence

Technology use, skills, knowledge and attitude

When having adherence in mind, an essential component in this study was the attitude towards the use of technology. In this paragraph, an overview is provided about the quotes regarding the use of computers and the general attitude towards technology.

When offering a blended treatment, participants are expected to have a certain skill level when using an intervention online. In this study, the respondents were also expected to have a certain knowledge about computer use. That is why, when evaluating the data, technology skills and knowledge were also taken into account.

Skills, attitude and knowledge were all topics that were asked about during the interviews. Interestingly, most of the respondents had not much affection with the web based treatment and had little knowledge of how to use the provided technology. This resulted in an overall more negative attitude towards the web-based part of the intervention. Sometimes, this was literally expressed by the respondent, Ra 27: "*Ik vind computers leuk of niet leuk. Het gaat dat uhh, computer is een machine, blijft een machine.*" And Ra 509: "*Waardeloos*."

Skills and knowledge. There were quite some differences between the level of skills between the respondents. Ra 14 mentioned that he had relatively good computer skills: *"Nou, ik heb veel vroeger ook veel in t bedrijf met de computer gewerkt dus uh in principe kon ik me er aardig mee redden"*. In contrast, Ra 509 mentioned that he had only knowledge about the necessary elements: *"Als computergebruiker, uh, noodzakelijk, noodzakelijke dingen"*.

Attitude. When the subtopic of attitude and the use of technology was mentioned, this was mostly expressed in a negative way. Respondents who did have a positive opinion about technology use, did not mention this literally. Ra12 expressed himself clearly: *"Nee nee, ik hou ook niet zo veel van computers, dat niet…. Het gaat dat uhh, computer is een machine, blijft een machine"*.

Use of technology. Regarding the use of technology in general, most participants used technology or the computer solely for social purposes, such as Facebook or Whatsapp on their

smartphone. Ra 12: "*Jawel, jawel, jawel. Als ik uh facebook of weet ik veel noem maar op. Ik krijg een bericht van familie.*.". However, one participant cleary stated that he was working in IT, Ra 34: "*Uh, nou ja ik werk 80% van mijn werkzaamheden, gebeuren op de computer tegenwoordig. En dat varieert…"*

Some of the respondents advised to provide the online part of the treatment via an application on a smartphone. The ease of access should be higher, in order to increase the amount of use. This would lower the threshold to effectively participate in the web-based treatment. *Ra27: "Ja, dat je dan een, een rook-stop app van maakt ofzo die je kunt downloaden."* And*: Ra53 "En dat je niet steeds in moet loggen en denkt van oeh wacht even wat was mijn wachtwoord ook al weer…"* In addition to this, one respondent forgot her password a few times, which made it more difficult to log in. By creating an application, this could be made easier.

Another important aspect of technology use, is the place where someone can participate in the online environment. For example, Ra10 mentioned that his computer was upstairs. Every time he wanted to use his computer, he had to walk up the stairs. In contrast, when using the iPad, he claimed that it would not take him any effort starting it up and using it for the intervention. For him, this was difficult and it made it harder to engage in the online activities. Ra10: *"Ja, kijk, met de iPad zit je beneden met dat ding op schoot zeg maar. En op de computer zit je boven. Dus? als ik van het MST een nieuwe computer had gekregen was het veel makkelijker."*

Social support and modelling

Social support is the second important variable about the adherence of respondents. In this study, we have made a distinction between the support a respondent receives from his social surroundings and the surroundings in which someone is being exposed to smoking behavior, this is called social modelling. Regarding social support, it can be said that the respondents overall received positive support Ra 53: *"En de grote drijfveer was mijn dochter, want die kwam? 's Avonds bij mij in het ziekenhuis en die begon eigenlijk te huilen en die zei van, papa hier zijn we nou altijd bang voor geweest."* And Ra10*: "Nee, ze heeft alleen maar goed gestimuleerd vollop en verder niet. Ennuuh als je het volhoudt zei ze dan krijg je een nieuwe Ipad, een hele goeie."*

Not only positive support was found, for example, Ra27 indicated that: "*Ja die (echtgenoot) vindt dat helemaal niet leuk. Die vindt het verschrikkelijk. Moet je dat alweer doen?"*

Social modelling was about the environment the respondents found themselves, regarding their smoking behavior. Overall, most participants were in a non smoking environment. One respondent stimulates others to quit smoking: Ra10: "*Ja, ik stimuleer die andere mensen ook wel, die nog wel roken enzo. Een zoon die rookt ook nog, maarja, maar, ja pa ik weet het wel*." In contrast with the previous statement, also poor social modelling was reported by the respondents. Ra12 indicated that he had to watch his girlfriend smoking: "*Zij rook ook, ik heb gestopt alleen*." Another example of poor social modelling is the fact that the husband of Ra27 promised to smoke outside and stopped doing so after three days: "*Ik zeg.. had ik dus afgesproken om buiten te roken. En dat heeft die drie dagen gedaan ofzo haha."*

Smoking status

The smoking status shows whether a respondent quitted smoking yes or no. Five respondents indicated that they have successfully quitted smoking, after or during the treatment. Ra 27 *"En ehhh, zes maand gestopt geweest met roken." Ra 25: "Eh, dat is natuurlijk een heel moeilijke vraag voor mij, want het is mislukt…. ik rook een pakje per dag"*. Some respondents who did not succeed in achieving abstinence, did report to have reduced their number of daily cigarettes. Ra 509: *"Ik ben, ik heb wel geminderd"*. In light of respondents who achieved partial success i.e. smoking less, it can be mentioned that this could also be a strived for during the treatment. When a respondent notices that quitting completely is not achievable, then the decision can be made to adapt the opted goal, and smoke less.

Health status

Another important variable when it comes to the level of adherence, is the health of the respondents. In this part, the health of the respondents will be described and its meaning to the results.

Seven respondents were talking about their health status during the interviews. What was seen in the data is the fact that a lot of medical issues were mentioned by several respondents. Ra 27 had obesity and had to undergo several surgeries. *"En ik werd toe alleen maar dikker en dikker en dikker en ik kreeg daar niks voor. En ik zit met operaties en ik moet dus afvallen.*" She indicated that these health issues raised the complexity of completing the treatment and had to stop smoking. *"Ja, nee ik walgde niet echt zo maar ik had wel een stemmingswisseling gehad. En ik ben wel eens emotioneel geweest. omdat ik juist ehhm, ik was bezig met Modifast afvallen, shakes, noem alles maar op.*

Other diseases that were mentioned were having cardiac complaints and having lung complaints. Ra10 said that he took the decision of quitting when he got the heart attack: *"Het besluit had ik zelf al heel duidelijk genomen toen ik dat hartinfarct kreeg."*
Ra14 mentioned that a specialist advised to quit smoking: *"T is namelijk zo, ik moest stoppen van de longarts en van de vaatchirurg."*

Ra509 indicated that his decease forced him to stay in bed, so that he could not smoke: *"Kijk ik heb t al bij t begin van de ziekte, ik lag bijna een half jaar op bed. En toen heb ik een paar weken helemaal niet gerookt. En dan denk je van, gaat de goeie kant op he. Maar zo gauw als je weer een beetje kunt. Dan hupakee dan begint het weer."* This shows that having physical disabilities do not have to be a disadvantage when in comes to smoking cessation. In this case, following the web-based part of treatment could be helpful for those patients who face such difficulties. In addition, having a disease, can stimulate a respondent to stop quitting, which is also important to take into account when enabling a respondent to follow the treatment.

Medication for quitting

Two respondents got medication to help them quit smoking. Champix is the most important type of medication given to support people to quit smoking. Ra27 used Champix to support during the treatment. She also used NRT patches. Unfortunately, this did not help her in the quitting process.

Medication NRT

Respondents indicated that the patches and nicotine pill were both helpful the quitting process. Ra53: *"Nee, ik had alleen van, eh, dat heeft mij wel geholpen, de ondersteuning van de nicotine tabletjes." And ra27: "*Ja, ik heb pleisters gekregen."

Although the patches did not always have a positive effect, according to Ra34. She felt uncomfortable when using them. *"Want ik heb pleisters geprobeerd nou daar werd ik heel slecht van. Dus die heb ik op een gegeven moment, op aanraden van mijn cardioloog, ben ik daar mee gestopt."*

Intervention variables

Preference for blended vs. face to face

In the interviews, respondents were asked about their plausible preference between following the blended treatment or the face to face treatment. The respondents did in fact not

have a choice during the treatment. It was asked what their preference was at the end of the treatment.

Eight of ten respondents reported that, if they would have had the choice, they would have chosen to only follow the face-to-face part. The main reason that was told that there is more interaction ra509: *"Voor mij heeft dat (het online invullen) geen nut. Dan denk ik dat je beter face-to-face kunt zeggen. En zeggen van, he luister, het ging niet goed. En dan krijg je ook antwoord terug."* This respondent later also said that a balance of 70% face to face and 30% web based should be ideal. Being able to go deeper in the conversation and the problem was also something that was mentioned. Ra 34: *"Uh ja, voor mij persoonlijk, meer persoonlijk he, dus voor mij persoonlijk is het beter denk ik een op een omdat je dan dieper kunt ingaan op problemen die er spelen."*

Prerequisites for blended

In the interviews, respondents were also asked about which competences a user should possess in order to effectively participate in the web-based part of the treatment. By most respondents, it was mentioned that being able to work with a computer was essential to complete the online part. It was said that knowing how the internet works and have basic computer skills, someone should be able to complete the web-based part. Ra 53: *"Ja je moet met de computer om kunnen gaan, dat is gewoon, je moet weten hoe internet werkt en je moet stukje, ja, een stukje office moet je kennen om eh, om toch te beantwoorden en die vaardigheden moet je wel hebben."* Ra 14 said: *"Als je een beetje vaardig ben met de computer, is dat prima."*

Second, having a peaceful place to work the web-based part was also indicated as important. Ra 53: *"... Dus, voor mij geen probleem, maar kan best zijn dat voor iemand anders zegt van ja ik moet dat in een rustige omgeving gaan doen."* This has obviously to do with having the opportunity to focus in order to do the online exercises. This statement contradicts the earlier statement of Ra10, who said that it was a threshold of going upstairs to a computer. So different views about a private place for the web-based part of the treatment can be seen in the data.

Expectation treatment

Expectation about the start of the treatment was another important topic of conversation during the interviews. Three respondents spoke about not having specific expectations, they were open to the content of the treatment. Ra 27: *"Niks, ik heb geen verwachtingen. Ik ga hier*

gewoon neutraal heen en ik zie wel wat ervan komt." And, Ra 34: *"Uh, in eerste instantie had ik daar natuurlijk helemaal geen verwachting van want uh ik wist niet wat er op me af zou komen."*

Two respondents indicated that they experienced the treatment as supportive, because they wanted to quit smoking, Ra 53: "Ondersteuning in het stoppen met roken." Ra 14: *"Ja nouja ik denk ik moet gewoon afwachten hoe t gaat (...) Nou ja ik denk t klonk interessant. Heel interessant, ik denk misschien kom ik er zo wel af. Ik denk alleen is het altijd moeilijk dus als je er hulp bij hebt is vaak wel makkelijker."*

Although being briefed at the beginning of the treatment by email (Respondent information), interestingly, one respondent mentioned that she did not have a clear vision about what to expect in the treatment and that this had to do with the fact, that she was not given a detailed introduction about the content of the treatment. She also did not know that there was a combination with face to face and web-based elements, Ra 25: *"Eh, had ik eigenlijk niet zo'n duidelijk idee over (...) Of, hoewel ik denk toch dat het een beetje te maken had met het feit dat niet helemaal tot in detail is uitgelegd." (...) Ja dat klopt, dat ik dus onvoldoende, eh, wist of daarop voorbereid was dat er er een afwisseling was tussen een face to face gesprek en een online."* Even though she did not have a clear idea about the part of the face-to-face conversations, she did go to all of the face-to-face meetings. The web-based part was not commented on.

Parts perceived as (not) effective

In order to gain insights in the effective parts of the treatment, the interviewers touched this topic during the study. Very different elements were indicated as being effective during the treatment. One respondent mentioned a counsellor explaining that one can compare smoking cessation to pulling out a power plug out of the outlet. This example was given in order to illustrate the fact to release the tension when craving for a cigarette, Ra53: *"De voorbeelden en de waarschuwingen waar ze mee kwam. Pas op voor bepaalde situatie en eh, ja net wat ik zei met die stekkerdoos, van dat je denkt dat je er bent?"*

Being confronted with the fact that quit smoking is an intensive process and the fact that he was reminded (via mail, or text) that he should stop smoking was effective, *Ra34: "Dat je in ieder geval uh uh, ik werd daar regelmatig mee geconfronteerd doordat ik een mail kreeg of een telefoontje kreeg, en dan maak je je wel weer bewust van oja. Dus dat houd je wel wakker, laat ik het zo zeggen. Dus de contactmomenten, die helpen wel. Denk ik. En dan hoeft dat niet eens in de diepte te gaan. Dat kan ook zijn van ik bel even om de afspraak te*

bevestigen."

Also, being told what a cigarette contains in the face-to-face part, was a useful element for Ra 106: *"Ik denk het gene wat zij mij liet zien wat allemaal in die sigaret zat. Dat dat wel een iets is geweest dat waar je zoiets had van nou. Daar denk ik nog wel een keer over na. Dat is niet goed."* Obviously, knowing this basic fact helped him to gain insights in effects of smoking. Notably, different elements are mentioned as being effective. Although most effective elements are in the face-to-face sessions, this seems to differ for every respondent.

In contrast, also not effective parts were mentioned. Ra75 explained that she did not finish the web based part, due to the fact that the diary exercise was not doing its' job and made her constantly reminded of the fact that she wanted to smoke. Ra 75 also mentioned that she missed the personal touch with the counselor, when doing the exercises online. However, later in the interview she indicated that she liked the fact that the treatment was a combination of face-to-face and web-based elements: *"Nou wat ik al zei dus dat het elkaar erg aanvult en versterkt he, dat vind ik gewoon het belangrijkste."*

Experience combi-treatment

The experience regarding the combination treatment is in the data not quite elaborate. There were a lot of quotes about the online part and the face-to-face part, but almost no quotes about the combination treatment as a whole. A positive element about having a web-based part, is the fact that it saves time, compared to following face-to-face session, because one does not have to travel to the hospital for the counselor, Ra34: *"Allerbelangrijkste voordeel van die combibehandeling is natuurlijk het gemak. Niet te hoeven reizen en uh het voordeel van een combi behandeling, gaat minder tijd in zitten natuurlijk."* She also mentioned that for the overview, it was a good thing having the opportunity to manage the treatment on the computer. Ra34: *"(...) Maar het heeft ook wel klein beetje een voordeel dat je wat op de computer kunt zetten."*

Experience face-to-face

The face-to-face part of the treatment was given positive reviews when it comes to the conversations with the counselors. Five respondents indicated that the conversations were supportive and the content of the sessions were helpful. Especially creating goals were of great use according to ra 25: *"En die zijn, en die vond ik echt het belangrijkste hoor. Dus doel stellen en gewoontes doorbreken."* The personal aspect in the treatment is being valued by the respondents and the fact that the conversation slightly forces the respondent to be there. What

should not be forgotten, is that respondents do experience support, which they need in their quitting process. This emphasizes the importance of the face-to-face-sessions.

Additionally, there were also disadvantages mentioned. Three respondents had difficulty with the conversations, mostly because they thought that the conversations were too slow and too long. One respondents said that he felt like he was spoken to in a negative way, Ra34: *"Uh, nou de allereerste keer dat ik daar kwam, uhm, had ik het gevoel dat het een beetje belerend was. Dan met t vingertje zo. Ja en dat voelt natuurlijk nooit goed."* Also, the waiting time for the session with the counselor was experienced as being too long. Several respondents complained about this fact, Ra14: *"Ja, soms de wachttijd, soms moesten we lang wachten als je. Ja dan loopt t misschien zo lang uit, dan heeft dus de vorige patiënt, die kon t dus niet in twintig minuten doen, die moest er veel langer over doen, dus dat zo gebeurt dat wel is."*

Experience human computer interaction

In this type of intervention, especially when following an online treatment, respondents should have a sense of communicating with the counselor in the online surroundings. Two respondents had the feeling that they were communicating with the counselor in the online part. Mostly, because of the reminder this respondent received, Ra34: *"Nee ik had wel de indruk ook omdat je wel gebeld wordt of een mailtje krijgt, van joh dit je bent t vergeten in te vullen. Dus je weet wel dat daar iemand achter staat."* Ra53 felt that when he wrote something online, that the counselors had an active role in anticipating on the messages he sent them. *"Nee ik ga iets met een mens uitwisselen, ik had wel het idee dat er aan de andere kant ook wat mee gedaan werd."*

On the other hand, three respondents did not share this opinion and felt that they could not share their emotions with a computer. Ra12: *"En de persoon is een persoon en als jij wil jou emoties kwijt en je moest bij een persoon.. dat .. dit.. kan jouw gevoelens voelen en de machine die doet niet."* Also the fact that the computer did not reply on their message was a disadvantage for Ra14. *"En kijk ja wat is, ja computers zegt niks terug. Dat is uh dat is het enigste nadeel."* Here, it can be seen that Ra14 clearly did not have the feeling that there was interaction between himself and the counsellor in the system. It can be questioned whether he knew that the system did not have a chat function, but that there was communication with the counsellor via e-mail.

Experience online questionnaire

Before, during and after the treatment, an online questionnaire was presented to the respondents who participated in the combination treatment. Two respondents addressed this topic in the interviews. They both mentioned that the length of the questionnaire was too long and they felt that the same questions were asked over and over again, Ra 27: *"Veel dezelfde vragen. En dan wel anders geformuleerd, maar dan lijkt het net of het strikvragen zijn ofzo."*

Experience quitting success and relapse

When trying to stop smoking, respondents experienced ups and downs in the process. This topic was also one of the many in the interviews. Several main issues were addressed here. A mental breakdown was mentioned by two respondents. Certain times, when they were longing for a cigarette, they felt awful and one of the two started smoking again for a short period. But noticed directly that he did not like it anymore, Ra 53*: "Toen heb ik ook een pakje sigaretten gehaald, heb ik gerookt, en de ervaring daar van was dat het mij eigenlijk helemaal niet beviel."*

Not only a breakdown, but also stress yielded a lot of craving. One respondent did not complete several exercises of the web-based part, mainly because she had several health complaints. By trying to quit smoking, she felt worse and worse and had a lot of stress. Ra75: *"En waarbij het idee van het stoppen met roken, nou daar flipte ik helemaal bij he. Dus het maakt me heel erg stressig en ik ben dus, ik heb een bepaalde afwijking aan mij hart. En ik merkte gewoon dat de gedachte alleen al heel, ja mijn hartslag helemaal uit cadans bracht. En dat vond ik heel naar. En op een gegeven moment leidde het bij mij tot zo veel stress dat ik zei van ik ga het niet meer doen."* In addition to this feelings of guilt were experienced by Ra 25. He had difficulty not smoking, so sometimes, he started again. *"Nee, vooral, eh, zwak en schuldig dat het niet lukt, en?"*

In contrast, Ra 14 had no effort of quitting himself. He did no experience any difficulty and quitted cold turkey. *"Maar ik heb vanaf het moment dat ik dus ben geopereerd, geen enkel probleem gehad om te stoppen met roken."* Interestingly, he claimed that he did not need the treatment and he was overall quite negative about it, but did quit.

Experience web based

Overall, it can be seen that most respondents evaluate the web based part as not interesting, having no feeling of interaction and the content yielded feelings of boredom (mainly because of the repeated content). Moreover, they experience a high threshold of

logging in and using the technology. When they manage to do so, it can be seen above, that they do not really feel that there is an interaction with the counselor. This lead to the fact that only a few respondents actually managed to complete this part.

Ra53 mentioned that he did experienced the online surroundings as helpful, but also felt that there was a lot of repetition in the content. *"Nou ja dat, dat was meer op het eind zeg maar, dat ik het gevoel heb dat ik steeds hetzelfde in moest vullen met de vraagstelling, maar anders eigenlijk niet."* It should be noted here that he confused this as being part of the web-based treatment, while it was the Randomized Control Trial (RCT).

Ra10 said that the web based part was not in his area of interest, so he did not feel the need to actively work this part. Besides, he did not see the added value of the web based part. *"Ik ben daar heel eerlijk in. Eerlijk gezegd vond ik het een beetje flauwekul. Ik zat alleen met mijn gedachten bij het niet roken enzo weejwel."*

Interestingly, Ra12 said that the web based part was easy to manipulate. In this way, he could lie about the amount of cigarettes he smoked, without getting critical feedback about it. *"Ja, ja is makkelijk te liegen."* Another comment on the web based part was that the way of presenting questions towards the user, were mostly closed questions. This was not motivating for the user. [1]

Lastly, Ra509 mentioned that he felt easygoing about the use of the web based part. He felt like he could do it any other time, so he did not feel the need to do it. There was little monitoring he felt, so did not actively manage this part. *"Uh, het is een soort gemakzucht. Van als je het via de computer moet doen zegmaar. Van dat doe ik morgen wel, of dat doe ik eind van de dag wel."*

Experience of user groups

Experience of suitable users

Three respondents were categorized in this group, namely: Ra14, Ra53 and Ra106.

Technology. Overall, the level of knowledge of technology and computers can be called average and above for the suitable user. They know how to use the computer for daily life issues and have a positive attitude towards using the computer. Mostly, this group uses the computer for basic problem solving, such as using Microsoft office. They also state to have better smartphone experience, and wanting to have the possibility to work on the treatment on

[1] Some respondents confused the online questionnaire (RCT) with the exercises of the treatment

their mobile phone.

Smoking and medication. Most of this group quitted smoking at the end of the treatment. One of the four did not finish it. Two respondents used assistance in the form of medication, such as pills (Champix and Syban).

Social support and modelling. Three respondents in this group indicate that there are several acquaintances in their surroundings smoke: a family member, a colleague, friends at the café. However, they also report that this given, they do not feel affected by it. They are able to resist participating in smoking behavior and mention that seeing other people smoking, does not bother them.

Health status. The participants in this group reported several health issues. Three of the four mentioned having cardiac problems. It was also seen that they were advised to stop smoking.

Face-to-face-experience. The overall experience was positive, the content was mentioned to be effective, the information as well. One respondent was negative about the time he had to wait for his appointments.

Web-based experience. Repetition of questions in the web-based part was mentioned several times by respondents of this group. It was said that filling in questions which were quite similar felt repetitious and was uninteresting. Also, the level of support was not the same as in the face-to-face conversations. [2]

Preferences. There were mixed preferences reported regarding the combination treatment. Two mentioned their preference for a solely face-to-face treatment, whereas two indicated that blended would be a nice option, because it is easier to work in a system of a computer, than doing so in a face-to-face conversation.

Experience quitting success and relapse. There were great differences in this group regarding the quitting process. On the one hand, two respondents had no difficulty of quitting, and quitted ‘cold turkey’. The third respondent in this group said that the quitting process was difficult and yielded a lot of stress for her.

Effective parts. Also, different effective elements of the treatment were indicated: the power plug metaphor, the toxics in a cigarette and the fact that the combination treatment as a whole was supportive. It can be seen that almost all the effective parts were in the face-to-face conversations.

Summarized. It can be said that this group overall: has a positive attitude towards

[2] see footnote 1

technology, has average computer skills, is not influenced by smokers in surroundings, overall quitted smoking after treatment, has health issues, prefers the face-to-face treatment, reviews more positive element of the face-to-face elements.

Experience of potential users

Three respondents were categorized in this group, namely: Ra25, Ra34 and Ra509.

Technology. The participants in the potential user group shows different levels of computer skills. One respondent has a lot of experience in working with computer, the other two did not. These two also reported not to be a fan of the technology. They do favor using a smartphone for general use.

Smoking. All three respondents in this group did not succeed to quit smoking.

Social support. No support was felt during the treatment by their surroundings according to two respondents.

Health status and medication. It can be said that two respondents had health issues, and one of the three used patches to help her quit smoking. The other did not give comments about this topic.

Face-to-face experience. The face-to-face conversations were rated as being supportive and stimulating. All three respondents were positive about the conversations and the way in which they were supported, in regard to their needs during the treatment.

Web-based experience. The web-based part of the treatment is not evaluated positively in this group. It is said to be difficult to log in every day and fill in the progress. Besides this, one respondent got reminded to smoke constantly, that is why she did not complete this exercise. An other respondent mentioned that is was too distant in the use of it.

Preferences. Mostly, the respondents in this group favor the face-to-face conversations over the web-based part. Overall, they do not see the advantages of this part. The third respondent would like to see a 70/30 rate of face-to-face and web-based.

Experience quitting success and relapse. Overall, the respondents in this group report having ups and downs in the quitting process. Stress and the difficulty of not having a cigarette is mentioned by two of them. The other reported having feelings of guilt when she could not resist temptation of smoking a cigarette.

Effective parts. Different effective parts of the treatment are mentioned here. One respondent said it were the reminders that were helping to focus on the process. The other mentioned that the counselor's warning about the effects of smoking were helpful. The third respondent did not comment on this topic.

Summarized: It can be seen that this group overall has: different experiences with technology in general, not quit smoking, no feeling of social support, a preference of face-to-face over web-based treatment, a negative opinion about the web-based part.

Experience of the non suitable user

Four respondents were categorized in this group, namely: Ra10,Ra12, Ra27 and Ra75.

Technology. The overall opinion of the use of computers is quite negative for this group. One respondent clearly states that he does not like computer at all, for example. However, they do favor being on an iPad or mobile phone, two respondents report. The fact that an iPad can be used everywhere is also mentioned as a plus in the use of technology.

Smoking. Two respondents quit smoking in this group, the other one quitted for six months, after this, she started smoking again, the other one did not quit.

Social support. There is quite a difference between the level of support the respondents received. One mentioned that he had to face the treatment without any support. The other said that her family at home did not support her, but were complaining about her having to do another exercise. The other one was in fact supported by his wife, who have him a present. The last one did not commented on this topic.

Health status and medication. Health issues are playing an important part in this group. It was either the drive to start the treatment, or it was a limitation for the respondents to smoke.

Face-to-face experience. Different types of experiences were mentioned about the face-to-face conversations. Two respondents were mostly negative, because of the waiting time and about the length of the conversations (too long). The other two reported the conversations to be stimulating.

Web-based experience. This group did not find it interesting to follow the web-based part, they found it mostly boring. One respondent said that he was not motivated to fill this in, because he felt every time that he could do this the next day.

Preferences. Two respondents say that they would prefer to follow only the face-to-face part. The other one said she prefers a combination, but was not enthusiastic about the face-to-face part.

Experience quitting success and relapse. All four mention their personal lives and emotions to be of great influence on the treatment. They all faced happenings in their lives, that made it sometimes difficult to focus on the treatment.

Effective parts. Two respondents reported different parts that were most effective in

their process. One mentions the Champix she received. The second respondent found the conversations most helpful. The third and fourth respondent did not comment on this topic.

Summarized. This group has overall: a negative attitude about technology, a different experience in social support, a negative experience with the web-based part and a relative negative opinion about the face-to-face treatment.

Discussion

Only little is known about blended care in terms of user experience and adherence. Therefore, the purpose of this study was to evaluate the match between the *Rookvrij Leven combi* intervention and its users. This was done by a secondary analysis of the interviews with participants, purposefully selected to represent high and low adherence and being successful in quitting or not, that were conducted by previous researchers to evaluate the intervention. The research question in this study was: *How can the match be described between the blended therapy intervention of 'Rookvrij leven combi and its users, by analyzing adherence and user experience?* Our hypothesis was that three user groups can be distinguished, namely: suitable users, potential users and non-suitable users. Additionally, we expected that, based on these three groups, three personas could be distinguished who would give insights about the match between the user and this blended treatment.

Interpretation of main findings

In this paragraph, we will review the factors that can explain the user experiences to the blended smoking treatment. By the previous researchers Patrinopoulos Bougioukas (2017) and Siemer (under review, 2018) there was already made a quantitative analysis of adherence predictors, such as counsellor reports, the log data and quality of life. In this study, the focus was on the qualitative aspects of adherence. Most striking in the previous study of Patrinopoulos Bougioukas (2017), is the low level of adherence to the web-based part of the treatment that was found. Most respondents did not finish the web-based part and were not adherent. In line with this, the negative experience about this part of the treatment was quite evident and was mentioned frequently by the respondents.

From our findings, several aspects came forward that constitute this negative experience. Overall, it can be seen that most respondents evaluate the web based part as not interesting, having no feeling of interaction and the content yielded feelings of boredom

(mainly because of the repeated content). Moreover, they experience a high threshold of logging in and using the technology. When they manage to do so, it can be seen that they do not really feel that there is an interaction with the counselor. This lead to the fact that only a few respondents actually managed to complete this part. The review of the web-based part differs completely with the review of the face-to-face part. It can be questioned whether there is an actual blended treatment after all, because eight out of ten respondents favors the face-to-face sessions and most of the respondents are negative about the web-based part. Unfortunately, to the best of our knowledge, little research has been done about blended treatment in combination with smoking cessation and the review of such treatment. This makes it difficult to compare our results with existing literature.

Importantly, five respondents indicated that they quitted smoking after or during the treatment. One explanation of this achievement can be seen in the amount of social support these respondents received. According to Linstrom, Isacsson and Elmstahl (2003), social support was associated with smoking cessation and maintenance of this. Also, having a partner who provides social support can predict smoking cessation (Liechenstein, Andrews, Barckley, Akers & Severson, 2002). These studies clearly show the importance of social support in one's attempt to quit smoking. It can be seen (Table 2) that all respondents who did not quit smoking also did not receive social support. Also, respondents who received social support did quit smoking in this study. More research about the effects of social support in blended treatment should be done to claim cause and effect here.

It makes it difficult to claim that having no social support leads to not being able to quit smoking, because also adherence may play an important role here. The most respondents who were adherent did quit smoking, but it is difficult to say whether this is cause and effect.

Furthermore, respondents had the feeling they were interacting with a computer, not with the actual counsellor in the web-based part. This means that the web-based part can feel quite mechanical for its users and would not be stimulating to work through. Respondents prefer the face-to-face sessions over the web-based part, mainly because of the interaction, which they do not evaluate positively in the web-based part. This interaction is a critical point when it comes to the use of this web-based part. Obviously, for some respondents the functionalities of the web-based interaction features are not clear. One respondent seemed to had a chat in mind, when it was actually a mail function. Expectation management about the content of the web-based part would be key to overcome disappointment afterwards. In addition, the functionalities could also be expanded to offer more interaction with the counsellor. Some examples of this could be: video feedback or chat functions.

Group level interpretation

Our hypothesis was that we could classify respondents, based on their outcome (quitting) and adherence, intro three groups. After this, user experiences collected in the exit interviews after the treatment were analyzed on group level to explore whether such user types could be confirmed and to fill in the typical characteristics of each persona.

The first point to notice is that there seems to be a relative good match between the intervention and the group a priory marked as 'suitable'. Of course, this match was also expected when the division of the groups was made, but besides from our expectation, this group has clearly the best fit with the intervention. Mainly the positive attitude towards technology and their perceived social support for their quitting process can be seen as factors for this. Whether this social support is specific for blended care is difficult to say, only little research has been done about this topic. Their social supportive surroundings were seen as very important to quit smoking, that is what respondents indicated. This explains the high quitting percentage in this group, all respondents were successful to quit smoking.

Notably, in the potential group, it was seen that the overall experience was quite negative. No respondents in this group quitted smoking, were adherent and were all quite negative about the web-based parts of the treatment. It remains questionable whether a higher level of adherence in this group, would have resulted in them being suitable for this type of treatment, based on their negativity about the web-based part.

What was also indicative for the negative judgment about the treatment, was that the respondents in this group received almost no social support and experienced a lot of exposure towards smokers in their surrounding, in other words: a high social modelling. According to Cummings, Jaén, and Giovino, (1985) and Shiffman (1982), the presence of smokers in a social environment is one of the main reasons for people to relapse in their old smoking behavior. This clearly indicates the importance of one's social environment regarding the treatment. It is expected that a higher level of social modelling (high number of smokers in one's social environment) could have led to relapse in smoking behavior and, consequently, have resulted in a lower adherence level in the treatment. It must be said here, that in light of adherence, having social support could have lead to a respondent being more adherent.

Interestingly, there is not much difference between the non-suitable user group and the potential group. Both the groups tend to be overall negative about the treatment. The face-to-face sessions were positively evaluated by the potential group. This was a difference compared to the non-suitable group, they were quite negative about the face-to-face part.

Also, no respondent quitted smoking in the potential group. Two respondents in the non-suitable group quitted smoking.

Beforehand, it was expected that respondents in the potential group were more likely to quit smoking than they did eventually and would receive more social support. This cannot be seen in the data and is quite notable, because the level of adherence is in the same in the potential the and non-suitable group.

Coming back to our hypothesis, it can carefully be said that the potential and non-suitable group do not differ substantially in terms of user characteristics. The only two clear differences that were found, were that in the potential group no respondent quitted smoking, compared to one respondent in the non-suitable group and the overall review of the face-to-face sessions were more positive in de potential group. Besides this, no substantial differences were found.

Essential additions

In light of the previous mentioned results, it can be concluded that the treatment expectation of respondents is an important variable to take into account before starting the treatment. It was mentioned by several respondents that they did not know beforehand what the exact content of the treatment was. They also did not know what the amount of face-to-face or web-based part was. However, this was communicated to the respondents by a written information letter from the researchers and counsellors. Although this was done, it was to some respondents still unclear what to expect. This confusion about the yields of the treatment could have lead to a lower adherence level. It must be noted that this is only a speculation. To stress the importance of expectations, it is argued by Dimatteo, Haskard and Williams (2007) and Zolnierek and Dimatteo (2009), that clear communications from care professionals to patients about the usefulness and the plausible benefits of a treatment, might stimulate active use of an intervention. This usefulness can also be found in the technology acceptance model of Davis (1989). This model argues that the respondents' acceptance of a technological intervention (such as the web-based part) depends on the expected usefulness of the intervention. In other words: when the respondent will expect that the intervention has something useful to offer, he or she will be more likely to accept it and chances are more favorable that the intervention will be used. So, when providing a better communication about what to expect in the treatment, chances are that the respondents will be more likely to see the usefulness of the intervention and be more likely to use it.

It was also seen in the data that three respondents confused the Randomized Control Trial (the effect evaluation) as a part of the web-based treatment. This effect measure was provided four times (at baseline, during the treatment, at the end of the treatment and 3 months after completing) and was mostly in order to evaluate the total effect of the treatment. The web-based part contained also several questions which had to be answered. Most of the respondents indicated that they had to answer the same question repeatedly and thought that this was part of the web-based treatment. However, this was the RCT and not a part of the web-based treatment. The irritation of filling in this RCT resulted in a more negative review of the web-based part of the treatment. It can be questioned to what extent the respondents where biased about the treatment as a whole, also because of this irritation.

Personas

As mentioned before, the respondents were divided into three separate groups to review the match between the user and the intervention Rookvrij Leven combi. It was seen that there was a substantial difference in the group labeled as suitable and the other two groups: potential and non-suitable users. Therefore, the decision has been made to create two personas, based on this difference. A third persona would not have had a more distinctive value in this study.

Persona A is created based on the suitable user group. This persona clearly shows essential competences, such as being interested in technology and having social support ot quit smoking, that are needed to fully engage in the combi treatment and being able to quit smoking based on the treatment. This persona represents a user type that will be suitable to follow the Rookvrij Leven combi treatment.

In contrast, Persona B shows that the lack of perceived time and pressure indicates that the quitting process will be difficult to manage. Besides this, lack of technological knowledge and interest makes a blended therapy more difficult.

These personas represent the match between the offered blended treatment and the respondents who follow the treatment. For example, these personas can be used to indicate what type of user will be suitable for this type of treatment. Counsellors could make an estimation whether a respondents or patient could be suitable for the treatment, based on one of the personas. In this way, the effect of the treatment could be increased, because of the greater fit between the patient and treatment. The personas can also be used in order to make critical changes in the way the treatment is offered. When for example the social environment

seems relevant for the success in the treatment, assignments with a focus on the social environment of the respondent could be implemented.

Persona A: Henk

Henk is 58 years old and is living in Bentelo. He is a successful farmer and has two children and four grandchildren. He is married to Martine and has rheumatoid arthrosis. He was told by the doctor that smoking is not good for him. Because of his health situation, he is not able to work fulltime anymore. He smokes one and half packet of cigarettes a day. His wife wants him to quit. He likes new features of technology; he uses these to manage his farm. He would like to have an application on his mobile phone to help him to quit smoking. Although his children also smoke, he is not triggered to smoke in their presence, he smokes whenever he feels like it. He wants to be a good example to his children and takes the lead in the process of smoking cessation. Besides this, he is motivated to quit smoking, mainly because his health situation deteriorates a bit, which worries him.

Persona B: Rita

Rita is a 37-year-old mother living in Enschede. She has four children and is fulltime mother. Her husband is John, he works as a forklift truck driver in a warehouse. She did not complete her college and has difficulty to manage her family and taking care of the housekeeping. She smokes nearly two packages a day, her husband too. She indicates that smoking relieves the stress of daily life. She wants to quit smoking, because the costs are relatively high, which affects the family. Her husband tells her that they should quit, although he does not take any effort to do so. During the day, she checks her Facebook account regularly and spends much time to play games on her mobile phone with her friends. She has tried to quit smoking before, at that time it was to stressful to manage in combination with the care of her children. Also, she is afraid of weight gaining, when she quits smoking. When it comes to following a treatment for her addiction, she prefers a real counselor.

Strengths of this study

At this point, little research has been done about user experiences who participated in a blended treatment in contrast to separate face-to-face or web-based treatments. Our study focuses on the experiences of a blended treatment, which can contribute to future studies about blended treatment, mainly by setting an example of how a qualitative blended treatment study can be done.

Overall the strength of this study can be found in the originality of the research method. Using personas to show the type of user that suits best to the treatment is something that has not hardly been done in such way. By doing so, useful additional information was found about the respondents and about the intervention in this study and information from a different perspective about the match between the intervention and the user is provided.

In light of our original approach is that it makes clear that the match between the user and the intervention can be established in two ways: 1) the design can be created to a specific user group or 2) offer an existing intervention to the right target group only. These methods can be used by future designers who want to study the effects of blended treatments for example.

Limitations

Besides the innovative aspect of this study, the first limitation of this study is the fact that the use of personas to describe user experience lacks a certain amount of scientific evidence. Even though personas have been described substantially in the research in the design process, which is for example demonstrated in the research of Swallow, Blythe and Wright (2005), it is still not clear what the validity is of our approach. This way of grouping respondents in combination with the use of personas has not been done before. Therefore, the validity of this method has not been clarified. According to Chapman & Milham (2006) there is still missing a thorough examination of the personas method. This can be seen in the way in which we created the grouping of respondents: non-suitable, potential and suitable users. The division of participants in these separate groups were discussed by the researchers in this study. A priori, we came up with several characteristics of what a suitable or non-suitable user would be in this study. This was done after the interviews were coded. Each researcher made for himself the division of respondents into group. Interestingly, when we compared our division afterwards, we had a 90% overlap. Even though this division was based on the same characteristics, this was not always showing clearly in the data, but we did come up with a high percentage in overlap. Obviously, the research method was heuristic, and it would be interesting to evaluate why our agreement was relatively high.

What makes it quite hard to measure the effect of this blended treatment, is that the experiences of respondents could be biased, mainly because these are retrospective perceptions. Therefore, it is quite difficult to determine the underlying factor of success in the treatment.

It should also be noted that the small sample size in this study is a disadvantage. It is

quite challenging to draw conclusions based on only ten respondents who commented on the intervention. When having more respondents in this study, conclusions can be supported by more quotes and data.

Implications for further research

Many participants indicate their wish to engage in the web-based part on their mobile phone. They indicate that lowering the threshold to carry out the exercises would be helpful. They specifically indicate that they do not want to search for their computer and have to login every time. In May 2018, there will be launched a platform with a mobile functionality. So further researcher can be executed in order to get a better view of how to evaluate the intervention on a mobile application. This can improve the rate of adherence and the level of positive experiences.

Another interesting variable of adherence in web-based interventions is the level of social support and modelling, which was also asked about in the interviews. According to Cummings, Jaén, & Giovino (1985), ex-smokers will be triggered when there are smokers in their presence. This will have a substantial influence in their process to quit smoking. This may have influenced the level of adherence of the participants. Clearly, the underlying factor in the smoking cessation process and the level of adherence will have to be studied, in order to take the social environment of the participant into account. This can be of great use for the final outcome of the treatment or for a blended treatment in general.

The central theme in this study was the use of personas. As mentioned before, personas are mostly being used in the design process. When taking the Cehres roadmap of evaluation into account (van Gemert-Pijnen, Nijland & Ossebaard, 2011), it becomes clear that our evaluation has been done after the implementation phase. This means that using personas is in this study a summative evaluation. Almost no research has been conducted to our way of using personas in order to evaluate the match between the intervention and the users after implementation. Developing a systematic way of using personas as a summative evaluation method would be a tremendous contribution to evaluation psychological interventions in general.

The last point that has to be made is in regard to the match between the intervention and its users. The remaining question is whether to adapt the intervention up front to its potential users, or to screen in such a way that the potential users will match the treatment. When it is decided to adapt the intervention, it will be suitable to a broader scope of patients. In this way, more patients will be reached and treated for their addiction. When a more

elaborate screening will be done, the success rate will increase, because of the better fit between patient and intervention. Additionally, it can also be decided to combine the best of these two methods, such as we did in our study.

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Appendix

Appendix A. Codelist

Code name	Description	Number of code(s) given
Amount of face to face	Adherence to the face-to-face treatment (more quantitative)	6
Amount web-based	Adherence to the web-based treatment (more quantitative)	7
Education/Vocation/Profession (low)	Educational status lower than MBO, HBO, WO (School, Vocational Education and Training, Higher Education)	2
Education/Vocation/Profession (VET, HE)	Educational status MBO, HBO, WO (School, Vocational Education and Training, Higher Education)	0
Effective parts of treatment	Helping elements the patient mentioned	18
Expectation treatment start	Only about before treatment starts	22
Experience blended treatment	-	4
Experience combination treatment	-	12
Experience face-to-face treatment	-	63
Experience freedom vs. Structure	e.g. flexibility	6
Experience human computer interaction	Only if it as about the the experience of having the feeling of communicating with a computer or a human being (counsellor)	12
Experience online questionnaires	Only if is clearly about the questionnaires for the study, if it not clear if the quote refers to study or treatment use „amount of web-based treatment“ or „Experience web-based treatment"	7
Experience quitting success & relapse	Coping	44
Experience web-based treatment	E.g. opinion, expectations (not about the questionnaires for the study), if it	79

	explicitly about human computer interaction use the referring code	
Health status	E.g. diseases	24
Main income (wage/own company)	Main income, coming from salary	0
Main income (welfare) (2)	Main income, coming from welfare	0
Marital status (alone)	Data about status e.g. living alone, living with family; for data about interaction use „social modelling“ or „social support"	4
Marital status (with partner/family)	Married or with partner	6
Medication for quitting	e.g. Champix	4
Medication NRT	Nicotine Replacement Therapy (e.g. patches)	6
Medication/alcohol/drugs	Use of medication/alcohol, drugs NOT RELATED to quitting	0
Preference for blended vs f2f	Data about „does this treatment fit you?“ and „would you recommend this treatment to others?"	42
Prerequisites for blended treatment	Data about skills, personal traits, knowledge ... you need to follow the treatment	10
Sex male	Sex male	3
Sex female	Sex female	7
Smoking status	Defined as: smoker (at this point)	10
Smoking status- quitter	Defined as: non smoker (at this point)	5
Social Modelling	experience with smokers/non-smokers in your personal environment	12
Social Support	experience with support from others e.g. family, partner, friends	23
Technology (knowledge/skills/attitude)	Knowledge/skills/attitude about/towards technology	56