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Assessing integrity of MI in web-based treatments: a preliminary validation of the Motivational Interviewing Skill Code applied to the web-based treatment Look at your Drinking – an exploratory study

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Abstract

Introduction: Motivational Interviewing (MI) is known to be a well-proven behavior change technique in face-to-face treatments. The Motivational Interviewing Skill Code (MISC) is an instrument to measure the treatment integrity of counselors applying MI in face-to-face treatments. MI is also applied in web-based treatments, but an instrument to measure treatment integrity does not exist for web-based treatments. The aim of this study is to validate the MISC and to make it more feasible for asynchronous communication in web-based interventions.

Methods: In this exploratory study, the researcher is trained in applying MI and the MISC. In the preliminary research it was tested if the MISC was feasible. After it was concluded that the MISC is feasible as it is, the MISC was applied to nine cases. The summary-scores are measured from the codes, which represents the MI-consistency. It is expected that the MI-consistency measure can predict treatment outcome and therefore the correlation between these two is being measured. This analysis is being conducted in three different ways. Thereby, the cases are qualitatively analyzed on characteristics of the cases (including the goal set by clients themselves), with the goal to test the consistency of the different analysis. To gain insight in the relevant major differences for applying the MISC in web-based interventions an analysis based on the MISC-summary scores is applied.

Results: MI-consistent codes do occur much more than the MI-inconsistent codes. There is a significant strong negative correlation ($r = -.84$, $n = 9$, $p = <.01$) between the Percentage MI-Consistent Responses and the treatment outcome. This result is found to be consistent after comparing three different treatment outcomes with the MI-consistency. It was expected that MI-consistency predicts treatment outcome in a positive way, from this perspective that is not the case. Another interesting finding is that is the clients sets goal for abstinence appear to reach their target. Although the counselors are compared with counselors applying MI in face-to-face, the counselors from these nine cases score as a beginner according to the MISC-summary scores. From this perspective the MISC is not a valid instrument for predicting treatment outcome, nor is it feasible in its current state.

Conclusion: At first sight, the MISC seems to be feasible without modification for asynchronous communication via web-based treatments. But the outcomes of the MISC-summary scores compared with the treatment outcome are counter intuitive. Because the MISC does not take the differences between synchronous and asynchronous communication into account, which causes interference in the outcomes of the MISC-scores of asynchronous communication. To increase predictive validity, it is recommended to make methodological improvements to the MISC, such as creating new codes to decrease the interference and to allow that multiple questions (about the same topic) are being assigned with one code, in stead of one code per question.

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1. Introduction

In advance of the actual study, a preliminary research has been conducted to check whether the Motivational Interviewing Skill Code (MISC) needs modification for asynchronous communication/eHealth in a web-based treatment for alcohol addiction care. To make this study more understandable, an introduction is given below.

Alcohol use in the Netherlands

In 2017, 9.2% of the Dutch population of eighteen years and older drank excessively alcohol (Zantinge & Hakstege, 2018). When men drink over 21 alcoholic beverages per week, it is called excessive drinking. For women, it is called excessive drinking when they drink more than 14 alcoholic beverages per week (van Laar et al., 2017). Every year, 5.9% of all deaths worldwide is caused by harmful alcohol use (World Health Organisation, 2014). Consequently, almost all organs of the human body are affected by drinking alcohol and about 60 diseases and conditions are coherent with drinking excessively alcohol (Anderson & Baumberg, 2006). A lot of people (including women, higher-educated people, employees and elderly people) are harder to reach with face-to-face treatments against alcohol addiction (Postel, De Jong, & De Haan, 2005), therefore it was needed to develop a treatment which reaches the 'hard-to-reach' population. The combination of alcohol problems in the Netherlands and the hard to reach population led to the development of a web-based treatment for alcohol addiction: "*Alcohol de Baas"* (in English: *Look at your drinking*). *Look at your drinking* is a web-based treatment for alcohol addiction, it will be explained in more detail later in this report.

(Web-based-) treatments

A treatment, according to Belzman (2003), is: "A counselor/client intervention in which the counselor challenges the system of self-deception that upholds the drug or alcohol abusers lifestyle in a one-on-one counseling session or group of sessions". Web-based treatments for behavior change are effective (Rooke, Copeland, Norberg, Hine, & McCambridge, 2013; Noar, Grant Harrington, Van Stee, & Shemanski Aldrich, 2011; Wantland, Portillo, Holzemer, Slaughter, & McGhee, 2004). The study of Postel, De Haan, Ter Huurne, Becker and De Jong (2010) conducted research to the effectiveness of a web-based intervention for problem drinkers and therefore compared an e-therapy program group (experimental group) with a control group. Both groups received treatment based on Motivational Interviewing (MI) and Cognitive Behavior Therapy. The experimental group was also allowed to communicate with the therapist asynchronously, via the internet. The control group received "no-reply" messages once every two weeks. These "no-reply"

messages were meant to keep the participants involved and contained information about alcohol, educational material, motivational messages, and references to the website for additional information, but reaction from the participant was not possible. This research has shown that the experimental group have reduced their alcohol-use further (average decrease of 28.8 glasses of alcohol per week) than the control group did (average decrease of 3.1 glasses of alcohol per week).

The combination of eHealth and MI, as behavior change technique, seems to be an effective method to help people who are harder to reach to get control over their addiction in an effective manner and that led to the treatment *Look at your drinking*. As Postel, De Jong and De Haan (2005) stated in their study: "women, higher-educated people, employees and elderly people are harder to reach for face-to-face care". Web-based treatments have shown to fill the gap between face-to-face treatments and harder to reach people (Postel et al., 2005). They compared a control group (with treatment as usual) with an experimental group (e-therapy clients). The experimental group involved more women, more highly educated people, more often employed people, and significantly older people than the control group. This is exactly what the treatment *Look at your drinking* is focused on. Another advantage is, treatments via the internet can vary more easily in the elements included than person-delivered interventions (Ondersma et al., 2015). Gainsbury and Blaszczynski (2011) state that web-based treatments have several advantages, for example availability, convenience and accessibility, cost effectiveness, anonymity and privacy. Besides advantages, disadvantages exist. For example, particular populations experience difficulty in accessing online treatment options (Monaghan & Blaszczynski, 2009). The problems they experience depend on the individual, problem gamblers may experience financial difficulties, and elderly may experience more technical problems. These advantages and problems occur in every web-based treatment.

Look at your drinking is a web-based treatment, from Tactus addiction care, to provide an easily accessible treatment intervention for people with alcohol problems (Postel, 2011). In this treatment counseling is very important and is based on MI and Cognitive Behavior Therapy. The regular part of the treatment consists of two main parts. The first part focuses on the drinking habits of the participant and consists of two assessments and four assignments:

1. Exploring advantages and disadvantages,

2 + 3. Understanding of drinking patterns, through:

   a. Completion of a daily drinking diary and,
   b. Description of the craving moments,

4. Identifying risky drinking situations.

After the first part, advice is given by a multidisciplinary team on whether or not to continue and how to continue with the treatment. Part two consists of five central concepts (Postel, 2011):

5. Setting a drinking goal,
6. Formulating helpful and non-helpful thought,
7. Considering helpful behaviors for moments of craving,
8. Identifying the moment of the decision to drink alcohol,
9. Formulating an action plan for maintaining the new drinking behavior and for relapse prevention.

In this treatment tunneling is being used. One step has to be finished before they can move on to the next step. Especially in the second part of the intervention, the therapist helps the client to achieve commitment on changing towards the desired behavior, which is typically MI.

The total average duration of the regular part of the treatment *Look at your drinking* is three months, with two asynchronous contacts moments per week with a counselor, and additionally, self-registration on daily basis. The client has the possibility to make use of aftercare. The aftercare is called "Finger-on-the-pulse" (in Dutch:"Vinger aan de pols"), and is meant to keep in contact with the client for about six weeks. In these six weeks the counselor only responds to the client. After the treatment, the client receives two additional messages at six weeks and six months after the treatment, as follow-up. The therapist always responds within three working-days, and the messages are always personalized. A major part of the messages in *Look at your drinking* from the therapist are standardized, and are mostly informative (Roskam, 2013). In some of these standardized messages, the therapist has to fill-in some open spots to personalize and finish sentences/messages. Another option is that the standardized text gives the counselor an overview of the content that he should address. The degree of standardized text in a message differs per message. Sometimes the messages are almost completely standardized, while others need more personal attention (Roskam, 2013). In both kind of messages, standardized and personalized, MI is being applied.

Motivational Interviewing

Motivational interviewing (MI) is in essence meant to explore the ambivalence of the client about changing his habits, and is usually used in face-to-face communication. With the therapist, the client starts talking about the topic in which the client should or wants to change. The therapist should listen very carefully to generate opportunities to help the client explore his view on changing towards desired behavior. For example, to get rid of their alcohol addiction or to adopt

a new lifestyle. MI is an instrument in which client and therapist are working together to strengthen a client's motivation and commitment to change (Miller & Rollnick, 2014).

MI consists of four basic processes and is an iterative process, these are:

- Engage: The degree to which someone feels like a comfortable and an active participant in the consultation,
- Focus: clarifying the goal to which you will work together,
- Evoke: investigating an individual's reasons for changing,
- Plan: making a plan on how to change (Miller & Rollnick, 2013).

MI is applied as a way of communication in the treatment *Look at your drinking*. MI is not applied in one particular part of the treatment, but it is applied through the whole treatment and is a way to deliver the treatment to the client. The four basic processes of MI match with the common thread of the treatment *Look at your drinking*. During the treatment, the counselor tries to engage with the client by asking about their personal lives and is writing in an informal way. The first main part of the treatment is to investigate the behavior of the client and afterwards a goal is set. At the end of the treatment, an action plan is made up. In face-to-face treatments, MI is known to be a successful behavior change technique (Roskam, 2013). It is unknown if this behavior change technique is also successful in eHealth. In order to successfully apply this treatment with MI, the counselor should deliver the treatment as meant.

In the statement of Belzman (2003) stated earlier, Belzman says that the counselor challenges the system, but it has to be done in a very precise manner. Therefore, adherence is very important. Treatment integrity is described by Goense, Boendermaker, and van Yperen, (2018) as a combination of therapist adherence and therapist competence: "Therapist adherence can be described as the degree to which the therapist delivers the prescribed components of a specific intervention. Therapist competence is commonly described as the level of the therapist's technical skills and judgment". This reflects the counselors ability to implement a technique as prescribed (Kohrt, Ramaiya, Rai, Bhardwaj, & Jordans, 2015). As Mowbray, Holter, Teague and Bybee (2003) stated in their study, it is an important attribute of any, as they call it, adherence measure (i.e. integrity measure) to predict client outcome. MI-adherence has shown to be a predictor of treatment outcome in face-to-face treatment (Apodaca & Longabaugh, 2010). In eHealth, there is a lacking of instruments to measure treatment integrity.

A coding scheme is a good way to measure treatment integrity. As Yoder and Symons describe in their book (2010) "*a coding manual is a set of rules, examples, and near nonexamples that guide the observers in counting and/or indicating the duration of the behaviors of interest*". In a coding manual, or coding scheme as we call it nowadays, start and stop coding rules have to be included, as for definitions and examples of categories (Yoder & Symons, 2010). For every kind of behavior, several coding schemes have been developed. For MI, the most known coding schemes

are (1) Motivation Interviewing Skill Code (MISC; Miller, Moyers, Ernst, & Amrhein, 2008), (2) the Motivational Interviewing Treatment Integrity (MITI; Moyers, Martin, Manuel, Hendrickson, & Miller, 2005), (3) the Yale Adherence and Competence Scale (YACS; Carroll et al., 2000) and (4) the Independent Tape Rater Scale (ITRS; Ball, Martino, Corvino, Morganstern, & Carroll, 2002). The MISC suits the best in this study, because both, the MISC and the study, are focused on counselor adherence and predicting treatment outcome.

The Motivational Interviewing Skill Code (MISC) is a coding scheme developed to measure counselor adherence, evaluate the effectiveness of a training, examine the relationship between counselor and patient, and to predict treatment outcome for MI (Miller et al., 2008). Jonge, Schippers and Schaap (2005) state that the MISC can also help in training for MI. The MISC consists of three coding passes and is meant to encode MI sessions via audiotapes and videotapes (Jonge et al., 2005). The first pass is focused on the counselor, the client, and the communication between them and consists of the following global rating scales: "acceptance", "egalitarianism", "empathy", "genuineness", "warmth" and the "spirit of MI". This pass is not used in this study, because the main focus lies at the asynchronous communication between client and counselor in which such global ratings hardly can be defined. The second pass is focused on the utterances of both the counsellor and the client. The second pass consist of all the codes assigned to the client and counselor. In this part the utterances are being parsed and coded afterwards. In this research, the focus is mainly on the counselor part of the codes. The second pass is most interesting for this study, because it is focused on the content of what is being said and on how well MI is applied. The third pass is focused on the length of time that both the counsellor and the client are talking individually, and the total length of time spent talking. The third pass is also irrelevant for this study, because there is no information available about the duration of writing messages. With all the three passes included, the MISC is a validated coding scheme developed for measuring treatment integrity in MI (Miller et al., 2008), but for the purpose of this study only the second pass is used.

The coding scheme of the MISC consists of two parts, the counselor's side and the client's side. The counselor's side consists of fifteen codes (e.g. affirm and open question), from which four have sub-codes, which makes a total of nineteen possible codes. These codes can be separated into three groups, (1) prescribed codes (MI-consistent codes; e.g. QUO = asking open questions, REC = giving reflections), proscribed codes (MI-inconsistent codes; e.g. CO = confront, WA = warn), and neutral codes (nor prescribed, nor proscribed; e.g. GI = giving information, ST = structure) (Miller & Rollnick, 2002). The specific codes will be explained in the method section.

The client's side has only five codes, from which one is divided into three sub-codes, which makes a total of seven possible codes. The client codes are mainly focused on the client speaking

with change talk. If the client does not talk about changing (i.e. positive of negative change talk) it is coded neutral (Miller et al., 2008). The specific client codes can be found in appendix III.

Aim of this research

Nowadays, more and more eHealth treatments are being used, and therefore it is important to determine the integrity of the counselors. How to do this is already known in face-to-face counseling, but not in web-based treatments. The MISC is such an instrument to measure integrity, but has not been tested for eHealth. Therefore this research aims to validate the MISC for applying it to the web-based treatment: *Look at your drinking*.

This can be important to improve the counseling that Tactus offers. To measure how the counselors perform in eHealth settings, and especially in asynchronous communication, has not been investigated yet. This is the first step towards a better way of measuring the integrity of the counselors and in the end for a better way of offering help to addicted clients. This leads to the following research question:

"*How to modify the MISC into a valid instrument to measure integrity from counselors in web-based treatments?*"

To check if the MISC is a valid instrument to measure integrity from counselors in web-based treatments, first a preliminary research has to be conducted to check if the MISC is feasible in its unmodified state. It will become clear during the research whether there is a possibility to predict treatment outcome by the MISC. Another interesting topic is what differences in communication between synchronous and asynchronous communication are important for the MISC. This leads to the following questions:

1. How to make the MISC more feasible for applying it to asynchronous communication?
2. What elements of the MISC-outcomes are predictors of the treatment outcome?
3. What are the most relevant differences for applying the MISC between eHealth and face-to-face settings?

2. Method

The goal of this study is (1) to investigate how the MISC can be modified into a valid instrument to measure treatment integrity from counselors in web-based treatments, and (2) to measure the predictive validity from the MISC for treatment outcome. Prior to the study a preliminary research was conducted, because it is expected that the MISC does not need any modification for applying it to transcripts from asynchronous communication of web-based treatments.

Ethical approval

For this study, the cases have been retrieved from Tactus addiction care and are completely anonymized before the start of this study. The cases are not included in this report nor appendices to ensure privacy. The data is being carried on an encrypted USB-stick the whole time, with a password to ensure the privacy. The participants had to give informed consent at the beginning of the treatment and the ethical aspects were approved by the scientific committee of Tactus addiction care, which is responsible for ethical issues. Only a short description is included to conduct a qualitative analysis and to give the reader an impression of the cases.

Materials

To ensure the researcher did not knew the treatment outcomes of the selected cases, the cases were selected by researchers who did not primarily conduct this research. The nine selected cases include three cases with a positive treatment outcome, three cases with a neutral treatment outcome, and three cases with a negative treatment outcome. All cases that are being used in this research are from clients who fulfilled the whole regular part of the treatment from the web-based intervention *Look at your drinking*. This data includes only asynchronous interaction/ communication and treatment outcome. In some cases, the finger-on-the-pulse and follow-up at six weeks and/or six months are included as well, if the client chose to take part in these parts. One of the nine cases is used twice, the first time it has been used to investigate whether the MISC is feasible or not. Afterwards, all cases (including the already used one) are being used to measure the predictive validity. The cases consist of approximately 80 messages between the counselor and the client.

Treatment: *Look at your drinking*

These completed cases are from actual clients and are fulfilled between 2009 and 2012. *Look at your drinking* consists of two main parts. As shown in table 2.1 below, both parts have several components.

A more comprehensive description of all parts of the treatment can be obtained at appendix I. In the counselor manual, the counselor is instructed to insert standard messages if possible, to reply on the clients message, and to ask for specific things relevant for the client (Tactus Verslavingszorg, 2014). For doing this, a lot of examples are given in the manual.

After the regular treatment there is an option for the client to keep in touch with the counselor for six additional weeks, this is being called: Finger-on-the-pulse (in Dutch: Vinger aan

de pols). In this period, the counselor sends a message every week, this is being offered so the client can get used to less help from the counselor.

After the regular treatment and Finger-on-the-pulse trajectory, there is a follow-up at six weeks and at six months in which the participant can take part. In this follow-up, the participant is asked to answer questions about his thought of alcohol and his craving behavior. Based on the answer the therapist can give a final advice.

Table 2.1
The components of which both parts exist in the web-bases intervention Look at your drinking (Roskam, 2013).

Look at your drinking part 1	*Look at your drinking* part 2
1. Advantages, disadvantages	5. Setting goals
2. Keep up a registration script	6. Breaking habits
3. Analyzing situations	7. Think differently
4. Measuring and knowing	8. Act differently
	9. Decisions
	10. Make an action plan
	11. Closure

Motivational Interviewing Skill Code

The codes used for the counselor and client are different. In this study, the goal is to investigate how the MISC can be modified to a valid instrument to measure treatment integrity in web-based interventions. To measure treatment integrity, only the summary scores in which the counselor is included are relevant. Because the clients codes are not included in the calculation of these summary scores, the clients messages are not coded in this study. Thereby, the client codes are only used to measure the process of change from the client.

The counselor codes are presented in table 2.2, the client codes can be found in appendix III. To determine which MISC-summary scores are included and excluded, all the summary-scores in which the counsellor codes have influence are being included, the rest is excluded. This implies that only the Percentage Client Change Talk is excluded. The counselor codes are divided into nineteen different codes and sub-codes, and are shown in table 2.2 (Miller et al., 2008).

The MISC is being scored via several measures which are shown below, the number in front correspond with the numbers in table 2.2:

- 1. Ratio of Reflections to Questions (R/Q)
- 2. Ratio of Open Questions (%OQ)
- 3. Ratio of Complex Reflections (%CR)
- 4. MI-Consistent Responses (MICO)

- 5. MI-Inconsistent Responses (MIIN)
- 6. Percent MI-Consistent Responses (%MIC)

The summary scores also includes Percent Client Change Talk, but since this is based on the clients codes, it is excluded in this study. It is expected that the global rating scale for empathy (Miller et al., 2008) might predict treatment outcome in web-based treatments, therefore the global rating scale for empathy is included in the analysis. Although there is not a training to master scoring global rating scales, it might give interesting outcomes.

MISC-training for the researcher

The researcher coded all nine cases himself and therefore training was needed. First of all, in applying MI. Via *GGZ-Ecademy* the training for MI was completed by the researcher. After that, Jos Dobber (MISC-expert from the *Hogeschool van Amsterdam*, University of applied sciences from Amsterdam) trained the researcher in applying the MISC. This was done by standardized transcripts from face-to-face conversations between counselors and clients from the Brown University. Usually this training includes audio scripts, for this study an exception is made and the training is just completed with transcripts. In eight cases, the researcher learned to master the MISC, and the final test was also a case from the course which included only a transcript from a face-to-face conversation.

The inter-rater reliability is unknown so far, due to too little time. The outcome of the codes assigned by the researcher were compared with the standard codes and had an agreement of 90% on the counselors side of the treatment (and 70% on the clients side). According to Jos Dobber, usually an average agreement of 80% is good enough to perform a research. Because this research focusses mainly on the counselor side, it is decided to continue with the research without knowing the exact inter-rater reliability.

When the inter-rater reliability will be measured the Cohen's Kappa will be used. According to Moyers et al. (2005) and Cicchetti (1994), the scores are categorized into scales: below .40 = poor, .40 to .59 = fair, .60 to .74 = good, and .75 to 1.00 = excellent. Due to the high percentage of agreement it is expected that this will not affect the validity.

Table 2.2
A brief explanation of the codes and overview in which summary-scores they are included.

Codes	Brief explanation	Included in
Prescribed		
ADP	Counselor gives advice with permission	4, 6
AF	Counselor is appreciative or complementary to client	4, 6
EC	Counselor acknowledges/honors client autonomy, choice, personal responsibility	4, 6
QUO	Counselor asks open question allowing wide range of answers	1, 2, 4, 6
REC	Counselor gives a complex reflection, adds substantial meaning or emphasis to client words	1, 3, 4, 6
RES	Counselor gives a simple reflection, adds little to no additional meaning	1, 3, 4, 6
RF	Counselor shifts meaning or emotional valence of client words	4, 6
SU	Counselor is sympathetic, compassionate, or understanding	4, 6
Proscribed		
ADW	Counselor gives advice without permission	5, 6
CO	Counselor directly disagrees, is paternal/judging/shaming/labeling	5, 6
DI	Counselor gives direction or commands	5, 6
RCW	Counselor raises concern without permission	5, 6
WA	Counselor predicts negative consequences, warns or threatens client	5, 6
Neutral		
FA	Simple utterances that keep client speaking	-
FI	The few responses not codeable elsewhere	-
GI	Counselor provides information, feedback, or educates	-
QUC	Counselor asks closed question implying short answer	1, 2
RCP	Counselor raises concern with permission or indirect offer of option to disregard	-
ST	Counselor provides information of treatment or session structure; transition	-

Note. 1 = R/Q, 2 = %OQ, 3 = %CR, 4 = MICO, 5 = MIIN, 6 = %MIC

Preliminary research: no need for modifying the MISC

After finishing the literature study, the unmodified MISC has been applied to one of the nine cases of Tactus. This was done to check if all the MISC-codes were feasible to asynchronous communication in web-based interventions. This preliminary research was conducted by the first author. After applying the unmodified MISC, and discussing parses of codes with an expert (Jos Dobber) it was concluded that no modification was needed and that the MISC was applicable to the cases used for this study.

Description of the data

The data consists of the general part of the treatment, the finger-on-the-pulse, follow-up and standardized messages. Because not all the clients did take part in the finger-on-the-pulse trajectory, this part is excluded from this study. The same counts for the follow-up: not everybody replied in that part, although it was expected and asked them prior to the treatment. The standard messages contain the same codes and are therefore excluded, these would fade the outcome and the summary-scores and therefore it is harder to measure the influence of a particular counselor. The standardized messages are collected by comparing the messages from the counselors in all cases. Messages that were (almost) identical were labelled as standard message and are excluded in the analysis phase of this study.

The data is being described in two ways. In the first way, a brief description of the cases will be presented, this brief description is based on a several characteristics, which are shown below:

- The alcohol use per week at the intake,
- Other (mental-) problems,
- Relationship,
- Alcohol history,
- Replying to messages,
- Goal of the client for the treatment,
- Alcohol notebook,
- Exceeding the goal,
- Finger on the pulse, and
- Satisfied after treatment.

In these characteristics the post-test is not included, that is because in the messages the alcohol use after the treatment is not being discussed.

In the second part, a description of the data is presented, this data exists of the MISC scores from the cases. The amount of codes per case is included, and the same counts for the mean, standard deviation (SD), and coefficient of variation (CV). The CV is included because the differences in the amount of assigned codes is huge. The CV shows the ratio of the standard deviation to the mean. In this part also some noticeable results are being discussed. And the

correlations between the codes are analyzed. From these outcomes the differences between face-to-face settings and web-based interventions for applying the MISC are being defined.

Analyzing the case descriptions

The clients messages will be analyzed to search for other interesting outcomes, such as particular characteristics of the case descriptions and to compare with the summary-scores. These predetermined characteristics are determined by frequently recurring content from the cases and from expert opinions. An overview of the determined characteristics is shown above in the sector 'Description of the data'. Additionally, the self-reported amount of alcohol use per week before treatment is also included in the analysis, because there seems to be a difference in these quantities. Furthermore, the cases are compared to each other based on the characteristics and the treatment outcome.

Predictive validity of the MISC

With a valid coding scheme, the predictive validity can be measured. Many participants have completed the *Look at your drinking* treatment, from these participants nine cases are being analyzed in this study. As stated earlier in this report, it is an important attribute of any integrity measure to predict client outcome (Mowbray et al., 2003). In this case, the MISC-summary score can possibly predict the treatment outcome. In this analysis the cases were analyzed blindly to ensure the researcher does not know which cases has a positive, neutral or negative treatment outcome. For the quantitative analysis the MISC summary-scores are being used to predict treatment outcome. In the quantitative analysis the summary-scores are analyzed in several ways and compared with the ratios of counselors from face-to-face treatments included in the study of Moyers, Martin, Manuel, Miller, & Ernst (2010). Because the pre-test differs in the different approaches, a mix-method study is applied for this part of the study. (1) The first variable that is measured is the treatment outcome (i.e. pre-test minus post-test) based on the alcohol use in the week just before the start of the treatment (i.e. intake). (2) The second variable used to measure treatment outcome is based on the self-reported average use of alcoholic beverages per week. (3) The third variable used to measure treatment outcome is based on the post-test. Furthermore, because the self-reported alcohol use is not very valid or reliable, the post-test (i.e. the weekly alcohol use after the treatment) is also compared with the MISC-scores.

3. Results

The findings and the results are presented in this section. First, the data is presented, this includes a short description of the cases, the MISC summary scores and the treatment outcome. Second, the data is analyzed. Third, the qualitative and quantitative results are compared. Last, the observations from the researcher during the coding process are described.

Brief description of the cases

The nine cases are qualitative analyzed and is totally based on the messages, this is done by several characteristics. These characteristics are described earlier in the sector 'Description of the data'.

Case 1

Usually this client drank about eleven glasses of alcoholic drinks per week. This is just above the amount recommended by the WHO for female. This client also suffers from bulimia nervosa, thereby she automutilates herself and is perfectionistic. The client does has a boyfriend, which helps her in achieving her goals, this works constructive for the client. But, her boyfriend is about to leave her for half a year to study abroad, which scares the client. The parents from the client also have problems with handling alcohol, which the client interprets as a cause for her own drinking problems. The goal of the client was to decrease the alcohol use to a maximum of ten alcoholic beverages per week. The client did not change this goal during the treatment. By using the alcohol notebook, the client became more aware of her alcohol use. During the treatment the client exceeded this goal four times, despite this she still is satisfied with the treatment and the things she achieved with the help of the treatment. After the treatment, the client used the opportunity to follow the finger-on-the-pulse trajectory. The clients reactions were accurate, complete and she replied fast.

Case 2

Before the treatment, this client drank 100 alcoholic beverages per week. The client is known with addictions, she has an addiction to gaming and smoking (and energy drinks). Besides the addictions, this client also suffers from a fear of failure, she suffers from fatigue and she also finds it too busy when there are many people around her. She has a boyfriend which helps her a lot. For a short period she lived with his parents, who cared for the client. The goal of the client was to decrease her alcohol use to a maximum of 60 alcoholic beverages per week. Later in the treatment, the client decided to stop drinking alcohol at all as next target. Although the alcohol notebook made the client aware of her alcohol use, she exceeded her goals five times during the treatment. The client choose not to use the opportunity of the finger-on-the-pulse trajectory.

Whether she was satisfied or not is not known. This client did not reply fast and when she replied, the messages did not answer all the questions of the counselor.

Case 3

This client drank usually ten alcoholic beverages per week before the treatment, which is below the maximum alcohol use per week according to the WHO. Any other (mental-) problems are not being discussed during the treatment, the client is known with drinking problems. She drank too much for fifteen years and tried several times to stop drinking. Her husband is not very constructive, and they often have fights. During the treatment her husband also wanted to decrease on alcohol use, and he became more and more constructive, which was helpful for the client. The goal of the client was to stop drinking alcoholic beverages and she kept this goal up till the end of the treatment. She gave complete responses and did this soon after the counselor sent her a message. It is not described whether she becomes more aware of her alcohol use or not, due to the use of the alcohol notebook. During the treatment she exceeded her goals a few times, and as she progressed more, she kept achieving her target as well. After the treatment she unexpectedly drank more than ever before and therefore she is dissatisfied and does not want any help at all anymore.

Case 4

Before the treatment this client drank fifteen alcoholic beverages per week, which is more than recommended for women. She is familiar with her alcohol addiction since her puberty, any other (mental-) problems are not discussed. Sometimes she stops drinking, because she is trying to become pregnant via a clinical trajectory, these tries to become pregnant did not work out. Her husband does not like it when the client is drunk and therefore she also wants to stop. Furthermore her husband is cooperative. During the treatment the client gave complete reactions and most periods she was able to react quickly on the messages of the counselor. It is not described whether the client became more aware by using the alcohol notebook. The goal of the client was to decrease her alcohol use to a maximum of ten alcoholic beverages per week. Just two times she exceeded her goals during the treatment. At the end of the treatment, she got pregnant in a natural way and therefore her goal is to stop drinking alcohol, which is very easy to do at this point. She used the opportunity to keep contact during the finger-on-the-pulse trajectory and afterwards she is very satisfied with the treatment.

Case 5

Usually this client drank about 26 of alcoholic beverages per week, which is too much for men. It is unknown if he was already known with alcoholic problems, besides that he is a perfectionist and is declared unfit for work. Why he is declared unfit is not described. This client does not have a relationship and that makes him feel lonely. During the treatment this man met a

woman with whom he started a relationship. This client did not give complete reactions to the messages of the counselor and it took long before he answered, once it took more than a month for him to answer. Although, he does not react complete or fast, he became more aware of his alcohol usage due to the use of the alcohol notebook. The goal of this client is to decrease the amount of alcohol use to a maximum of 21 alcoholic beverages per week. The client exceeded this goal seven times during the treatment and therefore chose to use the finger-on-the-pulse opportunity. After the treatment the client was very satisfied by the things that he achieved with the help of the counselor and the treatment.

Case 6

This client drank approximately 150 alcoholic beverages per week, which is far too much according to the recommendations of the WHO. This man had a father who drank excessively as well, and according to the client, he inherited this alcohol problem from his father. Any other (mental-) problems are not described. This client has a wife who is very constructive and supportive to him. The goal of this client is to stop drinking and he did not exceed his goal during the treatment, even after losing a close relative. It is unclear whether the alcohol notebook made him more aware of his alcohol use. Because he did not exceed his goal during the treatment, he did chose not to make use of the finger-on-the-pulse trajectory, and he is very satisfied with the help from the counselor and the treatment.

Case 7

Before the start of the treatment this client drank about 70 alcoholic beverages per week, which is far more than recommended by the WHO. Since her puberty she struggled with drinking problems, besides that she also has memory problems and a sleep disorder. Due to a car accident she has been struggling with a whiplash for a long time, this caused her memory problems. Her husband is supportive and also wanted to stop drinking. Although he found it hard to stop, it helped the client to stop drinking. During the treatment she replied fast to the messages of the counselor, and her replies were very complete and clear. The goal of this client was to decrease the amount of alcoholic beverages to a maximum of ten per week. Later in the treatment she decided to change this goal to stop drinking at all. During the treatment she exceeded her goal five times and found the alcohol notebook confronting. This helps her to achieve her goal. At the end, she also decided to make use of the finger-on-the-pulse trajectory. The client was very satisfied with the things she achieved, the counselor and the treatment.

Case 8

This client drank about 25 alcoholic beverages per week before the treatment started. It is not described whether she already had problems with alcohol before. Regarding other (mental-) problems, she sometimes thinks about committing suicide. She has an eating disorder, and

suffers from a depression. Her boyfriend helps her in a constructive way, but she is afraid that he will leave her because he does not like her anymore. The client gave incomplete reactions, but did do this quickly after the counselor sent a message. It is not described whether she became more aware of her alcohol use due to the use of the alcohol notebook. During the treatment she once took a lot of medication and asked for help. Her goal is to drink less than six alcoholic beverages per week, later in the treatment she changed this goal to a maximum of eight per week. During the treatment she exceeded her goal six times and she decided to make use of the finger-on-the-pulse trajectory. It is unknown if she was satisfied with the treatment.

Case 9

Usually this client drank about 106 alcoholic beverages per week, which is far more than recommended by the WHO. He has problems with his memory. The client started drinking after he divorced from his ex-wife. During the treatment he met another woman with whom he fell in love, after a short period they decided to break-up and a few months later they got together again. This woman helped the client to achieve his goals. He did not have a good relationship with his son, which made it hard to stop drinking. Also his beloved sister became ill and had to stay in the hospital, during this tough period it was hard for him to keep his target in mind. He did not reply fast on messages, but when he did his answers were very complete. During the treatment he decided to stop with drinking alcohol at all, but he exceeded his goal four times. Because he exceeded a few times he decided to continue with the finger-on-the-pulse trajectory, and at the end he was very satisfied with the treatment.

Descriptive results of the MISC summary-scores

There are no demographic variables, neither from the client nor from the counselor. The data exists of the MISC coding scores, the MISC summary scores and the treatment outcome. The treatment outcome data includes: alcohol use before treatment, alcohol use after treatment and decrease/increase of alcohol use per week.

In the first row of table 3.1 a lot of abbreviations are given, the meaning of these abbreviations is explained in the method section in table 2.2. A more comprehensive description of the codes is presented in appendix II. In table 3.1, the amount of codes is shown per case in the general part of the treatment. As shown in the table, the codes advice with permission (ADP), confront (CO), facilitate (FA), raise concern with permission (RCP), raise concern without permission (RCW), reframe (RF), and warn (WA) are almost unused. These codes are assigned just more than once in average, especially FA and RCP which are not assigned at all. Affirm (AF), give information (GI), closed question (QUC), open question (QUO), simple reflection (RES), and structure (ST) are the most coded codes and are assigned at least 44 times in average per case.

ADW is an outlier, it is been used multiple times in case two and three, but in the other cases it is used up to five times. It is noteworthy that case two and three score higher on all the codes than the rest. The opposite counts for case five and seven score, which score lower on all codes than the other cases.

In figure 3.1 a bar chart is shown of how many times in average a code is used. It is clear that the most given code is GI. In contrast to some codes, which have not been used at all or almost have not been used, which are described above. In (figure 3.1) red are the codes that are proscribed, in green are the codes that are prescribed, and in blue the codes that are not prescribed nor proscribed. The red and green codes are included in the %MIC. It is important to note that some of these codes do not influence the %MIC, because they are not included in the formula of the %MIC and are therefore neutral. These are facilitate, filler, give information, closed question, raise concern with permission, and structure (blue bars in figure 3.1). These together are in average 49.2% of the total used codes, which is a big part.

If we take a closer look at the most used codes (AF, GI, QUC, QUO, RES, and ST), it is noticeable that these all score approximately the same on the coefficient of variation (CV; table 3.1), and are assigned relatively equally. The least used codes (ADP, CO, FA, RCP, RCW, RF, and WA) do score differently on CV.

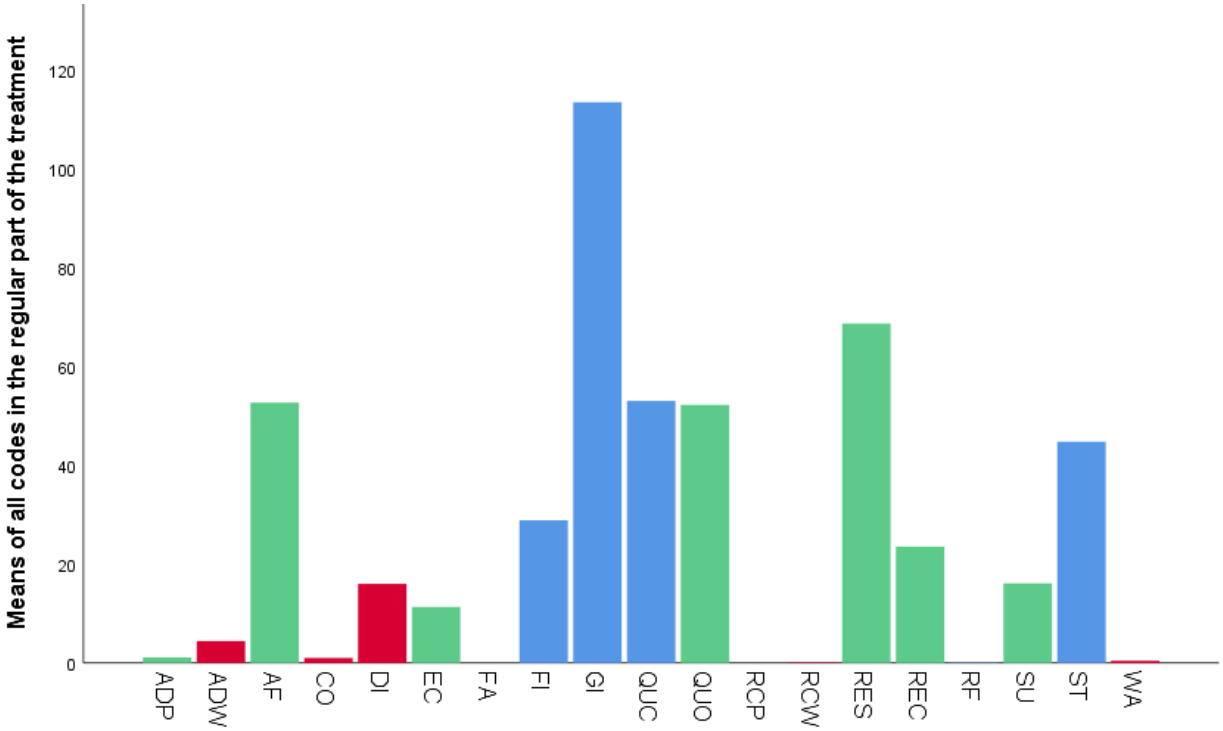

Figure 3.1. Mean frequency of the codes per case (N=9) in the regular part of the treatment. In red are the proscribed codes, in blue the neutral codes and in green the prescribed codes.

In table 3.3 the correlations between the individual codes and the MI-consistency ratio (%MIC) are shown. In this table facilitate (FA) and raise concern with permission (RCP) are

excluded, because these codes were not assigned in these nine cases. The codes advice without permission (ADW), affirm (AF), filler (FI), give information (GI), open question (QUO), and structure (ST) correlate at least with nine other codes significantly. Especially for GI, which correlates significant with twelve of the sixteen other assigned codes, as can be seen in table 3.3. Therefore, conclusion might be that in general in every *Look at your drinking* treatment a lot of information is given (GI), and that there is not a counselor that uses GI more than other counselors. The opposite counts for advice with permission (ADP), confront (CO), raise concern without permission (RCW), and reframe (RF), these codes do not correlate significantly with any other code. Noticeable is that all significant correlations are positive.

From all the assigned codes there is only one code which correlates significantly with the %MIC, that is CO. But if we take a look at table 3.1 it is shown that this codes is assigned once per case in average. Also, as expected the %MIC correlates negatively with all proscribed codes. This does not count for the prescribed codes, nor does it for the proscribed codes.

Another approach to analyze table 3.3, is to compare the correlations of all prescribed codes with all the proscribed codes. It is expected that the prescribed codes correlate positively to each other, the same counts for the proscribed codes. But, when prescribed codes are compared with proscribed codes, a negative correlation is expected. There are 91 correlations measured between the codes. From these 91 correlations, 70.33% is expected and 29.67% is unexpected. From the significant correlations the same ratio results, 71.88% of the significant correlations are intuitive and 28.13% of the significant correlations are counter intuitive.

With the results in table 3.2, it can be concluded that: three cases decreased (case number: 2, 6 and 9), three stayed equal (case number: 1, 4 and 7), and three (case number: 3, 5 and 8) increased in alcohol use per week. Noticeable is, that if a client has decreased on alcohol-use, he decreases with at least 106 alcoholic beverages per week.

Table 3.1

MISC-scores of all nine cases during the regular part of the treatment

	Codes																		
Case	ADP	ADW	AF	CO	DI	EC	FA	FI	GI	QUC	QUO	RCP	RCW	RES	REC	RF	SU	ST	WA	Total
1	1	0	44	1	16	0	0	18	95	48	40	0	0	60	20	1	14	43	0	401
2	0	19	82	1	28	26	0	69	195	97	113	0	0	111	48	0	27	60	2	878
3	5	10	69	1	19	8	0	32	139	70	90	0	0	110	30	0	33	46	0	662
4	2	0	58	1	13	16	0	28	127	74	71	0	0	57	44	0	13	44	1	549
5	0	0	37	0	10	9	0	19	77	23	33	0	0	61	12	0	4	37	0	322
6	0	4	57	1	26	21	0	20	110	46	31	0	0	59	13	0	19	52	0	459
7	1	2	32	2	9	5	0	23	82	41	18	0	0	27	15	0	17	36	0	310
8	1	0	52	0	8	10	0	23	97	35	36	0	0	69	15	0	6	37	0	389
9	0	5	43	2	15	7	0	28	99	43	38	0	1	64	15	0	12	48	1	421
Mean	1.11	4.44	52.7	1	16	11.3	0	28.9	113	53	52.2	0	.11	68.7	23.6	.11	16.1	44.8	.44	487.89
SD	1.62	6.41	15.9	.71	7.18	8.19	0	15.8	36.5	22.9	31.8	0	.33	26.5	13.9	.33	9.31	7.89	.73	168.64
CV	1.46	1.44	.30	.71	.45	.72	0	.55	.32	.43	.61	0	3	.39	.59	3	.58	.17	1.66	.35

Table 3.2

Treatment outcome, decrease based on the intake

	Case number								
	1	2	3	4	5	6	7	8	9
Pre-test	22	106	10	15	26	153	46	2	106
Post-test	22	0	28	15	43	0	46	20	0
Decrease	0	106	-18	0	-17	153	0	-18	106

Table 3.3
Correlation between different codes

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. ADP (Pre)	-	.09	.30	.00	-.06	-.25	-.04	.19	.31	.40	-.26	.39	.29	-.03	.56	-.14	-.26	.33
2. ADW (Pro)	.09	-	.80*	.19	.76*	.60	.92**	.89**	.77*	.80**	.03	.79*	.60	-.26	.77*	.81**	.68*	-.42
3. AF (Pre)	.30	.80*	-	-.16	.75*	.72*	.78*	.95**	.87**	.91**	-.23	.87**	.77*	-.20	.70*	.79*	.59	-.08
4. CO (Pro)	.00	.19	-.16	-	.15	-.15	.10	.03	.20	-.07	.53	-.26	.04	.00	.36	.22	.24	-.67*
5. DI (Pro)	-.06	.76*	.75*	.15	-	.69*	.61	.75*	.66	.59	-.05	.60	.44	.00	.69*	.95**	.48	-.66
6. EC (Pre)	-.25	.60	.72*	-.15	.69*	-	.66	.72*	.59	.54	-.20	.42	.55	-.52	.32	.73*	.62	-.25
7.FI (N)	-.04	.92**	.78*	.10	.61	.66	-	.92**	.83**	.84**	-.02	.70*	.77*	-.26	.57	.75*	.86**	-.20
8. GI (N)	.19	.89**	.95**	.03	.75*	.72*	.92**	-	.95**	.94**	-.15	.80**	.86**	-.19	.72*	.83**	.77*	-.18
9. QUC (N)	.31	.77*	.87**	.20	.66	.59	.83**	.95**	-	.92**	-.16	.66	.94**	-.08	.74*	.75*	.74*	-.15
10. QUO (Pre)	.40	.80**	.91**	-.07	.59	.54	.84**	.94**	.92**	-	-.17	.87**	.90**	-.14	.69*	.68*	.68*	.05
11. RCW (Pro)	-.26	.03	-.23	.53	-.05	-.20	-.02	-.15	-.16	-.17	-	-.07	-.23	-.13	-.17	.15	.29	-.36
12. RES (Pre)	.39	.79*	.87**	-.26	.60	.42	.70*	.80**	.66	.87**	-.07	-	.57	-.12	.64	.63	.44	.02
13. REC (Pre)	.29	.60	.77*	.04	.44	.55	.77*	.86**	.94**	.90**	-.23	.57	-	-.10	.53	.57	.76*	.12
14. RF (Pre)	-.03	-.26	-.20	.00	.00	-.52	-.26	-.19	-.08	-.14	-.13	-.12	-.10	-	-.09	-.08	-.23	-.01
15. SU (Pre)	.56	.77*	.70*	.36	.69*	.32	.57	.72*	.74*	.69*	-.17	.64	.53	-.09	-	.62	.27	-.44
16. ST (N)	-.14	.81**	.79*	.22	.95**	.73*	.75*	.83**	.75*	.68*	.15	.63	.57	-.08	.62	-	.72*	-.61
17. WA (Pro)	-.26	.68*	.59	.24	.48	.62	.86**	.77*	.74*	.68*	.29	.44	.76*	-.23	.27	.72*	-	-.20
18. %MIC	.33	-.42	-.08	-.67*	-.66	-.25	-.20	-.18	-.15	.05	-.36	.02	.12	-.01	-.44	-.61	-.20	-

Note. FA and RCP are excluded because these codes were not assigned. Pre = prescribed, Pro = proscribed, N = neutral.
* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Comprehensive analysis of the cases

Out of the messages sent between the counselor and the client, some interesting findings came up. The pre-test, which is the amount of alcoholic beverages in the week just before the start of the treatment (based on the alcohol-notebook), is in some cases different than what the clients usually drink per week (self-reported). This is confirmed and shown in table 3.4, and is based on a self-reported answer from the intake. The last given fact is taken into account in the qualitative analysis.

Table 3.4
The amount of alcohol use per week in the week before treatment (intake) and the self-reported average alcohol use per week

	1	2	3	4	5	6	7	8	9
Intake	22	106	10	15	26	153	46	2	106
Self-reported	11	100	10	15	26	150	70	25	106

Five out of the nine clients did decrease the use of alcohol on weekly basis, as showed in table 3.5. From these five clients who stopped, four had the goal to stop, where the other one had the goal to decrease on alcohol use. From the others (the clients who did not decrease on alcohol use per week), three out of the four had the goal to decrease, and just one had the goal to stop. It seems that the goal, especially if the goal is abstinence, that is been set by the clients self, influences the treatment outcome in a positive way.

In five cases, the client had some kind of relation with alcohol problems in the past or in their close relatives. For example, one of their parents was addicted to alcohol, a client had other addictions as well or was already addicted since a young age. From these five cases, three did decrease on alcohol use, one increased, and the last one stayed equal. From the other four cases, two clients did not have any problems related to alcohol. One of them increased and one of them decreased on alcohol use per week. From the last two clients it is not discussed in the text, whether they have any other problems or not. One of the last discussed cases increased and one decreased on alcohol use per week. From this perspective, there seems to be no correlation between alcohol related problems (personal or close relatives) and treatment outcome.

In seven cases the client has other (mental-) problems, such as bulimia nervosa, being a perfectionistic, memory problems or sleeping disorder. In the other two cases this is not being discussed, and thus this is unknown. There seems to be no correlation between other mental problems than alcohol related problems and treatment outcome.

Most clients were satisfied by the treatment. Six clients wrote that they were satisfied, one was dissatisfied, and the remaining two did not wrote about satisfaction.

Table 3.5
Overview of the characteristics, the treatment outcome and the MISC summary-scores.

	Case								
Characteristic	1	2	3	4	5	6	7	8	9
Other (mental-) problems	Yes, 3	Yes, 1	Unknown	Unknown	Yes, 1	No	Yes, 2	Yes, 3	Yes, 1
Relationship	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Known with alcohol problems	Yes	Yes	No	Yes	Unknown	Yes	Yes	Unknown	No
Responses:									
- Soon	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No
- Complete	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Goal: stop or decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Stop	Decrease	Decrease	Stop
Change goal	No	Yes, new goal: stop	Yes, new goal: stop	No	No	No	Yes, new goal: stop	Yes, decrease*	No
Awareness by alcohol notebook	Yes	Yes	No	No	Yes	No	Yes	Unknown	Unknown
Exceeded the goal … times.	3	4	4	6	4	0	5	5	4
Finger-on-the-pulse trajectory	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes
Satisfied after treatment	Yes	Unknown	No	Yes	Yes	Yes	Yes	Unknown	Yes
Treatment outcome	Amount of alcoholic beverages per week								
Pre-test	22	106	10	15	26	153	46	2	106
Self-reported	11	100	10	15	26	150	70	25	106
Post-test	22	0	28	15	43	0	46	20	0
Decrease 1	0	106	-18	0	-17	153	0	-18	106
Decrease 2	-11	100	-18	0	-17	150	70	5	106
Summary-scores									
R/Q	,98	,80	,94	,81	1,28	1,02	,88	1,21	1,00
%OQ	,48	,54	,57	,47	,60	,41	,36	,52	,47
%CR	,20	,27	,19	,40	,14	,16	,26	,15	,18
%MIC	,84	,86	,88	,89	,86	,83	,84	,88	,85

Note. Decrease 1 = decrease of alcoholic beverages per week based on the intake, Decrease 2 = decrease of alcoholic beverages per week based on the self-reported amount of alcoholic beverages per week.
*The client of case 8 changed her goal to a higher amount of alcoholic beverages per week, that is less decrease.

There was also a big difference in the way clients responded and how fast they responded. Six out of the nine clients responded usually before the counselor was about to send the next message, the three others did not. Thereby, the messages of the clients were not complete. The messages are not complete if not all the questions of the counselor were answered. Usually, five clients did give complete answers, where the other four did not. They did not wrote about half of the topics the counselor wrote/asked about. If we compare this with the treatment outcome, there seems to be no correlation.

There is only one client who did not exceeded his treatment goal, the other eight exceeded their treatment goals multiple times. The one who did not exceeded his goal, did stop with drinking alcohol. From this fact no conclusions can be drawn, because there was only one client who did not exceeded his goal.

Analyzing the MISC summary-scores

In table 3.6 the summary scores of the MISC are presented. The summary-scores from this study are compared with the summary-scores from face-to-face treatments from the study from Moyers et al. (2010). In the second row of table 3.6 the Ratio of Reflections to Questions (R/Q) is shown, which shows that in most of the cases the counseling scores below 1.0. According to Moyers et al. (2010) this ratio is usually scored by beginning counsellors. They state also that if a counselor scores 2.0, he is competent. The same counts for the Percent Complex Reflections (%CR) and Percent MI-Consistent Responses (%MIC), according to Moyers et al. (2010) all counselors from this study are beginners. The %CR scores the lowest of all summary-scores, beginners should score at between .40 and .50, but only the counselor of case four reaches that target. If a counselor scores at least .50 he is competent according to Moyers et al. (2010). For Percent Open Questions (%OQ), beginners should score between .50 and .70, above .70 is called competent. The counselors of five cases score below the target of .50, the others score just above .50, and are therefore, according to Moyers et al., beginners. For the %MIC six counselors score beginner. The %MIC can vary between 0 and 2. For the %MIC counts that beginning counselors should score between .90 and 1.00. Above 1.00 is being called competent. The other three counselors score beneath .90.

The standard deviation in R/Q is .21, this is high according to the other summary scores. The others score all under .10. There is a small standard deviation in %MIC, which indicates that the quality of the counsellors applying MI is almost equal.

When looking at the previous results and we compare these with the nine case descriptions, that does not give us any new insights except for the way of setting a goal. Because, the clients who set as goal to stop drinking alcohol reached their target, except for one client who

was dissatisfied with the treatment. The other clients set decrease as their goal and did not reach their targets.

Table 3.6
MISC-summary scores of all cases

MISC-Scores	Case number								
	1	2	3	4	5	6	7	8	9
R/Q	,98	,80	,94	,81	1,28	1,02	,88	1,21	1,00
%OQ	,48	,54	,57	,47	,60	,41	,36	,52	,47
%CR	,20	,27	,19	,40	,14	,16	,26	,15	,18
%MIC	,84	,86	,88	,89	,86	,83	,84	,88	,85

Note. R/Q = Ratio of Reflections to Questions; %OQ = Percent open questions; %CR = Percent Complex Reflections; MICO = MI-Consistent Responses; MIIN = MI-Inconsistent Responses; %MIC = Percent MI-Consistent Responses. A more comprehensive explanation is given in the method section.

Predictive validity

The goal of this study was to predict the treatment outcome by the MISC-scores. As shown in table 3.7, there is a significant negative correlation ($p < 0.01$) between the decrease of alcohol use per week and %MIC. This means that the higher %MIC is, the lower the decrease is. This is also shown in figure 3.2. As stated earlier, the %MIC represents the percentage of prescribed actions for MI and therefore should be high, which is counter intuitive. Due to the fact that the intake differs from the self-reported amount of alcohol use per week, the same analysis is done with the decrease based on self-reported alcohol use per week (table 3.8). The correlation between decrease based on self-reported alcohol use per week before treatment are almost the same and confirm each other.

Table 3.7
Correlation between MISC-scores and treatment outcome based on the alcohol use in the week before treatment

Measure	1
1. Decrease	-
2. R/Q	-.20
3. %OQ	-.23
4. %CR	-.18
5. %MIC	-,84**

** Correlation is significant at the 0.01 level (2-tailed).

Table 3.8
Correlation between MISC-scores and treatment outcome based on self-reported average alcohol use per week

Measure	1
1. Self-reported decrease	-
2. R/Q	-.19
3. %OQ	-.32
4. %CR	-.17
5. %MIC	-,82**

** Correlation is significant at the 0.01 level (2-tailed).

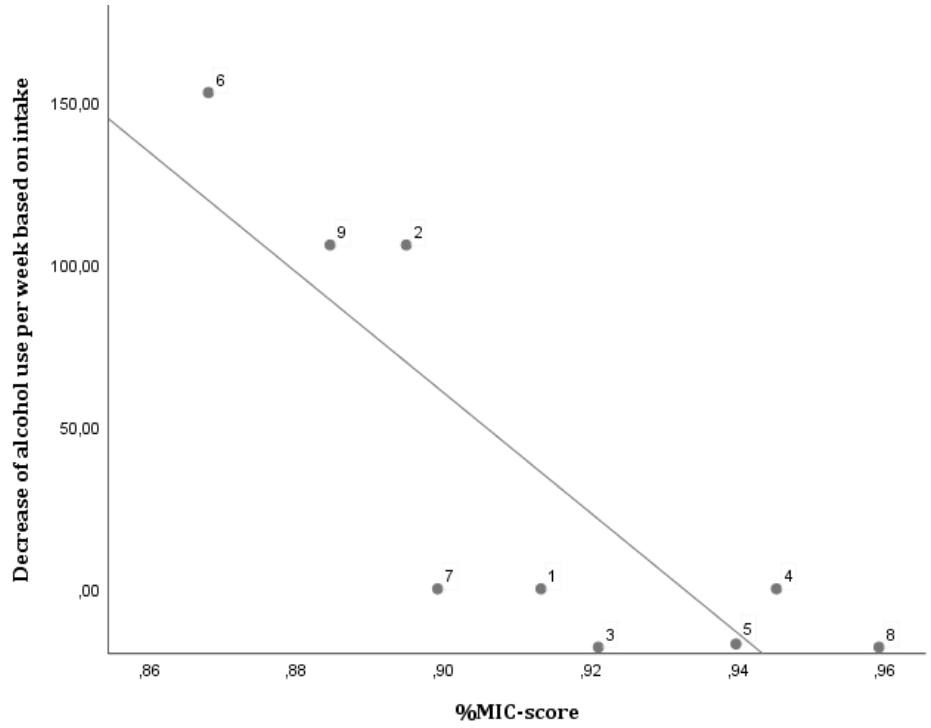

Figure 3.2. Correlation between %MIC-score and the decrease of alcohol use per week.

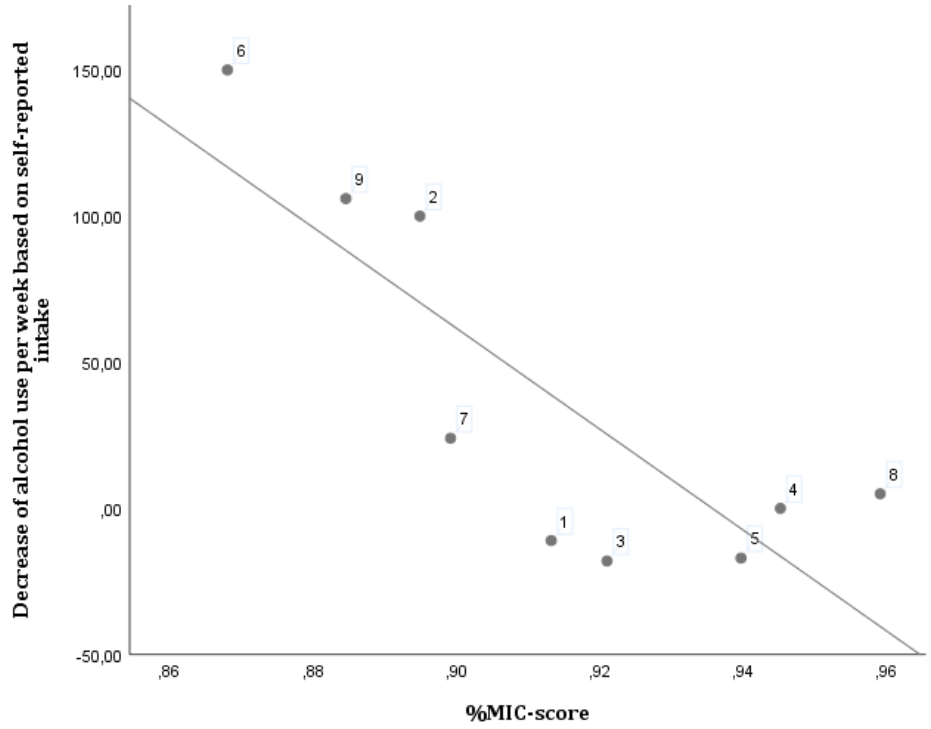

Figure 3.3. Correlation between %MIC-score and the decrease based on the self-reported intake.

From figure 3.2 it is noticeable that case 2, 6 and 9 are separated from the rest. These cases did decrease far more on weekly alcohol use than the rest did and their counselors applied MI worse than the other counselors. No further patterns could be discovered in figure 3.2 and 3.3. Due to the fact that there are differences in the pre-test and the self-reported average intake, the results from the quantitative part of the analysis is influenced in disadvantage of the study.

Therefore, we also choose to use the post-test (i.e. weekly alcohol use after the treatment) as 'treatment outcome', to compare the results. Table 3.7 and figure 3.2 are shown below again (table 3.9 and figure 3.4), but with the post-test instead of the decrease on alcohol use per week.

Table 3.9
Correlation between MISC-scores and post-test

Measure	1
1. Post-test	-
2. R/Q	0.21
3. %OQ	-0.07
4. %CR	0.09
5. %MIC	0.47

As shown in the table 3.9, the correlation between the post-test and the %MIC is positive, but not significant (p = .20). That means that the less a client drinks after the treatment, the worse MI is applied by the counselor. This is also counter intuitive, but consistent with the measurements from table 3.7 and 3.8.

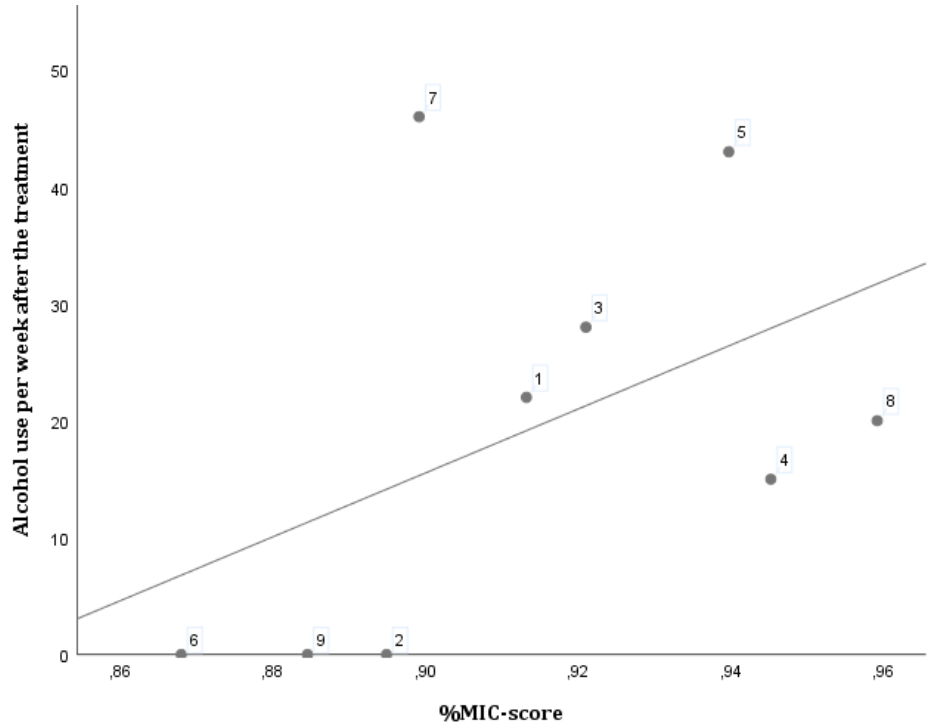

Figure 3.4. Correlation between %MIC-score and the post-test (i.e. amount of alcohol-use per week after the treatment).

As shown in table 3.9 and figure 3.4 there is a positive correlation, which is not significant. Also shown in this figure is that there is an outlier. If that outlier (number 7 in figure 3.4) is being excluded, there is almost a significant correlation between %MIC and the post-test (r = .71, p = .051, n = 8).

Although, most counselors score below competent on all summary-scores, most of the clients are satisfied by the treatment. This finding is also in the expense of the validity of the MISC.

Other findings

The unmodified MISC has been applied to the nine cases. In this process some interesting findings were found.

Global rating scale for empathy

During the coding process, the global rating scale for empathy was included in the analysis. Thereby, all counselors replied almost equally supportive, and therefore it is hard to differentiate on empathy score. Giving emphatic responses is prescribed in MI. The counselors tried to work on the relation between the counselor and the client, by asking about their personal lives, which most of the clients liked. The (what seems to be) empathic responses of the counselors might have caused the overall satisfaction of the clients.

Answering the messages

Another interesting finding is that the counselors were all very complete in their responses towards the client. If a client asked something, the counselor always gave response. Furthermore, when the client wrote something about a topic (whether it was relevant for the treatment or not), the counselor responded to it. Although not all the clients gave a complete reactions on all the questions and tasks given by the counselor, all the counselors tried to get answers on their questions, by repeating the question or task. Unfortunately, this did not always work out.

Finger on the pulse and follow-up

At the end of the treatment, the client has the choice to keep in contact for aftercare or to stop with the program. Because some clients choose not to take part in the aftercare, there was a difference in the amount of assigned codes. Even in the finger-on-the-pulse trajectory, some clients did not respond on the messages of the counselor. This is counter intuitive, because the clients chose to take part in the finger-on-the-pulse trajectory to have support from the counselor. Here, again, counselors sometimes had to ask multiple times to get an answer to their questions.

Six weeks after the treatment and half a year after the treatment, the client received a message with the question to fill in a questionnaire about the treatment. Of course, the content of these messages were not very relevant for the treatment and were therefore actually unnecessary to code. The messages only contained a link, and the question if the client wanted to fill out the form.

Difference in amount of codes

Another interesting fact is the difference in the amount of codes per case, shown in table 3.1. The difference between the case with the most codes (i.e. case 2 with 878 codes) and the one with the least codes (i.e. case 7 with 310 codes) is 568.

Percentages from the MISC summary scores

Some noticeable percentages came out the analysis of the MISC-percentages. For example, among all cases the %CR (i.e. REC/[RES+REC]) is almost equally except for case four. The same counts for the %OQ (i.e. QUO/[QUC+QUO]), except for case five, as shown in table 3.6.

4. Discussion

The aim of this study was to determine how the MISC can be modified into a valid instrument which can be applied in web-based interventions (such as *Look at your drinking)* and what elements of the MISC are predictors of the treatment outcome. This is done in three ways, (1) with the decrease of alcohol use per week compared with the week before the start of the treatment, (2) with the decrease of alcohol use per week compared with the self-reported weekly amount of alcohol use, and (3) with the post-test only. Before the actual research could start, a preliminary research was conducted to check in what extent the MISC was feasible. In the preliminary research, it was concluded that the MISC seems to be feasible for applying it to asynchronous communication. All these analysis are conducted with nine cases from the web-based treatment: *Look at your drinking.*

The main question of this study is: "*How to modify the MISC into a valid instrument to measure integrity from counselors in web-based treatments?*" The unmodified MISC is feasible at first sight, however the results are not trustworthy. The low summary-scores might indicate that the unmodified MISC does not fit properly to asynchronous communication in a web-based treatment, such as *Look at your drinking*. Which also results in an unexpected negative correlation between the MISC (i.e. %MIC) and the treatment outcome. The lack of reliability is caused by the interference in asynchronous communication in eHealth. An example of interference is the reference of a counselor to something the client said in a previous message, to make clear what is responding on. In a face-to-face setting this reference is not needed. The only purpose of this sentence is to refer, it does not contribute to MI. Another example of interference is the way a counselor asks questions, sometimes the counselors ask multiple questions to clarify one question. This leads to multiple codes for actually the same question, that distorts the outcome of MI-consistency. It is important to reduce the interference to gain more clear and reliable outcomes, therefore it is important to modify the MISC so that it is not being distorted by the interference.

Feasibility of the MISC for web-based interventions

A goal of the study was to determine which elements of the MISC are predictors of the treatment outcome. Due to the preliminary research it was expected that the MISC was feasible,

but contrary to the expectation it was found that the more consistent MI is applied (i.e. %MIC), the lower the success rate of the treatment (treatment outcome).

The treatment outcome based on the intake was found to be incorrect. This error was found because it differs from what the clients reported themselves in their messages towards the counselor. This difference can be explained, because at the beginning of the treatment the client is asked to fill in the alcohol notebook. In this notebook, the client fills out how many alcoholic beverages he drinks per week. This amount might be distorted, because some clients might decrease their alcohol usage before the treatment starts, because they know they have to decrease on their alcohol use eventually. If we take a look at the usual amount of alcohol-use per week reported by the clients themselves, we see different quantities in some cases. This could of course influence the results of this study. Because treatment outcome based on the intake seemed to be incorrect, the analysis was done in three different ways. The significant negative correlation is found to be consistent after measuring the correlation between MI-consistency (%MIC) and treatment outcome in three different manners, which are: (1) %MIC vs. decrease of alcohol use per week based on the intake (which is based on the week before treatment), (2) %MIC vs. decrease of alcohol use per week based on the self-reported average alcohol use per week, and (3) %MIC vs. post-test only (i.e. alcohol use after treatment per week).

This counter intuitive finding can be caused by the interference in the asynchronous communication, the next paragraph will explain more about the interference. Another explanation could be that if a client is increasing on the amount of alcohol use per week, the counselor applies more MI and if a client is approaches their goal (and thus drinks less alcoholic beverages per week) the counselor applies less MI. This can be investigated by analyzing the clients side of the conversations in asynchronous communication as well. The next question would be whether the MISC is the right instrument for such an analysis. The MISC is focused on the quantity of the codes, where the MITI (Moyers et al., 2005) also focuses on the interaction between the client and the counselor, which could provide the researcher with information about how the counselor responds to the client. Although the MITI is not included in this study, it might be an interesting instrument for further research on this topic.

Predictive validity of the MISC for treatment outcome

A possible explanation for the consistent negative correlation between the decrease in alcohol use and %MIC (shown in table 3.7, 3.8 and 3,9) is that the counselors score high on the ratio of consistency of MI (%MIC). Due to the asynchronous communication the counselor is forced to give a lot of simple reflections (prescribed code), to refer to what he is answering on. The %MIC is influenced by several codes, prescribed and proscribed codes. This percentage is high because the counselors do not use the proscribed codes often (i.e. ADW, CO, DI, RCW and

WA). Because these codes are almost unused, the %MIC is high. That does not necessarily mean that the MI was applied very well, nor does it mean the opposite. This finding does not benefit the validity of the MISC.

An unexpected finding is that all counselors score low on MISC-summary scores, except for %MIC. According to literature (Moyers et al., 2005), most of the counselors of these cases do score as a beginner. The Manual for the MISC prescribes to ask open questions and to give complex reflections (Miller et al., 2008). So the higher the ratio of the open questions (i.e. %OQ) and ratio of the complex reflections (i.e. %CR) are, the better. A good explanation for these low scores is that the counselor has to refer to what the client said in his message to give an understandable answer. An example of this is: ”In your message you mentioned your eating problems, how do you cope with that?”. In this example a simple reflection and an open question are being coded, but the simple reflections only functions as a reference to what the client said earlier. In synchronous communication this reflection is not needed. For the relative low %OQ an explanation is that the counselors in these cases ask a lot of questions to give a better understanding of what they actually want to ask, for example: “For how long have you been drinking this much? And can you tell me something about the origin of this habit? When did you drink for the first time? Do you ever have an alcohol free day?”. In this sentence the counselor asks a few questions to give the client a better understanding of what the counselor wants to know. These, additional and in face-to-face communication unnecessary, questions are assigned with QUC (open question) which causes interference in the outcome. Both above mentioned examples, are some kind of interference and influence the summary-scores negatively.

The interference (as in the examples above) has to be separated from the real simple reflections and questions. Therefore an extra code could be a good solution, because if the interference is distinguished from the summary-scores, a more clear score will be the result. This might also result in a raise of the MISC summary-scores.

For the low ratio of open questions (%OQ) it is needed to differentiate between questions that belong together and questions that are meant to be a different question. The codes might be coded as groups per topic, so when multiple questions are being asked in a row, these should be grouped per topic, and should be assigned with one code.

For the low ratio of complex reflection it is needed to differentiate between real simple reflections and sentences that act as reference to make clear what the counselor is responding on.

The negative correlation between the %MIC and treatment outcome can also be explained by the following hypothesis that someone who decreases a lot on the use of alcoholic beverages per week, does need less MI-consistent counseling and vice-versa.

Another remarkable finding in the prediction of the treatment outcome is the correlation with the treatment goals set by the clients themselves. The goal of a client seems to correlate with

the treatment outcome, based on the qualitative analysis. It seems that if a client sets a goal for abstinence, clients are more likely to reach their goals. From this perspective MI would be redundant, but without MI the goal would not have been set. Due to the low amount of analyzed cases, this finding could also be a type I error. Further research should clarify to what extent the goal predicts the treatment outcome.

Differences between eHealth and face-to-face settings for the MISC

Although the counselors score low on the MISC-scores, all counselors replied consistently and complete (i.e. the counselor responded to all notes and questions of the client) to the clients' messages, even if the client did not sent a message. From the clients' side this was not always the case, some clients did, but some did not. From the counselors' side it was totally different. The counselors of the analyzed cases were all very complete in their responses towards the client. Because of the fact that the communication between the counselor and the client was asynchronous, both have more time to think about an answer and therefore both can give a reaction on every part of the received message. That also causes that they can reread messages and have an overview of what has been asked. This ensures that both are able to give complete reactions.

Having a lot of time to reread a message is also a risk in asynchronous communication, because the counselor asks multiple questions in a row in his messages, it is easily happen that one of both does not give a complete reaction and in fact ignores a questions or a note from the other. In this study it happened frequently, in fault of the clients. This forces counselors to ask the same question again, and therefore some codes (mainly QUC and QUO) are given multiple times for actually the same question, but in different messages. This influences the results of the study, because the summary-scores are based on the communication habits of face-to-face conversations. Repeating a question happens more frequently in asynchronous communication than in face-to-face conversations and therefore it is needed to distinguish between questions asked for the first time and questions asked more than once.

Another solution for the interference is to include interference in the formula for calculating the summary-scores. A lot of research is needed, for example to measure to what extent interference should be included in the forumula and to validate the new formula. Due to the amount of research that is needed to achieve new valid formulas, this is not recommended.

Another major difference is the lack of verbal communication. Therefore it is also hard to measure global scores, such as empathy. During the coding process, the global rating scale for empathy was included in the analysis. There is a form on how to assess a case on this global score, this form is multi interpretable which makes it hard to score consistent. Also, there is not a measurement for scoring the inter-rater-reliability for the global rating score for empathy. Which

makes it hard, (if not impossible) to ensure validity. Besides that, there were only nine cases, so there was also not a possibility to get a feeling, which is needed, for scoring on empathy. Moreover, all counselors reacted almost equally supportive and therefore it is hard to differentiate on empathy score.

If empathy is to be measured, it should be measured by the literally words of a person. Someone has to say, for example, that he understands someone's situation, so that it is clear that the counselor is showing empathy. So far, it is unclear whether empathy correlates with the treatment outcome in asynchronous communication.

Distribution of the codes

Although the MISC did not need any modification according to the preliminary research, it is the question if the consequential results are representative. Some codes are more frequently assigned than others. Some of the codes are not even used at all in any case. According to the MISC, every part of a conversation should be assigned with a code. This causes that the unused codes cannot be removed, because if they are being removed the parts should be assigned with another code, which causes interference. Another interesting fact is that the prescribed codes are assigned more often than the proscribed codes according to the MISC. In some cases much more codes are assigned than in others, but this does not have any effect on the treatment outcome. The most used codes (affirm, give information, open question, closed question, simple reflection and structure, all prescribed or neutral) cover almost half of all assigned codes together. Which is a lot for six out of nineteen codes (i.e. 31,6% of all possible codes).

There is an explanation why these codes are assigned that much, except for affirm and give information. The rest of the codes are assigned more than others for a particular reason. For closed- and open questions (QUC and QUO) that is, these codes are combined a lot. An example and a more comprehensive explanation can be found in paragraph "Predictive validity of the MISC for treatment outcome". Differentiating between several questions substantiating each other and questions meant as separate question would lead to a more valid ratio of open questions.

The code simple reflection (RES) is assigned more, because the counselor has to refer a lot to what the client said in his message. An example and a more comprehensive explanation can be found in paragraph "Predictive validity of the MISC for treatment outcome". Simple reflections which serve as reference to make clear what the counselor is reacting on, should be assigned with a new code, so the simple reflection only consists of real simple reflections.

For structure (ST) it clear, all headers are codes as ST. This is because the headers introduce a new part and therefore give structure to the messages. Actually the headers are all standardized, due to the determined topics, and are more common than other codes. Not assigning this code to headers could lead to more valid results.

Correlations between codes

Some codes are more often assigned than other codes. Noticeable is that these codes do correlate with a lot of other codes. This could mean that the way counselors apply MI is overall equal, so if any counselor asks a lot of questions, they also should give a lot of information or give a lot of reflections as well.

In table 3.3 the correlations between all codes are presented. In this table there are already a lot of significant correlations. Comparing the prescribed codes with proscribed codes results in intuitive findings. With this low amount of numbers it is hard to interpreted the outcomes and a lot of curious correlation are found, which might be a Type-I error. If more cases were included in this study, there would probably also be more significant correlations. Therefore, these correlations are not further interpreted in this study. However, for future studies it might be relevant to replicate this analysis with more cases and then, for example, the internal consistency could be analyzed.

Limitations

As in any study, in this study there are also limitations. The data existed of messages between the counselor and the client, and the treatment outcomes, which included pre-test and post-test. During the treatment the client carries out a lot of exercises which are not included in this study. Besides that, the client keeps an alcohol notebook up to date, which is also not included. Some clients wrote a lot of information about their progress in these tasks and therefore there is a lot of missing information. Because the counselor sometimes responds on these missing parts, it is hard to assign a proper code to these parts of the counselors side, which does not benefit the validity of the outcome of the MISC.

It is unknown which counselors were treating the clients. It is also unknown if some cases were treated by the same counselor. Because the data only consists of codes from the personalized messages and thus written by the counselors themselves, this could be interesting information to measure consistency of counselors and quality of counselors.

It is unclear whether empathy can predict treatment outcome, that is being caused by the amount of cases, which is a limitation in this study. If more cases were included in this study, it might would have been possible to score on empathy. Besides that, more cases would have led to more consistent quantities in the amount of given codes. This also would detect more significant correlations, which are missing out in this study.

Due to time, the inter-rater reliability is not known. So far, this study is based on the level of agreement.

Future research

Future research should focus on modifying the MISC, so that the MISC is a valid predictor without interference in the results. For modifying it is needed to focus research on how to distinguish between codes, for example: if a counselor refers to something the client has said before, what code should be assigned to this. With the unmodified MISC a simple reflection fulfills, but this does influence the outcomes so much that these outcomes are not representative to compare these with the summary-scores as done in the face-to-face treatments. The same counts for the questions, if a counselor asks multiple questions, it could be his goal to clarify what he is willing to ask. Whether it is valid to assign such a 'group' of questions with one code must first be validated in future research. If these improvements are applied, MISC-summary scores should also be included in a new study. The codes and the summary-score are inextricably linked and should therefore be reconsidered.

From this research it can be concluded that the goal (if the goal is abstinence) in combination with the treatment and thus in combination with MI and the MISC might predict the treatment outcome. This is just a finding, but further research could determine whether this combination is a predictor for treatment outcome.

Another interesting focus for future research is to compare counselors to predict the quality of a counselor and therefore the treatment outcome for a client. An advantage of this is that counselors can be trained in a more specific manner and this will result in a better treatment outcome for the client. If it is known that counselors could ensure a good treatment outcome, for example: because they ask more open questions than other counselors, other counselors should be trained to ask more open questions to make them more successful as well.

Another suggestion for future research is to focus on global-ratings (i.e. pass one of the MISC), such as empathy. The focus in future research should lay on the clients side, how much empathy does the client experience. To conduct research focused on global-ratings, better training for the researcher in these global-ratings is needed and more cases are necessary.

The third pass can be interesting as well, in the unmodified MISC the third pass focuses on the duration of a conversation, for eHealth this can be translated to the amount of messages send between the counselor and client, or the amount of assigned MISC-codes.

Conclusion

Initially, it seems that the MISC is feasible. But, modification of the MISC is needed to let the summary-scores be a more valid predictor of the treatment outcome. This can be achieved in two ways, (1) by adding/changing codes, so the amount of codes is not faded, or (2) determine

new aims in summary-scores for counselors, so the outcomes are representative for MI applied via web-based treatments. The first option is recommended.

It seems that there is a correlation between the MISC and the treatment outcome, but an unexpected correlation. At this moment, it is not possible to predict treatment outcome on the basis of the MISC. Although the unmodified MISC is applicable to the cases, the MISC needs modification to make it more appropriate.

The counselors from these cases seem to reply equally consistent and complete. Some counselors replied more extensive, but that does not seem to influence the treatment outcome in any way.

Another interesting outcome is the goal a client sets. It is clear that the clients who set abstinence as goal, achieves their goal, and those who did set their goal to decrease on alcohol use, mainly did not achieve their goal.

Thereby, the differences between face-to-face counseling and counseling in eHealth are big. How fast and complete a client responds to a message from the counselor is different, and that influences the communication and therefore the outcomes of this study.

In the field of eHealth this topic of research is very new. For a MISC that is usable for measuring treatment integrity in web-based treatments more research is needed, but an important first step is taken. The differences between synchronous and asynchronous communication and the impact of these differences on the outcomes of the MISC are clear, with that in mind further research can be conducted.

5. References

Anderson, P., & Baumberg, B. (2006). *Alcohol in Europe – Public Health Perspective*. *Drugs: Education, Prevention, and Policy* (Vol. 13). https://doi.org/10.1080/09687630600902477

Apodaca, T. R., & Longabaugh, R. (2010). Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. *Addiction*, *104*(5), 705–715. https://doi.org/10.1111/j.1360-0443.2009.02527.x.Mechanisms

Ball, S. A., Martino, S., Corvino, J., Morganstern, J., & Carroll, K. M. (2002). Independent tape rater guide.

Belzman, M. (2003). *Handbook for Christ-centered substance abuse and addiction counselors*. Redlands, CA: Association of Christian Alcohol and Drug Counselors.

Carroll, K. M., Nich, C., Sifry, R. L., Nuro, K. F., Frankforter, T. L., Ball, S. A., … Rounsaville, B. J. (2000). A general system for evaluating therapist adherence and competence in psychotherapy research in the addictions, *57*, 225–238.

Cicchetti, D. (1994). Guidelines, criteria and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, *6*, 284–290.

Gainsbury, S., & Blaszczynski, A. (2011). A systematic review of Internet-based therapy for the treatment of addictions. *Clinical Psychology Review*, *31*(3), 490–498. https://doi.org/10.1016/j.cpr.2010.11.007

Goense, P. B., Boendermaker, L., & van Yperen, T. (2018). Measuring Treatment Integrity: Use of and Experience with Measurements in Child and Youth Care Organizations. *Journal of Behavioral Health Services and Research*, *45*(3), 469–488. https://doi.org/10.1007/s11414-018-9600-4

Jonge, J. M. De, Schippers, G. M., & Schaap, C. P. D. R. (2005). The Motivational Interviewing Skill Code: Reliability and a Critical Appraisal, (Mi), 285–298. https://doi.org/10.1017/S1352465804001948

Kohrt, B. A., Ramaiya, M. K., Rai, S., Bhardwaj, A., & Jordans, M. J. D. (2015). Development of a scoring system for non-specialist ratings of clinical competence in global mental health: a qualitative process evaluation of the Enhancing Assessment of Common Therapeutic Factors (ENACT) scale. *Global Mental Health*, *2*, e23. https://doi.org/10.1017/gmh.2015.21

Miller, W. R., Moyers, T. B., Ernst, D., & Amrhein, P. (2008). Manual for the Motivational Interviewing Skill Code (MISC).

Miller, W. R., & Rollnick, S. (2002). Preparing people for change. *Motivational Interviewing*.

Miller, W. R., & Rollnick, S. (2013). *Motivational Interviewing: Helping People Change* (3rd ed.). Guilford Publications.

Miller, W. R., & Rollnick, S. (2014). The effectiveness and ineffectiveness of complex behavioral interventions: Impact of treatment fidelity. *Contemporary Clinical Trials*. https://doi.org/10.1016/j.cct.2014.01.005

Monaghan, S., & Blaszczynski, A. (2009). Internet-based Interventions for the Treatment of Problem Gambling. *Toronto: Centre for Addiction and Mental Health*.

Mowbray, C. T., Holter, M. C., Teague, G. B., & Bybee, D. (2003). Fidelity Criteria : Development , Measurement , and Validation. *American Journal of Evaluation*, *24*(3), 315–340.

Moyers, T., Martin, T., Manuel, J. K., Hendrickson, S. M. L., & Miller, W. R. (2005). Assessing competence in the use of motivational interviewing, *28*, 19–26. https://doi.org/10.1016/j.jsat.2004.11.001

Moyers, T., Martin, T., Manuel, J., Miller, W., & Ernst, D. (2010). Revised Global Scales : (MITI 3 . 1 . 1), *1*(January), 1–29.

Noar, S. M., Grant Harrington, N., Van Stee, S. K., & Shemanski Aldrich, R. (2011). Tailored Health Communication to Change Lifestyle Behaviors. *American Journal of Lifestyle Medicine*, *5*(2), 112–122. https://doi.org/10.1177/1559827610387255

Ondersma, S. J., Beatty, J. R., Svikis, D. S., Strickler, R. C., Tzilos, G. K., Chang, G., … Sokol, R. J. (2015). Computer-Delivered Screening and Brief Intervention for Alcohol Use in Pregnancy : A Pilot Randomized Trial, *39*(7), 1219–1226. https://doi.org/10.1111/acer.12747

Postel, M. G. (2011). *Well Connected.Web-based treatment for problem drinkers*. Oldenzaal, the Netherlands: Nijmegen Institue for Scientist-Practitioners in Addiction, Radboud University Nijmegen.

Postel, M. G., De Haan, H. A., Ter Huurne, E. D., Becker, E. S., & De Jong, C. A. J. (2010). Effectiveness of a web-based intervention for problem drinkers and reasons for dropout: Randomized controlled trial. *Journal of Medical Internet Research*, *12*(4), 1–12. https://doi.org/10.2196/jmir.1642

Postel, M. G., De Jong, C. A. J., & De Haan, H. A. (2005). Does E-Therapy for Problem Drinking Reach Hidden Populations? *The American Journal of Psychiatry*, (162 (12)), 2393.

Rooke, S., Copeland, J., Norberg, M., Hine, D., & McCambridge, J. (2013). Effectiveness of a self-

guided web-based cannabis treatment program: Randomized controlled trial. *Journal of Medical Internet Research*, *15*(2). https://doi.org/10.2196/jmir.2256

Roskam, R. V. (2013). An Explorative Study for Therapist Treatment Fidelity in an Asynchronous Web - Based Treatment.

Tactus Verslavingszorg. (2014). Handleiding Hulpverleners.

van Laar, M. W., Gestel, B. van, Cruts, A. A. N., van der Pol, P. M., Ketelaars, A. P. M., Meijer, R. F., … Brunt, T. M. (2017). *Nationale Drug Monitor: Jaarbericht 2017*.

Wantland, D. J., Portillo, C. J., Holzemer, W. L., Slaughter, R., & McGhee, E. M. (2004). The effectiveness of web-based vs. non-web-based interventions: A meta-analysis of behavioral change outcomes. *Journal of Medical Internet Research*, *6*(4). https://doi.org/10.2196/jmir.6.4.e40

World Health Organisation. (2014). Global status report on alcohol and health 2014. *Global Status Report on Alcohol*, 1–392. https://doi.org//entity/substance_abuse/publications/global_alcohol_report/en/index.html

Yoder, P., & Symons, F. (2010). *Observational measurement of behavior*. New York, NY: Springer Publishing Co.

Zantinge, E. M., & Hakstege, F. L. (2018). Alcoholgebruik volwassenen. Retrieved April 10, 2018, from https://www.volksgezondheidenzorg.info/onderwerp/alcoholgebruik/cijfers-context/huidige-situatie#!node-alcoholgebruik-volwassenen

6. Appendices

I. Comprehensive description of the treatment: *Look at your drinking*

Part 1

1. Advantages, disadvantages

   This step is an assignment and discussion about the advantages and disadvantages of the use of alcohol. The client has to think of three advantages and disadvantages of the use of alcohol.

2. Keep up a registration script

   In this contact moment the client is asked to keep up a drinking diary on daily basis. The client is being expected to do this during the whole treatment to let the participant get insights in their drinking behavior. The objective is to find problems and causes which make the participant drink alcohol.

3. Analyzing situations

   In this step the participant fills in a questionnaire about the craving and drinking behavior, this questionnaire is based on a 3-point Likert scale.

4. Measuring and knowing

   This step consists of several questions about the clients willingness of continuing, about what the client has learned so far and a small evaluation about the treatment and about the therapist so far.

Part 2

5. Setting goal

   In this step the participant sets a goal which is, measurable, feasible and realistic. Besides that, the participant has to describe the way he rewards himself if he succeeds in achieving his goals.

6. Breaking habits

   The motivation of the participant is being assessed in this step. This is being done by theses about the treatment, like 'I can quit without help', 'I want to get treated for my problems'. The participant can score them with a 5-point Likert scale.

7. Think differently

   The participant has to formulate his thought, those which are non-supporting have to be reformulated so they support the objective set as in step 5.

8. Act differently

In this step thought has to be translated into behavior. This is being done by thinking about how to change the craving-behavior. The main question in this step is: 'On moment of craving for alcohol, I can do the following things to feel better: …'.

9. Decisions

   In this step the participant has to formulate reasons for alcohol use. What situations trigger craving for alcohol use. Thought, feelings and behavior are being discussed, also the participant has to think what he is going to do in case of relapsing.

10. Make an action plan

    In this step the participant has to make an action plan. This plan consist of a description of risky situations, -thought, -feelings, -behaviors and helping thoughts. This should result in an action plan with precise and tangible formulated actions.

11. Closure

    This step is the end of the treatment before follow-up. In this step information from the participant is gathered for follow-up.

II. Quick reference card – Counselor codes

Therapist/Counselor Behavior Counts

AD: Advise - counselor gives advice, makes suggestions, offers solution/possible action.
Distinguish - **ADP** with permission or indirect offer of option to disregard
ADW without permission

AF: Affirm - counselor is appreciative or complementary to client; may appreciate, have confidence in or reinforce client.

CO: Confront - counselor directly disagrees, is paternal/judging/shaming/labeling, attempts to persuade or correct client.

DI: Direct - counselor gives direction or commands.

EC: Emphasize Control - counselor acknowledges/honors client autonomy, choice, personal responsibility.

FA: Facilitate - simple utterances that keep client speaking.

FI: Filler - the few responses not codeable elsewhere.

GI: Giving Information - counselor provides information, feedback, or educates.

QU: Question - counselor gathers information, elicits client story, or attempts understanding.
Distinguish - **QUC** closed question implying short answer
QUO open question allowing wide range of answers, encourages self-exploration, invites perspective.

RC: Raise Concern - counselor points to possible problem in client plan, goal, or intention.
Distinguish - **RCP** with permission or indirect offer of option to disregard
RCW without permission

RE: Reflect - counselor uses reflective listening to capture and return, repeat/rephrase, or summarize client statements.
Distinguish - **RES** simple reflection adds little -to no additional meaning, may be repeat or rephrase, conveys understanding.
REC complex reflection adds substantial meaning or emphasis to client words. Conveys deeper picture, add subtle or obvious content, may be analogy, double-sided reflection, or amplification.

RF: Reframe - counselor shifts meaning or emotional valence of client words.

SU: Support - counselor is sympathetic, compassionate, or understanding.

ST: Structure - counselor provides information of treatment or session structure; transition.

WA: Warn - counselor predicts negative consequences, warns or threatens client.

III. Quick reference card – Client codes

Client Language Behavior Counts

R: Reason - client makes a specific rationale, basis, incentive, justification or motive for making (or not making) the TBC; includes "ought," "should," "have to" or "got to"

Distinguish - **D (Desire)** includes "want," "desire," "like" or another synonym
A (Ability) includes "can," "possible," "willpower" or "ability"
N (Need) includes "need" or "must"

O: Other - client uses hypothetical language, statements of general attitude or advice to others with regard to the undesirability of the target behavior.

C: Commitment - client speaks in the future tense to imply an agreement, intention, or obligation regarding future TBC; "I'm going to ... "

TS: Taking Steps - client talks of the recent past when describing concrete and specific steps that they have taken towards TBC.

FN: Follow/Neutral - the client is making no indication or inclination toward or away from TBC; non-committal statements/irrelevant things.