Motivational interviewing

active ingredients and mechanisms of change

Author(s)
Dobber, Jos

Publication date
2020

MOTIVATIONAL INTERVIEWING:
ACTIVE INGREDIENTS AND MECHANISMS OF CHANGE

Jos Dobber

Author: Jos Dobber
Cover: Cathelijne van der Burg, Santpoort-Zuid
Lay-out and printed by:
ISBN:

The work in this thesis was financially supported by a research grant from the Netherlands Organisation for Scientific Research (NWO) (grant no. 023.004.060).

Motivational Interviewing:
active ingredients and mechanisms of change

ACADEMISCH PROEFSCHRIFT
ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. dr. ir. K.I.J. Maex
ten overstaan van een door het College voor Promoties ingestelde commissie,
in het openbaar te verdedigen in de Agnietenkapel
op woensdag 1 april 2020 te 12.00 uur

door

Joseph Tarcisius Pius Dobber
geboren te Amsterdam

PROMOTIECOMMISSIE

Promotores:	Prof. dr. R.J.G. Peters	AMC-UvA
	Prof. dr. W.J.M. Scholte op Reimer	AMC-UvA
Copromotores:	Dr. C.H.M. Latour	Hogeschool van Amsterdam
	Prof. dr. B.K.G. van Meijel	Vrije Universiteit Amsterdam
Overige leden:	Prof. dr. A.T. Harder	Erasmus Universiteit Rotterdam
	Dr. H.T. Jørstad	AMC-UvA
	Dr. J.M. de Jonge	Hogeschool van Amsterdam
	Prof. dr. G.M. Schippers	AMC-UvA
	Prof. dr. E.M.A. Smets	AMC-UvA
	Prof. dr. R. de Vos	AMC-UvA
	Prof. dr. J.C.M. van Weert	Universiteit van Amsterdam

Faculteit der Geneeskunde

Deo Fidendum, Mediis Utendum

(gevelopschrift voormalige apotheek Rozijnenkorf, Deventer)
Vertaling volgens de VVV-wandelgids:
'Vertrouw op God, maar neem wel uw medicijnen in'

TABLE OF CONTENTS

CHAPTER 1

Introduction and outline of this thesis

INTRODUCTION

In 1983, Dr William Miller published a paper in which he described the motivational interviewing (MI) approach [1]. Based on principles of experimental social psychology, he used this inductive, practice informed, approach in the treatment of problematic alcohol users. Motivation played an important role in this approach, and Miller described four key principles of motivation: (a) de-emphasis on labelling, (b) individual responsibility, (c) internal attribution, and (d) cognitive dissonance [1]. The approach further developed into a "method" [2] and into a "style of communication" [3]. Its success in the addiction field raised the question for what other target behaviours, and for what other target groups motivational interviewing (MI) might be a promising intervention. Many randomised clinical trials were conducted, with the vast majority in the field of addiction. Systematic reviews and meta-analyses found positive overall effects of MI for a number of target groups and target behaviours (e.g. body weight, systolic blood pressure, medication adherence dental care, HIV viral load) [e.g. 4-7]. However, in 2014, Miller and Rollnick pointed out that there is a high outcome variability across studies, sites, and therapists [8]. In the same publication they emphasised that the content of the MI delivered varies widely in trials of MI, and that the intervention should at least contain the, assumed active ingredients of MI. These assumed active ingredients were based on MI-theory. Miller and Rollnick expressed their hope that future research may show mechanisms of action [8].

In their 2014 paper [8] Miller and Rollnick identified an important problem related to the variability in effects: MI can only be effective if the intervention contains active ingredients. However, the active ingredients of MI are largely unknown [8]. Since MI is considered to be a complex behavioural intervention [8], with many relational and behavioural ingredients, there are many components that are candidate active ingredient and potentially irrelevant superstitious element at the same time. Miller and Rollnick [8] identified three active ingredients (which they called "mechanisms of change") within MI, for which they suggest

there is “reasonable empirical support”: (1) accurate empathy, (2) the absence of confrontation and counterargument, and (3) increased client change talk and decreased sustain talk [8, p.237-238]. However, the evidence base for the first suggested active ingredient (empathy) presented by Miller and Rollinick, is a single study in which a correlation was found between empathic speech and both change talk and sustain talk [9]. The second of these suggested active ingredients is the absence of an ingredient, and one may discuss if an absent ingredient can be an active ingredient or if its presence may be an impeding factor. The supporting evidence seems sufficient only for ‘increased client change talk and decreased sustain talk’ as an active ingredient.

The lack of knowledge about ‘how MI works’, about the active ingredients and the mechanisms of change was the starting point of our investigation. MI was proven effective in many studies, but the active ingredients remain unknown. Therefore, the first question in this dissertation is: Which ingredients within motivational interviewing cause the effects of this intervention?; followed by the second question: By which processes can these effects be explained? Or, in other words: What are (1) the active ingredients and (2) the mechanisms of change in motivational interviewing?

Motivational Interviewing

Motivational interviewing is a counselling style to enhance a patient’s motivation for behaviour change [2,3]. The target behaviour often is a health behaviour: e.g. lifestyle, substance dependence, medication adherence, and the behaviour change is meant to be a sustained change. For this, and to honour the patient’s autonomy, MI aims at intrinsic motivation. MI-theory states that motivation consists of three components: (a) importance/willingness to change, (b) confidence/ability to change, and (c) readiness to change [2]. The counsellor conducts the conversation to support the patient to find his/her own motives for behavioural change, and to feel competent to make this change. The

assumption is that if the change is important enough for the person, she/he will be ready to make this change. Thus, to stimulate the patient's willingness to change, the counsellor evokes 'change talk' (patient utterances in favour of change), and softens 'sustain talk' (patient utterances in favour of status quo) [3]. Thus, it is not the counsellor who puts forward the arguments, but the patient him/herself, for which Miller and Rollnick [2, p.21] cite Bem: "As I hear myself talk, I learn what I believe." [see also 10]. In MI, the counsellor communicates in an empathetic style with the underlying spirit of MI (its mind-set and heart-set: partnership, acceptance, compassion, and evocation) [3]. Many patients are ambivalent about behaviour change and have reasons for both changing and for not-changing, meanwhile maintaining the status-quo. Supporting the patient to explore and resolve this ambivalence, with a focus on the patient's motives, is an important component of MI [2,3].

Intervention fidelity and quality assurance in motivational interviewing

Miller and Rollnick decided not to trademark or copyright the name and method of MI [8]. And, as they point out, this may have contributed to the diverse content that is delivered under the name of 'motivational interviewing' [8]. The intervention content even differs between counsellors performing the intervention in the same study and at the same site [8]. This may be almost inevitable in executing complex behavioural interventions such as MI, even in the presence of an intervention manual [8]. Not only because of differences between counsellor characteristics and counsellor styles, but also because of differences between patients and their individual motivational processes, and because of context variation. According to Miller and Rollnick, MI is only MI if the following three fundamental characteristics are present [8, p.235]: (1) a person-centred non-authoritarian counselling style, (2) a clearly identified change goal, and (3) differential evoking and strengthening of the person's own motivation for change.

Methods to measure the level of MI delivered are the replicable MI–coding systems, especially the Motivational Interviewing Treatment Integrity (MITI) [11,12] and the Motivational Interviewing Skill Code (MISC) [13,14]. These instruments are usually employed to monitor the treatment fidelity, and the summary scores of these instruments count as a measure of quality level of the MI delivered. A limitation of this way of quality assurance is the fact "that it is unclear what level of MI fidelity is 'good enough' to facilitate change within particular contexts or sufficient to conclude that MI was actually delivered" [8, p.236].

Psychological interventions:

Clinician factors, Client factors, Mechanisms of change, Active ingredients

MI is a psychological intervention to achieve behaviour change. Nock [15] distinguishes three classes of factors that play a role in the process of behaviour change: (1) clinician factors, (2) client factors, and (3) mechanisms of change. Studying mechanisms of change in psychological interventions means studying psychosocial processes. It is important to know in advance which factors are involved in those processes, and to know how these processes of interacting factors can be assessed [15].

Clinician factors are the input of the counsellor in the MI-sessions. Some clinician factors are suggested as potential active ingredients, e.g. 'eliciting change talk', 'creating a change plan' [12]. The definition of clinician factors is: "What the clinician does in the treatment, including clinician behaviors, characteristics, and directives" [15, p.8s].

Client factors are the input of the patient in the MI-sessions. Some client factors are suggested as potential active ingredients, for instance: 'change talk', 'resolving ambivalence' [12]. The definition of client factors is: "What the client does in treatment, including behaviors, characteristics, and verbalizations on their part" [15, p.8s].

The definition of mechanisms of change is: "The processes that emerge from or occur as a result of the clinician and client factors, and their interaction, that explain how those factors

lead to change in the outcomes of interest" [15, p.8s]. In MI, these processes are psychological processes: a change in the patient's cognitions, beliefs, or the way of thinking that leads to the targeted behaviour change. Some psychological processes are suggested as mechanisms of change in MI, for example: 'arguing oneself into change', 'changing self-perception' [12].

In this investigation, the process to assess is whether, and how, specific clinician factors interact with specific client factors, resulting in a mechanism of change. If this process takes place, we call this interaction of factors an 'active ingredient'. The definition of active ingredients is: "Specific components that cause the observed change" [15, p.8s].

Secondary prevention

There is discussion on the definition of secondary prevention [16,17]. Some authoritative organisations, like the World Health Organisation (WHO) and the Centers for Disease Control and Prevention (CDC), limit secondary prevention to screening for early detection of diseases before symptom onset [18,19]. In this dissertation, in line with the guidelines of the European Society of Cardiology [20], we define prevention of recurrence, prevention of complications, and treatment of symptomatic patients as secondary prevention [see also 16, p.155].

A systematic review and meta-analysis on motivational interviewing in medical care settings shows that in many trials, MI has been tested as a secondary preventive intervention, e.g. to influence lifestyle risk factors (smoking, healthy food, substance use, safe sex practices, prevention of caries, physical activity) or medication adherence (e.g. in patients with HIV) [7]. In 31 of the 48 trials included in this systematic review a significant positive effect was found for motivational interviewing. The overall effect for MI across 48 studies that Lundahl et al. [7] found was OR = 1.55 (95% CI = 1.40 – 1.71). For smoking cessation, they also found an effect for MI (OR = 1.34; 95% CI 1.05 – 1.70), while for medication adherence the effect

for MI was not significant (OR = 1.25; 95% CI 0.95 – 1.65) [7]. However, there was considerable heterogeneity for all these outcomes, and for medication adherence there was also heterogeneity in effects. This suggests that MI may be an effective intervention for secondary prevention, but the heterogeneity precludes robust conclusions.

In this dissertation, we studied the process of motivational interviewing as an intervention for secondary prevention in two patient groups. First, we studied the process of MI for medication adherence in patients with schizophrenia, and, second, we studied the process of MI for smoking cessation in patients with coronary artery disease.

Medication adherence in schizophrenia

In the Diagnostic Statistic Manual of Mental Disorders (DSM-5), the presence of delusions, hallucinations, disorganised speech, grossly disorganised or catatonic behaviour, and negative symptoms (the loss of psychic functions, e.g. the loss of taking initiative [21]) are defining characteristics of schizophrenia. Also, the level of psychosocial functioning is markedly below the level achieved previously [22]. There is a broad variation between patients in symptom profile and severity and in the presence of other accompanying symptoms. Therefore, it is recommended that treatment should be tailored to the individual patient's condition and needs [21]. Antipsychotic drug treatment is an effective treatment for relapse prevention (RR = .35) [23], but it may also cause severe side effects, such as a movement disorder (RR = 1.55) or weight gain (RR = 2.07) [23]. In spite of the effectiveness of antipsychotic drugs treatment as secondary prevention, about 75% of the patients discontinue their medication use within 18 months [24]. Several factors contribute to the decision to adhere or not to adhere, such as lack of illness insight, beliefs about the medication, symptom severity, and obesity [25]. Motivational interviewing may address some of these factors, and thus may enhance the patient's motivation for medication adherence. However, many patients feel ambivalent about the willingness to use long-term

medication. Resolving ambivalence is one of the main goals of MI [2]. Previous trials in which MI was investigated as an intervention to address motivation for medication adherence in patients with psychotic disorders showed mixed results on this outcome [26-28]. These mixed results may partly be explained by the presence or absence of the active ingredients in the MI-intervention delivered. It is to be expected that the content of the MI varied between these trials, especially since, as discussed above, the active ingredients are largely unknown. Our study aims to take a step in better understanding of the active ingredients and mechanisms of change in MI for medication adherence, in patients with schizophrenia.

Smoking cessation in coronary artery disease

Influencing risk factors of patients with coronary artery disease (CAD) for a recurrent event via lifestyle change is an important secondary prevention strategy for many patients [29]. Smoking is an important risk factor, and smoking cessation after a myocardial infarction decreases the risk of a recurrent myocardial infarction (OR = 0.57; 95% CI 0.36 to 0.89) [30]. However, about 40-45% of the patients who smoked prior to the event do not undertake an attempt to quit smoking [31,32]. Lack of motivation, and inability to stop smoking, play a role in (the success of) smoking cessation for smokers who do not immediately quit after the event. Therefore, motivational interviewing may contribute to the success of quitting attempts, thus helping to reduce the rates of recurrent myocardial infarctions and other adverse effects of smoking.

The active ingredients of MI for smoking cessation in patients with CAD are largely unknown. In this study, we aim to explore the active ingredients and mechanisms of change in MI for smoking cessation in patients with CAD.

The study of the interactive processes of motivational interviewing in two patient groups (patients with schizophrenia and patients with a CAD), and for two target behaviours

(medication adherence and smoking cessation) adds to the value of this study. First, it enables a comparison between the processes of the different patient groups and to see similarities and differences. Second, it enables us to study motivational interviewing and its active ingredients and mechanisms of change more in-depth.

AIM AND OUTLINE OF THIS THESIS

We studied how motivational interviewing (MI) works: contributing to knowledge and understanding of the active ingredients and mechanisms of change in MI, to enable MI-counsellors to optimise their MI-strategies in daily practice.

For this, we analysed the actual sessions of MI for medication adherence in patients with schizophrenia. These sessions were part of a study by Barkhof et al. [33], the Motivation for Adherence to Treatment in CHronic psychotic disorders study (MATCH-study). We also analysed the actual sessions of MI for smoking cessation in patients with coronary artery disease, that were part of a study by Minneboo et al. [34], the Randomized Evaluation of Secondary Prevention by Outpatients Nurse SpEcialists 2 (RESPONSE-2).

First, we needed to find a measurement instrument which can reliably measure potential active ingredients of MI in audio-recorded MI-sessions. In **chapter 2**, we describe a systematic literature review to identify relevant instruments, and to select the optimal instrument to identify potential active ingredients of MI.

After the selection of such an instrument we prepared the transcripts of the audio recorded sessions of MI for medication adherence in patients with schizophrenia. We coded the sessions, using a combination of the Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE) and the Motivational Interviewing Skill Code (MISC).

In the process of analysis, we discovered that the understanding of the (motivational) processes occurring in the sessions demanded a more detailed analysis. We needed to

analyse beyond the sequence of the conversational techniques. By increasing our focus on the content of the sessions, we expected to increase our insight in the patient's motivational process and the MI-strategy of the counsellor. In **chapter 3** we present a qualitative multiple case study analysis in which we analysed the motivational process in patients with schizophrenia during the MI-sessions to enhance motivation for medication adherence. Subsequently, in the same multiple case study, we explored the potential active ingredients and the potential mechanisms of change appearing in the interaction between the patients and the counsellors (**chapter 4**).

The studies in the next part of this thesis took place in nurses, patients and MI-counsellors in the field of CAD. In the RESPONSE-2 study, CAD patients with lifestyle related risk factors, were referred by nurses to up to three community-based lifestyle programmes (*Weight Watchers®*: overweight, healthy diet; *Philips Direct Life®*: physical activity; *Luchtsignaal®*: smoking cessation). The nurses used motivational interviewing to enhance the patient's motivation for lifestyle change and to strengthen this motivation to help the patient to maintain the lifestyle change. The nurses were trained in a three-hour MI-workshop. However, the effects of a MI-workshop-only usually fade within months [35]. To prevent this, we developed a learning strategy, which consisted of four individual telephone feedback and coaching sessions with an interval of four months, as an add-on to the MI-workshop. The aim of this learning strategy was to support the nurses in the application of their MI-skills in their conversations with the patients. We performed a before-after study of this learning strategy to find out if this strategy helped to maintain or even develop the motivational interviewing skills in the nurses (**chapter 5**).

In the RESPONSE-2 study, Luchtsignaal performed a MI-based telephone coaching intervention. It represents a commercial community-based lifestyle programme for smoking cessation. In **chapter 6** we present a qualitative multiple case analysis in which we analysed

the potential active ingredients and potential mechanisms of change in the (audio-recorded) telephone MI-coaching sessions with the patients with CAD.

Finally, in **chapter 7**, this thesis concludes with a summary and a general discussion. In this discussion, we will relate our findings to the research questions, and we will discuss the meaning and the significance of our findings, in two patient groups and for two target behaviours, for the knowledge and understanding of motivational interviewing, and its relevance for the execution of MI in daily practice.

REFERENCES

1. Miller WR. Motivational interviewing with problem drinkers. Behav Psychother. 1983;11:147-72.
2. Miller WR, Rollnick S. Motivational interviewing: preparing people for change. 2nd ed. New York: Guilford Press; 2002.
3. Miller WR, Rollnick S. Motivational interviewing: helping people change. 3rd ed. New York: Guilford Press; 2013.
4. Hettema J, Steele J, Miller W. Motivational interviewing. Annu Rev Clin Psychol. 2005;1:91-111.
5. Rubak S, Sandbaek A, Lauritzen T, Christensen B. Motivational interviewing: a systematic review and meta-analysis. Br J Gen Pract. 2005;55:305-12.
6. Lundahl B, Burke B. The effectiveness and applicability of motivational interviewing: a practice-friendly review of four meta-analyses. J Clin Psychol. 2009;65:1232-45.
7. Lundahl B, Moleni T, Burke BL, Butters R, Tollefson D, Butler C, et al. Motivational interviewing in medical care settings: a systematic review and meta-analysis of randomized controlled trials. Patient Educ Couns. 2013;93:157-68.
8. Miller WR, Rollnick S. The effectiveness and ineffectiveness of complex behavioural interventions: impact of treatment fidelity. Contem Clin Trials. 2014;37:234-41.
9. Fischer DJ, Moyers TB. Is there an association between empathic speech and change talk in motivational interviewing sessions? Alcohol Treat Q. 2014;32:3-18.
10. Bem DJ. Self-perception: an alternative interpretation of cognitive dissonance phenomena. Psychol Rev. 1967;74:183-200.
11. Moyers TB, Martin T, Manuel JK, Miller WR, Ernst D. Motivational Interviewing Treatment Integrity (MITI). Version 3.1.1. 2010. Available from : https://casaa.unm.edu/download/miti3_1.pdf

12. Moyers TB, Manuel JK, Ernst D. Motivational Interviewing Treatment Integrity (MITI) Coding Manual. Version 4.2.1. 2010. Available from: https://casaa.unm.edu/download/MITI4_2.pdf
13. Miller WR, Moyers TB, Ernst D, Amrhein P. Manual for the Motivational Interviewing Skill Code (MISC). Version 2.0. 2003. Available from: https://casaa.unm.edu/download/misc2.pdf
14. Miller WR, Moyers TB, Ernst D, Amrhein P. Manual for the Motivational Interviewing Skill Code (MISC). Version 2.1. 2008. Available from: https://casaa.unm.edu/download/misc.pdf
15. Nock MK. Conceptual and design essentials for evaluating mechanisms of change. Alcohol Clin Exp Res. 2007;31(S3):4S-12S.
16. Froom P, Benbassat J, Inconsistencies in the classification of preventive interventions. Prev Med. 2000;31:153-8.
17. Katz DL, Ali A. Preventive medicine, integrative medicine & the health of the public. Commissioned for the IOM Summit on integrative medicine and the health of the public 2009. Available from: https://web.archive.org/web/20100827091640/http://www.iom.edu/~/media/Files/Activity%20Medicine%20Integrative%20Medicine%20and%20the%20Health%20of%20the%20Public.pdf (cited 2014 August 14)
18. WHO. www.empro.who.int/about-who/public-health-functions/health-promotion-disease-prevention.html (cited 2014 August 14)
19. CDC. https://www.cdc.gov/pictureofamerica/pdfs/picture_of_america_prevention.pdf (cited 2014 August 14)
20. Piepoli MF, Hoes AW, Agewell S, Albus C, Brotons C, Catapano L, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. *Atherosclerosis* 2016; 252: 207-274.

21. Veling W, De Haan L, Van Os J. Psychosesyndroom. In: Bak M, Domen P, Van Os J, red. Innovatief leerboek persoonlijke psychiatrie. Leusden: Diagnosis Uitgevers; 2017. P.375-85.
22. Tan N, Van Os J. Schizofreniespectrum en andere psychotische stoornissen in DSM-5. Tijdschrift voor Psychiatrie 2014;56(3):167-72.
23. Leucht S, Tardy M, Komossa K, Heres S, Kissling W, Salanti G, et al. Antipsychotic drugs versus placebo for relapse prevention in schizophrenia: a systematic review and meta-analysis. Lancet 2012;379:2063-71.
24. Lieberman JA, Stroup TS, McEvoy JP, Swartz MS, Rosenheck RA, Perkins DO, et al. Effectiveness of Antipsychotic Drugs in Patients with Chronic Schizophrenia. N Engl J Med. 2005;353:1209-23.
25. Higashi K, Medic G, Littlewood KJ, Diez T, Granström O, De Hert M. Medication adherence in schizophrenia: factors influencing adherence and consequences of nonadherence, a systematic literature review. Ther Adv Psychopharmacol. 2013;3:200-18.
26. Kemp R, Hayward P, Applewhaite G, Everitt B, David A. Compliance therapy in psychotic patients: randomised controlled trial. BMJ 1996;312:345-9.
27. Kemp R, Kirov G, Everitt B, Hayward P, David A. Randomised controlled trial of compliance therapy. 18-month follow-up. Br J Psychiatry. 1998;172:413-9.
28. O'Donnell C, Donohoe G, Sharkey L, Owens N, Migone M, Harries R, et al. Compliance therapy: a randomised controlled trial in schizophrenia. BMJ. 2003;327:834.
29. Corrà U, Piepoli MF. Secondary prevention: where are we. Eur J Prev Cardiol. 2017;24(3S):14-21.
30. Chow CK, Jolly S, Rao-Melacini P, Fox KAA, Anand SS, Yusuf S. Association of diet, exercise and smoking modification with risk of early cardiovascular events after acute coronary syndrome. Circulation 2010;121:750-8.

31. Snaterse M, Scholte op Reimer WJM, Dobber J, Minneboo M, Ter Riet G, Jørstad HT, et al. Smoking cessation after an acute coronary syndrome: immediate quitters are successful quitters. Neth Heart J. 2015;23(12):600-7.
32. Kotseva K, De Backer G, De Bacquer D, Rydén L, Hoes A, Grobbee D, et al. Lifestyle and impact on cardiovascular risk factor control in coronary patients across 27 countries: results from the European Society of Cardiology ESC-EORP EUROSPIRE V registry. Eur J Prev Cardiol. 2019;26:824-35.
33. Barkhof E. Motivation for adherence to treatment in chronic psychotic disorders. Intervention strategies and social cognitive factors. Doctoral thesis. Amsterdam; 2015.
34. Minneboo M, Lachman S, Snaterse M, Jørstad HT, Ter Riet G, Boekholdt SM, et al. Community-based lifestyle intervention in patients with Coronary Artery Disease: The RESPONSE-2 trial. J Am Coll Cardiol. 2017;70(3):318-27.
35. Schwalbe CS, Oh YH, Zweben A. Sustaining motivational interviewing: A meta-analysis of training studies. Addiction. 2014;109;1287-94.

CHAPTER 2

Selecting an optimal instrument to identify active ingredients of the motivational interviewing-process

Dobber J, Van Meijel B, Barkhof E, Scholte op Reimer W, Latour C, Peters R, Linszen D.

Journal of Psychosomatic Research 2015

ABSTRACT

Objective

Motivational Interviewing (MI) can effectively stimulate motivation for health behaviour change, but the active ingredients of MI are not well known. To help clinicians further stimulate motivation, they need to know the active ingredients of MI. A psychometrically sound instrument is required to identify those ingredients. The purpose of this study is to describe and evaluate the capability of existing instruments to reliably measure one or more potential active ingredients in the MI process between clients and MI-therapists.

Methods

We systematically searched MedLine, Embase, Cinahl, PsycInfo, Cochrane Central, specialised websites and reference lists of selected articles.

Results

We found 406 papers, 60 papers were retrieved for further evaluation, based on prespecified criteria. Seventeen instruments that were specifically designed to measure MI or aspects of MI were identified. Fifteen papers met all inclusion criteria, and reported on seven instruments that assess potential active ingredients of the interactive MI process. The capability of these instruments to measure potential active ingredients in detail and as a part of the interactive MI process varies considerably. Three of these instruments measure one or more potential active ingredients in a reliable and valid way.

Conclusion

To identify the potential active ingredients in the interactive MI process, a combination of the SCOPE (which measures potential technical active ingredients) and the GROMIT or the global ratings of the MISC2 (to measure potential relational ingredients) seems favourable.

INTRODUCTION

Currently, Motivational Interviewing (MI) is applied in a number of target populations and problem areas and benefits from an increasing popularity. It addresses a range of behaviours, such as reducing substance abuse, diet and exercise, and other lifestyle outcomes [1-6]. Evidence suggests that MI is effective, especially in substance use disorders [1-5]. However, questions such as "How does MI work?" and "What are the active ingredients of MI?" remain unanswered [1,3,5,7].

MI is "a collaborative counselling style for strengthening a person's own motivation and commitment to change" [8, p234]. It pays particular attention to the language of change, also called "change talk" (favouring change: e.g. "I probably should quit smoking") and "sustain talk" (favouring not changing: e.g. "I don't think I can quit"), which refers to statements in which the client expresses some kind of motivation for change. MI is a complex behavioural intervention [7,8], and MI sessions are complex processes of therapist utterances influencing client utterances and vice versa, in which the therapist continually makes choices in MI techniques and strategies. Through these techniques and strategies, the therapist elicits the client's own good reasons for change, discussed within a good client-therapist relationship, and by this the active ingredients of MI are applied in the therapeutic process. These active ingredients are "the key therapist strategies that facilitate positive change" [9, p860]. For MI, however, the active ingredients are not well known, although there are some indications for potential active ingredients from research [e.g. 10]. Currently, the ingredients of the MI-process are derived from MI-theory [7,11]. If we can measure the MI-process with a focus on these (potential) active ingredients, we may obtain a better insight in the actual active ingredients within the MI-process and how they influence the patient's behaviour. For this we need an instrument that measures the MI-process in a valid and reliable way, meaning that the instrument should represent these potential active ingredients.

The aim of the current literature review is to describe and evaluate the capability of existing instruments to measure one or more potential active ingredients of the interactive MI-process between clients and MI therapists in a valid and reliable way. Such an instrument should measure at least a part of the potential active ingredients of the MI-process.

Conform Miller and Rose [11], we distinguish a relational and a technical category of potential active ingredients. In the "relational category" appreciation of the client-therapist-relationship, well-timed and skilfully performed empathic understanding and MI-Spirit (a composition of partnership, acceptance, and compassion), are associated with better outcomes [10-12]. The "technical category" comprises the use of MI-techniques and strategies to evoke client change talk. MI-consistent behaviour is associated with more client change talk, while MI-inconsistent behaviour is associated with more client sustain talk. And these client expressions are associated with treatment outcomes [8,10]. Amrhein et al. [13] found that client commitment statements predicted the effect of MI on drug use outcomes. Other client expressions, such as statements about reasons for change, and average strength of ability statements, may also be associated with improved outcomes [10,14-17]. These studies indicate that in MI client change talk may be related to "processes occurring within the client, the mechanism of change" [9, p860]. So, to promote change, the therapist employs the active ingredients to stimulate the mechanisms of change.

Although the processes underlying MI and its active ingredients remain unclear, some of the potential active ingredients relate to therapist behaviour or to client-change talk. Consequently, for process research, suitable instruments show (a) which relational and/or technical ingredients the therapist employs, and preferably also when and how the therapist uses these ingredients, *and/or* (b) the client motivational process, made visible through the client change talk or sustain talk. The instrument or the combination of instruments should enable the study of the effects of the therapist behaviour in detail, by evaluating its immediate effect on the client behaviour. To study this interactive MI-process, the order of

the therapist-client interaction must be maintained as much as possible to bring into focus the interactive process. If we can identify the active ingredients of MI, clinicians will be able to purposefully apply these active ingredients, which will enhance the effectiveness of MI. In the current literature review we will discuss the potential of the available instruments to measure (a part of) one or more potential active ingredients of the interactive MI-process. We will also evaluate the psychometric properties of these instruments.

METHODS

Literature search

We searched computerized databases (MedLine, Embase, Cinahl, PsycInfo, Cochrane Central), with the following search string, using free text search terms: ((motivation OR motivational) AND (interview OR interviewing) OR (motivational interviewing)) AND (intervention fidelity OR skill OR evaluation) AND (validity OR reliability). The searches covered the period from 1990 to December 2013. No additional limits were used. This search included the bibliographies on www.motivationalinterview.org. We also searched for relevant cross-references in the reference lists of the selected articles.

Selection and quality assessment

It may be possible that an instrument or a combination of instruments jointly disclose the interactive process. The instrument must provide sufficient information to allow inferences on therapist behaviour and strategies, and their effect on the client. All kinds of existent MI-instruments (e.g. training tools, research tools, proficiency measurement tools) may be suitable to contribute to this, on the condition that the instrument measures a potential active ingredient and/or its effect on the client in a valid and reliable (preferably expressed in Intraclass Correlation Coefficient/ICC or Kappa) way. Also, the measurement should be

detailed enough to gain insight in the interactive process. Coding systems that divide therapist and/or client behaviour in only two categories each (e.g. elicited change talk: yes/no), are considered to offer not enough information for this purpose. So we used the following inclusion criteria to select instruments for this review. (1) The instrument specifically addresses measuring the execution of MI, (2) the instrument brings into focus one or more potential active ingredients in the MI-process and/or their effect on client behaviour, (3) the measurements are based on observations, and (4) the instrument collects detailed information.

Two researchers independently selected the articles based on prespecified criteria (first selection on title and abstract, second selection on full text) and each read the full text of the selected articles to perform the quality assessment. In case of disagreement on the data, the text of the original paper was checked. The quality assessment focused on the procedures, as described in the articles that reported on the studies, to assess the risk of bias (RoB) that may have occurred in the process of reliability-testing of the instrument. Since we did not find a suitable checklist to assess the RoB in the development of instruments for complex behavioural interventions, we developed a structured assessment form that all researchers used for the quality assessment. This form is based on the assumptions that (1) the reliability sample should be randomly chosen, and (2) big enough to avoid selection bias. Also, to avoid information bias, (3) the coders should be trained well enough to be able to code this complex behavioural intervention in a reliable way. Finally, also to avoid information bias, (4) to maintain the acquired coding skills, and to keep coding reliably, supervision or regular coding meetings are necessary. Hence, our structured RoB-form assessed (a) the sampling method (random or nonrandom), (b) the size of the reliability sample (the proportion of the sessions that was used to measure the inter-rater agreement), (c) the duration of the coder training (number of hours), and (d) the existence of ongoing supervision/coder meetings during the coding period.

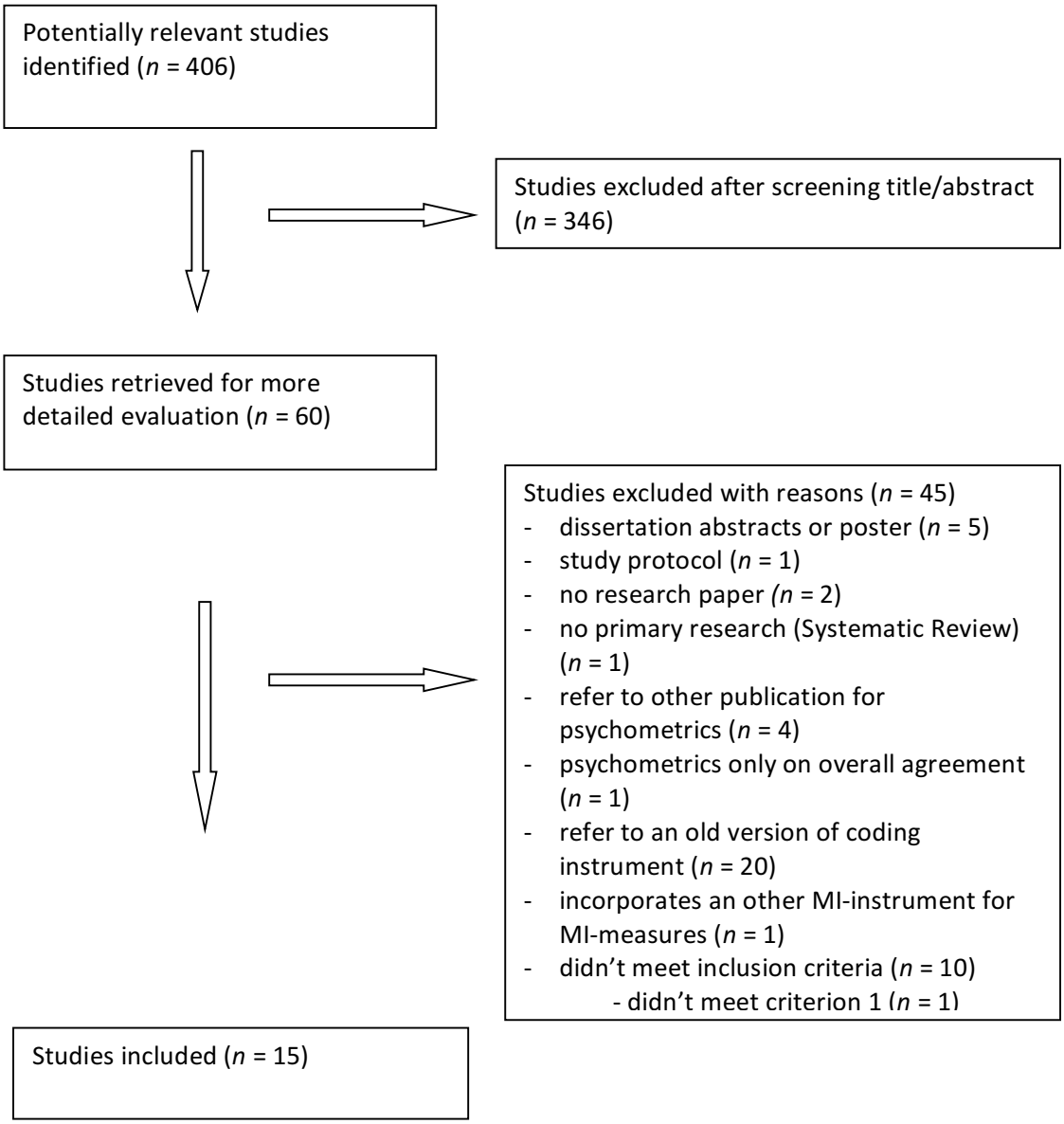
Data extraction

The same two researchers each independently extracted the data from the selected studies and from the instruments, via a structured data extraction form. The collected data of interest included the goal of the instrument, the ingredients that are measured, the method(s) of measuring (e.g. Likert scales, behaviour counts), and all information on reliability and validity measures.

Level of detail

We categorized the instruments in two categories to differentiate in level of detail: 1. instruments collecting information with a low level of detail (dividing client and/or therapist behaviour in two broad categories each), 2. instruments collecting detailed information (dividing client and/or therapist behaviour in three or more categories each).

Figure 1. Flow diagram



RESULTS

The systematic literature search identified 406 potentially relevant papers. Many of these papers were not on MI, or were RCTs in which the process of MI had not been measured. Sixty papers were retrieved in full text for further evaluation, revealing seventeen instruments that were specifically designed to measure MI or aspects of MI (table 1). One instrument didn't meet the first inclusion criterion because it measures behaviour change counselling (which does not strategically elicit change talk and develop discrepancy) instead of MI [19]. Three instruments are coding responses to scenarios, vignettes or simulated patients [20,32,39,40], and did not meet criterion 2. Two instruments measure through client opinion [22,37], and not through observations (criterion 3), and three instruments collect information with a low level of detail [21,23,36] (criterion 4). Finally, one instrument incorporates an other instrument (the MITI) to measure the MI-elements [35]. The eleven papers reporting on these ten instruments were excluded.

Fifteen papers reporting on the seven remaining instruments, met our inclusion criteria, and were included in this study (figure 1). Each of these instruments may measure at least one potential active ingredient, and may contribute to measure this ingredient in the interactive MI-process.

Table 1: Instruments

Instrument	Inclusion criteria*				Short description of the instrument	Goal of the instrument
	1	2	3	4		
BECCI (Behaviour Change Counselling Index) Lane et al. [19]	-	+	+	+	Eleven 5-point scales on therapist skills.	To measure practitioner competence in behaviour change counselling (BCC), an adaptation of motivational interviewing suitable for brief consultations in healthcare settings.
CASPI (Computer Assessment of Simulated Patient Interviews) Baer et al. [20]	+	-	+	+	A combination of dichotomous codes and a 5-point scale on therapist skills: reflective listening, responding to sustain talk, responding to change talk, eliciting change talk, affirming, summarizing.	To assess MI skills through a web-based assessment.
CBCCAI (Combined Behavioral Change Counseling Assessment Instrument) Strayer et al. [21]	+	+	+	-	Twenty-three closed (yes/no) questions on components, therapist tasks and therapist skills.	To evaluate the fidelity and quality of brief behavioural change interventions based on the 5A's, Stages of Change, or MI.
CEMI (Client Evaluation of Motivational Interviewing) Madson et al. [22]	+	+	-	+	Thirty-five 4-point scales on therapist behaviour, rated by the client.	To provide feedback and basis for supervision by assessing client perception of clinician MI use.
CLEAR (Client Language Easy Rating Coding System) Glynn & Moyers [23]	+	+	+	-	Tallies of client behaviour, divided in change talk and counter change talk.	To classify and quantify client language that is either change talk or counter-change talk.
GROMIT (Global Rating of Motivational Interviewing Therapist) Moyers [24]; Resko et al. [25]	+	+	+	+	Fifteen 7-point scales on therapist skill and MI-competence.	To measure MI-therapist skill, responsiveness and overall competence.
ITRS (Independent Tape Rating Scale) Martino et al. [26,27]	+	+	+	+	Thirty-nine 7-point scales, thirty-seven on therapist adherence and competence to MI or common drug counselling, and general therapist and two on client motivation. The 37 therapist-items are scored twice: on adherence and on competence.	To evaluate the therapists use of MI strategies, techniques inconsistent with MI, and general substance abuse monitoring.
MIPC (Motivational Interviewing Process Code) Barsky & Coleman [28]	+	+	+	+	Thirteen 5-point scales on functional MI-skills, and twelve 5-point scales on dysfunctional MI-skills.	To measure student competencies in MI skills.

MISC 2.0/2.1 (Motivational Interviewing Skill Code) Miller et al. [29,30]	+	+	+	+	Three 7-point scales to score the global impression of the therapist on Acceptance, Empathy, and MI-Spirit; One 7-point scale to score the client self-exploration; Behaviour counts on therapist and client utterances; Strength coding of client utterances; Coding of direction of client utterances (towards or away from the target behaviour); Summary scores, indicating the quality of MI.	To evaluate the quality of MI from audiotapes and videotapes of individual counselling sessions.
MIST-ED (Motivational Interviewing Scenarios Tool for Eating Disorders Sepulveda et al. [31]	+	-	+	+	Nine response categories (4 MI adherent, 4 MI non-adherent, 1 other) to classify the statements.	To assess the MI-skills of caregivers of adolescents with eating disorders.
MISTS (Motivational Interviewing Supervision and Training Scale) Madson et al. [32]	+	+	+	+	Behaviour counts of types of therapist responses uttered during sessions; Sixteen 7-point scales on the quality, MI fidelity and effectiveness on therapist interventions.	To assist in training and supervision of therapists by measuring the quality, fidelity and effectiveness of the MI sessions.
MITI 3.1.1 (Motivational Interviewing Treatment Integrity) Moyers et al. [33]	+	+	+	+	Three 5-point scales to capture the overall impression on MI-Spirit (a composition of 3 sub-scales), Empathy and Direction. Behaviour counts of therapist utterances divided in Giving Information, MI Adherent, MI Non-adherent, Question (open/closed), Reflection (simple/complex). Therapist proficiency summary scores.	To evaluate the competence of the therapist in performing MI.
PCCCS (Patient-Centered Communication Coding System) Ledoux et al. [34]	+	+	+	+	Four 5-point scales to capture the overall impression on Collaboration, Autonomy, Direction, and Empathy; Behaviour counts on 12 categories on (positive/negative) therapist utterances, based on Patient-Centred Communication.	To assess patient-centred communication techniques as a process evaluation of fidelity.
PEPA (Peer Proficiency Assessment) Mastroleo et al. [35]	+	+	+	-	Behaviour counts of Questions (open/closed) and Reflections (simple/complex).	To examine MI-adherence in undergraduate student peer delivered interventions.
REM (Rating Scales for the Assessment of Empathetic	+	+	-	+	Nine 7-point scales, rated by the client. Six of these nine scales are	To assess empathy and confrontation in physician-patient interactions.

Communication in Medical Interviews) Nicolai et al. [36]					directed to Empathy, three scales are directed to Confrontation.	
SCOPE (Motivational Interviewing Sequential Code for Observing Process Exchanges) Martin et al. [37]	+	+	+	+	Sequential coding of therapist utterances and client utterances; Coding of direction of therapist and client utterances (towards or away from the target behaviour); Summary scores, indicating the quality of MI.	To encode recorded and transcribed MI interactions between a therapist and an individual client, with a particular focus on the sequential information contained in the exchange between the parties, for the purpose of investigating the relationship between theoretical constructs important to MI, therapy process more generally, and client outcome.
VASE/VASE-R (Video Assessment of Simulated Encounters) Rosengren et al. [38,39]	+	-	+	+	Five subscales on Reflective Listening, Responding to Resistance, Summarizing, Eliciting Change Talk, Developing Discrepancy. Together the five subscales comprise eighteen 3-point items.	To assess the overall MI skill and 5 MI micro skills through video vignettes.

*1. The instrument specifically addresses measuring the execution of MI; 2. the instrument brings into focus one or more active ingredients in the MI-process, and/or its effect on client behaviour; 3. the measurements are based on observations; 4. the instrument collects detailed information

Quality / Risk of bias

Table 2 presents the RoB of the included studies. In general, there was a low RoB for sampling method, duration of training, and supervision. For more than half of the included studies however, the sample size of the sessions included to measure the inter-rater agreement leads to a high or unclear RoB.

Table 2: Risk of bias[1] and inter-rater agreement

Study	Instru-ment	Size reliability sample[2]	Sampling method[3]	Duration of coder training[4]	Super-vision[5]	Inter-rater agreement (ICC-range[6])
Moyers [24] and Resko et al. [25]	GROMIT	L	L	L	L	Global ratings: .41-.82
Martino et al. [26]	ITRS	H	L	L	U	MI-consistent skills: .66-.99 MI-inconsistent skills: .55-.98 Client motivation: .96-.96
Barsky & Coleman [28]	MIPC	U	H	U	U	percentage[7] inter-rater agreement functional skills: 51.27% percentage inter-rater agreement dysfunctional skills: 75.03%
Gaume et al. [16,40] and Bertholet et al. [41]	MISC 2.0	L	L	L	L	Global ratings: .50-.62 Therapist MI-consistent: .56-.82 Therapist MI-inconsistent: .22-.48 Therapist neutral: .36-.83 Client behaviour: .71-.77 Strength of change talk[8]: 38-.75
Campbell et al. [15]	MISC 2.0 modified	H	H	H	L	Global ratings: poor[9] Client behaviour: .75-.80 Strength of change talk[10]: .50-.78
Gaume et al. [42]	MISC 2.1	L	L	L	L	Therapist MI-consistent: .43-.91 Therapist MI-inconsistent (total): .79 Therapist neutral: .70-.89 Client behaviour: .66-.79
Vader et al. [43]	MISC 2.1	L	L	L	U	Global ratings: -.20-.67 Therapist MI-consistent (total): .96 Therapist MI-inconsistent (total): .07 Client behaviour: .84-.87
Kaplan et al [44]	MISC 2.1	U	U	U	L	Client behaviour: .72-.74
Madson et al. [32]	MISTS	L	L	H	U	Specific active listening skills: .41-.81 Specific skills MI-Spirit: .45-.74 Overall therapist ratings: .66-.76
Seng & Lovejoy [45]	MITI 3.1.1	H	U	L	L	Global ratings: .20 Behaviour counts: .77-.90
Kaplan et al [44]	MITI 3.1.1	U	U	H	L	Global ratings: .61-.74[11,12] Behaviour counts: .18-.76[6]
Moyers & Martin [46]	SCOPE	H	L	L	L	Therapist MI-consistent: .66[11] Therapist MI-inconsistent: .68[11] Therapist – other behaviour: .82[11] Client change talk: .79[11] Client counter change talk: .60[11] Client – neutral/ask: .79[11]
Moyers et al. [47]	SCOPE	L	L	L	U	Sequential coding of utterances: .56-.87[11] Frequency therapist MI-consistent: .49-.98[6] Frequency therapist MI-inconsistent: .79[6] Frequency client behaviour: .88-.96[6]

[1]Risk of Bias: L = low risk of bias; H = high risk of bias; U = Uncertain risk of bias.

[2]Proportion sample size: L = a proportion of at least 20%; H = a proportion of less than 20%; U = proportion not reported.
[3]Sampling method: L = all sessions or random; H = non-random methods; U = sampling method not reported.
[4]Duration of coder training: L = 35h of more, or training until sufficient inter-rater agreement was achieved; H = <35h; U = duration of coder training not reported.
[5]Supervision: L = supervision or coder meetings; H = no supervision or coder meetings; U = supervision or coder meetings not reported.
[6]ICC = Intraclass Correlation Coefficient. The interpretation of the ICC is: below 0.40 = poor; 0.40 to 0.59 = fair; 0.60 to 0.74 = good; 0.75 to 1.00 = excellent [48].
[7]ICC not computed.
[8]Average change talk strength (+5 to -5).
[9]All Global ratings were poor. ICCs not reported.
[10]Average change talk strength (+3 to -3).
[11]Kappa, not ICC. The interpretation of Kappa is: below 0.21 = poor; 0.21 to 0.40 = fair; 0.41 to 0.60 = moderate; 0.61 to 0.80 = substantial; 0.81 to 1.00 = good [49].
[12]measures were recoded as a match if the measure between raters differed by one increment on this 5-point scale.

Coding instruments

Below, we will review the seven included instruments on the ingredients they measure, how they measure these ingredients, and their psychometrics.

Global Rating of Motivational Interviewing Therapist (GROMIT)

The GROMIT [24] mainly concentrates on the relational ingredients, with an emphasis on MI-Spirit. It rates the therapist skill through fifteen 7-point scale-items, such as “The therapist directed the client’s attention toward their own strengths”. The extremes and the middle of the 7-point scales are defined: “Do not agree”, “Somewhat agree”, “Fully agree”. The inter-rater agreement of the GROMIT-scales is fair to excellent [25] (table 2).

Independent Tape Rating Scale (ITRS)

The ITRS [26], consists of 39 items to be scored on a 7-point scale, and addresses several potential active ingredients. Its main focus is on the technical ingredients, measuring MI-consistent (MICO) and MI-inconsistent (MIIN) therapist behaviour. Two items measure

relational ingredients, and are directed at MI-Spirit and at empathic understanding. Finally, two items evaluate the clients' motivational level. There are also IRTS-items that do not assess MI, but assess general substance abuse counselling interventions, and general characteristics of the therapists and the clients [27].

The twenty MI-items are scored on both adherence (1 = not at all, 7 = extensively) and competence (1 = very poor, 7 = excellent), leading to 42 scores including the two motivational level scores. The inter-rater agreement of those items is fair to excellent [26] (table 3).

Motivational Interviewing Process Code (MIPC)

The MIPC is a training tool that consists of two lists ("functional skills", "dysfunctional skills") [28]. Both lists combine items directed at technical and at relational ingredients. Each item must be scored at a 5-point scale, for which all points are defined. The authors computed the percentage of inter-rater agreement, and they found low percentage of agreement [28] (table 2).

Motivational Interviewing Skill Code 2.0 and 2.1 (MISC)

The MISC measures both therapist and client behaviour [29,30]. It measures the relational ingredients by 7-point Global Counsellor Rating scales, evaluating the extent to which the therapist communicates acceptance, empathy and MI-Spirit, and by one Global Client Rating ("client self-exploration").

For the technical ingredients, the coder counts the utterances of the therapist [29], and classifies these utterances in 19 categories that are either MICO (e.g. "reflect"), MIIN (e.g. "confront"), or neutral (e.g. "structure"). This also enables the coder to determine the therapist proficiency and the degree of intervention fidelity of the therapist, by calculating the summary scores of the MISC (e.g. percentage MICO responses).

Furthermore, the coder counts client responses (e.g. “expressing ability”), and determines the direction (towards or away from behaviour change) of the change talk. For this, the MISC 2.0/2.1 incorporated the Commitment Language Coding System developed by Amrhein et al. [13,29,30]. All responses are categorized in eight codes for client behaviour counts, reflecting the degree of the client’s willingness, ability and readiness to change. The coding of the strength of client utterances is optional because in the MISC 2.0-version the reliability on these strength ratings was hard to establish [29].

Though the inter-rater agreement for the global ratings varies between studies [15,16,43], the high-quality study of Gaume et al. [16], showed that the training in scoring of the global ratings may lead to a fair to good level of agreement. Other studies [15,43] found mainly poor agreement on these global ratings (table 2).

In the MISC, behaviour counts of therapist and client show the total number of codes that each coder has assigned to specific behaviour categories. The inter-rater agreement of the separate behaviour counts of the subcategories of MICO and MIIN showed a pattern of wide variation between studies. Again, the studies of Gaume et al. [16,42] showed that training in the coding of separate MICO subcategories led to fair to excellent inter-rater agreement, while the coding of the MIIN behaviours are much more difficult to train, probably because of the rare occurrence of MIIN behaviour in the coded sessions (poor to excellent) [16,42] (table 2).

The eight client behaviour codes are either change talk, sustain talk, or neutral. On these counts the ICC varied from good to excellent [42,43]. The inter-rater agreement for the average of the strength ratings of client behaviour varied from poor to excellent [15,16] (table 2).

Motivational Interviewing Supervision and Training Scale (MISTS)

The MISTS is primarily a training tool [32]. The instrument measures both relational and technical ingredients. The technical ingredients are measured through eight categories of therapist behavioural counts (e.g. “simple reflection”), and by some of the sixteen global ratings. The other global ratings measure relational ingredients (e.g. “collaborating with client”), focusing on therapist behaviour. One global rating is directed towards client behaviour, and one rates the fidelity to MI.

The global ratings are scored on 7-point scales, with defined anchors on point 1, 4, and 7. The inter-rater agreement for the global ratings is fair to excellent [32] (table 2). There is no information on the inter-rater agreement on the behavioural counts.

Motivational Interviewing Treatment Integrity (MITI)

In the introduction to MITI 3.1.1 [33] the authors underline that the MITI is designed as a treatment integrity and feedback instrument. The MISC, the “parent instrument” of the MITI, is more useful for detailed MI-process research [33].

The recent 3.1.1-version of the MITI uses a random 20-minute section for coding and for scoring the global ratings. It measures relational ingredients by 5-point global rating scales. All anchors are defined on each scale. Technical ingredients are measured by therapist behaviour counts, divided in eight categories. These categories focus on the most important therapist behaviours in MI. All above-mentioned measures contribute to calculate the summary scores, which reveal the proficiency and the fidelity in MI of the therapist.

Two studies [44,45] evaluated the inter-rater reliability of the MITI 3.1.1. In one study, the ICC for the global ratings is 0.20 [45]. This poor inter-rater reliability is probably influenced by the limited variability in the scores on the global ratings. Kaplan et al. [44] found substantial inter-rater agreement for all global ratings, in this study the measures were recoded as a match if the difference between the raters was one point on the 5-point scale.

The inter-rater agreement scores for the therapist behaviour counts are all excellent in one study [45], and poor to excellent in the second study [44]. These differences may be influenced by differences in coder training time (table 2).

Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE)

The SCOPE was developed to code and investigate sequential information on MI [37]. The SCOPE elaborates on the MISC, and adds the coding of direction (positive, neutral, or negative) to the questions and reflections of the therapist [37]. The SCOPE measures technical ingredients in context: the impact of the therapist behaviour on the client, and vice versa, is visible through the sequential coding. The coder uses 19 therapist behaviour codes, and nine client behaviour codes. It is also possible to compute the same summary scores as in the MISC, to detect the MI-proficiency and the fidelity of the therapist.

Three studies [46,47,50] have described the psychometric properties of the SCOPE. Two of these studies [46,50] used the same sample, so the reliability of the SCOPE is computed in two studies [46,47]. These studies computed the reliability of the SCOPE at utterance-to-utterance level. A sequential coding system is reliable only if different coders assign the same code to the same utterance, whereas the reliability of the MISC, in which the codes usually are counted, refers to the agreement on the total score at session level. In the first small study [46], a moderate to good inter-rater agreement was found (table 2). For the second study [47] the authors reported an average Kappa of 0.75 with a range of 0.56-0.87 on the behaviour categories [18] (table 2).

Table 3 offers an oversight of the potential of the instruments to measure relevant information of MI-sessions.

Table 3. Summary table

Instrument	Potential relational active ingredients	Potential technical active ingredients	Client behaviour	Sequential coding	Strength coding	MI-quality / proficiency / fidelity
GROMIT [24]	X					
ITRS [26,27]	X	X				X
MIPC [28]	X	X				
MISC 2.0/2.1 [29,30]	X	X	X		X	X
MISTS [32]	X	X				X
MITI 3.1.1 [33]	X	X				X
SCOPE [37]		X	X	X	X	X

DISCUSSION

Our review suggests that a combination of instruments reliably measures different potential active ingredients of the interactive MI-process. According to Miller and Rollnick [7,8] the three fundamental characteristics of MI are: "(1) a person-centred, non-authoritarian counselling style (…), and (2) a clearly identified change goal (…), and (3) differential evoking and strengthening of the person's own motivation for change." [8, p235]. This suggests that the relational active ingredients contribute to the first characteristic, and that the instrument should measure MI-Spirit, empathic communication, and client-therapist relationship. The technical active ingredients should contribute to the third characteristic, therefore, the instrument should measure the techniques and strategies to evoke and strengthen the client change talk and diminish sustain talk. The instrument should also measure the effect of these techniques and strategies on the client: does the change talk increase and become stronger?

All instruments, except the SCOPE, measure potential relational active ingredients. These ingredients are measured by global rating scales, which are directed at MI-Spirit and at empathic understanding, although not always explicitly. None of the instruments has a direct measurement of the client-therapist relationship. And all instruments, except the GROMIT, measure potential technical active ingredients. Two instruments use global rating scales [26,28], three instruments measure the technical ingredients by behaviour counts [29,30,32,33], and one instrument uses sequential coding [37]. Rating scales can only give an impression of the overall use of techniques (e.g. "Open ended questions" [26]), and, therefore, they don't show the interactive process of the MI-session. Counts of therapist behaviour provide insight into intervention fidelity and therapist proficiency. If the counts are linked to client behaviour counts, they may show associations between the use of certain techniques and the proportion of client change talk and sustain talk. However, this doesn't reveal the immediate effect of therapist behaviour on client behaviour. For detailed process information, it is best that the order in which the behaviours of the therapist and the client occur has been retained. The sequential coding of the SCOPE provides this detailed information on therapist behaviours, on the impact on the client, and on adaptations of the therapists' strategies based on the client reactions. Also, the SCOPE reveals the direction of the questions and reflections of the therapist, which may facilitate interpretations on successful therapist strategies. The MISC can also be used for sequential coding, but the authors of the MISC advise the use of the SCOPE for sequential coding, as an instrument that reveals detailed information on the therapy process [29]. The MISC is the only instrument that measures the strength of client statements. Although it is hard to measure these strength ratings in a reliable way, several studies found associations between the strength of statements and client outcomes [13,15,16], so strength rating adds extra detail to the measurement of client behaviour.

In their paper on the impact of treatment fidelity on the (in)effectiveness of complex behavioural interventions, Miller and Rollnick [8] stress the importance of the deliverance of the right intervention content. Therapist proficiency and intervention fidelity will probably enlarge the presence of active ingredients in the intervention, and therefore, though the quality of the MI delivered is not an active ingredient in itself, the measurement of the fidelity may help to interpret the research findings. Five instruments measure this intervention fidelity, by global rating scales [26,32] or, more detailed, by summary scores [29,33,37].

The active ingredients must be valid and reliably measured. The inter-rater reliability of three instruments is within acceptable range and is computed under circumstances with low risk of bias (table 2). Of these, the GROMIT and the MISC both measure potential relational active ingredients, but 14 of the 16 global ratings of the GROMIT reach a good inter-rater agreement [25], while the inter-rater agreement of the four global ratings of the MISC is mostly fair [16]. The MISC and the SCOPE measure potential technical active ingredients. The reliability of the SCOPE on an utterance-to-utterance level is moderate to good. However, the research on the selected instruments is scarce. We found no studies establishing the validity of the GROMIT, MISC 2, and SCOPE. The studies we have found only concentrated on the reliability of the instruments. For the GROMIT, we found only one RCT in which the inter-rater agreement [25] of the GROMIT was established. For the MISC, the psychometrics on the MISC 2-versions rely heavily on the research by one research group [16,40-42]. The studies on the SCOPE show moderate to good reliability, but this instrument has only been tested by its developers. In addition, it must be taken in account that reliably assessing the strength of client speech is difficult, and there is a wide range of the *average* strength ratings (ICC-range 0.38 to 0.78) [15,16]. We could not find information on the reliability of strength coding on an utterance level. Finally, for statistical reasons, most studies have categorized the separate behaviours, but differ in the composition of these categories.

These are limitations of the present state of the art, and, although it hinders the interpretation and the comparison of the psychometrics between different studies, most of the values of the psychometrics are in the same range. This means that they are trustworthy enough to rely on for a decision on the choice of a research instrument.

Conclusions

In conclusion, the potential relational active ingredients can best be measured by the global ratings of the GROMIT, with global ratings of the MISC as an alternative option. The potential technical active ingredients can best be measured by the SCOPE, or by the MISC. These two instruments measure both therapist behaviour and client behaviour. The method of behaviour counts though, employed by the MISC, offers less information than the sequential coding of the SCOPE. The SCOPE also makes the direction of therapist behaviour visible, while strength ratings of client speech is only measured by the MISC. For the quality measuring of the intervention delivered, the summary scores of the MISC can be used.

We propose that future research applies a comprehensive approach to link the SCOPE as the only instrument for sequential coding, and the global ratings of GROMIT or of the MISC, the strength ratings of the MISC 2.1, and the summary scores of the MISC, to client outcomes. This can be used to evaluate the effectiveness of techniques, client-therapist relationship and empathic communication, which will lead to more effective use of MI, which in turn may lead to better outcomes for clients in clinical practice.

ACKNOWLEDGEMENTS

We would like to thank Lori Broere MSc for her help in the searching, selecting, quality assessment and data extraction, and Marjolein Snaterse MSc and Vera Kruse MSc for their help in the quality assessment and data-extraction.

REFERENCES

1 Hettema J, Steele J, Miller WR. Motivational interviewing. An Rev Clin Psychol 2005;1:91-111.

2 Rubak S, Sandbaek A, Lauritzen T, Christensen B. Motivational interviewing: A systematic review and meta-analysis. Br Gen Pract 2005;55:305-12.

3 Burke BL, Arkowitz H, Menchola M. The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. J Consult Clin Psychol 2003;71:843-61.

4 Hunt GE, Siegfried N, Morley K, Sitharthan T, Cleary M. Psychosocial interventions for people with both severe mental illness and substance misuse. Cochrane Database of Systematic Reviews 2013, Issue 10. Art.No.:CD001088. doi:10.1002/14651858.CD001088.pub3.

5 Lundahl B, Burke BL. The effectiveness and applicability of motivational interviewing: A practice-friendly review of four meta-analyses. J Clin Psychol: In Session 2009;65:1232-45.

6 Barrowclough C, Haddock G, Tarrier N, Lewis SW, Moring J, O'Brien R, et al. Randomized controlled trial of motivational interviewing, cognitive behavior therapy, and family intervention for patients with comorbid schizophrenia and substance use disorders. Am J Psychiatry 2001;158:1706-13.

7 Miller WR, Rollnick S. Motivational Interviewing. Helping people change. 3rd ed. New York: Guilford Press; 2013.

8 Miller WR, Rollnick S. The effectiveness and ineffectiveness of complex behavioral interventions: impact of treatment fidelity. Contemp Clin Trials 2014;37:234-41.

9 Morgenstern J, Kuerbis A, Amrhein P, Hail L, Lynch K, McKay JR. Motivational interviewing: A pilot test of active ingredients and mechanisms of change. Psychol Addict Behav 2012;26:859-69.

10 Apodaca TR, Longabaugh R. Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. Addiction 2009;104:705-15.

11 Miller WR, Rose GS. Toward a theory of motivational interviewing. Am Psychol 2009;64:527-37.

12 Miller WR, Benefield GR, Tonigan JS. Enhancing motivation for change in problem drinking: A controlled comparison of two therapists styles. J Consult Clin Psychol 1993;61:455-61.

13 Amrhein PC, Miller WR, Yahne CE, Palmer M, Fulcher L. Client commitment language during motivational interviewing predicts drug outcomes. J Consult Clin Psychol 2003;71:862-78.

14 Baer JS, Beadnell B, Garrett SB, Hartzler B, Wells EA, Peterson PL. Adolescent change language within a brief motivational intervention and substance use outcomes. Psychol Addict Behav 2008;22,570-5.

15 Campbell SD, Adamson SJ, Carter JD. Client language during motivational enhancement therapy and alcohol use outcome. Behav Cogn Psychother 2010;38:399-415.

16 Gaume J, Gmel G, Daeppen JB. Brief alcohol interventions: Do counsellors' and patients' communication characteristics predict change? Alcohol Alcohol 2008;43:62-9.

17 Martin T, Christopher PJ, Houck JM, Moyers TB. The structure of client language and drinking outcomes in Project MATCH. Psychol Addict Behav 2011;25:439-45.

18 Madson MB, Campbell TC. Measures of fidelity in motivational enhancement: A systematic review. J Subst Abuse Treat 2006;31,67-73.

19 Lane C, Huws-Thomas M, Hood K, Rollnick S, Edwards K, Robling M. Measuring adaptations of motivational interviewing: The development and validation of the behavior change counseling index (BECCI). Patient Educ Couns 2005;56:166-73.

20 Baer JS, Carpenter KM, Beadnell B, Stoner SA, Ingalsbe MH, Hartzler B, et al. Computer Assessment of Simulated patient Interviews (CASPI): Psychometric properties of a web-based system for the assessment of motivational interviewing skills. J Stud Alcohol Drugs 2012;73:154-64.

21 Strayer SM, Martindale JR, Pelletier SL, Rais S, Powell J, Schorling JB. Development and evaluation of an instrument for assessing brief behavioral change interventions. Patient Educ Couns 2011;83:99-105.

22 Madson MB, Mohn RS, Zuckoff A, Schumacher JA, Kogan J, Hutchison S, et al. Measuring client perceptions of motivational interviewing: factor analysis of the Client Evaluation of Motivational Interviewing scale. J Subst Abuse Treat 2013;44:330-5.

23 Glynn LH, Moyers TB. [Internet] Manual for the Client Language EAsy Rating Coding System: Formerly: "Motivational Interviewing Skill Code (MISC) 1.1" 2012. [cited 2014 January 9] Available from http://casaa.unm.edu/download/CLEAR.pdf

24 Moyers TB. [Internet] Global Rating of Motivational Interviewing Therapist (GROMIT). 2004. [cited 2013 March 28] Available from http://casaa.unm.edu/download/gromit.pdf

25 Resko SM, Walton MA, Chermack ST, Blow FC, Cunningham RM. Therapist competence and treatment adherence for a brief intervention addressing alcohol and violence among adolescents. J Subst Abuse Treat 2012;42:429-37.

26 Martino S, Ball SA, Nich C, Frankforter TL, Carroll KM. Community program therapist adherence and competence in motivational enhancement therapy. Drug Alcohol Depend 2008;96:37-48.

27 Martino S, Ball S, Nich C, Frankforter TL, Carroll KM. Correspondence of Motivational Enhancement Treatment Integrity Ratings among therapists, supervisors, and observers. Psychother Res 2009;19:181-93.

28 Barsky A, Coleman H. Evaluating skill acquisition in motivational interviewing: The development of an instrument to measure practice skills. J Drug Educ 2001;31:69-82.

29 Miller WR, Moyers TB, Ernst D, Amrhein P. [Internet] Manual for the Motivational Skill Code (MISC). Version 2.1; 2008. [cited 2013 October 27] Available from http://casaa.unm.edu/download/misc.pdf

30 Miller WR, Moyers TB, Ernst D, Amrhein P. [Internet] Manual for the Motivational Skill Code (MISC). Version 2.0; 2003. [cited 2013 March 28] Available from http://casaa.unm.edu/download/misc2.pdf

31 Sepulveda AR, Wise C, Zabala M, Todd G, Treasure J. Development and reliability of a Motivational Interviewing Scenarios Tool for Eating Disorders (MIST-ED) using a skills-based intervention among caregivers. Eat Behav 2013;14:432-6.

32 Madson MB, Campbell TC, Barrett DE, Brondino MJ, Melchert TP. Development of the Motivational Interviewing Supervision and Training Scale. Psychol Addict Behav 2005;19:303-10.

33 Moyers TB, Martin T, Manuel JK, Miller WR, Ernst D. [Internet] Motivational Interviewing Treatment Integrity 3.1.1 (MITI 3.1.1). 2010. [cited 2013 March 28] Available from http://casaa.unm.edu/download/MITI3_1.pdf

34 Ledoux T, Hilmers A, Watson K, Baranowski T, O'Connor TM. Development and feasibility of an objective measure of patient-centered communication fidelity in a pediatric obesity intervention. J Nutr Educ Behav 2013;45:349-54.

35 Mastroleo NR, Mallet KA, Turrisi R, Ray AE. Psychometric properties of the Peer Proficiency Assessment (PEPA): A tool for evaluation of undergraduate peer counselors' motivational interviewing fidelity. Addict Behav 2009;34:717-22.

36 Nicolai J, Demmel R, Hagen J. Rating Scales for the assessment of Empathic communication in Medical interviews (REM): Scale development, reliability, and validity. J Clin Psychol Med Settings 2007;14:367-75.

37 Martin T, Moyers TB, Houck J, Christopher P, Miller WR. [Internet] Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE). Coder's Manual 2005. [cited 2013 march 28] Available from http://casaa.unm.edu/download/scope.pdf

38 Rosengren DB, Baer JS, Hartzler B, Dunn CW, Wells EA. The video assessment of simulated encounters (VASE): Development and validation of a group-administered method for evaluating clinician skills in motivational interviewing. Drug Alcohol Depend 2005;79:321-30.

39 Rosengren DB, Hartzler B, Baer JS, Wells EA, Dunn CW. The video assessment of simulated encounters-revised (VASE-R): Reliability and validity of a revised measure of motivational interviewing skills. Drug Alcohol Depend 2008;97:130-8.

40 Gaume J, Gmel G, Faouzi M, Daeppen JB. Counsellor behaviours and patient language during brief motivational interventions: A sequential analysis of speech. Addiction 2008b;103:1793-800.

41 Bertholet N, Faouzi M, Gmel G, Gaume J, Daeppen JB. Change talk sequence during brief motivational intervention, towards or away from drinking. Addiction 2010;105:2106-12.

42 Gaume J, Bertholet N, Faouzi M, Gmel G, Daeppen JB. Counselor motivational interviewing skills and young adult change talk articulation during brief motivational interventions. J Subst Abuse Treat 2010;39:272-81.

43 Vader AM, Walters ST, Prabhu GC, Houck JM, Field CA. The language of motivational interviewing and feedback: Counselor language, client language, and client drinking outcomes. Psychol Addict Behav 2010;24:190-7.

44 Kaplan JE, Keeley RD, Engel M, Emsermann C, Brody D. Aspects of patient and clinician language predict adherence to antidepressant medication. J Am Board Fam Med 2013;26:409-20.

45 Seng EK, Lovejoy TI. Reliability and validity on a treatment fidelity assessment for motivational interviewing targeting sexual risk behaviors in people living with HIV/AIDS. J Clin Psychol Med Settings 2013;20:440-8.

46 Moyers TB, Martin T. Therapist influence on client language during motivational interviewing sessions. J Subst Abuse Treat 2006;30:245-51.

47 Moyers TB, Martin T, Houck JM, Christopher PJ, Tonigan JS. From in-session behaviors to drinking outcomes: A causal chain for motivational interviewing. J Consult Clin Psychol 2009;77:1113-24.

48 Cicchetti DV. Guidelines, criteria and rules of thumb for evaluating normed and standardized instruments in psychology. Psychol Assess 1994;6:284-90.

49 Petrie A, Sabin C. Medical statistics at a glance. 2nd ed. Oxford: Blackwell Publishing; 2005.

50 Moyers TB, Martin T, Christopher PJ, Houck JM, Tonigan JS, Amrhein P. Client language as a mediator of motivational interviewing efficacy: Where is the evidence? Alcohol Clin Exp Res 2007;31:40S-7S.

CHAPTER 3

Medication adherence in patients with schizophrenia: a qualitative study of the patient process in motivational interviewing

Dobber J, Latour C, De Haan L, Scholte op Reimer W, Peters R, Barkhof E, Van Meijel B.

BMC Psychiatry 2018

ABSTRACT

Background

Motivational interviewing (MI) may be an effective intervention to improve medication adherence in patients with schizophrenia. However, for this patient group, mixed results have been found in randomized controlled trials. Furthermore, the process of becoming (more) motivated for long-term medication adherence in patients with schizophrenia is largely unexplored.

Method

We performed a qualitative multiple case study of MI-sessions to analyse the interaction process affecting motivation in patients with schizophrenia. Fourteen cases of patients with schizophrenia, who recently experienced a psychotic relapse after medication-nonadherence, were studied, comprising 66 audio-recorded MI-sessions. In the MI-sessions, the patients expressed their cognitions on medication. We used these cognitions to detect the different courses (or patterns) of the patients' ambivalence during the MI-intervention. We distinguished successful and unsuccessful cases, and used the cross-case-analysis to identify success factors to reach positive effects of MI.

Results

Based on the expressed cognitions on medication, we found four different patterns of the patient process. We also found three success factors for the intervention, which were a trusting relationship between patient and therapist, the therapist's ability to adapt his MI-strategy to the patient's process, and relating patient values to long-term medication adherence.

Conclusions

The success of an MI-intervention for medication adherence in patients with schizophrenia can be explained by well-defined success factors. Adherence may improve if therapists consider these factors during MI-sessions.

BACKGROUND

About 75% of patients with schizophrenia discontinue their antipsychotic drug treatment within 18 months [1]. Antipsychotic drug treatment reduces the risk of relapse (RR=.35), and the risk of readmission (RR=.38) [2]. It also increases the risks of a movement disorder (RR=1.55), sedation (RR=1.50), and weight gain (RR=2.07) [2]. In a systematic review, Higashi et al. [3] found that lack of illness insight, beliefs about the effectiveness of medication, substance abuse, and the quality of the therapeutic relationship were important influencing factors. Enhancing patient motivation, by taking into account these factors, may be key to encouraging medication adherence.

Motivational Interviewing (MI) is an effective intervention to enhance motivation for behavioural change [4-8]. MI has been investigated as an intervention for medication adherence problems in patients with psychotic disorders. Although the results are mixed, MI shows promising results in several studies [9-12].

MI-interventions comprise four overlapping processes: engaging (establishing a trusting relationship), focusing (determining the target behaviour for change), evoking (eliciting patients' own good motives in favour of change: "change talk"), and planning (helping to move on to actual change) [13]. In MI-theory three critical components of motivation comprise (1) willingness/importance, (2) ability/confidence and (3) readiness to change [14]. Patients are often ambivalent, expressing conflicting motivations towards change. Supporting the patient to solve this ambivalence is an important task of the MI-therapist [13]. When applying MI, therapists intentionally influence these components to elicit intrinsic motivation and to enable behavioural change. Hereto the therapist communicates in an empathic style and with "MI-Spirit" (the core values of MI: partnership, acceptance, evocation and compassion) [13]. The "language of change" plays a major role in MI. MI-therapists elicit patient change talk in which the patient hears her/himself argue for change. Meanwhile therapists try to avoid "patient sustain talk" (in favour of status quo). To be

effective, the therapist tunes the MI-strategy to the patient's process of becoming more motivated. Specific knowledge of the nature of this process in patients with schizophrenia may help practitioners to improve their tuning of the motivational process in the MI-sessions and enhance the effects of MI for sustained medication adherence. Therefore, the aim of this current study is to explore the patient process of becoming (more) motivated in a group of patients with schizophrenia, who recently experienced a psychotic relapse after medication-nonadherence. We address the following questions: (1) Can different patterns of the patient process be distinguished in patients with schizophrenia? (2) Can successful cases be distinguished from unsuccessful cases? (3) How do successful cases differ from unsuccessful cases?

METHODS

Study design

We used a qualitative multiple case study [15] to discover and explore the patient's motivational process during MI-sessions. This design is an inductive interpretative study of cases, to promote understanding of psychosocial processes influencing the patient process of becoming motivated for long-term medication use.

The multiple case study analysis comprised three phases: single case analysis, cross case analysis, and cross case synthesis [15]. Each case consisted of (1) audio records of at least three MI-sessions, (2) coded transcripts, (3) global ratings of the therapist style and the patient self-exploration in each session, and (4) summary scores measuring therapist MI-fidelity.

Study population

The cases were derived from the intervention group of a Randomized Controlled Trial investigating the effect of MI on medication adherence in non-adherent patients with multi-episode schizophrenia, who had experienced a recent psychotic relapse, following nonadherence to antipsychotic treatment [9]. The 55 participants in the intervention group were offered up to nine MI-sessions to promote motivation for medication-adherence.

Data collection and analysis

In the original trial, MI-sessions were audio-recorded if the participant consented to this. In the present study, patients were included if there were at least three sessions audiotaped, and if the patient did not experience active psychotic symptoms (as demonstrated by dominant verbal references to current hallucinations or delusions) during the MI-intervention. Five therapists were involved: a psychiatrist, a psychologist, and three community mental health nurses. Neither of the therapists had previous experience in MI. They followed a 32-hour MI training by a certified MI-trainer (member of the Motivational Interviewing Network of Trainers), and participated in monthly supervision on MI-fidelity during the conduct of the trial.

All audio recordings were transcribed verbatim, and parsed into patient and therapist utterances. For coding, we used a combination of the Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE) [16] and the Motivational Interviewing Skill Code 2.1 (MISC 2.1) [17] (table 1). For each session, summary scores were computed to assess the quality of MI-execution [16-18]. The first author was trained in MISC-coding at the MI-coding lab of the Center for Alcohol and Addiction Studies, Brown University, USA. He subsequently trained the two coders (one master level, one bachelor level) for performing data-analysis in the present study. After a 37-hour training the coders reached a Kappa of .82 on behaviour codes. For the global ratings, we considered a maximum of one point

difference on the 7-point scales as an agreement, and a difference of more than one point as a disagreement. So, we dichotomised the scores to “agreement” and “disagreement”. After the training, the coders reached a Kappa of 1.0 on the global ratings. Transcripts were first broken down into separate encodable utterances (“parses”) by one coder. A second coder then coded the transcript in two passes. In the first pass, the coder listened uninterruptedly to the complete session, assigned the global ratings, and registered the optional MI-components (table 1). In the second pass, each parse was coded in one of the coding categories (table 1). Coding dilemmas were solved in weekly coder-trainer meetings. We randomly selected 10% (n=7) of the sessions for recoding by the same coder to verify intra-rater agreement (Kappa behaviour codes = .77; Kappa global ratings = 1.0), and 20% of the sessions (n=13), randomly selected, were double-coded for interrater agreement (Kappa behaviour codes = .71; Kappa global ratings = .84).

During the multiple case analysis, a detailed log was kept on the research process, the findings, and the decisions. The analyst (JD) used worksheets based on Stake [15] to structure the analysis, and composed case reports. Two other investigators (CL, BvM) independently scrutinized random subsets of these materials, to ascertain the appropriateness of the research process, and to assure the integrity of the findings, decisions, and conclusions. Also, another investigator independently double analysed two cases. In case of disagreement, the original data were checked and disagreements were resolved by discussion.

Table 1. Measures and coding instruments

Unit of measurement	**Measurement**	**Coding instrument**
Therapist	sequential coding of 20 verbal behaviours: question, reflection, advice with permission, permission seeking, affirm, emphasize control, support, advice without permission, confront, direct, opinion, raise concern, warn, facilitate, feedback, filler, self-disclosure, general information, structure, not encodable.	SCOPE (Motivational Interviewing Sequential Code for Observing Process Exchanges) [16]
	rating of 5 MI-core values and other relational ingredients on a 7-point global rating scale: acceptance, empathy, collaboration, evocation, autonomy.	MISC 2.1 (Motivational Interviewing Skill Code) [17]
	computing 5 summary scores: • ratio of reflections to questions, • percent open questions, • percent complex reflections, • percent MI-consistent techniques, • mean global ratings.	MITI 3.1.1 (Motivational Interviewing Treatment Integrity) [18] SCOPE SCOPE SCOPE SCOPE MISC 2.1
	registration of optional MI-components: decisional balance, importance ruler, confidence ruler, typical day/week, looking back, looking forward, exploring goals and values, querying extremes, developing change plan.	Registration: applied / not applied
Patient	sequential coding of 10 patient verbal behaviours: commitment, desire, ability, reasons, need, taking steps, other, ask, follow neutral, not encodable.	SCOPE
	rating of the level of patient self-exploration on a 7-point global rating scale.	MISC 2.1
	percent patient change talk.	SCOPE

Measurement of the motivational process

We considered shifts in the cognitions on medication during the MI-sessions as indicative for changes in the patient process of motivation for long-term medication adherence. The course of these cognitions during the MI-sessions was used to determine the pattern of the patient motivational process. We assumed that a trusting relationship between patient and therapist supports the patient to open up and talk freely about his/her experiences, goals, values, concerns and ambivalence related to medication adherence. This patient self-exploration is measured by a 7-point global rating scale [17]. We regarded a score of four or higher on this scale as an indication of a trusting relationship.

We deduced criteria to distinguish successful and unsuccessful cases from the aim of the MI-intervention in the original study, i.e. to enhance motivation for long-term medication adherence [9]. In this intervention, the therapist should support the patient to find and explore his/her reasons and motives for medication use, and help to relate medication adherence to the patient's values and goals. If at baseline the patient felt ambivalent about his/her long-term medication, the patient and therapist should explore this ambivalence, and, if appropriate, potential barriers. Hence, the patient may be able to solve the ambivalence or may find ways to handle perceived barriers in relation to medication adherence, based on intrinsic motivation. If the patient is not ambivalent, but takes a convinced position pro or against long-term medication use, the intervention should concentrate on either potential barriers and strengthening long-term motivation for medication adherence (in case of a motivated patient), or exploring possible goals and values in relation to medication adherence to find out if new perspectives on medication adherence can be evoked (in case of no motivation). Thus, three criteria for success applied to all cases, while other criteria depended on the baseline ambivalence and motivation (table 2).

Finally, we compared the determined patient motivational processes with the outcomes on the medication adherence item of the Life Chart Score [19] (LCS, range 1-5, higher scores indicating higher levels of adherence) in the original RCT at 6-month follow-up [9].

Table 2. Criteria for success

Criteria	**Ambivalent at baseline**	**Not ambivalent at baseline**	
		motivated for MA[1]	**no motivation for MA[1]**
During the MI-sessions the patient has seriously considered what his/her motives are (not) to adhere to long-term medication.	X	X	X
Existing ambivalence and/or potential barriers are explored.	X	X[2]	
Values and goals are explicitly discussed in relation to medication adherence.	X	X	X
The patient solved the ambivalence and/or has an action plan for perceived barriers.	X		
Long-term motivation was strengthened.		X	
The decision (not) to adhere is based on intrinsic motivation: the patient articulates the intention (not) to adhere to long-term medication, based on motives that are valid to the patient.	X	X	X

[1]MA = Medication adherence

[2]Exploration of potential barriers

RESULTS

The inclusion criteria led to a sample consisting of 66 audiotaped sessions of 14 of the 55 participants of the original trial. The participants' background characteristics are listed in table 3. Based on MI-theory, we distinguished eight possible patterns of the patient process (table 4).

Table 3. Background characteristics

	Number (%) n=14
Gender: male	10 (71%)
Age: mean (range)	35.5 (23-48)
21-30	4 (28.5%)
31-40	6 (43%)
41-50	4 (28.5%)
Ethnicity	
Dutch	6 (43%)
Surinamese	4 (28.5%)
African	3 (21.5%)
Asian	1 (7%)
Native language is Dutch	
Yes	9
No	5
Highest education	
primary education or less	2 (14%)
secondary education	10 (71%)
tertiary/further education	2 (14%)
Duration of illness: mean in years (range)	6,9 (1-23)
Number of prior psychiatric admissions: mean (range)	3,4 (0-8)
Diagnosis (subtype schizophrenia, DSM-IV)	
disorganized type	2
paranoid type	6
residual type	1
undifferentiated type	1
schizoaffective disorder	4

Table 4. Patterns of the patient process

Baseline	**Development of patient process during MI-sessions**			**Observed cases in this pattern**
Not-ambivalent	Remained not-ambivalent		Motivation for medication adherence	cases 9, 10, 11, 12
			No motivation for medication adherence	cases 3 and 7
	Became ambivalent	Ambivalence, solved	Motivation for medication adherence	no cases
			No motivation for medication adherence	no cases
		Ambivalence, not solved		no cases
Ambivalent		Ambivalence, solved	Motivation for medication adherence	cases 5, 13, 14
			No motivation for medication adherence	no cases
		Ambivalence, not solved		cases 1, 4, 6, 8

Based on 13 cases. The pattern in case 2 remained unclear.

All patients expressed cognitions on medication use. Overall, 213 cognitions were classified in four categories: (1) cognitions supporting motivation for long-term medication use (n=90); (2) cognitions containing reasons to stop (n=58); (3) cognitions reflecting doubt or ambivalence (n=19); and (4) other cognitions (n=46). Based on the course of the expressed cognitions during the MI-sessions, we detected four of eight theorized patterns of the patient process of becoming motivated (table 4). In one case, we were not able to detect a pattern because the patient avoided serious conversations regarding medication adherence. Four cases followed the pattern 'Ambivalent – not solved'. In the nine other cases, the patient was not ambivalent (six cases) or resolved his/her ambivalence during the MI-sessions (three cases).

Based on the criteria, we considered four cases to have run through 'a successful patient process' (table 5). Hereafter we first discuss the similarities and differences between the

four patient processes that we observed, and next we discuss the characteristics of the successful and unsuccessful cases.

Table 5. Successful and unsuccessful cases

Criteria	Serious and explicit consideration of motives	Exploration of ambivalence and/or potential barriers	Explicit discussion of values and goals in relation to MA[1]	Ambivalence was solved and/or action plan was made	Strengthening of long-term motivation	Decision based on intrinsic motivation
Cases with ambivalence at baseline						
1	+	-	-	-		+
4	+	-	-	-		-
5	+	+	+	+		+
6	+	-	-	-		-
8	+	-	-	-		-
13	+	-	-	+		-
14	+	+	+	+		+
Cases without ambivalent at baseline, motivated for MA						
9	+	-[2]	-		-	-
10	+	+[2]	+		+	+
11	-	-[2]	-		-	-
12	+	-[2]	-		-	-
Cases without ambivalence at baseline, no motivation for MA						
3	+		+			+
7	-		-			-
Case in which the client avoided a serious conversation on MA						
2	-	-	-	-	-	-

[1]MA = Medication adherence

[2]Exploration of potential barriers

+ means: this criterion was met during the MI-sessions

- means: did not meet this criterion during the MI-sessions

Pattern 1: Not ambivalent, motivated for medication adherence

In this pattern, the four patients (cases 9, 10, 11 and 12) have in common that, from the start of the intervention, they expressed cognitions that support motivation for long-term medication use (table 6a). So, at first glance, they don't seem to need the MI-intervention. However, the task of the MI-therapist is also to maintain and strengthen motivation and

explore potential barriers. This only happened in case 10 (successful case), where the therapist guided the patient to explain how he stays in control, and how medication helps him "to have a better life". The patient stressed the value of this argument for medication adherence: "even if I'll have to use medication four more years", thus strengthening his long-term motivation.

Pattern 2: Not ambivalent, no motivation for medication adherence

This patient's process is characterized by dominating cognitions, through all MI-sessions, on reasons to stop medication (table 6b). In one case a language barrier hindered the execution of MI, and the therapist and patient failed to engage with each other (case 7). In the other case (case 3, successful case) therapist and patient explored both the patient's motives to stop the medication as well as alternative perspectives on the benefits of medication. However, this conversation did not evoke new cognitions on medication. As a result, the patient held on to his decision to stop the medication as soon as possible.

Pattern 3: Ambivalence solved, motivated for medication adherence

In three cases (5, 13 and 14) the patients' cognitions switched during the MI-sessions from doubt and ambivalence to needing long-term use of medications because of their effects (table 6c). In the cases 5 and 14 (successful cases), this happened after exploring both sides of the ambivalence. Guided by the therapists' open-ended questions and complex reflections, these patients discovered the relations between medication adherence, indirect benefits of medication and of relapse prevention, and important goals and values for them. This seemed to be key for the patients in solving their ambivalence. One patient saw medication as a strong protector against psychosis, but she felt that medication influenced her emotions, feeling "a little muted" and "not feeling completely myself". However, "Keeping my job" and "Autonomy" were important values for her, as she wanted to stay in

control, and so she employed a self-developed minimal dosing strategy. But sometimes the dose was too low, resulting in a relapse. Through the sessions this ambivalence shifted to "If I use an optimal dose keeping me stable, and helping me to function well in my job, I can learn to accept that I am a little muted and a little slower." (case 5).

In case 13, during the last session, the patient also switches his cognitions from 'doubt/ambivalence' to 'needing medication for its effect'. But this switch had not been preceded by an exploration of the ambivalence by the patient, nor was medication linked to the patient's values. Hence, the base of intrinsic motivation for this patient's decision to adherence is unclear.

Pattern 4: Ambivalent, not solved

These four patients (cases 1, 4, 6 and 8) expressed cognitions showing doubt and ambivalence (table 6d). In two cases (cases 4 and 8) the patient and therapist did not succeed in building a trusting relationship, and their conversations remained superficial. Both patients accepted the present need to take medication because external factors (the treating physician; being subjected to compulsory treatment) demand this. But they also set a one year limit as an acceptable period of time for medication use, with the intention to stop.

In all four cases the patient process stagnated after expressing the ambivalence towards, or barriers for, long-term medication use. The therapist and the patient kept going around in circles about the pros and the cons, and were not able to explore and solve the ambivalence.

Table 6. Examples of courses of cognitions on medication through the sessions*

Table 6a: Pattern 1 Not ambivalent, motivated for medication adherence (case 12)

Session 1
- I fear the way people, like colleagues or a potential partner, will look at me if they know I'm being treated.
- I'm not going to quit medication.

Session 2
- Medications prevent me from experiencing a relapse in psychosis.
- For the time being I need medication.

Session 3
- Provisionally, I'll stay on medication, I might never quit.
- There are so many people taking medication.

Session 4
- No cognitions on medication expressed in this session.

Table 6b: Pattern 2 Not ambivalent, no motivation for medication adherence (case 7)

Session 1
- The medication causes me a lot of trouble, makes me tired and gives me too much saliva.
- I don't think those medications are important for me.

Session 2
- This medication is bad, I don't need it, I quit using it.
- I'm fine if I don't use medication.

Session 3
- Sometimes, medication is important.
- When I live at home, I won't use medication.

Session 4
- I want to quit medication, I'm fine.

Table 6c: Pattern 3 Ambivalence solved, motivated for medication adherence (case 14)

Session 1
- It makes sense to take medication and I need it, but the dose should not be too high.
- Medications have effect, but they also cause side effects. When are the gains bigger than the harm?

Session 2 (no audio track available)

Session 3
- Medication makes me feel less myself.
- Medication helps me to experience positive periods of time.

Session 4
- Medications should be used wisely, I should not experiment with it.
- I need to use this medication dose because the impact of psychosis on my life is so big, so I need to prevent that from happening.

Table 6d: Pattern 4 Ambivalent, not solved (case 4)

Session 1
- When things are going better, I stop taking my pills.
- When I'm feeling fine, this is not just caused by the pills, but also because I'm taking good care of myself.

Session 2
- No cognitions on medication expressed in this session.

Session 3
- I'm not sure if the medications have an effect.
- I don't want to be a guinea pig by unceasing changing of my medication, not knowing their effects.

Session 4
- It would be much easier to accept medication if it didn't cause side effects.

Session 5
- No cognitions on medication expressed in this session.

Session 6
- In the long-term, medication is addictive.
- I'm certain that quitting medication won't make me relapse.

Session 7
- No cognitions on medication expressed in this session.

Session 8
- I fear medication-addiction because of long-term use.
- If I were in control, it would be fine to use the medication for one more year.

Session 9
- I'm not sure whether the pro's weight out the cons.

*Cognitions are explicitly or implicitly expressed by the patient. Sessions may have contained more cognitions, for reasons of space limitation we used maximal two cognitions per session.

Successful/unsuccessful

In the first session of all cases the therapist made an effort to engage with the patient, mostly by asking the patient to review his/her illness history and his/her experiences in mental health care. A trusting relationship is the base of motivational interviewing, and therefore a prerequisite for success. In all four successful cases (3, 5, 10 and 14) and in five of the nine unsuccessful cases (1, 6, 9, 12 and 13), the MISC-rating of patient self-exploration was $\geq$4, indicating a trusting relationship. In the four cases (4, 7, 8 and 11) lacking such engagement, the conversation remained superficial, with limited openness shown by the patient. One patient expressed this during the last session in a closing remark: "I know what you're thinking and what you want to say. I will not argue over that, but I have my own vision and opinion." (case 4). In line with MI-theory, the trusting relationship was fostered if the therapist showed good listening skills, asked open-ended questions, reflected the patient's experiences and perceptions and showed empathy, acceptance and understanding. By contrast, the relationship between patient and therapist was hindered by the therapist focusing on the actual facts in the patient's story (ignoring the patient's perception), and taking up the expert-role. Moreover, the emergence of a strict question-answer pattern, or the existence of a language barrier between patient and therapist, also impeded this relationship.

In successful cases the patients had the opportunity to tell their story from their perspective and without rushing. This story included ambivalence or potential barriers to long-term medication use, and the patients became aware of their ambivalences. The therapists and patients explored both sides of the ambivalence, and the patients linked medication use to their own goals and values. Hereafter the patients articulated their intention to adhere, based on their previously explored motives. In the unsuccessful cases, although articulated by the patient, ambivalences or barriers remained unexplored. In most of the unsuccessful

cases the patients expressed their values, but the therapists missed opportunities to elicit change talk by linking these goals or values to medication adherence (table 7). One patient expressed his fear of relapse and hospitalization: “I don’t ever want to go back there”, the therapist then only reflected this goal, failing to query how medication might contribute to this (case 8).

Table 7. Content of the MI-sessions

Elements of the sessions	**Successful cases (n=4)**	**Unsuccessful cases (n=9)**
	yes / no	yes / no
Trusting relationship	4 / 0	5 / 4
Open conversation on medication adherence	4 / 0	5 / 4
Ambivalence or barriers articulated by the patient	2 / 2	7 / 2
Values or goals articulated by the patient	4 / 0	8 / 1

Medication adherence

One of the main outcomes on medication adherence after six months in the originating RCT [9] was a 5-point adherence item of the Life Chart Schedule (LCS) [19], judged by patient, physician and/or caregiver. This follow-up score was complete for six patients. The scores indicate, in accordance with their patient process, $\geq$4 for patients who decided to adhere to long-term medication. An exception is the ambivalent patient in case 1, with a higher score than expected (table 8).

Table 8. Medication adherence at 6-month follow-up

Baseline	Patient process		Observed cases (n=13)	LCS-score patient[a]	LCS-score physician[a]	LCS-score carer[a]
Not-ambivalent	Remained not-ambivalent	Motivation for medication adherence	case 9	4	-	-
			case 10	-	-	-
			case 11	5	5	5
			case 12	4	5	5
		No motivation for medication adherence	case 3	-	-	-
			case 7	-	-	-
Ambivalent	Ambivalence, solved	Motivation for medication adherence	case 5	5	-	5
			case 13	-	-	-
			case 14	-	-	-
	Ambivalence, not solved	Ambivalent on medication adherence	case 1	4	4	-
			case 4	-	-	-
			case 6	3	2	2
			case 8	-	-	-

[a]LCS=Life Chart Score-adherence item [19]. Judged by patient, caregiver and/or physician. Score 1=prescribed medication never taken; score 2=took less than 50%; score 3=took more than 50%; score 4=nearly always took the prescribed medication; score 5=always took the prescribed medication.

DISCUSSION

In this study, we found four patterns of the patient process of becoming (more) motivated for long-term medication adherence. We detected that the content and course of the expressed cognitions on medication may serve as a possible indicator for that process, and we identified three success factors.

The first success factor was the trusting relationship. The establishment of such a relationship promotes the depth of patient engagement. The second success factor was the therapist's ability to adapt the MI-strategy to the patient process. Through this strategy, the therapist stimulates the mechanisms of change within the patient [20]. One of these potential mechanisms is "change talk", as it results in the patient hearing him/herself argue for medication adherence [21]. By hearing him/herself articulating "I must take my pills, or else it will get me in trouble", the patient strengthens his/her belief in this cognition, and

fosters a self-perception [22] of being “someone who takes medication for good reasons”. In this study, we found that the lack of such a strategy in the unsuccessful cases appeared to hinder the progress of the patient process.

An explicit conversation regarding the patient’s values or goals in relation to medication adherence was the third success factor. Taking medication is often associated with being ill and not feeling well, so intrinsic motivation for long-term medication use can only be elicited if the medication serves an important goal for the patient. This means that the therapist should support the patient to reflect on his/her goals and values and on his/her willingness and ability to change (i.e. take medications for a prolonged period of time) for these goals or values. In line with MI-theory, it is the patient who has to voice this relation, not the therapist.

The combination of these success factors may constitute good MI-practice on medication adherence in this patient group. Miller and Rollnick [13,23] stress that, in MI, the intervention comprises both the relational and technical components, and that the active ingredients must be present. But the exact effects and active ingredients may differ between target groups [21]. These active ingredients however, are not well known and based on MI-theory, which was inductively derived from the analysis of clinical practice [24,25], and on inconsistent findings from deductive empirical research [24]. In alcohol dependency studies, change talk and intention to change were related to better outcomes [20], while therapist MI-inconsistent behaviour was related to worse outcomes [20]. In a meta-analysis on the potential technical MI-key components [26], MI-consistent skills were associated with more change talk, and MI-inconsistent skills with less change talk and more sustain talk. In a secondary analysis of two RCT’s on brief MI in college students [27], client self-exploration and therapist MI-Spirit were associated with better outcomes. In research with mixed mental health groups [28], patient engagement was found as a potential mechanism of change. So, all these studies suggest potential active ingredients that are in line with MI-

theory. We found that MI-Spirit and patient engagement constituted the basis of a fruitful MI-session. Empathy, partnership and acceptance and the technical MI-strategy were essential components in the successful cases. Lane [29] and Hilton et al. [24] however, point out that the focus on theorized ingredients may be premature, and call for qualitative inductive research for a deeper understanding of the phenomenon of MI and processes within MI. The three success factors we found in our qualitative study are in line with MI-theory, but suggest that the optional component "exploring values" may be a key component of MI in this patient group for this target behaviour.

Our study adds to the scarce research literature on MI to enhance medication adherence in patients with schizophrenia. Drymalski and Campbell [30] conclude in their review that, due to serious methodological concerns, there is no reliable research on MI and medication adherence in patients with schizophrenia before 2006. In the trial from which the present sample originates, Barkhof et al. [9] found no effect of MI on medication adherence, but there were indications that targeted use of MI might be beneficial for medication adherence for some subgroups. In the present study, however, we used other criteria to detect successful cases, i.e. not medication adherence per se, but a patient decision (not) to adhere, based on intrinsic motivation after explicit exploration of motives, goals, values, and solved ambivalence and potential barriers. As a consequence, one case in which the patient decided not to adhere to long-term medication use, is also a successful case (case 3).

Strengths and limitations of this study

A strength of this study is the pragmatic character of the original RCT. After a 32-hour training and with monthly supervision, the therapists started the MI-intervention. This closely parallels usual practice in non-research conditions. Hence, the results reflect the MI-practice of newly starting MI-therapists at beginning proficiency, and not of experienced MI-therapists at expert level. This is also a limitation, because it may have led to less variation in

patient process patterns, and it may explain why none of the initially not-ambivalent patients became ambivalent during the MI-intervention. Another strength is the inclusion of patients with a severe course of schizophrenia who experienced a psychotic relapse due to medication nonadherence in the past year.

A limitation of this study was the size and the composition of the sample. We retrieved sufficient audio-recorded MI-sessions for 14 of the 55 patients. This led to a selection of patients from the original sample, so this study lacks an analysis of patients not-consenting to audio-recording, and of drop-out patients.

The qualitative design and the limitations in sample size and sample composition call for prudence in generalization of the findings. Despite this limitation, our study results offer an indication on processes that might also be important in MI-sessions with comparable patients with multi-episode schizophrenia and recent medication nonadherence in their history.

Conclusions

First, there are different patterns of patient processes in MI on medication adherence. This suggests that motivation for medication adherence may be improved if MI-therapists adapt their MI-strategy to the process. An indicator of these processes may be found in the course of the expressed cognitions on medication.

Second, criteria based on both MI-theory and good practice of care may be useful to differentiate between successful and unsuccessful cases. Third, the findings in our study suggest that the content of a successful MI-intervention for this target behaviour comprises a trusting relationship, the articulation of ambivalence or possible barriers for sustained medication use and the exploration of this ambivalence and barriers in relation with patient values and goals. When a patient is not ambivalent, MI may support the exploration of medication adherence in relation to the patient's values and goals, to strengthen long-term

motivation, or to explore the possibility of new patient perspectives on indirect benefits of long-term medication use.

ABBREVIATIONS

DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, 4th Edition; LCS: Life Chart Score; MA: Medication adherence; MI: Motivational Interviewing; MISC: Motivational Interviewing Skill Code; MITI: Motivational Interviewing Treatment Integrity; n.a.: not applicable; RCT: Randomized Controlled Trial; RR: Risk Ratio; SCOPE: Motivational Interviewing Sequential Code for Observing Process Exchanges; USA: United States of America.

ACKNOWLEDGEMENTS

We thank Vera Kruse for her help in coding and for independently (double) analysing two cases, Elena Le Poole for her help in coding, and Grace Jenkins for her comments on our English language use.

FUNDING

This work was supported by a research grant from the Netherlands Organisation for Scientific Research (NWO) to JD.

AVAILABILITY OF DATA AND MATERIALS

The datasets generated and analysed during the current study are not publicly available due to identifying participant information. Data may be available from the corresponding author upon request, but restrictions apply on the availability of these data in accordance with the ethical rules of the Medical Ethical Committee of the Academic Medical Center of the University of Amsterdam.

AUTHORS'CONTRIBUTIONS

JD, CL, LdH, WSoR, RP, EB, BvM contributed to the study design. JD and EB performed the data acquisition and the data analysis. JD, LdH and EB interpreted the data, and CL and BvM checked the data-interpretation. JD, CL, LdH, WSoR, RP, EB, BvM participated in the writing of the manuscript. All authors read and approved the final manuscript.

COMPETING INTERESTS

The authors declare that they have no competing interests.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Medical Ethics Committee of the Academic Medical Center, Amsterdam. Written informed consent was obtained from all participants.

REFERENCES

1. Lieberman JA, Stroup TS, McEvoy JP, Swartz MS, Rosenheck RA, Perkins DO, et al. Effectiveness of Antipsychotic Drugs in Patients with Chronic Schizophrenia. N Engl J Med. 2005;353:1209-23.
2. Leucht S, Tardy M, Komossa K, Heres S, Kissling W, Salanti G, et al. Antipsychotic drugs versus placebo for relapse prevention in schizophrenia: a systematic review and meta-analysis. Lancet. 2012;379:2063-71.
3. Higashi K, Medic G, Littlewood KJ, Diez T, Granström O, De Hert M. Medication adherence in schizophrenia: factors influencing adherence and consequences of nonadherence, a systematic literature review. Ther Adv Psychopharmacol. 2013;3:200-18.
4. Burke B, Arkowitz H, Menchola M. The efficacy of motivational interviewing: a meta-analysis of controlled clinical trials. J Consult Clin Psychol. 2003;71:843-61.
5. Hettema J, Steele J, Miller W. Motivational interviewing. Annu Rev Clin Psychol. 2005;1:91-111.
6. Lundahl B, Burke B. The effectiveness and applicability of motivational interviewing: a practice-friendly review of four meta-analyses. J Clin Psychol. 2009;65:1232-45.
7. Lundahl B, Moleni T, Burke BL, Butters R, Tollefson D, Butler C, et al. Motivational interviewing in medical care settings: a systematic review and meta-analysis of randomized controlled trials. Patient Educ Couns. 2013;93:157-68.
8. Rubak S, Sandbaek A, Lauritzen T, Christensen B. Motivational interviewing: a systematic review and meta-analysis. Br J Gen Pract. 2005;55:305-12.
9. Barkhof E, Meijer CJ, Sonneville LJ, Linszen DH, De Haan L. The effect of motivational interviewing on medication adherence and hospitalization rates in non-adherent patients with multi-episode schizophrenia. Schizophr Bull. 2013;39:1242-51.

10. Kemp R, Hayward P, Applewhaite G, Everitt B, David A. Compliance therapy in psychotic patients: randomised controlled trial. BMJ 1996;312:345-9.
11. Kemp R, Kirov G, Everitt B, Hayward P, David A. Randomised controlled trial of compliance therapy. 18-month follow-up. Br J Psychiatry. 1998;172:413-9.
12. O'Donnell C, Donohoe G, Sharkey L, Owens N, Migone M, Harries R, et al. Compliance therapy: a randomised controlled trial in schizophrenia. BMJ. 2003;327:834.
13. Miller WR, Rollnick S. Motivational interviewing: helping people change. 3rd ed. New York: Guilford Press; 2013.
14. Miller WR, Rollnick S. Motivational interviewing: preparing people for change. 2nd ed. New York: Guilford Press; 2002.
15. Stake RE. Multiple case study analysis. New York: Guilford Press; 2006.
16. Martin T, Moyers TB, Houck J, Christopher P, Miller WR. Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE). Coder's manual. 2005. http://casaa.unm.edu/download/scope.pdf Accessed 28 March 2013.
17. Miller WR, Moyers TB, Ernst D, Amrhein P. Manual for the Motivational Interviewing Skill Code (MISC). Version 2.1. 2008. http://casaa.unm.edu/download/misc.pdf Accessed 27 October 2013.
18. Moyers TB, Martin T, Manuel JK, Miller WR, Ernst D. Manual for the Motivational Interviewing Treatment Integrity (MITI). Version 3.1.1. 2010. http://casaa.unm.edu/download/MITI3_1.pdf Accessed 17 August 2016.
19. Susser E, Finnerty M, Mojtabai R, Yale S, Conover S, Goetz R, et al. Reliability of the Life Chart Schedule for assessment of the long term course of schizophrenia. Schizophr Res. 2000;42:67-77.
20. Apodaca TR, Longabaugh R. Mechanisms of change in motivational interviewing: a review and preliminary evaluation of the evidence. Addiction. 2009;104:705-15.

21. Miller WR, Rose GS. Toward a theory of motivational interviewing. Am Psychol. 2009;64:859-69.
22. Bem DJ. Self-perception: an alternative interpretation of cognitive dissonance phenomena. Psychol Rev. 1967;74:183-200.
23. Miller WR, Rollnick S. The effectiveness and ineffectiveness of complex behavioral interventions: impacts of treatment fidelity. Contem Clin Trials. 2014;37:234-41.
24. Hilton CE, Lane C, Johnston LH. Has motivational interviewing fallen into its own premature focus trap? Int J Adv Counseling. 2016;38:145-58.
25. Miller WR. Motivational interviewing with problem drinkers. Behav Cogn Psychother. 1983;11:147-72.
26. Magill M, Gaume J, Apodaca TR, Walthers J, Mastroleo NR, Borsari B, et al. The technical hypothesis of motivational interviewing: a meta-analysis of MI's key causal model. J Clin Psychol. 2014;82:973-83.
27. Borsari B, Apodaca TR, Jackson KM, Mastroleo NR, Magill M, Barnett NP, et al. In-session processes of brief motivational interviewing interventions in two trials with mandated college students. J Consult Clin Psychol. 2015;83:56-67.
28. Romano M, Peters L. Evaluating the mechanisms of change in motivational interviewing in the treatment of mental health problems: a review and meta-analysis. Clin Psychol Rev. 2015;38:1-12.
29. Lane C. A discourse analysis of client and practitioner talk during motivational interviewing sessions. ClinPsyD Thesis (Volume 1). University of Birmingham. 2012. http://etheses.bham.ac.uk/3708/1/Lane12ClinPsyD1.pdf Accessed 16 June 2016.
30. Drymalski WM, Campbell TC. A review of motivational interviewing to enhance adherence to antipsychotic medication in patients with schizophrenia: evidence and recommendations. J Ment Health. 2009;18:6-15.

CHAPTER 4

Active ingredients and mechanisms of change in motivational interviewing for medication adherence. A mixed methods study of patient-therapist interaction in patients with schizophrenia

Dobber J, Latour C, Van Meijel B, Ter Riet G, Barkhof E, Peters R, Scholte op Reimer W, De Haan L.

Submitted

ABSTRACT

Background

Trials studying Motivational Interviewing (MI) to improve medication adherence in patients with schizophrenia showed mixed results. Moreover, it is unknown which active MI-ingredients are associated with mechanisms of change in patients with schizophrenia. To enhance the effect of MI for patients with schizophrenia, we studied MI's active ingredients and its working mechanisms.

Methods

First, based on MI literature, we developed a model of potential active ingredients and mechanisms of change of MI in patients with schizophrenia. We used this model in a qualitative multiple case study to analyse the application of the active ingredients and the occurrence of mechanisms of change. We studied the cases of fourteen patients with schizophrenia who participated in a study on the effect of MI on medication adherence. Second, we used the Generalized Sequential Querier (GSEQ 5.1) to perform a sequential analysis of the MI-conversations aiming to assess the transitional probabilities between therapist use of MI-techniques and subsequent patient reactions in terms of change talk and sustain talk.

Results

We found the therapist factor 'a trusting relationship and empathy' important to enable sufficient depth in the conversation to allow for the opportunity of triggering mechanisms of change. The most important conversational techniques we observed that shape the hypothesized active ingredients are reflections and questions addressing medication adherent behaviour or intentions, which approximately 70% of the time was followed by

'patient change talk'. Surprisingly, sequential MI-consistent therapist behaviour like 'affirmation' and 'emphasizing control' was only about 6% of the time followed by patient change talk. If the active ingredients were embedded in more comprehensive MI-strategies they had more impact on the mechanisms of change.

Conclusions

Mechanisms of change mostly occurred after an interaction of active ingredients contributed by both therapist and patient. Our model of active ingredients and mechanisms of change enabled us to see 'MI at work' in the MI-sessions under study, and this model may help practitioners to shape their MI-strategies to a potentially more effective MI.

INTRODUCTION

Antipsychotic drug treatment is an effective intervention in patients with schizophrenia [1]. However, non-adherence is a problem in approximately 42 – 74% of the patients [2,3]. Motivational Interviewing (MI) may be an intervention to stimulate motivation for long-term medication adherence. However, studies on the use of MI to promote medication adherence in schizophrenia show mixed results [4-7], in contrast to the more consistent effects of MI on behaviour change in many other disorders [8-11]. These discrepancies may partially be explained by differences in MI-strategy, in particular by the application of active ingredients, leading to success or failure in subsequent activation of mechanisms of change in the patients [12]. Furthermore, these ingredients and mechanisms of successful MI may be different for patients with schizophrenia [13].

MI is "a person-centered counseling style for addressing the common problem of ambivalence about change" [14, p.29]. In MI, the therapist deliberately influences the patient's motivation for change, through eliciting change talk (pro change) and softening sustain talk (counter change). The therapist adopts an empathetic attitude, thus communicating the partnership with the patient. The intervention includes four overlapping processes: engaging (relation building), focusing (finding the patient's change goals), evoking (eliciting change talk: the patient's own motives for change), and planning (supporting the patient to create a small concrete plan to move on to actual change) [14].

Nock [15] described three classes of factors involved in psychological interventions to influence subsequent behaviour change: clinician factors, client factors, and mechanisms of change (see table 1). The clinician and client factors of interest are those that form the active ingredients of MI. In literature on MI-theory [12,14,16-18] and in research [19-23] there are several hypothesized active ingredients of MI in general, such as the clinician factor 'discussing ambivalence' [17,18], and the client factor 'experiencing discrepancy'

[19,23]. There are also some hypothesized mechanisms of change of MI, e.g. 'arguing oneself into change' [14,18].

If we would know which active ingredients and which mechanisms of change determine the success of MI in patients with schizophrenia, then MI-therapists would be able to optimize their execution of MI.

In a previous study, we focused on the patient process in MI and we found three factors for successful MI in patients with schizophrenia: a trusting relationship between patient and therapist, the therapist's ability to adapt the MI-strategy to the patient's process, and relating the patient's values to long-term medication adherence [24]. In the current study, we focus on therapist strategies to effectively employ MI, i.e. if and how the therapist applies active ingredients, and whether these stimulate mechanisms of change.

Table 1. Factors involved in psychological interventions[a]

Clinician factors: what the clinician does in the treatment: behaviours, directives, characteristics.
Client factors: what the client does in treatment: behaviours, verbalizations, characteristics.
Mechanisms of change: the processes that emerge from the clinician and client factors that explain how these active ingredients lead to change.
Active ingredients: the specific ingredients in the intervention that cause the change.

[a] *Based on Nock [15]*

METHODS

Aim

The aim of this study is to explore which clinician factors are employed by MI-therapists, and whether these clinician factors activate client factors, and whether this triggers hypothetical mechanisms of change.

Study Population

The cases were the audiotaped and transcribed MI-sessions of 14 patients who participated in the intervention group of a randomized controlled trial (RCT) on MI to promote medication adherence in patients with schizophrenia [4]. All patients recently experienced a psychotic relapse after nonadherence to treatment with antipsychotic medication. The mean age of the patients was 35.5 year (range: 23-48). Four patients were female. Two patients had primary education or less, ten patients had secondary education, and two patients had tertiary education or further education. The mean duration of their mental illness was 6.9 years (range: 1-23). The DSM IV diagnoses were schizophrenia (ten patients) or schizoaffective disorder (four patients).

With the patient's consent, the MI-sessions in the original RCT were audio-recorded. The five therapists (a psychiatrist, three community mental health nurses, and a psychologist) were not involved in the regular treatment of the patients. Before the study, the therapists had no previous experience in MI and they followed a 32-hour training by a certified MI-trainer. All MI-therapists participated in monthly supervision on MI-fidelity.

Study Design

We used mixed methods to study if and how MI-therapists apply clinician factors to activate client factors, and, through these, stimulate hypothetical mechanisms of change (after this: mechanisms of change).

First, to find potential active ingredients and mechanisms of change in MI, we performed a literature search in PsycInfo and in PubMed (search string 1: "motivational interviewing" and "active ingredients"; search string 2: "motivational interviewing" and "mechanism* of change") and in textbooks on MI (e.g. 14, 16). We also searched for relevant cross-references in the reference list in the selected articles.

Next, we performed a qualitative multiple case study (25) to explore clinician factors, client factors and mechanisms of change in the process of motivational interviewing. This design contains three phases: single case analysis, cross case analysis, cross case synthesis (25). The single case analysis was an analysis of every case separately, guided by worksheets with questions on which the analysis focused. In the cross case analysis, the findings from the separate cases were merged in clusters. In the cross case synthesis, these clusters were translated in cross case assertions, and the evidence for these assertions was reviewed.
In addition, we used sequential analysis (26) to find the probabilities that specific therapist use of MI-techniques, such as a reflection, is subsequently followed by patient change talk or patient sustain talk.

Data Collection and Analysis

To be included, cases had to have at least three audiotaped sessions. We excluded patients with severe psychotic symptoms which hindered effective communication and participation in the MI-sessions. Patients with moderate symptoms, who were able to effectively participate in the MI-sessions, were not excluded.
The audio recordings were transcribed and parsed in patient and therapist utterances in accordance with the coding manuals of the Motivational Interviewing Skill Code 2.1 (MISC 2.1) [27] and the Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE) [28]. We used MISC 2.1 Global Ratings (7-point scores) to score the therapist behaviour on three dimensions (acceptance, empathy, MI-spirit), and to score the level of patient self-exploration. The SCOPE was used to sequentially code the patient and the therapist communication behaviour in 20 codes for the therapist, and 10 codes for the patient language (table 2) [29]. Also, we computed five summary scores as suggested in the coding instruments, to assess the therapist fidelity to MI and thus the quality of the MI delivered. After a 37-hour training, two coders coded all MI-sessions (for details, see Dobber

et al. 2018 [24]). A random selection of 10% (n=7) of the sessions were re-coded by the same coder to verify intra-rater agreement, and another randomly selected 20% of the sessions (n=13) were double coded by the two coders independently, to compute the inter-rater agreement. For the global ratings, we considered a maximum of one-point difference on the 7-point scales as an agreement, and a difference of more than one point as a disagreement. So, we dichotomized the scores to "agreement" and "disagreement". For the intra-rater agreement, we found a Kappa of .77 for the behaviour codes, and a Kappa of 1.0 for the global ratings. For the inter-rater agreement, the Kappa's were .71 and .84 respectively. While performing the multiple case study analysis, the first author (JD) produced a detailed log on the findings and the decisions during the research process. Furthermore, in accordance with the method of multiple case study analysis [25], the analyst used worksheets to perform a systematic analysis and to register the findings, and composed detailed case reports. The worksheets concentrated on:

(a) how clinician factors interacted with the client factors,
(b) the hypothetical active ingredients, used by the MI-therapists,
(c) clues for the stimulation of which mechanisms of change, and
(d) how the MI-therapist applied the active ingredients within the four MI-processes (engaging, focusing, evoking, planning).

For the latter, we constructed a worksheet based on the targets of MI-consistency in the Motivational Interviewing Target Scheme 2.1 (MITS 2.1) [30,31]. In addition, based on the textbook by Berger and Villaume on MI for health care professionals [32], we added the concept 'sense making' (see table 3). This concept refers to the phenomenon that patients develop their own ideas and beliefs about what is happening to them (for instance their illness) and how they should cope with what they perceive is happening to them. These

beliefs explain the patient's stance towards therapy and consequently to using or not using medication. The therapist needs to understand this patient perspective to effectively apply the clinician factors and strengthen the patient's motivation for medication adherence (see also Berger & Villaume, 2016 [33]). Two investigators (BvM and CL) checked all these steps, and, for quality assurance of the research process, independently chose a subset of these materials and performed an inquiry audit. To check the reliability of the findings, another independent investigator double analysed two cases. In case of disagreement we checked the original data to resolve the disagreement.

Finally, we used the Generalized Sequential Querier (GSEQ 5.1, software for analysing sequential observational data) [26,34] to perform a sequential analysis and compute the conditional probabilities of the patient motivational verbal reactions on the therapist communication behaviours. Thus, through GSEQ 5.1, we computed the probability that a certain patient motivational statement (e.g. change talk), immediately followed any specified therapist verbal behaviour (e.g. an open question querying the target behaviour) within the MI-sessions. The p-values for the probabilities resulting from the sequential analysis, were not corrected for multiple analyses. Because of the low frequency of some verbal behaviour codes, we combined these codes in broader categories on the basis of MI-theory [14,16] and previous research [35]. For patient verbal behaviour, we composed three categories. 'Change talk' comprises desire, ability, reasons, need, commitment, taking steps, and other pro-change statements, while 'sustain talk' contains desire, ability, reasons, need, commitment, taking steps, and other counter-change statements. The 'neutral' category includes ask, follow/neutral, and not encodable patient statements. The therapist verbal behaviour category sequential MI-consistent comprises affirmation, emphasize control, permission seeking, support. The therapist behaviours confront, direct, warn, opinion, advise without permission were combined into the category MI-inconsistent, and facilitate,

filler, self-disclosure, general information, raise concern, structure, advise with permission, and not encodable therapist statements into the category 'other'.

Table 2. Codes for therapist and patient verbal behaviour

	Codes
Therapist behaviour	advise with permission, advise without permission, affirm, confront, direct, emphasize control, facilitate, feedback, filler, general information, opinion, permission seeking, question, raise concern, reflect, self-disclosure, structure, support, warn, not encodable.
Patient behaviour	ask, follow/neutral, commitment, desire, ability, need, reasons, taking steps, other, not encodable.

Based on SCOPE [28]

Table 3. Topics of a worksheet for the qualitative analysis of the cases

Target	Description
1. Activity emphasis	The therapist chooses to perform the activity that, at any particular point of the conversation, contributes most to behavioural change.
2. Posture, empathy and collaboration	The therapist engages with the patient and demonstrates accurate understanding of the patient's perspectives and feelings, and works with the patient in a purposeful collaboration.
3. Independence	The therapist emphasizes the patient's control over his/her decisions and behaviour, and encourages the patient to take responsibility for his/her decisions and behaviour.
4. Evocation	The therapist elicits patient change talk and elaborates on this. Also, the therapist softens the patient's sustain talk.
5. Navigation	The therapist ensures that the conversation progresses in the direction of the change goal.
6. Contrasts	The therapist supports the patient to relate the target behaviour to his/her values and life goals, and may develop discrepancy between values, goals and present behaviour.
7. Structured brief tactics	The therapist performs optional MI-components as conversational strategies as short routes to facilitate the patient's process. Examples of these tactics are the use of 'importance rulers', 'confidence rulers', 'a typical day', and the composition of a 'change plan'.
8. Information and advice	The therapist gives only information and advice after (implicit or explicit) permission of the patient, and in an effective way.
9. Sense making	The therapist actively tries to understand the patient's perspective on his/her health problems and the target behaviour, and tries to influence the patient's sense making.

Topic 1 to 8: based on the MITS 2.1 [30]
Topic 9: based on Berger & Villaume 2013 [33,36]

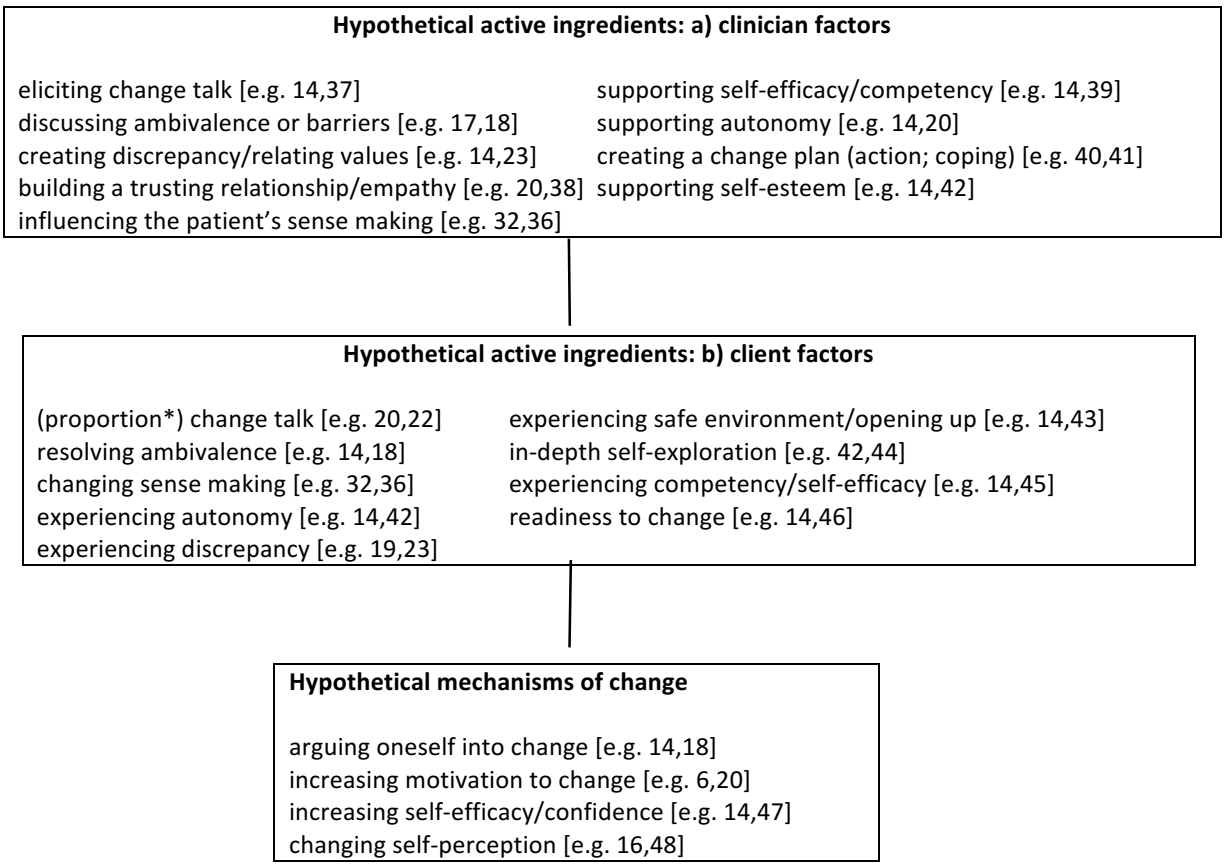
RESULTS

Development of the Model of Active Ingredients and Mechanisms of Change

The composition of the model is based on both the literature search and MI-textbooks [e.g. 14,16]. Our literature search yielded 89 articles, of which, based on title and abstract, the full text of 33 articles were retrieved. Of these, 9 articles were excluded because of lack of relevance for determining potential active ingredients or mechanisms of change. As a result,

we used 24 articles and four textbooks to compose our model of hypothesized active ingredients and hypothesized mechanisms of change (figure 1).

Figure 1. Model of hypothetical active ingredients and mechanisms of change in MI for medication adherence in patients with schizophrenia



**proportion change talk = frequency change talk : (total frequency change talk + sustain talk)*
For a brief explanation of each factor: see supplementary material: files 1 - 3.
Numbers between brackets are references.

Included cases

There were 16 cases with three or more audiotaped MI-sessions. We excluded two cases with patients presenting with active psychotic symptoms during the MI-sessions, since this made practicing MI impossible. So, 14 cases, comprising 66 audiotaped MI-sessions were included. One therapist performed MI in five cases (28 sessions), one therapist performed

MI in four cases (19 sessions), two therapists each performed MI in two cases (eight sessions per therapist), and one therapist performed MI in one case (three sessions).

Which Clinician Factors are Present?

Overall, eight out of nine clinician factors (see figure 1) were applied by the therapists (table 4). There was great diversity in the application of these factors among the therapists. Three therapists applied eight different clinician factors, one therapist three, and one therapist applied only one clinician factor. The most frequently used clinician factor was 'eliciting change talk', without which the intervention would not be MI [12]. Still, in two cases the interaction with the patients and the course of the sessions hindered the therapist to elicit change talk. There was some change talk, but in these sessions it was of such poor quality or artificially elicited (e.g. "You're sleeping well, aren't you, on these medications?"), that we did not consider it as a potential active ingredient. In the first case, the patient avoided serious conversations about medication compliance, and in the second case, a trusting relationship could not be established. This was apparent from superficial conversations with limited openness shown by the patient. A trusting relationship is fundamental to MI, and in this case the conversations, which were also strongly influenced by a language barrier, were dominated by mutual misunderstandings. There was some discord in the second session with this patient, which resulted in a great deal of sustain talk and no change talk. In the following sessions the patient was disengaged, and the conversation fell back into a question-answer pattern wherein the therapist didn't manage to improve the relationship and return to motivational interviewing. Hence, though all therapists showed 'empathy', not all therapists succeeded to always establish a 'trusting relationship' (table 4).

Table 4. Application of clinician factors

Hypothetical clinician factors	**frequency**	**number of therapists (n=5) who applied it**	**number of clients (n=14) it was applied to**
Eliciting change talk	61	5	12
Building a trusting relationship/empathy	*	4	10
Supporting self-esteem	10	4	6
Discussing ambivalence and/or barriers	7	3	3
Influencing the patient's sense making	6	3	4
Supporting self-efficacy/competency	16	3	4
Supporting autonomy	7	3	5
Creating discrepancy/relating values	9	3	4
Creating a change plan	0	0	0

**mostly applied and maintained through all sessions*

Which Client Factors are Activated by the Clinician Factors?

Except for 'readiness to change', we observed all client factors from our model (table 5). Often, a clinician factor activated a variety of client factors, sometimes simultaneously. Discussing ambivalence, for instance, may activate 'patient change talk', but can also activate the 'patient experiencing discrepancy' and can lead to 'resolving ambivalence'. The application of a clinician factor however, does not always activate the targeted client factors (table 5). While 'eliciting change talk' (almost) always led to 'change talk', 'supporting self-efficacy' activated only in 25% of the applications a client factor (see box 1 for a successful and a less successful example). Also, 'eliciting change talk' sometimes resulted in both change talk and sustain talk, which can be a sign of ambivalence.

Box 1. Examples of Supporting self-efficacy and patient reaction

Therapist: “And you are good at that: fine-tuning your medication dose, you are able to do that yourself.” Patient: “Yes, I guess ten years of experience made me some kind of an expert by experience.” (Case 5) Comment: the patient experiences the therapist emphasizing his control over his medication as an affirmation of his competence.
Therapist: “So you do see which factors throw you off-balance and which, in contrast, keep you stable: your medication use, on which you have a clear vision of now, and alcohol-use which you want to, and can, control. And also, regularity in your life and daytime activities.” Patient: “Yes.” (Case 14) Comment: the summarizing character of this supporting reflection seems to restrict the effect of the clinician factor ‘Supporting self-efficacy’.

Table 5. Clinician factors, client factors, mechanisms of change

Clinician factors	freq	**Client factors**	freq	**Hypothetical mechanisms of change**	freq
Building a trusting relationship / Empathy	*	Experiencing safe environment/opening up	*		
		In-depth self-exploration	*		
Eliciting change talk	61	Change talk	60	Arguing oneself into change	12
		Sustain talk**	10		
		Experiencing competency/self-efficacy	1		
		Experiencing autonomy	1		
Supporting self-esteem	10	Experiencing competency/self-efficacy	1	Changing self-perception	1
		Experiencing autonomy	1	Increasing motivation to change	1
Discussing ambivalence and/or barriers	7	Experiencing discrepancy	1		
		Change talk	5	Arguing oneself into change	1
		Sustain talk**	2		
		Resolving ambivalence	2	Arguing oneself into change	1
Influencing the patient's sense making	6	Changing sense making	2	Arguing oneself into change	1
		Resolving ambivalence	1	Arguing oneself into change	1
Supporting self-efficacy/competency	16	Experiencing competency	3		
		Experiencing autonomy	1	Increasing motivation to change	1
Supporting autonomy	7	Experiencing autonomy	3	Increasing motivation *not* to change***	1
Creating discrepancy/relating values	9	Change talk	1		
		Changing sense making	2	Arguing oneself into change	2
		Experiencing discrepancy	1		
		Resolving ambivalence	1	Arguing oneself into change	1
		Experiencing autonomy	1	Increasing motivation to change	1

**mostly applied and maintained through all sessions.*

***sustain talk is a client factor in favour of nonadherence.*

****this patient did not feel ambivalent about his decision to stop the medication as soon as possible.*

Do Client Factors Lead to Mechanisms of Change?

Since mechanisms of change refer to processes within the patient's mind, it is not possible to observe these psychological processes from an outsider perspective. One can listen to the patient's change talk, and infer from the content and course of the patient change talk that he/she is arguing him or herself into change, but one cannot be certain this process is actually happening (see also Miller & Rollnick [18]). So, when listening to motivational interviewing sessions, we needed to confine ourselves to, based on the content of patient speech, recognizing clues of a psychological process which might take place within the patient.

We recognized clues for mechanisms of change in sessions with six out of fourteen patients. Clues for the mechanism of change 'arguing oneself into change' were most prevalent, and the client factor that mostly preceded it was 'change talk' (table 5, see box 2 for an example). However, this may paint a slightly distorted picture. While client factors are often activated by the immediately preceding clinician factors, the mechanisms of change are mostly the result of a much longer part of the session and preceded by a sequence of clinician factors and client factors.

The mechanism of change 'increasing motivation for change' seemed to occur in non-ambivalent patients who were arguing to strengthen their decision pro or against long-term medication adherence. The clue for 'changing self-perception' was observed in a session in which the patient at first presented himself as "someone who *knows* that medication works". After therapist's reflection on *understanding* the importance of medication and the affirmation on the patient's *insight*, the patient expressed being "someone who *understands the utility* of medication", thus fostering a self-perception which may strengthen his medication adherence. We did not find clues for the stimulation of the mechanism of change 'increasing self-efficacy/confidence'.

Box 2. Example of stimulation of a mechanism of change: arguing oneself into change

Therapist: The medication taking in itself…
Patient: Is no problem.
T: You just think "that's how it is…"
P: Yes.
T: … or "I need it…"
P: Yes, you just accept it… To others, sometimes I tell them to stay on their medication. You know, sort of… (laughs) as if I have to advise them. It's just… to young people I sometimes say: you have to stay on medication, because they think 'I'm doing fine', you know, what they don't know… But one may have a chronic condition, and the other doesn't. But I have a chronic condition, so I know for the rest of my life I'll have to…
T: How do you see your condition? Sometimes, you experience psychosis, how would you call it? Some people would say schizophrenia, others…
C: With me, they say it's schizoaffective. (…)
T: Do you think you have an illness?
P: Yes. Yes, now, when I use my medication, I'm not ill, obviously. But if I don't use them then I'm ill. I can see that difference, yes.
(Case 1)

How does the MI-therapist apply Active Ingredients to influence Mechanisms of Change?

1. Quantitative Analysis

The sequential analysis (in GSEQ 5.1 [26,34]) over all 66 MI-sessions shows that the client factor '*Change talk'* is usually elicited by reflections directed at medication adherent behaviour or intentions (Reflection+) and by questions directed at medication adherent behaviour or intentions (Question+). *Sustain talk* is mainly elicited by reflections directed at medication non-adherent behaviour or intentions (Reflection-). Surprisingly, sequential MI-consistent (sMI-consistent) therapist behaviour like Affirmation and Emphasizing control, was nine out of ten times followed by a neutral client statement, while we expected a higher proportion of change talk (table 6). We performed a sensitivity analysis omitting the sessions of one patient in which a language barrier possibly hampered the MI-conversations. The sensitivity analysis revealed minor differences in some of the probabilities. In the supplementary material, file 4 we present the results of the sensitivity analysis, which in our opinion do not affect the interpretation of the analysis.

Table 6. Conditional probabilities[ab]

Target (patient statements; n=6269) **Given** (therapist statements; n=6474)	**Sustain talk**	**Change talk**	**Neutral**
Other[d]	.06	.07	.87
2-sided-question (±)[e]	.19	.36	.45
Question-	.58	.08[c]	.35
Question neutral	.01	.02	.96
Question+	.04	.69	.27
2-sided reflection (±)[e]	.24	.29	.47
Reflection-	.67	.05	.29
Reflection neutral	.01	.01	.98
Reflection+	.02	.74	.24
sMI-consistent[f]	.04[c]	.06	.90
MI-inconsistent[g]	.04[c]	.07[c]	.90

[a]Probability of a certain type of patient statement given a particular type of therapist statement
[b]All: p ≤0.01, except [c]0.01< p <0.05
[d]Other comprises facilitate, filler, self-disclosure, general information, raise concern, structure, advising with permission, not encodable
[e]2-sided means questions or reflections addressing both change talk and sustain talk
[f]sMI-consistent = sequential MI-consistent, and comprises affirmation, emphasizing control, permission seeking, offering support
[g]MI-inconsistent comprises confrontation, directing, warning, giving opinion, advising without permission

2. Qualitative Analysis

Below, we describe the application of the active ingredients in the four MI-processes: engaging, focusing, evoking, and planning.

Engaging

Though posture, empathy and collaboration remained important through all sessions, the clinician factor 'trusting relationship', was built in the first session. Making an effort to understand the patient's perspective, showing empathy and interest in the patient and his/her story established rapport, which was maintained through all sessions. Moreover, therapists who understood the how the patient made sense of his/her psychoses and of

his/her antipsychotic medication treatment were able to use the clinician factor 'influencing the patient's sense making' at a later moment in the evoking process of the MI-sessions (Box 3).

Box 3. Influencing the patient's sense making

This patient wants to have control over her life, but her life is negatively impacted every time she experiences a psychosis. She thinks that medication is helpful to recover from psychosis. However, during stable periods, she finds only a low dose of medication acceptable, or no medication at all. She prefers no medication because of the drugs' side effects and she feels more autonomous without medication.

Therapist: So, what I learn from you is that in your opinion medication may be a decisive factor to remain stable.
Patient: Yes, if it is not, that would be a problem, what else could I do then?
T: And you mentioned that if things go wrong, and you were off medication for a longer period of time, things seem to get worse.
P: Yes, it does.
T: Is that also a consideration?
P: It is, yes, it is. It may go well for say three months, but I've learned from the past that it ends up going wrong. So, medication should be used wisely, I should not experiment with it. Although I'm still a little bit troubled with the physical side effects for which I also need to see an internist, how many sorts of medication do I have to take to stay stable?
T: These long-term consequences are a concern for you…
P: They are.
T: …and at the same time it is obvious for you that medication protects you.
P: It is. (…) Apparently, I do need medication after all… I think.
(Case 14)

Focusing

In most sessions, the therapist managed to focus on the target behaviour of medication adherence. However, therapists who were able to consistently select the conversational activity (e.g. active listening, goal setting, exploring ambivalence, providing information) which fit best to the patient's motivational process, used a higher variety of clinician factors to activate client factors. This seems to depend not only on the therapist's skills, but, based on the observation of intra-therapist variation in the application of clinician factors, also on

the therapist-patient combination: three of the five therapists used many different clinician factors with one patient, and just a few with another patient.

Evoking

The quality of evocation of change talk (see also Moyers et al. [49], p.5) varied between therapists, and for some therapists this variation also appeared within the sessions. Good quality 'change talk' (in terms of depth, amount and strength) mostly occurred as a result of an MI-strategy in which the therapist navigated to support the patient to 'resolve his ambivalence', or to 'develop discrepancy' (box 4). However, the fine line between evocation of good quality change talk and lower quality change talk is easily crossed. Sometimes poor quality change talk was elicited, in particular when the therapist artificially sought to elicit change talk without embedding this in a more comprehensive MI-strategy (T: "At what time of the day do you take your medication?" P: "In the morning, after breakfast."; T: "Why is medication important for you according to your physician, do you know?" P: "No, just for my illness." T: "Yes, for your illness. So it does help you.").

Since change talk plays a central role in MI [12,14,16] and as it is considered as an essential part of MI [12], it may be one of the most important client factors. To gain more insight in the pattern of change talk during the sessions, we added an additional file with a visual overview of all 66 sessions included in this study, focused on occurrence of change talk and sustain talk, and the applied therapist techniques, (figure 2; supplementary material: file 5).

'Developing discrepancy' is an important MI-strategy, especially with medication-adherence as target behaviour, since many patients with medication-nonadherence in the recent history do not consider medication-use in the remission state as desirable or in line with their values and life goals. Values and life goals may provide, however, powerful motives to change the patient's perspective on long-term medication-adherence [24]. Autonomy and independence are important values related to medication adherence, as pointed out by four

patients, and these patients felt that the need for medication restricts their autonomy and independence. Only a few therapists addressed this topic to discuss if and how medication may contribute to autonomy and independence. Especially if patients expressed their intention to stop using medication in the near future, therapists tended to argue for medication-adherence instead of accepting the patient's perspective at that moment, thus taking over the responsibility and reducing the patient's independence (box 5).

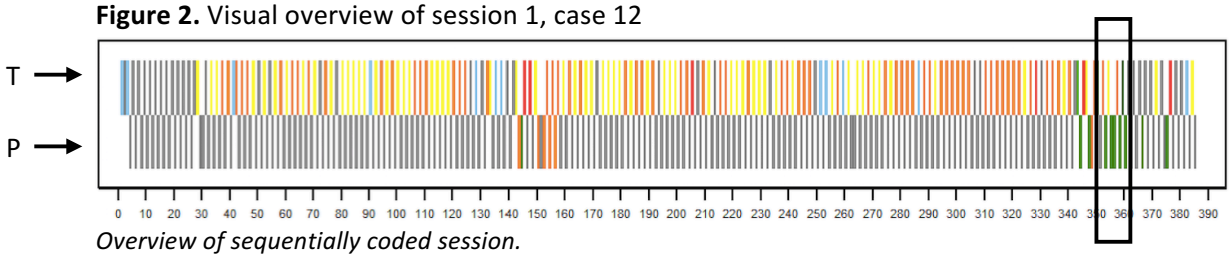
The therapists used just a few structured brief tactics in the MI-sessions to evoke change talk or to clarify the importance of medication adherence as perceived by the patient. Most regularly employed was the decision balance (listing the pros and the cons of medication adherence), which was helpful when the therapist listened well to the patient and reflected his/her concerns, and when the therapist elaborated on the pro-side of medication use. However, often, the performance of a decision balance happened at the cost of much sustain talk. Other structured brief tactics were 'looking forward', which helped the patient to express his/her changing cognition on long-term medication use, and the 'importance ruler' (the patient assigns a number between zero and ten to express his/her opinion on the importance of taking long-term medication).

Giving information and advice is another technique that differentially could either support patient engagement and the patient's motivational process, or cause disengagement. Information and advice deepened the conversation if it was tailored to the patient process, or asked for by the patient. But otherwise, it could emphasize the therapist's expert role and threaten the patient's feeling of competence and autonomy, and a few times this caused some discord and patient disengagement.

Box 4. Evoking change talk

Patient: I stopped taking my medication because I thought… I feel fine… I'll quit taking them…
Therapist: I'm cured.
P: But that's what the medication does.
T: What does the medication do?
P: Make you feel better. So, if you feel fine, you should not stop taking medication but just continue… that's what the medication does.
T: You have experienced that, you learned from that.
P: I did. If I stop taking my medication that will make the chance of relapse much larger than when I do take my medication.
T: Did other persons tell you this, or do you feel… experience that this is how it works?
P: Yes, I've noticed that it works like this.
(Case 12)

Figure 2. Visual overview of session 1, case 12



Overview of sequentially coded session.
Coloured bars therapist verbal behaviour: dark green = question querying for change, or two-sided question; light green = reflection of change talk, or two-sided reflection; yellow = question querying counter-change, or question not directed at target behaviour; orange = reflection of sustain talk, or reflection of neutral talk; blue = sequential MI-consistent techniques (affirm, emphasize control, permission seeking, support); red = MI-inconsistent techniques (confront, direct, warn, opinion, advice without permission); grey = other techniques.
Coloured bars patient verbal behaviour: green = change talk; orange = sustain talk; grey = neutral.
On the x-axis, the sequential utterance number is displayed.
The line in of the black rectangle shows the session part displayed in box 4.

Box 5. Arguing for medication adherence

Patient: If I can take care of my own things, then I won't collect my medication at the clinic anymore, because previously I didn't go to the clinic for medication. Therapist: Later, when you have a job, do you think that you'll need the medication and collect it somewhere else, or will you stop taking medication? P: Yes, I'll stop taking medications. It is not a good thing to take medications for your whole life, but just for three years like I have done now. Previously I didn't take medication, and it's no good to be tired and fat. (…) If I have a job, no one can force me to take medications. T: So, if you are not dependent anymore, there is no obligation for you to come to the clinic. P: Yes. T: Earlier you told me you don't think taking medication is a problem. And your mother thinks that it is very important for you to use medication. P: Yes. T: Will it cause big problems for you later? P: No, when I have a home of my own, no one can say anything about that. (Case 3)

Planning

In some sessions therapists and patients discussed potential barriers for prolonged medication adherence and relapse prevention. None of the patients, however, created a 'change plan' or a relapse prevention plan.

Therapist Fidelity

The quality of the MI delivered by the therapists also influenced the appearance and the potency of the active ingredients. As shown through the five summary scores of the MISC [27] and the SCOPE [28], the therapists performed MI at beginning proficiency level (table 7). Overall, the therapists were good at verbalizing complex reflections, but were inclined to ask closed questions. One therapist focused mainly on factual information, and tended to pursue his own agenda, with limited effort to gain a deeper understanding of the patient's perspective and experiences.

Table 7. Therapist fidelity ratings

Therapist	Global Therapist Ratings[a]	Reflection/ Question ratio[b]	Proportion open questions of all questions asked[c]	Proportion complex reflections of all reflections[d]	Proportion MI-consistent behavior[e]
1	+	+	-	++	+
2	+	-	-	++	+
3	-	+	-	++	+
4	+	-	+	++	+
5	+	-	-	++	+

Scores are means over all of the therapist's sessions.
-=not proficient; +=beginning proficiency; ++=competent [based on thresholds in manuals [27,50].
[a]Global Therapist Ratings. Scores based on mean ratings on three 7-point Global Rating scales (Acceptance, Empathy, MI-Spirit) [27]. Threshold beginning proficiency: mean rating = 4.9 [50].
[b]Reflection/Question ratio. Ratio between reflections and questions [27]. Threshold beginning proficiency if R:Q=1 [50].
[c]Proportion open questions of all (open and closed) questions [27]. Threshold beginning proficiency if %OQ=50% [50].
[d]Proportion complex reflections of all (simple and complex) reflections [27]. Threshold competency is %CR=50% [50].
[e]Proportion MI-consistent behaviour of MI-consistent and MI-inconsistent behaviour [27]. Threshold beginning proficiency if %MICO=90% [50].

DISCUSSION

This study was designed to study the mechanisms of MI in patients with schizophrenia with medication adherence as the target behaviour. We unravelled the MI-intervention in active ingredients (clinician factors and client factors) and mechanisms of change, and we systematically studied the application of active ingredients and the appearance of clues for mechanisms of change in 66 MI-sessions with the target group. Our model helped us to see 'MI at work'. It offered a view on how therapists act to influence the patient's behaviour, activating client factors, which may sometimes stimulate the occurrence of mechanisms of change: covert assumed psychological processes that are associated with a subsequent change in medication adherence (see also Miller & Rollnick [18]).

We found that many clinician factors were employed by the therapist. Whether the clinician factor activates one or more client factors depended on both the specific clinician factor,

and whether the clinician factor was embedded in a broader MI-strategy. In a few sessions, the therapist was not able to apply such a strategy, and in these sessions therapists sometimes elicited change talk in an artificial way. This resulted in poor quality change talk, which never led to an active ingredient. These practices, however, are due to occur in newly starting MI- therapists at beginning proficiency.

We also detected indications for the appearance of three of the four mechanisms of change of our model: 'arguing oneself into change', 'increasing motivation to change', and 'changing self-perception'. We did not observe the clinician factor 'creating a change plan', the client factor 'readiness to change', and the mechanism of change 'increasing self-efficacy/confidence'. Whereas the manual of the intervention [51] in the RCT [4] from which the MI-sessions originate instructs the therapists to discuss the patient's confidence in long-term medication adherence, the construction of a change plan is not included in the manual. This may explain the absence of the factors 'creating a change plan' and 'readiness to change'. It may also be an explanation for the absence of the mechanism of change 'increasing self-efficacy/confidence'. In four cases the therapists supported existing self-efficacy, but in none of the cases the therapist addressed the increase of self-efficacy in the context of creating a change plan for medication adherence.

Most of the present knowledge about active ingredients and mechanisms of change in MI originates from alcohol dependency research [e.g. 17,19,21,22]. Magill et al. [21] used mediation analysis to test a model with active ingredients, mechanisms of change and patient outcomes in a brief motivational interviewing intervention in heavy drinking underage young adults. Despite the differences between the studies in target populations, target behaviour, and study design, two of the MI-specific mechanisms of change of the model by Magill et al. [21], were also found in our study ('experiencing discrepancy', which we consider an active ingredient, and 'increasing motivation for change'), but we did not

find ‘increasing self-efficacy’ in our sample. However, it is plausible that this mechanism of change may also be relevant in MI with patients with schizophrenia.

In contrast to Magill et al. [21] our model differentiates between clinician factors and client factors, consistent the description by Nock [15]. The influence of client factors in psychological interventions is recognizable in MI, since the mere act of ‘eliciting change talk’ does not stimulate a mechanism of change. It depends on the client reaction (e.g. change talk in a certain depth, amount and strength, and sometimes it may also elicit sustain talk) whether a mechanism of change is stimulated. Moreover, in our qualitative analysis we found that mechanisms of change mostly are a result of a MI-strategy adapted to the patient process, which comprised an interaction between therapist and patient during larger session parts, and included a variety of clinician factors and client factors. Also, while interaction between clinician factors and client factors seems to be a prerequisite for the appearance of a mechanism of change, many of these interactions did not result in a stimulation of a mechanism of change.

Kazdin & Nock [52] point out that knowing how or why psychological interventions work presumes knowledge about necessary and sufficient ingredients, effective and non-effective doses, and factors impeding change. Our study suggests that in particular the client factors are in fact a pool of factors from which, if properly activated by clinician factors, different combinations can form active ingredients that stimulate a mechanism of change.

However, a mechanism of change for a specific outcome is only a mechanism of change if it causes that specific outcome. We did not study the relation between the mechanisms of change and medication adherence. Before studying such a relationship, we first needed to know what active ingredients are actually delivered in the intervention under study, and whether there are sufficient clues for the stimulation of mechanisms of change by the active ingredients. For causality, statistical mediation is required [15] in addition to the causal guidelines [e.g. 15,52,53]: strong association, specificity, gradient/dose-response

relationship, temporal relation, consistency, experiment, plausibility and coherence. Of these, we only showed temporality, and we had to accept the plausibility of the mechanisms of change from the theory of MI [14,16].

Limitations and Strengths

A limitation of this study is the limited visibility or measurability of most of the client factors and mechanisms of change, and the subsequent interpretative character of the findings. Still, due to the rigorous (systematic and transparent) method and the strict quality control measures, we believe the findings are credible and trustworthy.

Our tentative model is based on MI-theory and research literature, thereby reflecting the current state of the MI-knowledge on this subject. In spite of this, the hypothetical character of our model of active ingredients and mechanisms of change is still a limitation, and there may be other, possibly unknown factors or mechanisms missing in the model [54,55].

A strength of this study is the depth of analysis. We analysed beyond the MI-measurement instruments (MISC [27], SCOPE [28], MITS [30]), and used both quantitative and qualitative research methods. This thorough analysis enabled us to study the interactions between ingredients and mechanisms. A better understanding of this is an important step in the development of knowledge on MI. With the results of this study, we add a building block to answer the question how and why MI works in general, and particularly how MI works in patients with schizophrenia with medication adherence as target behaviour.

Conclusions

A large variation in the application of clinician factors enables the therapist to build a MI-strategy. The clinician factors activate the client factors, of which in our data 'change talk' was the most prevalent. It is plausible, however, that it is not about individual clinician

factors activating individual client factors, but about a sufficient combination of factors. This combination acts as an active ingredient and can trigger a mechanism of change.

The most important conversational techniques that shape the clinician factors we observed are reflections and questions addressing medication adherent behaviour or intentions, often followed by the client factor 'change talk'. 'A trusting relationship and empathy' turned out to be an important clinician factor, that enabled both therapist and patient to attain sufficient depth in the conversation through which clinician factors and client factors allow for a fruitful interaction with opportunities to trigger mechanisms of change.

Our model enabled us to see 'MI at work', and formed a basis for qualitatively studying MI. The model and our findings may help practitioners to improve the effectiveness of their MI-strategies to a more effective MI, in which active ingredients are intentionally employed to increase the probability of behaviour change.

MI may be more effective if the therapist is informed about the active ingredients and the mechanisms of change. The current study provides possible ingredients of effective patient-therapist interactions triggering mechanisms of change. However, whether these mechanisms lead to better outcomes needs to be studied in further detail. A next step in research may be to study whether there are better outcomes for patients with MI-sessions in which one or more mechanisms of change appeared, compared to patients for whom no mechanisms of change were observed.

CONTRIBUTION TO THE FIELD

It is unclear how motivational interviewing (MI) for medication adherence with patients with schizophrenia works. This leads to practice variation in which practitioners and patients cannot be sure that the critical intervention components are present. The results of this study indicate that the practitioner should develop an MI-strategy targeting the working

mechanisms of MI, based on an understanding of the patient's perspective on medication use, and on the recognition of the patient's process in the MI-sessions.

Although the study sample was small (14 patients) and the patient process can be affected by many factors (e.g. age, gender, culture, severity of illness), the motivational processes found in this study may also be present in comparable patients. However, this study is a first exploration of how MI might work in this patient group and for medication adherence as target behaviour. Thus, the transfer of our findings needs to be exercised with prudence.

AUTHOR CONTRIBUTIONS

JD, CL, BvM, GtR, EB, RP, WSoR, LdH contributed to the study design. JD and EB performed the data acquisition, JD, GtR and EB performed the data analysis. JD, GtR, EB, LdH interpreted the data, and CL and BvM checked the data-interpretation. JD, CL, BvM, GtR, EB, RP, WSoR, LdH participated in writing the manuscript. All authors approved the final manuscript.

FUNDING

This work was supported by a research grant from the Netherlands Organization for Scientific Research (NOW, grant number 023.004.060) to JD.

ACKNOWLEDGMENTS

We would like to thank Vera Kruse and Elena LePoole for their help in coding, Suzanne Kieft for independently (double) analysing two cases, and Grace Jenkins for her comments on our English language use.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Medical Ethics Committee of the Amsterdam UMC, Amsterdam. Written informed consent was obtained from all participants.

CONFLICT OF INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

REFERENCES

1. Leucht S, Tardy M, Komossa K, Heres S, Kissling W, Salanti G, et al. Antipsychotic drug versus placebo for relapse prevention in schizophrenia: a systematic review and meta-analysis. Lancet (2012) 379:2063-71. doi: 10.1016/S0140-6736(12)60239-6
2. Ascher-Svanum H, Zhu B, Faries DE, Lacro JP, Dolder CR, Peng X. Adherence and persistence to typical and atypical antipsychotics in the naturalistic treatment of patients with schizophrenia. Patient Prefer Adherence (2008) 2:67-77. doi: 10.2147/ppa.s2940
3. Lieberman JA, Stroup TS, McEvoy JP, Swartz MS, Rosenheck RA, Perkins DO, et al. Effectiveness of Antipsychotic Drugs in Patients with Chronic Schizophrenia. N Engl J Med (2005) 353:1209-23. doi: 10.1056/NEJMoa051688
4. Barkhof E, Meijer CJ, Sonneville LJ, Linszen DH, De Haan L. The effect of motivational interviewing on medication adherence and hospitalization rates in non-adherent patients with multi-episode schizophrenia. Schizophr Bull. 2013;39:1242-51. doi: 10.1093/schbul/sbt138
5. Kemp R, Hayward P, Applewaith G, Everitt B, David A. Compliance therapy in psychotic patients: randomised controlled trial. BMJ. 1996;312:345-9. doi: 10.1136/bmj.312.7027.345
6. Kemp R, Kirov G, Everitt B, Hayward P, David A. Randomised controlled trial of compliance therapy. 18-month follow-up. Br J Psychiatry. 1998;172:413-9. doi: 10.1192/bjp.172.5.413
7. O'Donnell C, Donohoe G, Sharkey L, Owens N, Migone M, Harries R, et al. Compliance therapy: a randomised controlled trial in schizophrenia. BMJ. 2003;327:834. doi: 10.1136/bmj.327.7419.834
8. Rubak S, Sandbaek A, Lauritzen T, Christensen B. Motivational interviewing: a systematic review and meta-analysis. Br J Gen Pract. 2005;55:305-12.

9. Smedslund G, Berg RC, Hammerstrøm KT, Steiro A, Leiknes KA, Dahl HM, et al. Motivational interviewing for substance abuse. Cochrane database Syst Rev. 2011;5:CD008063. doi: 10.1002/14651858.CD008063.pub2
10. Hill S, Kavookjian J. Motivational interviewing as a behaviorial intervention to increase HAART adherence in patients who are HIV-positive: A systematic review of the literature. AIDS Care. 2012;24:883-92. doi: 10.1080/09540121.2011.630354
11. Lundahl B, Moleni T, Burke BL, Butters R, Tollefson D, Butler C, et al. Motivational interviewing in medical care settings: a systematic review and meta-analysis of randomized controlled trials. Patient Educ Couns. 2013;93:157-68. doi: 10.1016/j.pec.2013.07.012
12. Miller WR, Rollnick S. The effectiveness and ineffectiveness of complex behavioural interventions: impact of treatment fidelity. Contem Clin Trials. 2014;37:234-41. doi: 10.1016/cct.2014.01.005
13. Romano M, Peters L. Evaluating the mechanisms of change in motivational interviewing in the treatment of mental health problems: a review and meta-analysis. Clin Psychol Rev. 2015;38:1-12. doi: 10.1016/j.cpr.2015.02.008
14. Miller WR, Rollnick S. Motivational Interviewing: Helping People Change. 3rd ed. New York: Guilford Press; 2013.
15. Nock MK. Conceptual and design essentials for evaluating mechanisms of change. Alcohol Clin Exp Res. 2007;31(S3):4S-12S. doi: 10.1111/j.1530-0277.00488.x
16. Miller WR, Rollnick S. Motivational Interviewing: Preparing People for Change. 2nd ed. New York: Guilford Press; 2002.
17. Magill M, Kiluk BD, McCrady B, Tonigan JS, Longabaugh R. Active ingredients of treatment and client mechanisms of change in behavioural treatments for alcohol use disorders: progress 10 years later. Alcohol Clin Exp Res. 2015;39;1852-62. doi: 10.1111/acer.12848

18. Miller WR, Rollnick S. Talking oneself into change: motivational interviewing, stages of change, and therapeutic process. J Cogn Psychother. 2004;18:299-308. doi: 10.1891/jcop.18.4.299.64003
19. Apodaca TR, Longabaugh R. Mechanisms of change in motivational interviewing: a review and preliminary evaluation of the evidence. Addiction. 2009;104:705-15. doi: 10.1111/j.1360-0443.2009.02527.x
20. Copeland L, McNamara R, Kelson M, Simpson S. Mechanisms of change within motivational interviewing in relation to health behaviors outcomes: a systematic review. Patient Educ Couns. 2015;98;401-11. doi: 10.1016/j.pec.2014.11.022
21. Magill M, Colby SM, Orchowski L, Murphy JG, Hoadley A, Brazil LA, et al. How does brief motivational intervention change heavy drinking and harm among underage young adult drinkers. J Consult Clin Psychol. 2017;85:447-58. doi: 10.1037/ccp0000200
22. Magill M, Apodaca TR, Borsari B, Gaume J, Hoadley A, Gordon REF, et al. A meta-analysis of motivational interviewing process: technical, relational, and conditional process models of change. J Consult Clin Psychol. 2018;86:140-57. doi: 10.1037/ccp0000250
23. McNally AM, Palfai TP, Kahler CW. Motivational interventions for heavy drinking college students: examining the role of discrepancy-related psychological processes. Psychol Addict Behav. 2005;19:79-87. doi: 10.1037/0893-164X.19.1.79
24. Dobber J, Latour C, De Haan L, Scholte op Reimer W, Peters R, Barkhof E, et al. Medication adherence in patients with schizophrenia: a qualitative study of the patient process in motivational interviewing. BMC Psychiatry. 2018;18:135. doi: 10.1186/s12888-018-1724-9
25. Stake RE. Multiple Case Study Analysis. New York: Guilford Press; 2006.
26. Bakeman R, Quera V. Sequential Analysis and Observational Methods for the Behavioural Sciences. Cambridge: Cambridge University Press; 2011.

27. Miller WR, Moyers TB, Ernst D, Amrhein P. Manual for the Motivational Interviewing Skill Code (MISC). Version 2.1. 2008. Available from: https://casaa.unm.edu/download/misc.pdf
28. Martin T, Moyers TB, Houck J, Christopher P, Miller WR. Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE). Coder's manual. 2005. Available from: https://casaa.unm.edu/download/scope.pdf
29. Dobber J, Van Meijel B, Barkhof E, Scholte op Reimer W, Latour C, Peters R, et al. Selecting an optimal instrument to identify active ingredients of the motivational interviewing-process. J Psychosom Res. 2015;78:268-76. doi: 10.106/jpsychores.2014.10.010
30. Allison J, Bes R, Rose G. Motivational Interviewing Target Scheme (MITS 2.1). An instrument for practitioners, trainers, coaches and researchers. 2012. Available from: http://www.motivationalinterviewing.org/sites/default/files/MITS_2.1.pdf
31. Oberink R, Boom SM, Van Dijk N, Visser MRM. Assessment of Motivational Interviewing: A qualitative study of response process validity, content validity and feasibility of the motivational interviewing target scheme (MITS) in general practice. BMC Med Educ. 2017;17:224. doi: 10.1086/s12909-017-1052-7
32. Berger BA, Bertram CT. Motivational interviewing and specialty pharmacy. J Manag Care Spec Pharm. 2015;21:13-7. doi: 10.18553/jmpc.21.1.13
33. Berger BA, Villaume WA. A new conceptualization and approach to learning and teaching motivational interviewing. Innov Pharm. 2016;7(1):Article 3.
34. GSEQ 5.1. Software accessed 2016. Available from: www.ub.edu/gcai/gseq/
35. Moyers TB, Martin T, Houck JM, Christopher PJ, Tonigan JS. From in-session behaviors to drinking outcomes: a causal chain for motivational interviewing. J Consult Clin Psychol. 2009;77:1113-24. doi: 10.1037/a0017189

36. Berger BA, Villaume WA. Motivational Interviewing for Health Care Professionals. A Sensible Approach. Washington DC: American Pharmacists Association; 2013.
37. Glynn LH, Moyers TB. Chasing change talk: the clinician's role in evoking client language about change. J Subst Abuse Treat. 2010;39:65-70. doi: 10.1016/j.jsat.2010.03.012
38. Moyers TB, Miller WR. Is low therapist empathy toxic? Psychol Addict Behav. 2013;27:878-84. doi: 10.1037/a0030274
39. Barnett NP, Apodaca TR, Magill M, Colby SM, Gwaltney C, Rohsenow DJ, et al. Moderators and mediators of two brief interventions for alcohol in the emergency department. Addiction. 2010;105:452-65. doi: 10.1111/j.1360-0443.2009.02814.x
40. Gollwitzer PM. Implementation intentions: Strong effects of simple plans. Am Psychol. 1999;54:493-503. doi: 10.1037/0003-066X.54.7.493
41. Lee CS, Baird J, Longabaugh R, Nirenberg TD, Mello MJ, Woolard R. Change plan as an active ingredient of brief motivational interviewing for reducing negative consequences of drinking in hazardous drinking emergency-department patients. J Stud Alcohol Drugs. 2010;71:726-33. doi: 10.15288/jsad.2010.71.726
42. Miller WR. Motivational interviewing with problem drinkers. Behav Psychother. 1983;11:147-72. doi: 10.1017/S0141347300006583
43. Arkowitz H, Miller WR, Westra HA, Rollnick S. "Motivational Interviewing in the Treatment of Psychological Problems: Conclusions and Future Directions". In: Arkowitz H, Miller WR, Westra HA, Rollnick S, editors. Motivational Interviewing in the Treatment of Psychological Problems. New York: The Guilford Press; 2008. p.324-42.
44. Apodaca TR, Borsari B, Jackson KM, Magill M, Longabaugh R, Mastroleo NR, et al. Sustain talk predicts poorer outcomes among mandated college student drinkers receiving a brief motivational intervention. Psychol Addict Behav. 2014;28:631-38. doi: 10.1037/a0037296

45. Gaume J, Gmel G, Daeppen JB. Brief alcohol interventions: do counsellors' and patients' communication characteristics predict change? Alcohol Alcohol. 2008;43:62-9. doi: 10.1093/alcalc/agm141
46. Miller WR, Rose GS. Toward a theory of motivational interviewing. Am Psychol. 2009;64:527-37. doi: 10.1037/a0016830
47. Moos RH. Theory-based active ingredients of effective treatments for substance use disorders. Drug Alcohol Depend. 2007;88:109-21. doi: 10.1016/drugalcdep.2006.10.010
48. Bem DJ. Self-perception: an alternative interpretation of cognitive dissonance phenomena. Psychiatry Rev. 1967;74:183-200. doi: 10.1037/h0024835
49. Moyers TB, Manuel JK, Ernst D. Motivational Interviewing Treatment Integrity. Coding Manual 4.2.1. 2015. Available from: https://casaa.unm.edu/download/MITI4_2.pdf
50. Moyers TB, Martin T, Manuel JK, Miller WR, Ernst D. Manual for the Motivational Interviewing Treatment Integrity (MITI). Version 3.1.1. 2010. Available from: https://casaa.unm.edu/download/MITI3_1.pdf
51. Barkhof E, Meijer K. Motivational interviewing. Intern publication of the intervention manual. Amsterdam: AMC/De Meren; 2004.
52. Kazdin AE, Nock MK. Delineating mechanisms of change in child and adolescent therapy: methodological issues and research recommendations. J Child Psychol Psychiatry. 2003;44:1116-29. doi: 10.1111/1469-7610.00195
53. Hill AB. The environment and disease: association or causation? Proc R Soc Med. 1965;58:295-300. doi: 10.1177/003591576505800503
54. Hilton CE, Lane C, Johnston LH. Has motivational interviewing fallen into its own premature focus trap? Int J Adv Counseling. 2016;38:145-58. doi: 10.1007/s10447-016-9262-y

55. Gaume J, McCambridge J, Bertholet N, Daeppen JB. Mechanisms of action of brief alcohol interventions remain largely unknown – a narrative review. Front Psychiatry. 2014;5:108. doi: 10.3389/fpsyt.2014.00108

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article:

S1: Brief explanation Clinician factors

S2: Brief explanation Client factors

S3: Brief explanation Hypothetical Mechanisms of change

S4: Sensitivity analysis of the conditional probabilities

S5: Visual overview of all 66 MI-sessions

Supplementary material file 1. Clinician factors ("what the clinician does in the treatment, including clinician behaviors, characteristics, and directives" Nock, 2007, p.8s [1]).

Eliciting change talk

The therapist purposefully employs activities to elicit change talk (e.g. through complex reflections or open ended questions). Change talk entails patient statements in favour of behaviour change in the direction of the target behaviour: long-term medication adherence.

Discussing ambivalence and/or barriers

The therapist openly/explicitly or implicitly talks about the patient's ambivalence towards medication adherence. The therapist may discuss both sides of the ambivalence, or how the ambivalence may be solved, or differentially simply reflect the patient's concerns on the contra side and reflect and elaborate on the pro-side of change.

The discussion of barriers may concentrate on identifying barriers and on discussing the patient's concerns about these barriers.

Creating discrepancy / relating values

The therapist tries to direct the course of the conversation in such a way that the patient relates his/her own values or life goals to the target behaviour (long-term medication adherence). In doing so, the therapist may attempt to create discrepancy, i.e. the patient experiences a gap between the present situation and the desired situation.

Building a trusting relationship / empathy

Therapist and patient develop a relationship of mutual respect and trust. The therapist takes a listening and empathic stance, shows genuine interest in the patient, and sympathizes with

the patient's experiences (and does not pursue his/her own agenda). The patient is being listened to, understood, or the therapist takes an effort to understand him/her.

Influencing patient's sense making

By providing information, the coach attempts to influence the patient's sense making (in which the present behaviour [poor medication adherence] seems obvious and logical to the patient) in such a way that the patient finds his/her sense making no longer logical, or even incorrect.

Supporting self-efficacy / competency

The therapist promotes or affirms the patient's experience of competency or confidence or the belief of self-efficacy, e.g. by discussing coping strategies to handle these barriers.

Supporting autonomy

The therapist promotes or affirms that the patient is the only person who decides (about medication adherence); or promotes or affirms that the patient is gaining control or has control over the medication by using it for his/her own purposes and goals; or promotes or affirms the patient's (feeling of) autonomy.

Creating a change plan

The therapist and the patient work out a concrete plan that fits the patient's actions and strategies for long-term medication adherence or to avoid or cope with potential barriers for long term medication use.

Supporting self-esteem

The therapist emphasizes (e.g. affirms or reflects) a positive patient trait or skill.

Reference

1. Nock MK. Conceptual and design essentials for evaluating mechanisms of change. Alcohol Clin Exp Res. 2007;31(S3):4S-12S.

Supplementary material file 2. Client factors ("what the client does in treatment, including behaviors, characteristics, and verbalizations on their part" (Nock, 2007, p.8s [1]).

Change talk

Patient statements in favour of change: prolonged medication adherence. Patient statements may concern desire, ability, reasons, need, commitment, taking steps, or other pro-change statements.

Resolving ambivalence

The patient expresses a choice for one of the two sides of ambivalence, which resolves the originally present doubt or ambivalence.

Changing sense making

The patient adjusts his/her original explanatory model through which the patient explains his/her medical and psychological condition and his/her coping with it, including his/her sense making of medication (non)adherence.
Or: the patient adjusts his/her reasoning about the consequences of the explanatory model for his/her coping with this condition, including his/her sense making of medication (non)adherence.

Experiencing autonomy

The patient's reaction shows that, due to a therapist statement, the patient experiences autonomy or being in control, in an enhanced degree.

Experiencing discrepancy

Patient's statements show that the patient experiences a gap (or the development of a gap) between the existent situation and the desired situation, recognizing certain life goals or values for which medication adherence can be key to accomplish (a higher degree of) these life goals or values.

Experiencing a safe environment / opening up

The patient overtly talks about his/her concerns and opens up. The patient goes deeper into personal material, spontaneously elaborating on it with feeling.

In-depth self-exploration

The patient explores personally relevant material and may discover new perspectives and/or personal meanings (see also: Client self-exploration, MISC2.1, p.7; 2008 [2]).

Experiencing competency / self-efficacy

The patient reaction shows that, due to a therapist statement, the patient experiences competence or self-efficacy, in an enhanced degree.

Readiness to change

The patient states directly or indirectly to adhere to long-term medication use (while up to that moment, he/she did not completely adhere to long-term medication use).

References

1. Nock MK. Conceptual and design essentials for evaluating mechanisms of change. Alcohol Clin Exp Res. 2007;31(S3):4S-12S.

2. Miller WR, Moyers TB, Ernst D, Amrhein P. Manual for the Motivational Interviewing Skill Code (MISC). Version 2.1. 2008. https://casaa.unm.edu/download/misc.pdf Accessed 27 October 2013.

Supplementary material file 3. Hypothetical mechanisms of change ("the processes that emerge from or occur as a result of the clinician and client factors, and their interaction, that explain how those factors lead to change in the outcomes of interest" Nock, 2007, p.8s [1]).

Arguing oneself into change

The patient talks about long-term medication use in such a way that he/she convinces him/herself to use medication on a long-term basis (while up to that moment he/she was unconvinced). If the patient was already convinced, he/she may strengthen this belief.

Increasing motivation to change

The patient clearly expresses a stronger motivation for long-term medication adherence than earlier in the same session or in previous sessions.

Increasing self-efficacy / confidence

The patient expresses an enhanced degree of self-efficacy or confidence in his/her ability to adhere to medication on a long-term basis.

Changing self-perception

The patient's statements show a shift in self-perception regarding (an aspect related to) medication use.

Reference

1. Nock MK. Conceptual and design essentials for evaluating mechanisms of change. Alcohol Clin Exp Res. 2007;31(S3):4S-12S.

Supplementary material file 4. Sensitivity analysis of the conditional probabilities

Conditional probabilities[ab] omitting the sessions of one patient with a language barrier

Target (patient statements; n=5954) **Given** (therapist statements; n=6122)	**Sustain talk**[c]	**Change talk**[d]	**Neutral**[e]
Other[f]	.05	.07	.88
2-sided-question (±)[g]	.17	.37	.46
Question-	.55	.08**	.37
Question neutral	.01	.02	.97
Question+	.03	.70	.28
2-sided reflection (±)[g]	.23	.30	.47
Reflection-	.64	.05	.31
Reflection neutral	.01	.02	.98
Reflection+	.02	.74	.24
sMI-consistent[h]	.04*	.06	.91
MI-inconsistent[i]	.03*	.07*	.90

[a] *Probability of a certain type of patient statement given a particular type of therapist statement*
[b] *All: p ≤0.01, except *0.01< p <0.05 and **p=0.08*
[c] *Sustain talk comprises desire to change, ability to change, reasons to change, need to change, commitment to change, taking steps to change, and other pro-change statements*
[d] *Change talk comprises desire not to change, ability not to change, reasons not to change, need for status quo, commitment to status quo, taking steps to status quo, and other counter-change statements*
[e] *Neutral comprises ask, follow/neutral, and not encodable patient statements*
[f] *Other comprises facilitate, filler, self-disclosure, general information, raise concern, structure, advising with permission, not encodable*
[g] *2-sided means questions or reflections addressing both change talk and sustain talk*
[h] *sMI-consistent = sequential MI-consistent, and comprises affirmation, emphasizing control, permission seeking, offering support*
[i] *MI-inconsistent comprises confrontation, directing, warning, giving opinion, advising without permission*
Note that row percentages add up to 100 (except for rounding)

Supplementary material file 5. Visual overview of all 66 MI-sessions

The data were collected in the intervention group of a RCT to study the effect of motivational interviewing (MI) to promote medication adherence in patients with schizophrenia (1). All audiotaped MI-sessions were coded using the Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE, 2), sequentially coding both therapist and patient communication behaviour.

Below, 66 MI-sessions are displayed. Both patient verbal behaviour and therapist verbal behaviour is converted into colours. For reasons of clarity we limited the number of categories for patient verbal behaviour to three, and seven for therapist verbal behaviour. The categories were composed on theoretical grounds. The therapist behaviour is shown through the coloured bars in the top half of each figure, while the coloured bars in the bottom half show the patient behaviour. On the x-axis, the sequential utterance number is displayed. Broadly, the colours green and blue sign “good”, grey signs “neutral”, yellow and orange sign “caution”, and red signs “bad”. For further description of the meaning of the colours: see the legend below. Note that these colours don’t convey the quality and the exact content of the utterances.

In the first sessions of all cases the therapist took some time with the patient and asked him/her to review his/her illness history. Most times, this contributed to the trusting relationship between patient and therapist. This start explains why in session 1, in many cases, the topic of medication adherence played a minor role.

The sequence of the colours shows the course of the change talk and sustain talk, and the therapist techniques preceding and following change talk and sustain talk. The sequence may also reveal interaction patterns. On the basis of MI-theory (3) in good quality MI-sessions, one might expect [1] “green therapist behaviour” to be followed by “green patient behaviour”; [2] “green patient behaviour” to be followed by “green therapist behaviour”; [3] none, or just a small number or “red therapist behaviour”; [4] a “mix of yellow and green

patient behaviour" in ambivalent patients; [5] an increasing quantity of "green patient behaviour" towards the end of the last sessions. However, our qualitative study suggests that good quality MI to improve long-term medication adherence in patients with schizophrenia, is more complex. MI-strategies comprise large parts of the MI-sessions, and in these sessions sufficient attention for both change talk and sustain talk is essential. Furthermore, "neutral talk" often serves an important role in rapport building, which is also an essential MI-component.

Legend

Therapist (top half)

dark green = question querying for change, or two-sided question

light green = reflection of change talk, or two-sided reflection

blue = MI-consistent techniques (affirm, emphasize control, permission seeking, support)

grey = other (facilitate, filler, self-disclosure, general information, raise concern, structure, advice with permission, not encodable)

yellow = question querying counter-change, of question not directed at the target behaviour

orange = reflection of sustain talk, or reflection of neutral talk

red = MI-inconsistent techniques (confront, direct, warn, opinion, advice without permission)

Patient (bottom half)

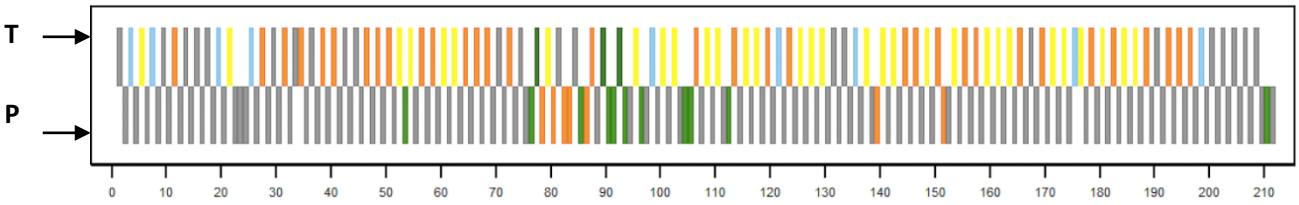
green = change talk

grey = neutral talk

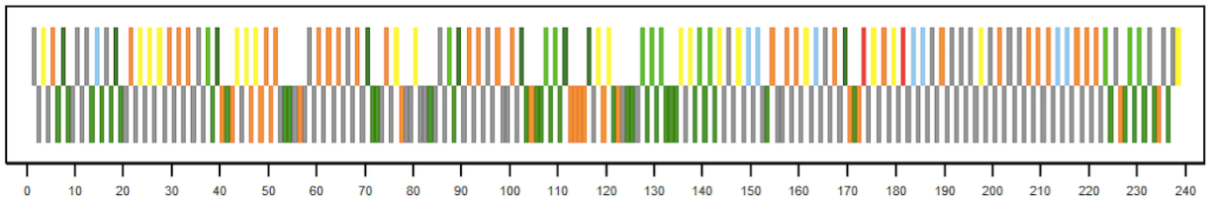
orange = sustain talk

Case 1. At the start of the MI-sessions this patient felt ambivalent about long-term medication use, and remained ambivalent through all sessions but tended to medication adherence.

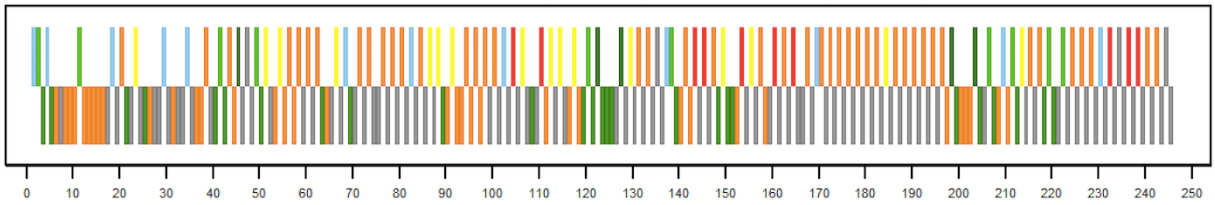
Session 1



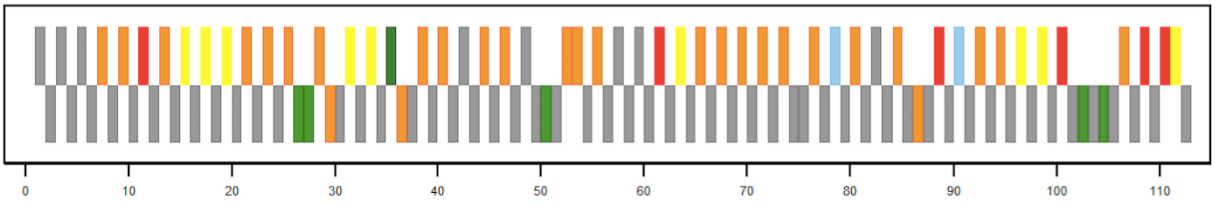
Session 2



Session 3

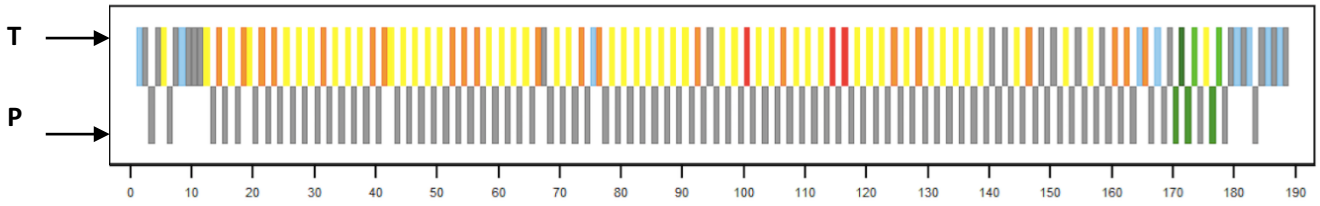


Session 4

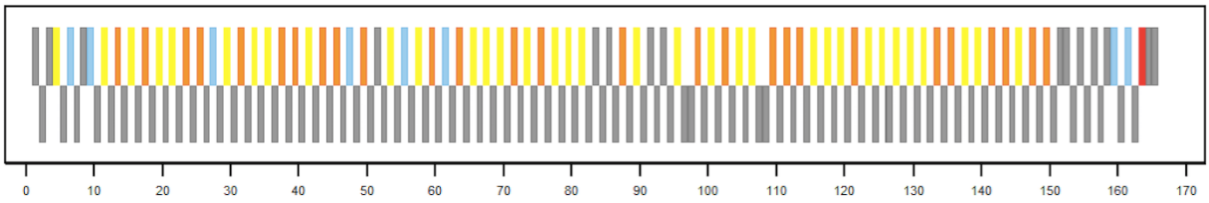


Case 2. This patient avoided discussing the topic of medication use, as visualized by the grey bars in the bottom half of the session images.

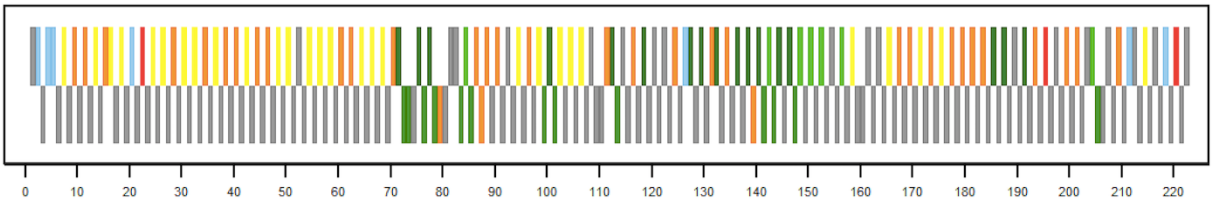
Session 1



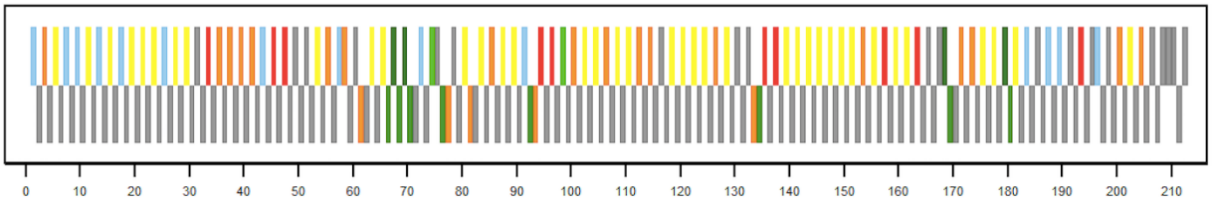
Session 2



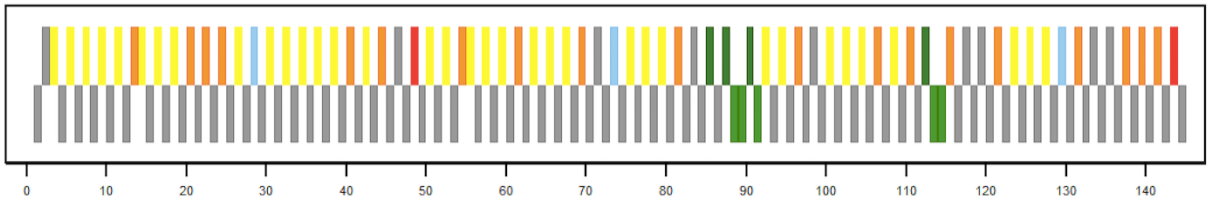
Session 3



Session 4

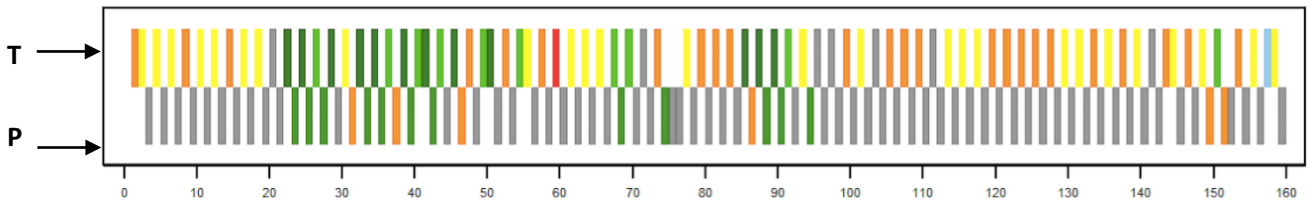


Session 5

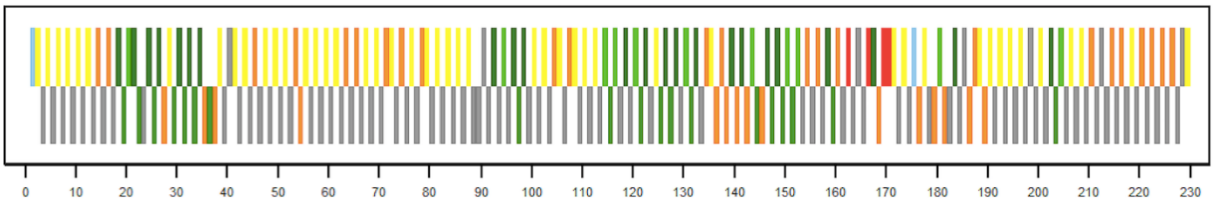


Case 3. This patient did not feel ambivalent and strongly believed in the decision to stop medication use immediately after discharge from hospital. In all sessions, the therapist and the patient explored the patient's motives and discussed the patient's perspectives. The therapist tried to influence patient's sense making and to develop discrepancy, but both attempts failed. In session 3 the atmosphere almost became unpleasant when the therapist confronted the patient four times (codes 162 – 171), but it did not become really tense, and the trusting relationship remained intact.

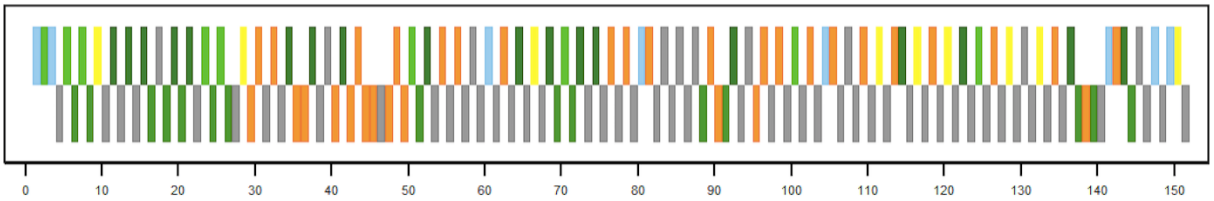
Session 2



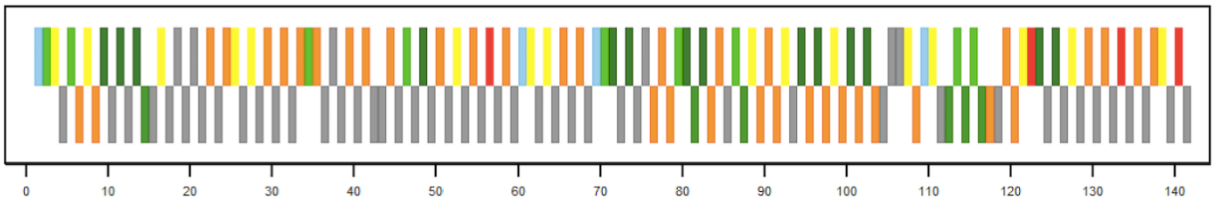
Session 3



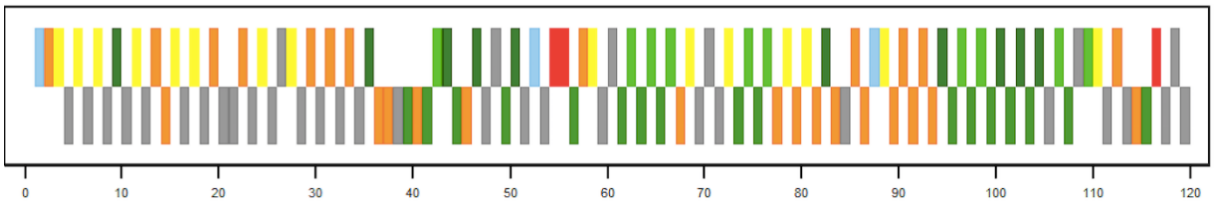
Session 4



Session 5

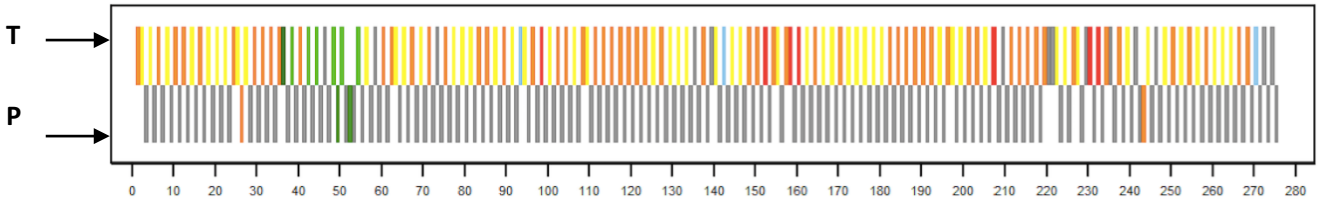


Session 6

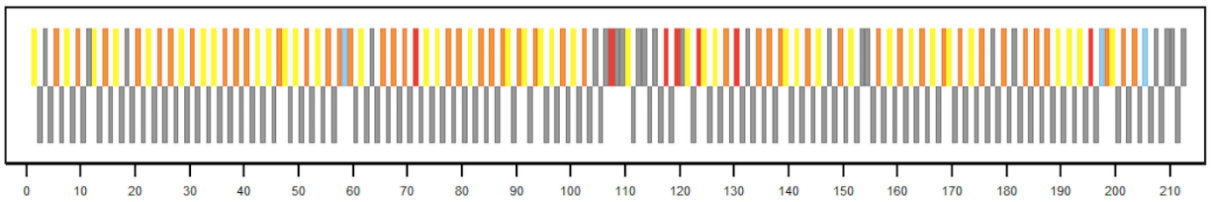


Case 4. At the start, this patient felt ambivalent about long-term medication use, and the patient remained ambivalent during all sessions. The therapist tried to persuade the patient, and expressed his opinion many times. In session 2 and session 7, the conversation was not on the target behaviour. In sessions 6 and 8, the therapist and the patient performed a decision balance: exploring the pros and cons of long-term medication use.

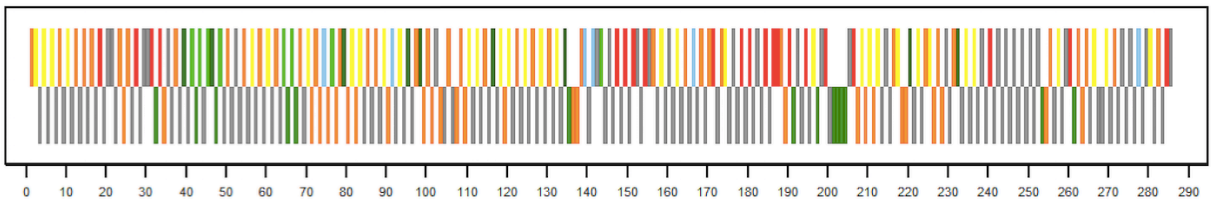
Session 1



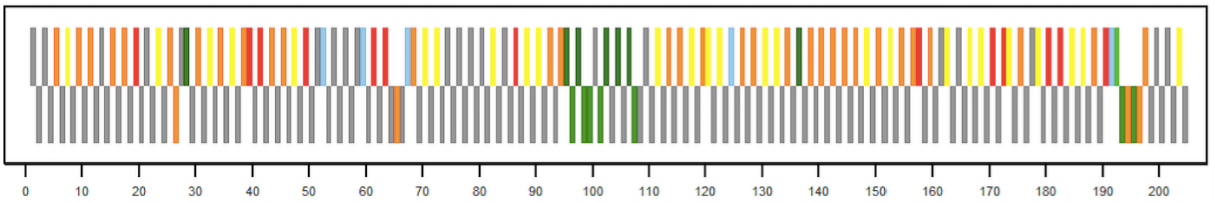
Session 2



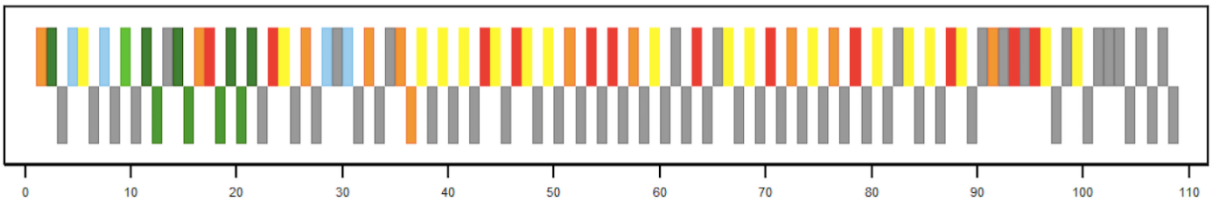
Session 3



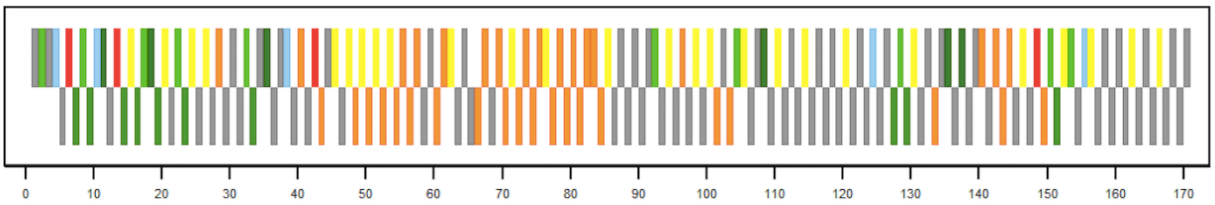
Session 4



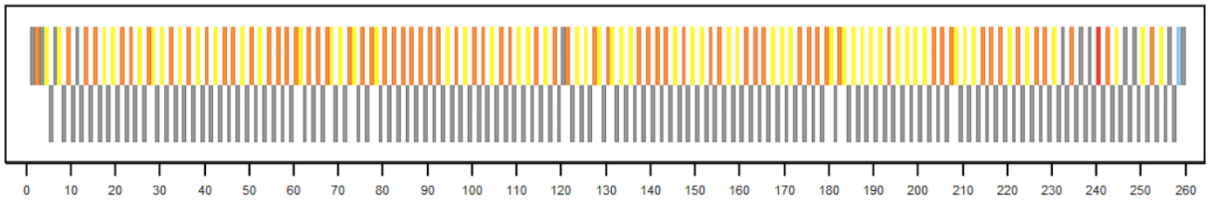
Session 5



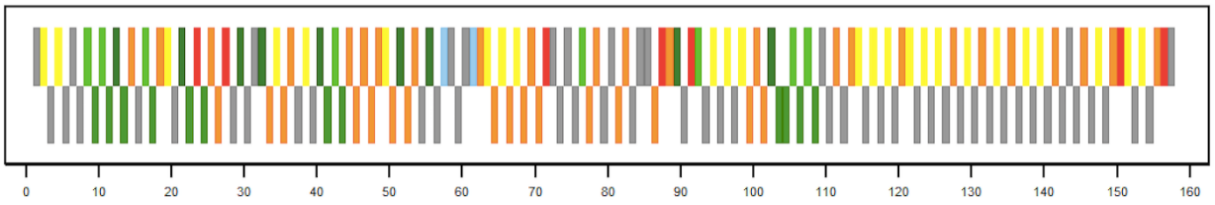
Session 6



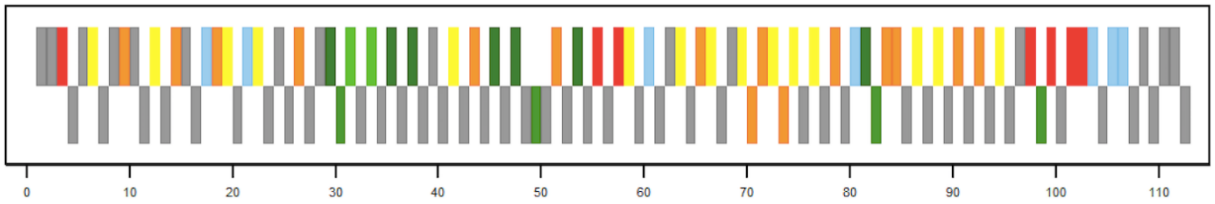
Session 7



Session 8

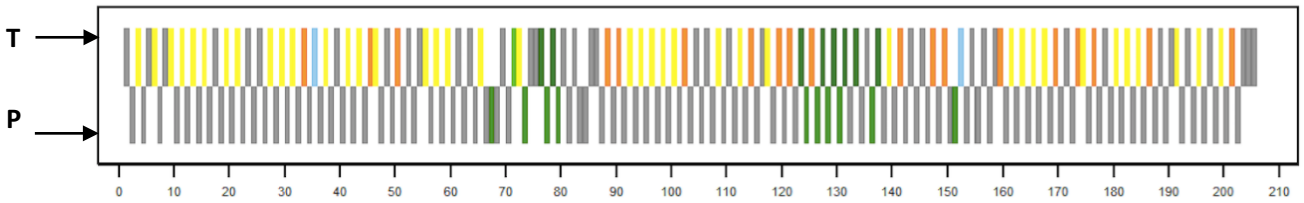


Session 9

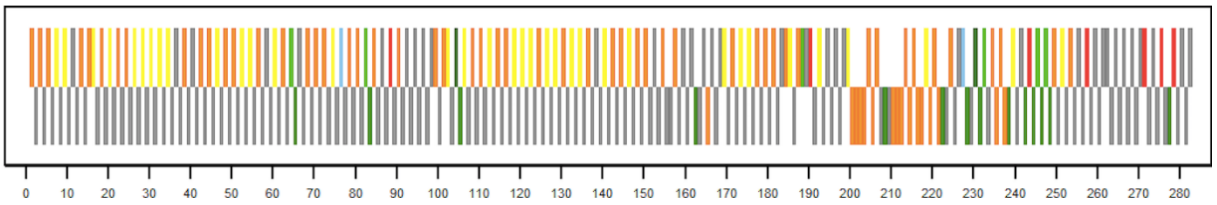


Case 5. At the start of the MI-sessions, this patient felt ambivalent about long-term medication use, which became apparent in session 2. Especially during sessions 3 and 4, the patient explored the meaning of medication in daily life. In session 5, the patient solved the ambivalence, and, in spite of the disadvantages, the patient decided in favour of long-term medication adherence.

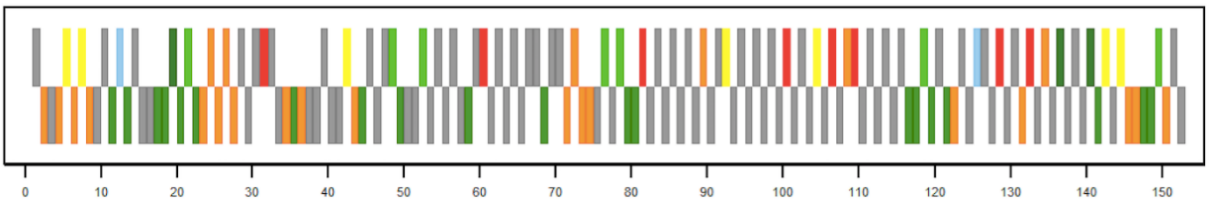
Session 1



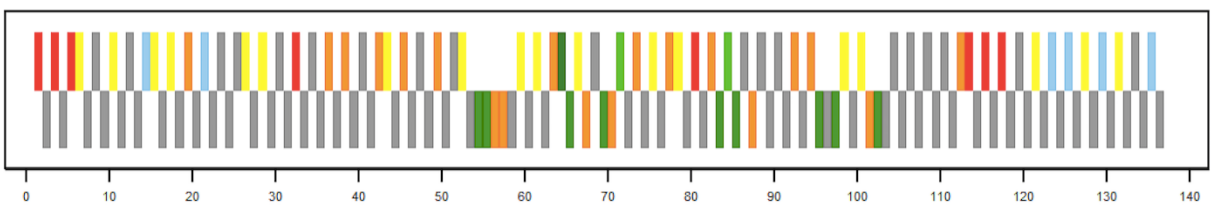
Session 2



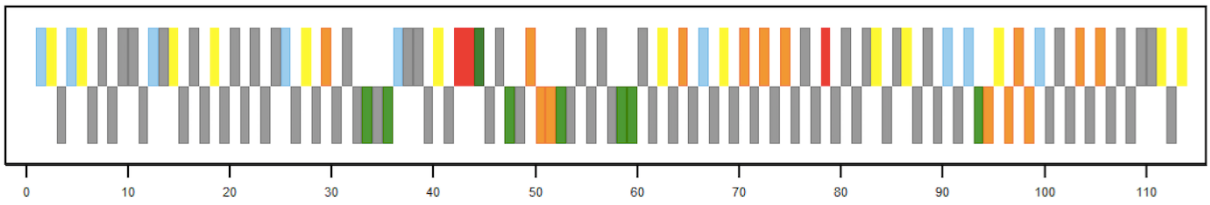
Session 3



Session 4

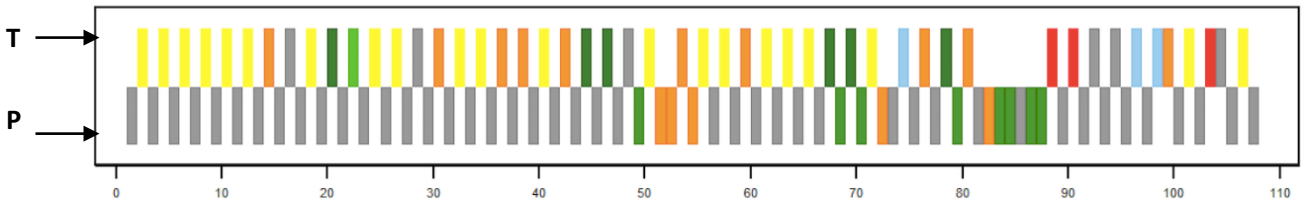


Session 5

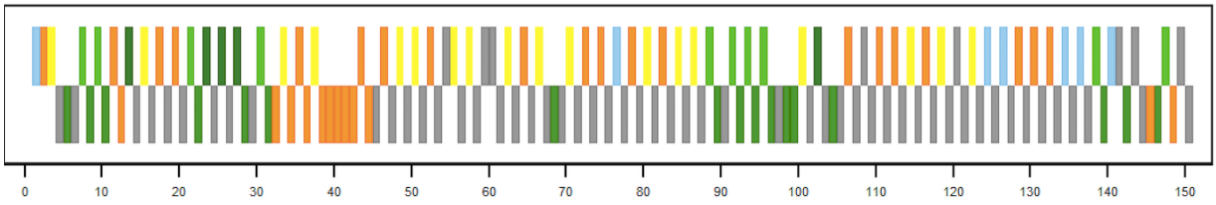


Case 6. At the start, this patient felt ambivalent about long-term medication use, and the patient remained ambivalent during all sessions. The ambivalence is dominantly present in the fourth session. Hereafter, there was a stagnation in the MI-process and the patient's ambivalence was still unchanged in the last session.

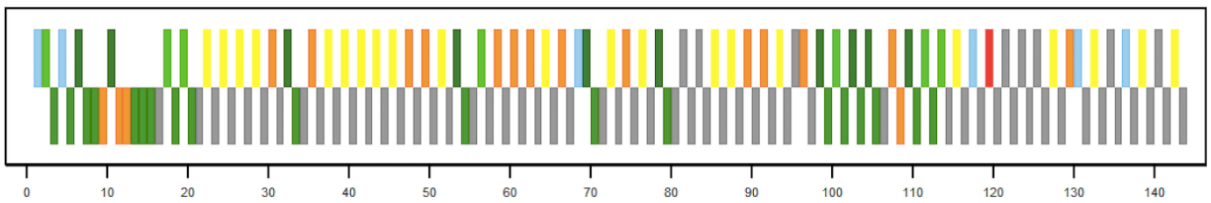
Session 1



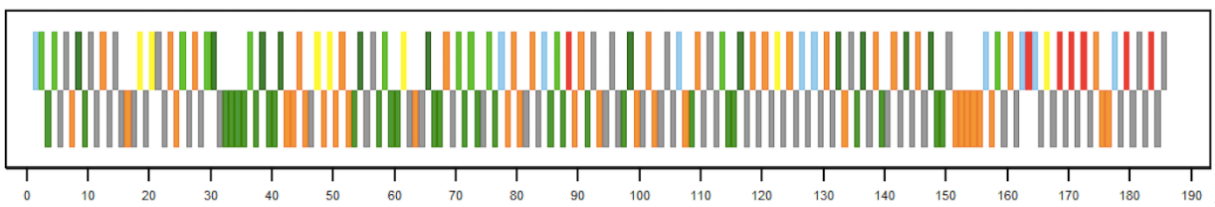
Session 2



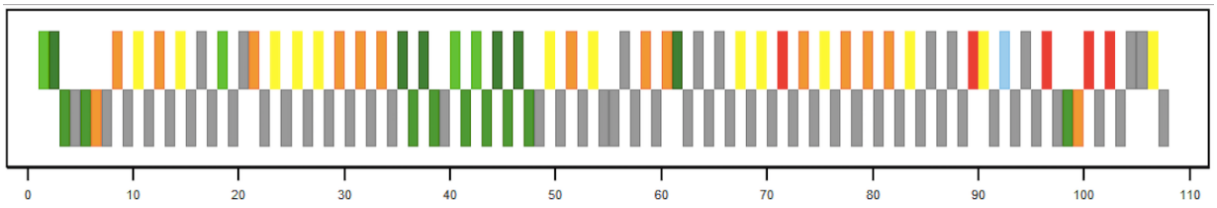
Session 3



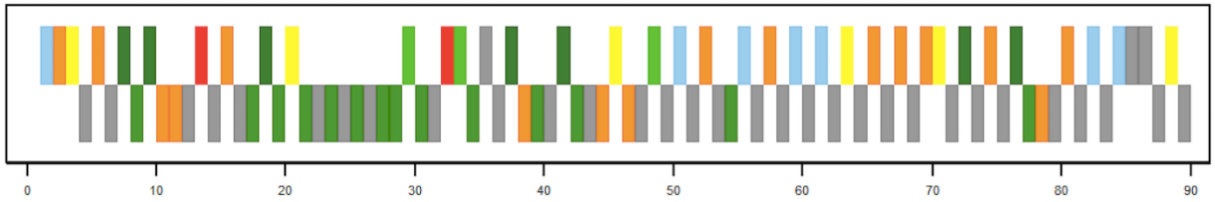
Session 4



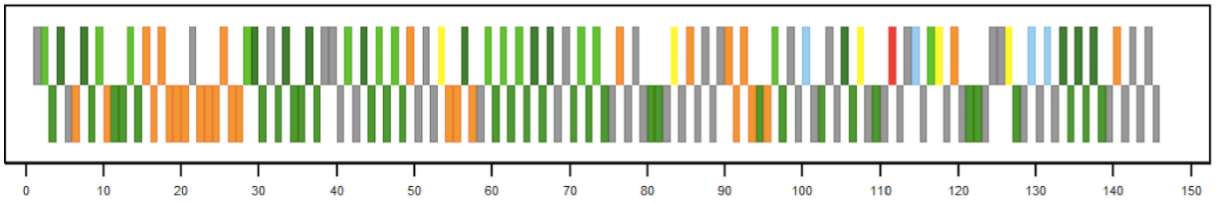
Session 5



Session 6

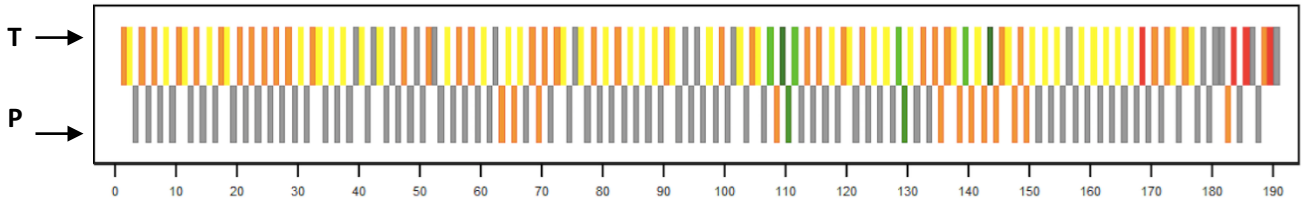


Session 7

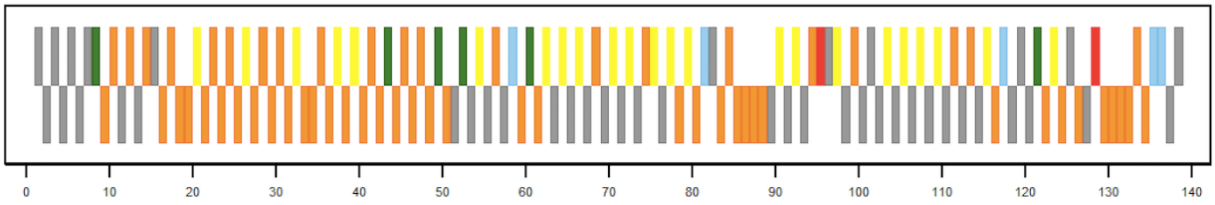


Case 7. This patient did not feel ambivalent and was convinced that medication "is of no use". The language barrier between patient and therapist and the lack of engagement between them, led to unfruitful sessions. The change talk in session 3 and 4 was of low quality, the patient mostly followed the therapist, saying what the therapist wanted to hear.

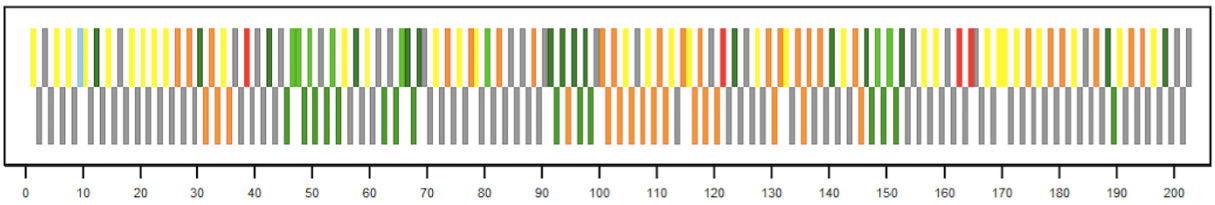
Session 1



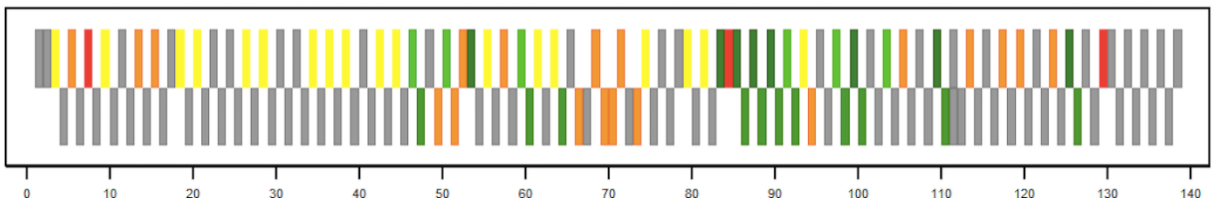
Session 2



Session 3

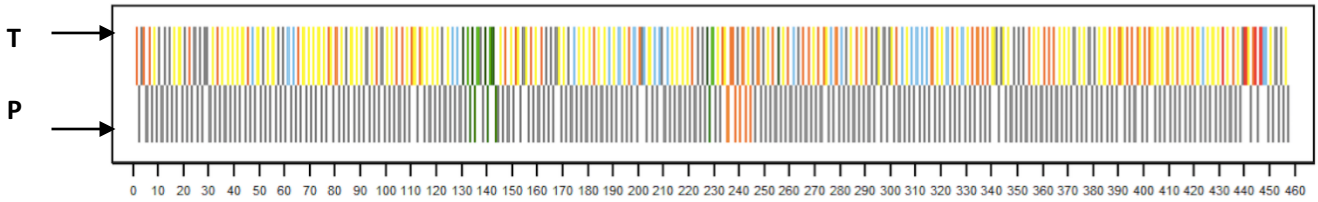


Session 4

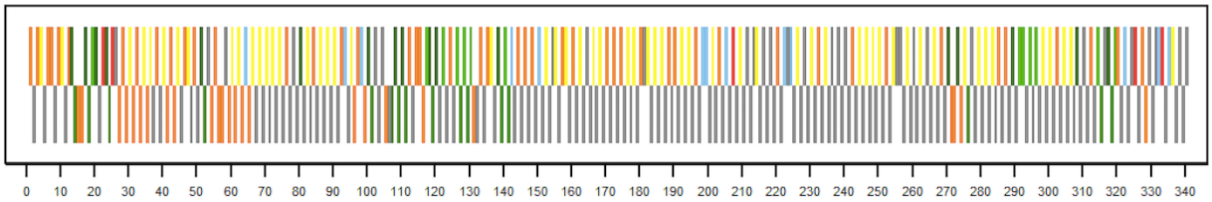


Case 8. At the start of the MI-sessions this patient felt ambivalent about long-term medication use, although in session 1, medication use was only a minor subject. To some extent, the ambivalence became apparent in the third session, but the therapist did not explore and discuss it. Particularly in the first session, there were many patient and therapist utterances. As shown by the large number of yellow bars, the high number of utterances was partly due to a large number of questions, leading to a question–answer pattern: exploring the pros and cons of long-term medication use.

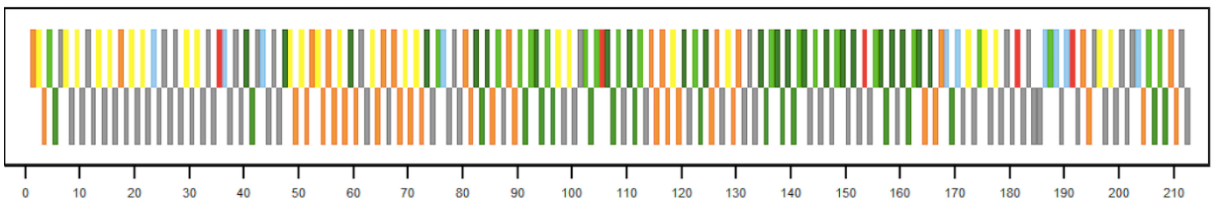
Session 1



Session 2

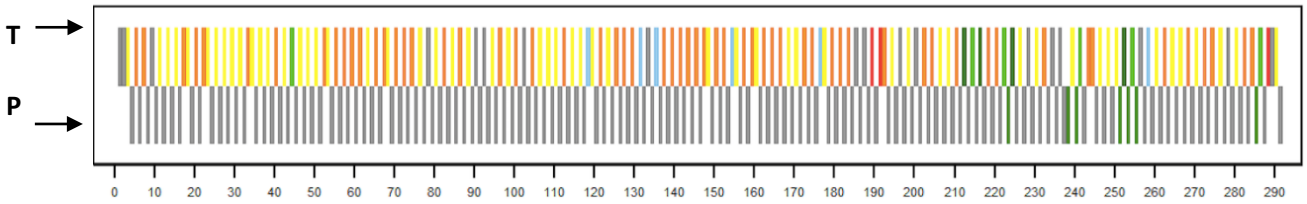


Session 3

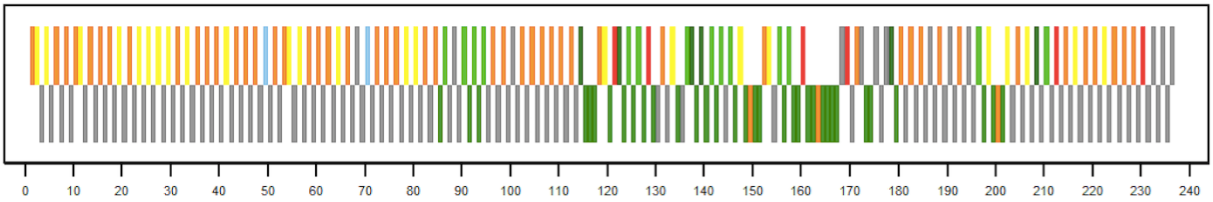


Case 9. From the start, this patient expressed motivation for long-term medication adherence. The sustain talk in session 3 was provoked by the performance of a decision balance (exploring the pros and cons of long-term medication use).

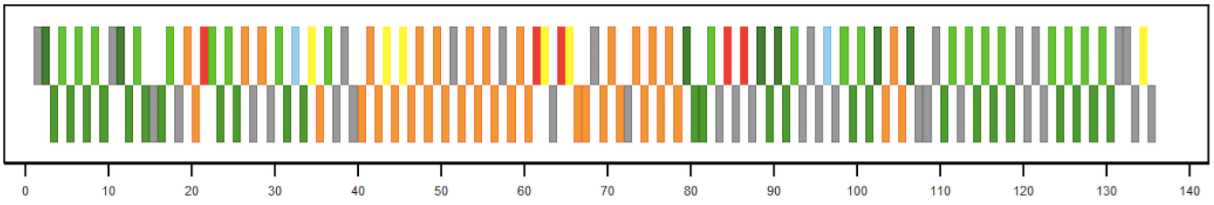
Session 1



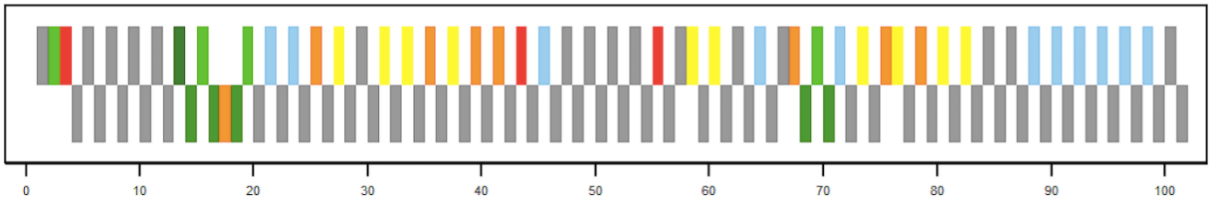
Session 2



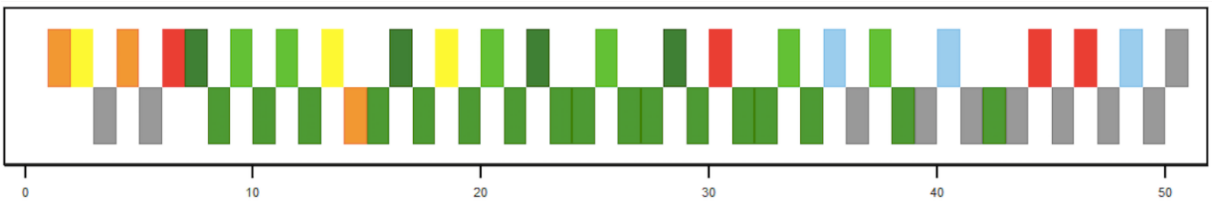
Session 3



Session 4

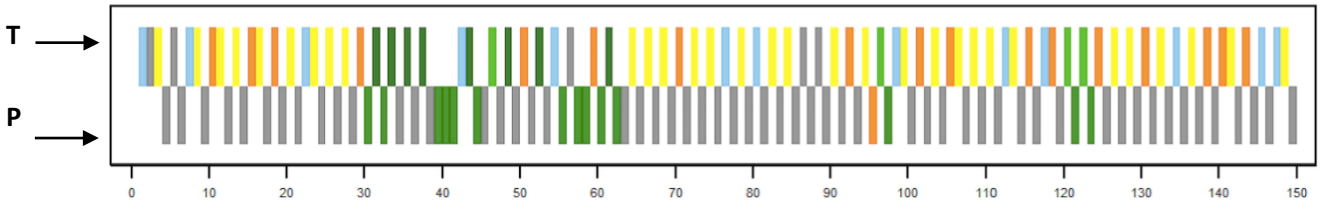


Session 5

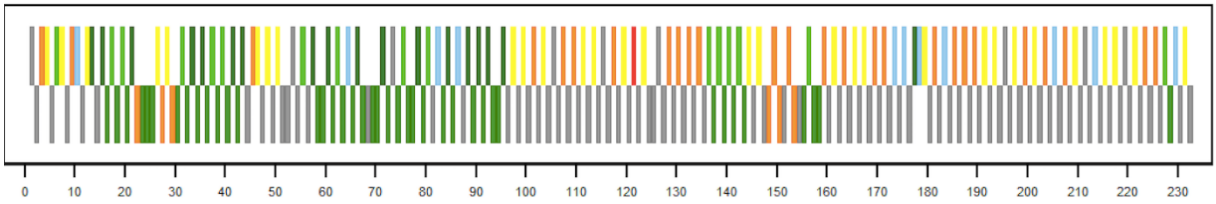


Case 10. From the start, this patient expressed motivation for long-term medication adherence. In session 2 (utterance 19-69), the therapist guided the patient to strengthen his long-term motivation for medication use.

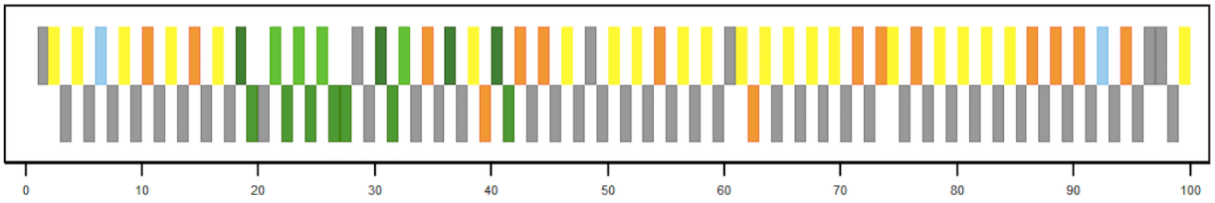
Session 1



Session 2

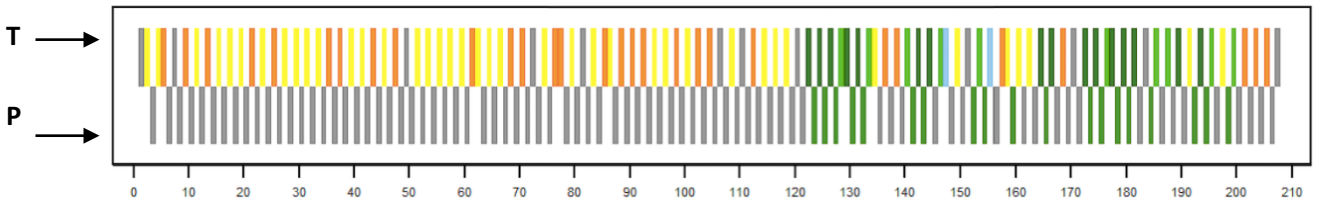


Session 3

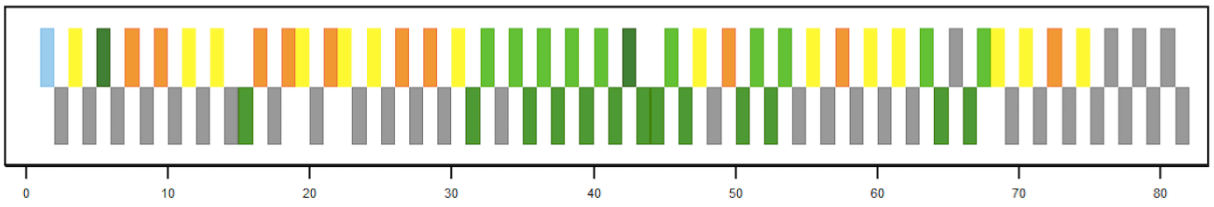


Case 11. From the start, this patient expressed motivation for long-term medication adherence. However, the level of conversation was superficial, due the patient's limited control of the Dutch language. For instance, in session 1 there were 98 patient utterances, and 51 of these consisted of only one word (mostly: "Yes."). This language barrier also led to shorter session lengths, the fifth session consisted of only 32 utterances, of which there were 15 patient utterances and of these 9 utterances of one word. In the remaining six utterances, the patient said five times that medication is important and should be taken until the psychiatrist advises otherwise.

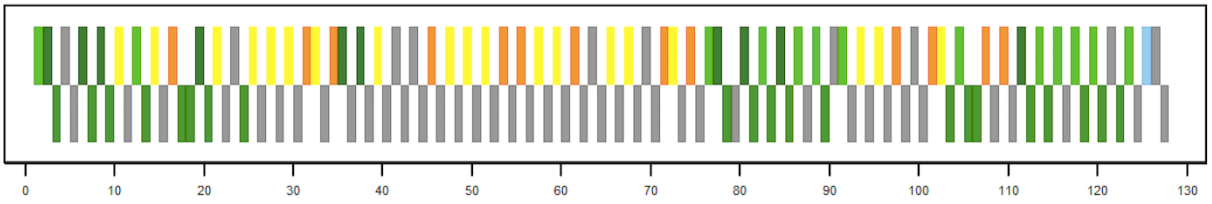
Session 1



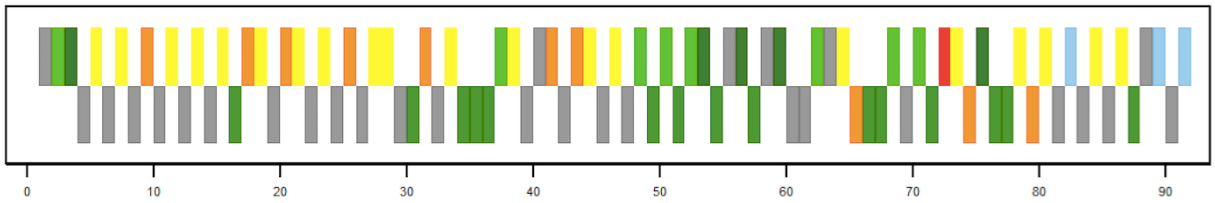
Session 2



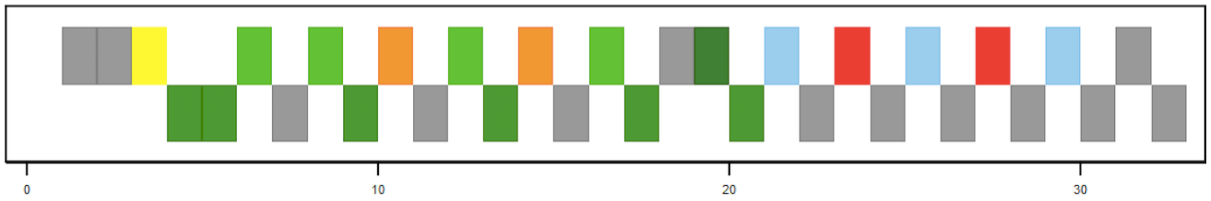
Session 3



Session 4

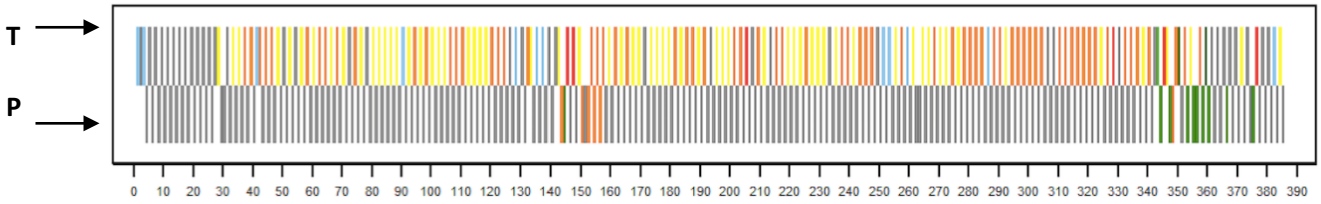


Session 5

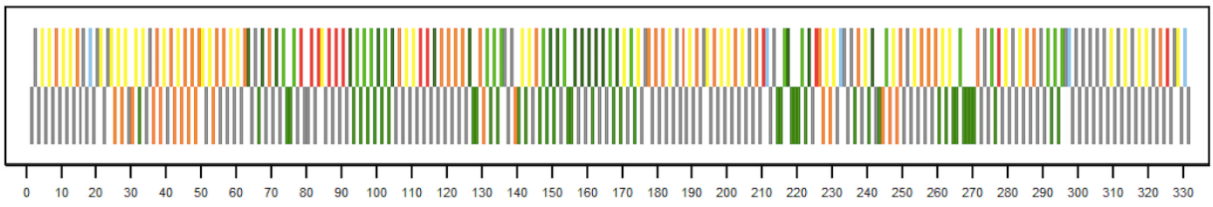


Case 12. From the start, this patient expressed motivation for long-term medication adherence. The sustain talk in the first part of session 2 was provoked by the performance of a decision balance (exploring the pros and cons of long-term medication use).

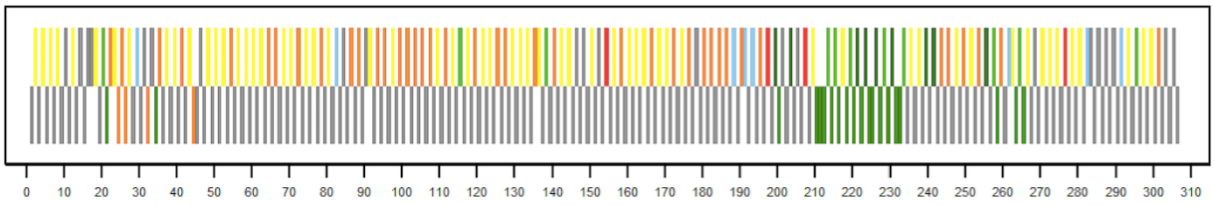
Session 1



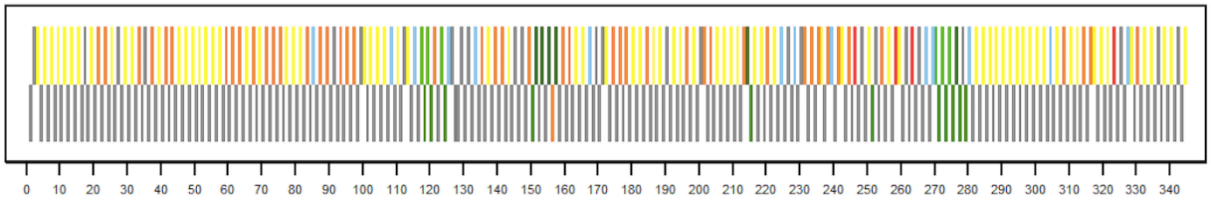
Session 2



Session 3

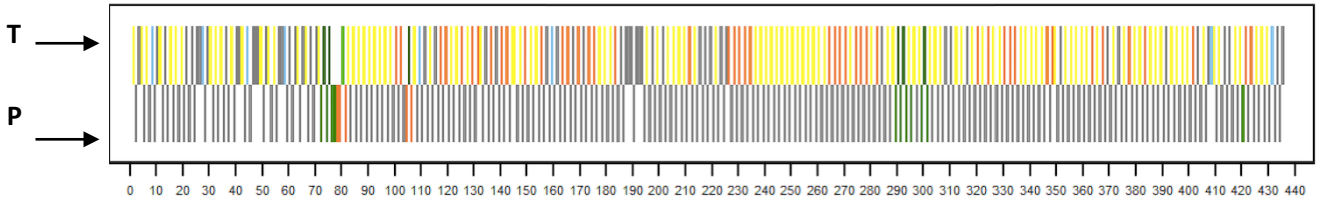


Session 4

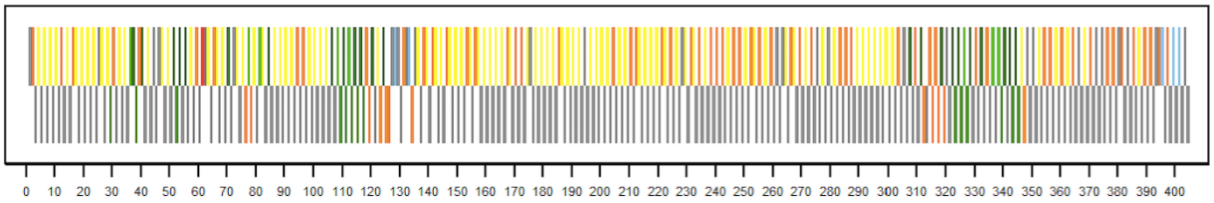


Case 13. At the start of the sessions, this patient felt ambivalent about medication use, mainly because of the side effects. In session 3, the therapist and client performed a decision balance (exploring the pros and cons of long-term medication use). During session 4, the patient switched from 'doubt/ambivalence' to the cognition 'needing medication for its effect'. This happened without an exploration of the ambivalence.

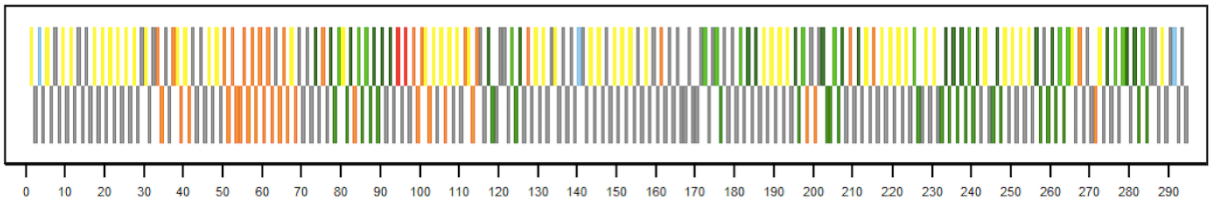
Session 1



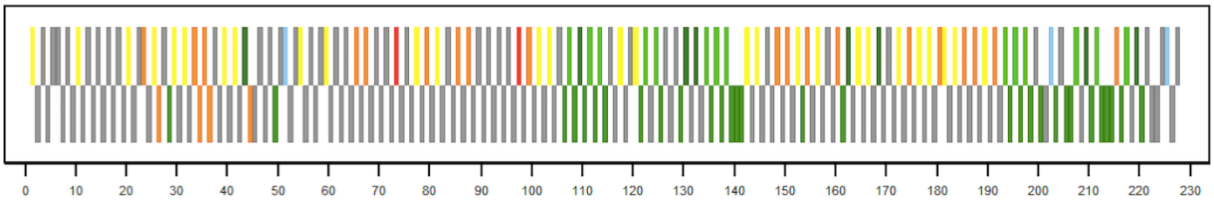
Session 2



Session 3

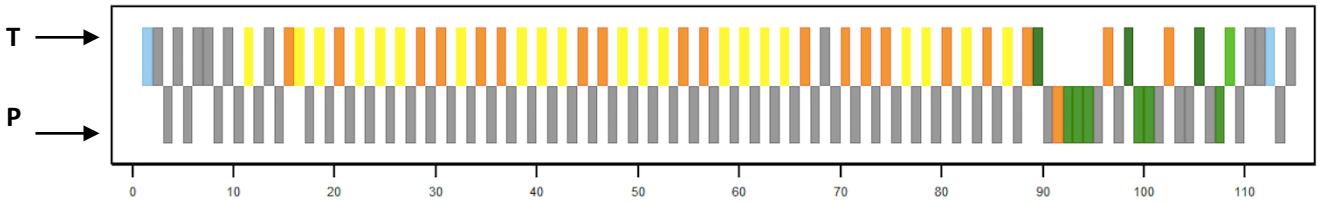


Session 4

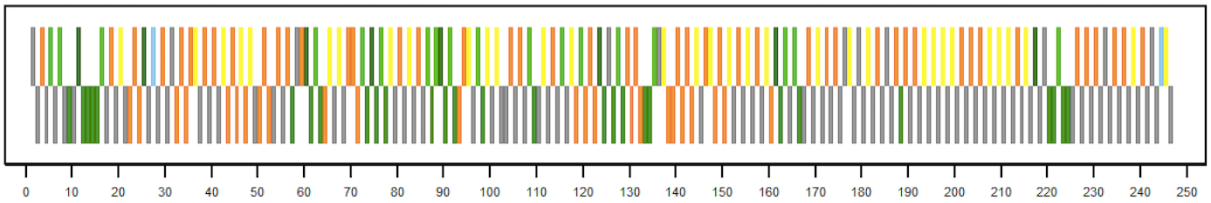


Case 14. At the start of the MI-sessions, this patient felt ambivalent about long-term medication use. In the third session, the therapist and the patient explored the patient's ambivalence. In the fourth session, the therapist and patient related important patient values to long-term adherence, after which the patient resolved the ambivalence and decided in favour of medication adherence.

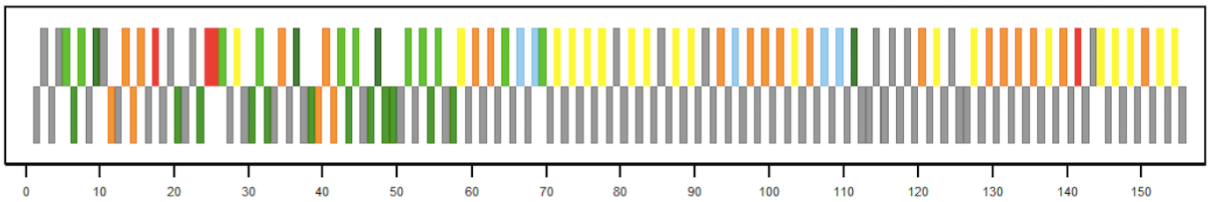
Session 1



Session 3



Session 4



References

1. Barkhof E, Meijer CJ, Sonneville LJ, Linszen DH, De Haan L. The effect of motivational interviewing on medication adherence and hospitalization rates in non-adherent patients with multi-episode schizophrenia. Schizophrenia Bulletin 2013;39:1242-51.
2. Martin T, Moyers TB, Houck J, Christopher P, Miller WR. Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE). Coder's manual. 2005. https://casaa.unm.edu/download/scope.pdf Accessed 28 March 2013.
3. Miller WR, Rollnick S. Motivational interviewing: helping people change. 3rd ed. New York: Guilford Press; 2013.

CHAPTER 5

Developing nurses' skills in motivational interviewing to promote a healthy lifestyle in patients with coronary artery disease

Dobber J, Latour C, Snaterse M, Van Meijel B, Ter Riet G,
Scholte op Reimer W, Peters R.

European Journal of Cardiovascular Nursing 2019

ABSTRACT

Background

If nurses have the communication skills and the time, they can play an important role in increasing the intrinsic motivation of patients with coronary artery disease (CAD) to change their lifestyle. Motivational Interviewing (MI) can be used to further support this role. However, few nurses are sufficiently proficient in applying MI-skills. Increasing these complex communication skills may contribute significantly to achieve lifestyle changes in CAD-patients.

Aims

The aim of this study was to evaluate the coaching of nurses to skilfully use MI in a secondary prevention programme for CAD-patients.

Methods

The design was a before-after study of a learning strategy as a follow-up on a short MI-workshop. At (on average) four-monthly intervals, the nurses received three times feedback and coaching by telephone and email on their use of MI-skills in audio-recorded conversations on lifestyle change with CAD-patients. The MI consistency of the nurses' communication skills was scored using the Motivational Interviewing Target Scheme 2.1 (range 0-32).

Results

Of the 24 nurses, 13 completed all audio-recordings. The mean change in MI consistency of these completers between the first and the last audio-recording was 6.4 (95% CI 3.2 to 9.5).

This change indicates an improvement from “a small part of Motivational Interviewing practice” to “a mainly sufficient degree of Motivational Interviewing practice”.

Conclusion

A one-year follow-up on a MI workshop with feedback and coaching improves MI-skills of nurses. Healthcare professionals should be aware of the importance of a follow-up on training in complex communication skills, to develop and preserve competency.

INTRODUCTION

Lifestyle is an important factor in primary and secondary prevention of coronary artery diseases (CAD) [1-4]. Nevertheless, about 30 to 50% of myocardial infarction patients continue an unhealthy lifestyle after a myocardial infarction, thus increasing the risk of re-infarction [5-7]. An important question is how to bring about beneficial changes in unhealthy lifestyles such as smoking, unhealthy diet, and lack of exercise. Increasing people's intrinsic motivation for sustained lifestyle changes may be a key factor [8].

Nurses, due to their intensive contact with patients, are in a favourable position to discuss potential lifestyle changes. If nurses take the opportunities to elicit and strengthen intrinsic motivation, they may help prevent reoccurrence of acute cardiovascular events [8,9]. Motivational Interviewing (MI) is particularly designed to strengthen intrinsic motivation to promote healthy behaviour [8-11], and showed to be effective for a variety of outcomes (e.g. body weight, alcohol and tobacco use, sedentary behaviour, dental outcomes) [10]. It is "a collaborative conversation style for strengthening a person's own motivation and commitment to change" (Miller & Rollnick, 2013; p.29) [11]. MI aims to address the patient's ambivalence about change, and to support the patient to resolve this ambivalence by eliciting and exploring the patient's own reasons for change (change talk). When applying MI, the nurse intentionally influences the patient's willingness, ability and readiness to change [11]. Most nurses are not trained as MI counsellors, but by using components of MI they may enhance patients' intrinsic motivation for health behaviour change [12].

Effectively applying newly learned communication skills, such as MI, and further improving these skills in daily nursing practice, can be challenging. The importance to enhance patients' motivation by using professional motivational skills is widely recognized [13]. Systematic training of nurses in applying these skills is essential. However, the systematic review by Schwalbe et al. [14] on the effects of learning and applying MI in daily practice shows that the skills acquired through a workshop-only approach usually fade within months. In this

review, 13 studies reporting on MI workshop effects are summarised. The authors conclude that while effects of a MI workshop-only had decreased at three and six months, three to four post-workshop sessions of feedback and/or coaching seemed to lead to retention of MI-skills [14,15]. Based on these findings, we developed a strategy for providing feedback and coaching to nurses, as a follow-up intervention after a three-hour MI workshop, to achieve enhancement of their MI-skill use in daily practice. The feedback and coaching intervention started after the initial workshop, so the pre-intervention workshop itself was not part of the intervention. In the present study, we investigated the effects of this intervention on the adequate use of MI-skills by nurses in planned conversations about lifestyle change with CAD-patients. We also investigated which difficulties nurses encountered in these conversations, and how MI may have helped them to successfully address these difficulties. The following questions are central in the present study: (1) To what extent does structured feedback and coaching increase recently acquired MI-skills in nurses during their planned conversations on lifestyle change with CAD-patients? (2) What common conversational difficulties do nurses encounter during these conversations, and (3) how can a MI strategy help to reduce these difficulties? (4) Is the feedback and coaching intervention a satisfactory learning strategy for the participating nurses?

METHODS

Design

The study was designed as a before-after study of a learning strategy, in which nurses were coached to use MI-skills within a comprehensive nurse-coordinated secondary prevention programme to improve lifestyle-related risk factors in CAD-patients. The study was conducted within the RESPONSE-2 trial [16].

At the start of the RESPONSE-2 trial, and prior to our MI feedback and coaching intervention, the 24 participating nurses received a 3-hour MI workshop to learn the basic MI-skills (content workshop available upon request). Our feedback and coaching intervention started after the workshop. The first measurement (baseline) was four months (on average) after the workshop. At this point, nurses were sufficiently familiar with the execution of the nurse-coordinated lifestyle intervention programme, but their MI-skills were expected to have decreased due to the elapsed time since the MI workshop [14]. Our hypothesis was that the feedback and coaching sessions would result in an increase to the MI-skills after this baseline session.

At entry in the RESPONSE-2 study, all patients gave written informed consent, including consent to record conversations. The investigation confirms with the principles outlined in the Declaration of Helsinki, and was approved by the Medical Ethics Committee (AMC, Amsterdam, number NL41645.018.12).

Study setting and participants

The study was carried out on the outpatient clinic of 15 hospitals in the Netherlands. The participants were registered nurses with experience in cardiovascular nursing. For the RESPONSE-2-study [16], patients with an acute coronary syndrome (ACS) and/or coronary revascularisation with at least one lifestyle-related risk factor, received up to four scheduled visits with a nurse. During these visits, the nurse performed a nurse-coordinated secondary prevention programme, aimed at adopting a healthy lifestyle and monitoring the patient's coronary condition and medication adherence. The nurse discussed lifestyle topics with the patient, and, if present, his partner. If the patient expressed his motivation for lifestyle change (smoking, diet, exercise pattern), the nurse discussed referral to a community-based lifestyle intervention programme. The nurse also addressed the progress and the patient's satisfaction with this programme, and the patient's ability to integrate the lifestyle change in

his daily life. After finishing the lifestyle programme, the patient and nurse discussed the opportunities to, and the patient's ability to maintain the lifestyle change. In all these conversations, the nurse was expected to integrate MI components in her conversation style.

Intervention

The intervention consisted of four feedback and coaching sessions in one year, each session was based on a planned conversation on lifestyle change between the nurse and a CAD-patient. We audio-recorded the conversations and measured the MI-skills applied by the nurses (see: measurements). Next, the nurses received their feedback and coaching. During the four months between these sessions the nurses had sufficient opportunity to process the feedback and integrate it into the working routines (see flow chart). This procedure ensured that the audio-recordings comprised conversations with different patients, which ensured a variety in the addressed lifestyle topics, in the patients' motivation for lifestyle change, and in the perceived difficulty of the conversations.

The feedback and coaching focussed on improving the effective use of MI components in the conversations, and consisted of one or two compliments and one or two tips for improvement. Hereby, we sought a balance in feedback on skills that were already used well, and skills whose further development would improve the MI level of the conversations. The focus of the feedback was based on the MI-skills measurements, in combination with the determination by a MI expert (JD) of the area in which the skill gain would be most effective. Each point of feedback consisted of three elements: an observation from the audio recording, an interpretation of the meaning of that observation based on MI theory and a suggestion for improvement/development (see table 1). The feedback and coaching was provided by telephone within one week after the audio-recorded patient visit. The MI expert and the nurse discussed the feedback on the audio-recorded conversation. Immediately

after this telephone conversation, a written exemplar of the feedback, including examples from the audio-recorded conversation, and, if appropriate, suggestions for alternative MI approaches in the conversation, was sent to the nurse by email. To ensure continuity in feedback and coaching, the feedback provided during the previous session always was the starting point of the subsequent feedback. By this, we aimed to stimulate transfer of the nurse's MI knowledge and MI-skills to other patient contacts, and to equip the nurse for the natural variety of the patients she will encounter [17].

Figure 1. Flow chart of the Motivational Interviewing learning intervention

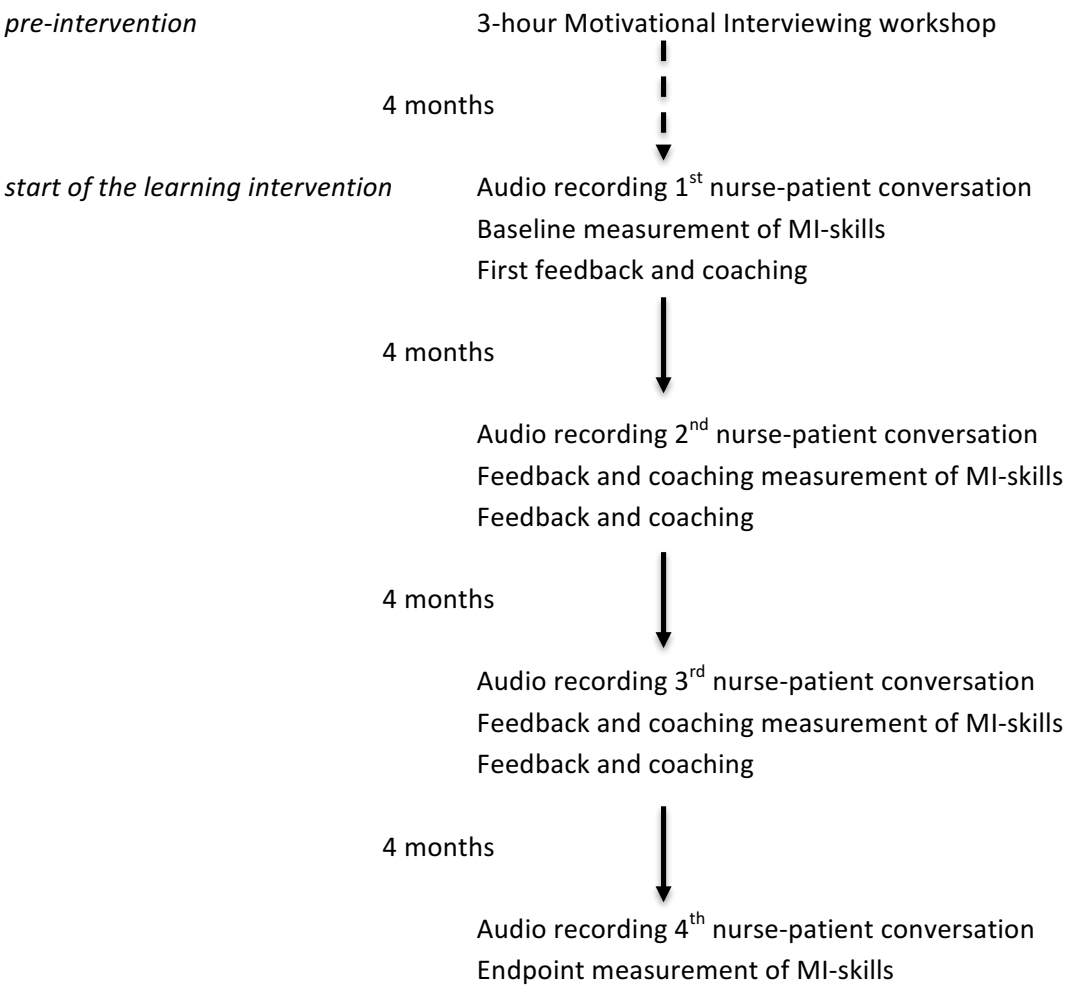


Table 1. Example of the written structured feedback

MITS 2.1 target: Evocation	
Observation	While you are working on the strengthening of the patient's motivation for exercise, and for maintaining his exercise level, the proportion of open questions you ask is high, compared to the number of your reflections. The questions that you ask are adequate and of good quality, and so are the reflections that you offer.
Interpretation	At some times and places in the conversation, a reflection is a more sufficient technique than an open question. In motivational interviewing, as a rule of thumb, an open question should be followed by two reflections. For example, in the conversation, the patient tells you about his concern that he might not be able to keep up to the agreed exercise level, after returning to full time employment. You started this conversation with a very good open question ("Why would you want to exercise more?"). And if you reflect the patient's reaction this will probably support the patient's thought process in dealing with this potential barrier.
Hint for improvement / development	Try to trade a question for a reflection sometimes. In your conversations, you have already offered good-quality reflections. Consider e.g. the following suggestion: You: "Why would you want to exercise more?" Patient: "That is easy: for my health." The patient continues explaining that, in addition to exercise, there are other obligations and activities, like his job, his friends and family, and his weekly choir rehearsal. You: "That's true." Alternative reaction: "When you're back in your job full time, the sports and other exercises need to be squeezed between all the other activities like your choir rehearsal. It is hard to keep up with exercise when you are working long days, coming home tired." The patient will probably tell you about his view on this potential barrier, and (with your guidance: How can you respond if this might happen?; What other people could help or support you with this?; How could they be of help?) the patient may arrive at an idea for dealing with this potential obstacle.

Data collection and measurements

We compared the MI-skills on endpoint with the skills four months post-workshop, and not with skills immediately post workshop. There are three reasons for this choice: (a) we preferred baseline measurement of the MI-skills in the real intervention condition, with real patients and in the real nurse-coordinated programme of RESPONSE-2, instead of the post-workshop MI-skills in role play conditions (see also Miller et al. [18]); (b) recording of conversations may provoke anxiety for the nurse, we didn't want the recording to interfere with the start-up period of the RESPONSE-2-trial intervention; (c) we wanted the nurses to feel familiar with the performance of the study protocol before starting to record conversations.

A research assistant contacted the nurse to set a date for the audio recording, and randomly selected one of the patient visits scheduled on that particular date. On the planned date, we contacted the outpatient clinic and requested the nurse use the speaker function of the telephone to record the conversation. After explicitly obtaining the patient's verbal consent for this recording, the nurse started the conversation.

We used the validated Motivational Interviewing Target Scheme 2.1 [12,19] (MITS 2.1) to analyse the nurse's use of MI components during the conversation. The MITS describes and assesses the core components of MI, in order to analyse practice performance and to support the development of skilfulness in MI [12]. It describes ten targets of MI consistent practice, seven of which are obligatory, and three are discretionary targets. We used the seven obligatory and one discretionary target (see table 2 for a description and the scoring of MITS-targets). The reason for exclusion of the other discretionary targets is that these targets demand more advanced MI-skills, which requires a more expansive MI training. Each target is scored on a 5-point scale (0–4). The discretionary target is only scored if there is observable evidence [12]. The range of the MITS using these eight targets is 0-32 points.

After the analysis of the conversation (see: data analysis), we categorised all feedback in one of the feedback areas based on the content of the MITS-targets.

During the process of feedback and coaching on MI performance, we performed four measurements (see figure 1). We used the difference between MI-skills at baseline and endpoint as outcome measure. The two interim measurements were solely used for feedback and coaching.

After completing all feedback and coaching sessions, the research assistant requested the nurses score their satisfaction with the MI learning intervention, using three self-developed questions (10-point scale). These questions concerned their satisfaction with this method of communication skill development, the applicability and acceptability of the received feedback, and the management and organisation of the contacts between the nurse and the research team.

Table 2. MITS 2.1 Targets of motivational interviewing consistency

Target	Description	Focus
Activity emphasis	The nurse switches between the activities (considering, discussing, advocating) and uses the activity that, at that point of the conversation, will best serve movement towards change.	• switching • active listening • exploring ambivalence • discussing • providing information or advice
Posture	The posture is one of 'being with the patient'.	• compassionate • courteous • respectful • considerate • caring and friendly
Empathy	The nurse skilfully performs empathic reflections, to achieve and maintain a trusting working relationship.	• reflective statements • accurate understanding of the patient's feelings • genuinely curious about the patient
Collaboration	Purposeful collaboration between all parties to the conversation, evident from all the persons' speech.	• collaborative ambience • patient feels encouraged to articulate his ideas • purposeful partnership • the nurse is never impatient and appears able to exercise self-restraint
Independence	The nurse works to establish, legitimise and maintain recognition of the patient's independence.	• emphasize control • freedom of choice • autonomy • encouraging to accept responsibility • nurse emphasizes his/her own role as being in service of the patient
Evocation	Evocation and consolidation of change talk through evocative questions, reflections, affirmations, summaries and other tactics.	• encourages patient to articulate own motivations for change • desire, reasons, need, ability, commitment, activation statements and taking steps • acceptance and affirmation • the nurse doesn't attempt to persuade the patient
Navigation	The nurse pushes forward the conversation in a promising and productive direction, without causing disengagement.	• change target is maintained largely at the centre • goal oriented • navigates along cliffs tactically • prevents discord
Information and advice	The nurse gives information or advice in such a manner that the patient will at least consider it.	• skilfulness • discusses the patient's understanding and the meaning/value he/she attaches to the information • the nurse has good knowledge on the subject

Descriptions derived from the manual for the Motivational Interviewing Target Scheme, Version 2.1 [12]. For this study, eight out of ten targets were used. Targets not used are: Contrasts; Structured brief tactics. Each target is scored: 0=no evidence in the nurse's performance to support the target description (TD); 1=the evidence partly supports the TD; 2=the evidence supports the TD in a mainly sufficient degree; 3=the evidence largely supports the TD; 4=the evidence (almost) completely supports the TD.

Outcomes

The primary outcome was the change in MI-skills. Secondary outcomes were a summary of common conversational difficulties for the nurses and applied MI strategies to cope with these difficulties, and the satisfaction of the nurses with the MI learning.

Data analysis

The conversation parts in which the patient and the nurse discussed lifestyle topics were transcribed. The MI expert analysed the conversation, using both the audio recording and transcript. A second MI coder double scored a random selection of 20% of the sessions to determine the interrater agreement. We considered a maximum of two-point difference in the total score as an agreement, and a difference of >2 points as a disagreement. Based on this dichotomisation, we calculated Kappa of 0.59, which indicates moderate agreement [20]. We also verified whether the nurses who had followed a MI training prior to the pre-intervention MI workshop (n=9), differed in their baseline and/or endpoint MITS-score from the other nurses (n=15). We found no significant differences between these groups (mean score prior trained nurses 12, range 8-19; mean score other nurses 12.3, range 4.5-17).
To analyse the pre-test/post-test changes for the nurses who completed all four audio recordings ('completers', n=13), we computed the mean MITS-scores at baseline and endpoint, and performed a paired t-test in SPSS version 22. We also tested the null hypothesis of no change for all included nurses (n=24), irrespective of the number of audio recordings they completed, and for the 'noncompleters' (n=11). Due to the non-symmetric distribution of these data, we used the Bootstrapped Quantile Regression (1000 repetitions) in Stata version 13.1 to compute the median difference with 95% confidence intervals for all groups. The score on endpoint for nurses who did not complete all audio recordings was replaced by carrying forward the last observation.

We tallied the number of feedback entries for each feedback area, thus determining the common conversational difficulties and MI solutions for these difficulties. We translated examples of the three most common conversational difficulties. Because translation is an interpretative act, we tried to reduce the risk of loss of meaning by staying as long as possible in Dutch. The original audio recorded Dutch text of the patient and the nurse (and the transcript) was compressed by the first author, this was checked by two other authors, then translated to English by the first author, and the translation was checked by an English native speaker. Finally, we computed the means of the satisfaction scores.

RESULTS

Sixty-nine nurse-patient conversations were recorded, transcribed and analysed, and the 24 nurses (see table 3 for background characteristics) were provided with feedback. Thirteen nurses completed the full intervention. Two nurses completed three recordings, two nurses completed two recordings, and seven nurses completed one recording. Reasons for not completing the full intervention were an insufficient number of intervention patients in the caseload (n=3), prolonged illness (n=1), stopped participation in the RESPONSE-2-study (n=4). For three nurses the reasons were unknown.

Table 3. Background characteristics cardiac care nurses (n=24)

	All nurses (%) n=24	Completers (%) n=13	Non completers (%) n=11
Age (years)			
mean (SD)	44 (8.5)	47 (5.7)	41 (10.0)
Gender			
Female	23 (96%)	13 (100%)	10 (91%)
Male	1 (4%)	0 (0%)	1 (9%)
Education			
second level nurse[a]	4 (17%)	3 (23%)	1 (9%)
first level nurse[a]	14 (58%)	5 (38.5%)	9 (82%)
masters level	6 (25%)	5 (38.5%)	1 (9%)
Previous MI-training			
yes	9 (37.5%)	9 (69%)	0 (0%)
no	15 (62.5%)	4 (31%)	11 (100%)
Years of experience as a nurse mean (SD)	22 (9.5)	24 (6.4)	18 (11.7)
Years of experience as a cardiac care nurse mean (SD)	7 (3.9)	7 (3.1)	7 (4.7)

[a]Based on Robinson & Griffiths (2007) [21].

Effects of feedback on Motivational Interviewing practice performance

For the 13 completers, we found statistically significant improvements in their MI-skills (table 4). The mean increase in MITS-score for these completers was 6.4 (95% CI 3.2 to 9.5). Based on the MITS-definitions of standards of MI consistency, this indicates a clinically important improvement, from demonstrating "a small part of Motivational Interviewing practice" to demonstrating "a mainly sufficient degree of Motivational Interviewing consistent practice" [12]. The 13 completers were very satisfied with the content, applicability and the organisation of the intervention (table 5).

Table 4. Scores on MITS 2.1[a]

	Baseline mean (SD)	Endpoint mean (SD) (12 months)	Mean Difference (SD; 95% CI)	Median Difference (95% CI)
Completers (n=13)	12.5 (3.4)	18.8 (3.9)	6.4 (5.2; 3.2 to 9.5)	7 (2.2 to 11.8)
Non completers (n=11)	11.9 (3.6)	12.6 (3.6)	[b]	0.0 (-0.8 to 0.8)
All nurses (n=24)	12.2 (3.4)	16.0 (4.8)	[b]	2 (-0.9 to 4.9)

[a]Range MITS 2.1 [12] (8 targets) 0-32.
[b]Non-symmetric distribution: no mean and standard deviation computed.

Table 5. Satisfaction with the intervention (n=13)

	Mean (SD)
Satisfaction with this method of developing Motivational Interviewing skills	9.1 (0.9)
Acceptability and applicability of the feedback	9.3 (0.6)
Satisfaction with the organisation of the audio-recordings	9.0 (0.9)

Nurses were asked to rank their satisfaction with the intervention from 1 (not satisfied at all) to 10 (very satisfied).

Difficulties in the conversation on lifestyle change and possible Motivational Interviewing-solutions

The most prevalent conversational difficulties over all recorded sessions were (1) the effective use of reflections, (2) the utilisation of patient's sense of control as a motivator for long-term conservation of the lifestyle behaviour, and (3) the handling of patient ambivalence about lifestyle change.

1) Reflections. Nurses tended to ask questions, while reflections are more powerful in encouraging the patient to continue exploring his lifestyle behaviour [11]. Good reflections go one step further than the patient's statement, they reflect what the patient meant but has not said, thus reflecting the next step in the patient's thought process on lifestyle change. A skilful worded reflection sounds like a thought unit of the patient, helping the patient to move forward in his thought process (box 1) [11].

Box 1. Trading a question for a reflection

Patient: "My diet, I usually stick to my diet, but sometimes I eat too much." Nurse: "What do you mean by 'usually'?" *Alternative reaction:* Nurse: "Mostly you're doing well, but you would like to succeed always."

2) Sense of control. Frequently, patients reported getting familiar with their changed lifestyle. Mostly, the nurses reacted with an affirmation, sometimes followed by a reflection. But, in order to strengthen long-term motivation, it is important that this reflection emphasizes the patient's control over the acquired lifestyle, thus fostering the patient's belief that he is in control (box 2).

Box 2. Emphasizing control

Nurse: "So, how do you manage at work, now that you've stopped smoking?" Patient: "Oh, I used to step outside and take a smoke every now and then, with the other smokers. It is the same at parties and other social events. Now I go outside to take a short walk, you know, stretching the legs…" Nurse: "So you simply replaced the behaviour." Patient: "Not on purpose." Nurse: "No, automatically, that's good!" *Alternative reaction:* Nurse: "By changing these routines, you've taken back control over smoking."

3) Ambivalence. Often, patients felt ambivalent about changing their lifestyle, which hindered the decision to change their lifestyle behaviour. In MI, when a patient directly or indirectly expresses his ambivalence, the nurse should reflect both the pro and contra side of the ambivalence in a non-judgmental way. The nurses mostly recognised and reflected the patient's ambivalence well. The next step however, to explore the ambivalence and help the patient to solve this ambivalence and reach a decision on lifestyle change, was more difficult to achieve. At this point, many nurses were inclined to give information about the lifestyle risks, e.g. the risks of smoking for a recurrent infarction. Almost all patients, however, were well aware of these risks, which represented one side of their ambivalence: the pro-side. Since the ambivalent patient experiences two sides, and since information presented by the nurse focuses on the pro-side, the patient feels forced to plead for the other side, contra lifestyle change: *"Yes I know. But like I said, it is the stress, and smoking makes me feel better."* (box 3).

This reaction, the emphasis by healthcare professionals on the pro-change side of the patient's ambivalence, is known as 'the righting reflex' [11]. Instead of this persuasive reaction, it is better to explore the ambivalence, and help the patient to express the reasons and motives for lifestyle change himself (change talk).

Box 3. Exploring ambivalence

Nurse: "You seem to be kind of on two tracks. On one hand, you feel stress and the smoking helps you to calm down. And on the other hand, you want to stop smoking for your heart, for your health."
Patient: "Yes. I have been smoking for more than fifty years. And I wonder… maybe quitting is not always the best thing to do, or is it?"
Nurse: "Like I said, the nicotine in the cigarettes narrows your arteries, and the smoke roughens and damages your arteries. It also makes your blood thicken, and this all increases your risk on another infarction."
Patient: "A mess in my arteries and all that junk. But not with my cigarettes, they don't contain so much tar and nicotine."

Alternative reaction 1:
Nurse: "You seem to be kind of on two tracks. On one hand, you feel stress and the smoking helps you to calm down. And on the other hand, you want to stop smoking for your heart, for your health."
Patient: "Yes. I'm already smoking more than fifty years. And I wonder… maybe quitting is not always the best thing to do, or is it?"
Nurse: "What do you hope for, concerning the smoking?"

Alternative reaction 2:
Nurse: "Shall we take a closer look at the pros and cons of smoking?"
(With the patient's permission, the patient and the nurse continue differentially exploring the advantages of smoking in a way that does not induce the patient advocate them, and next elaborate on the most important disadvantages of smoking.)

DISCUSSION AND CONCLUSION

Discussion

Our study suggests that feedback and coaching helps nurses to increase their MI-skills, after presupposed initial decrease of these skills in the four months following the MI workshop. The MI learning strategy also enables the nurses to increasingly use MI-skills in their patient contacts. If nurses integrate this MI approach in their daily practice, they may be able to reduce the conversational difficulties and be more effective in their professional conversations about lifestyle change. For the nurses who completed the whole intervention, we found the intervention had a clinically relevant and statistically significant effect, with a

good suitability to nursing practice. Receiving the feedback and coaching didn't take much nursing time (four times 15-30 minutes in one year), and the 13 nurses who completed the intervention expressed high satisfaction with their skill gain. The question whether "better Motivational Interviewing" is associated with better patient outcomes will be subject to a separate analysis.

Although we had four measurements of the MI-skills, we only used two in our statistical analysis: at baseline and at endpoint. We considered the two measurements in between necessary to determine the topics for feedback and coaching, but of no extra value in the information on overall MI skill development of the nurses. The intervention was based on the assumption that skilfulness and expertise develops through "volume of practice" and through the critical reflection on sufficient conversations with a variety of patients [15]. For this, the intervention had to be spread over sufficient time (one year). We considered the number of three sessions for feedback and coaching as the minimum [14] to ensure feedback on a variety of patient behaviours [17]. As a consequence, the two measurements between baseline and endpoint may have been affected too much by the random difficulty of that specific patient conversation to be considered as an adequate reflection of the real MI-skills at that point.

The findings are in line with studies on learning Mi [14,15,18,22], in which the effects of feedback and coaching retained the MI-skills acquired in a previous workshop. In their systematic review, Schwalbe et al. [14] reported a non-significant skill gain for post-workshop feedback, coaching, and coaching and feedback together, based on 13 studies, measured three and six months after the post-workshop measurements. We found a significant increase of MI-skills for the 13 completers, 12 months after the baseline measurement. This baseline measurement, however, took place four months after the workshop, and the MI-skills had probably already decreased by then. Thus, retention of MI-skills as reported in the systematic review [14] may be as valuable as the increase in MI-skills

that we've found in our study. Our study comprised a total coaching time of one to two hours over one year. Based on six studies, Schwalbe et al. [14] found increased skills for 5 to 12 contact hours spread over at least six months. It is plausible that increasing the contact time in our study might have led to further MI skill gain.

Limitations

We measured the performance of nurses who received the MI learning intervention, and there was no control group. Therefore, we are unable to compare the change in MI-skills with a control group. The decision not to expand measures to a control group is based on the finding in a systematic review of six studies that the workshop-only condition leads to a decrease in MI-skills (*d*=-0.30) [14].

Another limitation is that it took four months from workshop to baseline measurement of the MI-skills. We might have found other results had our learning intervention started about two months after the workshop, before the MI-skills start to erode.

The intervention comprised three sessions of feedback and coaching spread over a one-year period. The learning curve of skills will not stop after one year so prolonged coaching would probably have led to further skill development.

Finally, the attrition of 11 of the 24 nurses may have introduced some selection bias. Attrition is a problem in research measuring improvement of communication skills, and our attrition rate is in line with similar research [14,18,23]. The attrition of eight of the eleven nurses was due to organisational or personal circumstances (see: results), the reasons for not completing the intervention of the other three nurses is unclear.

Conclusion

This study demonstrates that a one-year follow-up on a MI workshop with feedback and coaching improves the MI-skills of nurses. The nurses used the acquired skills in their patient

conversations, and expressed high satisfaction with their MI skill gain. The learning intervention does not consume much nursing time and can easily be implemented without disturbing the working routines.

IMPLICATIONS FOR PRACTICE

- Nurses can use Motivational Interviewing to address the difficult topic of ambivalence about lifestyle behaviour change in CAD-patients.
- Follow-up workshops on complex communication skills such as Motivational Interviewing may enhance the effective use of these skills in daily practice.
- Implementation of this learning strategy helps nurses to reflect and explore the patient's ambivalence and change talk, and to emphasize the patient's sense of control. It also fosters the quality of the nurse – patient communication, and thus may promote better patient outcomes.

ACKNOWLEDGEMENTS

We thank Vera Kruse for her help in (double) coding, Elena Le Poole for her help in organising and collecting audio recorded data, and Grace Jenkins for her comments on our English language use.

FUNDING

This work was supported by a research grant from the Netherlands Organisation for Scientific Research (NWO) to JD.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

1. Smith SC, Benjamin EJ, Bonow RO, Braun LT, Creager MA, Franklin BA, et al. AHA/ACCF Secondary prevention and risk reduction therapy for patients with coronary and other atherosclerotic vascular disease: 2011 Update. A guideline from the American College of Cardiology Foundation. J Am Coll Cardiol. 2011;58(23):2432-46.
2. National Institute for Health and Care Excellence. Secondary prevention in primary and secondary care for patients following a myocardial infarction. (Clinical guideline 172). 2013. www.nice.org.uk/guidance/cg172.
3. Piepoli MF, Corrà U, Adamopoulos S, Benzer W, Bjarnason-Wehrens B, Cupples M, et al. Secondary prevention in the clinical management of patients with cardiovascular diseases. Core components, standards and outcome measures for referral and delivery. Eur J Prev Cardiol. 2014;21(6):664-81.
4. Piepoli MF, Corrà U, Dendale P, Frederix I, Prescott E, Schmid JP, et al. Challenges in secondary prevention after acute myocardial infarction: a call for action. Eur J Prev Cardiol. 2016:23(8);1994-2006.
5. Chow CK, Jolly S, Rao-Melacini P, Fox KAA, Anand SS, Yusuf S. Association of diet, exercise, and smoking modification with risk of early cardiovascular events after acute coronary syndromes. Circulation. 2010:121;750-8.
6. Jørstad HT, Von Birgelen C, Alings AMW, Liem A, Van Dantzig JM, Jaarsma W, et al. Effect of a nurse-coordinated prevention programme on cardiovascular risk after an acute coronary syndrome: main results of the RESPONSE randomised trial. Heart. 2013;99:1421-30.
7. Iestra JD, Kromhout D, Van der Schouw YT, Grobbee DE, Boshuizen HC, Van Staveren WA. Effect size estimates of lifestyle and dietary changes on all-cause mortality in coronary artery disease patients. A systematic review. Circulation. 2005:112;924-34.

8. Rubak S, Sandbaek A, Lauritzen T, Christensen B. Motivational Interviewing: A systematic review and meta-analysis. Br J Gen Pract. 2005;55:305-12.
9. Bredie SJH, Fouwels AJ, Wollersheim H, Schippers GM. Effectiveness of Nurse Based Motivational Interviewing for smoking cessation in high risk cardiovascular outpatients: a randomized trial. Eur J Cardiovasc Nurs. 2011;10:174-9.
10. Lundahl B, Moleni T, Burke BL, Butters R, Tollefson D, Butler C, et al. Motivational Interviewing in medical care settings: A systematic review and meta-analysis of randomized controlled trials. Patient Educ Couns. 2013;93:157-68.
11. Miller WR, Rollnick S. Motivational Interviewing: helping people change. New York: The Guilford Press; 2013.
12. Allison J, Bes R, Rose G. Motivational Interviewing Target Scheme (MITS 2.1). An instrument for practitioners, trainers, coaches and researchers. Hilversum MiCampus; 2012. Available at: http://www.motivationalinterviewing.org/sites/default/files/MITS_2.1.pdf (accessed: November 2013)
13. Piepoli MF, Hoes AW, Agewell S, Albus C, Brotons C, Catapano AL, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. Atherosclerosis. 2016;252:207-74.
14. Schwalbe CS, Oh HY, Zweben A. Sustaining Motivational Interviewing: a meta-analysis of training studies. Addiction. 2014;109:1287-94.
15. Dunn C, Darnell D. Commentary on Schwalbe et al. (2014): two wishes for the future of Motivational Interviewing – workshops with fewer learning targets and sustainable coaching. Addiction. 2014;109:1295-6.
16. Minneboo M, Lachman S, Snaterse M, Jørstad HT, Ter Riet G, Boekholdt SM, et al. Community-based lifestyle intervention in patients with coronary artery disease: The RESPONSE-2 trial. J Am Coll Cardiol. 2017;70(3):318-27.

17. Van den Bossche P, Segers M, Jansen N. Transfer of training: the role of feedback in supportive social networks. Int Train Dev. 2010;14(2):81-94.
18. Miller WR, Yahne CE, Moyers TB, Martinez J, Pirritano M. A randomized trial of methods to help clinicians learn Motivational Interviewing. J Consult Clin Psychol. 2004;72(6):1050-62.
19. Oberink R, Boom SM, Van Dijk N, Visser MRM. Assessment of Motivational Interviewing: a qualitative study of response process validity, content validity and feasibility of the Motivational Interviewing target scheme (MITS) in general practice. BMC Med Educ. 2017;17:224.
20. Petrie A, Sabin C. Medical statistics at a glance. 2nd ed. Oxford: Blackwell Publishing; 2005.
21. Robinson S, Griffiths P. Nursing education and regulation: international profiles and perspectives. London: King's College London, National Nursing Research Unit; 2007. Available at: http://www.kcl.ac.uk/research/nnru/Publications?Reports/NurseEduProfiles.pdf (accessed: May 2017)
22. Miller WR, Moyers TB. Motivational Interviewing and the clinical science of Carl Rogers. J Consult Clin Psychol. 2017;85(8):757-66.
23. Moyers TB, Manuel JK, Wilson PG, et al. A randomized trial investigating training in Motivational Interviewing for behavioural health providers. Behav Cogn Psychother. 2008;36:149-62.

CHAPTER 6

Active ingredients and mechanisms of change in motivational interviewing for smoking cessation in patients with coronary artery disease. A mixed methods study

Dobber J, Snaterse M, Latour C, Peters R, Ter Riet G,
Scholte op Reimer W, De Haan L, Van Meijel B.

Submitted

CHAPTER 7

General discussion and future directions

This dissertation aims to add to scientific understanding of the phenomenon of 'motivational interviewing', and to facilitate counsellors to use the theory that explains this intervention [1]. Thus, the point at issue is: what, in light of existing evidence, does this research add to the knowledge on motivational interviewing (MI), especially on the knowledge about the active ingredients and the mechanisms of change in MI. Which uncertainties remain or are newly raised? And what are the consequences for daily practice, especially for the execution of MI for medication adherence in patients with schizophrenia, and of MI for smoking cessation in patients with coronary artery disease?

Measuring the content of motivational interviewing sessions

To detect potential active ingredients and mechanisms of change, we needed to reliably analyse MI-sessions. Therefore, we needed an overview of available MI-measurement instruments. There is a growing volume of measurement instruments to measure aspects of motivational interviewing. On the website of the Center on Alcoholism, Substance Abuse & Addictions (CASAA) at the University of New Mexico [2], which is 'the home' of MI, there are six MI-measurement instruments. And a recent review on MI-adherence tools [3] identified 49 adherence measures.

At the start of our study, we searched for a valid and reliable instrument, or a combination of these instruments, which measures both patient and counsellor behaviour in MI-sessions. In our systematic literature study, we employed four inclusion criteria:

1. the instrument specifically addresses measuring the execution of MI;
2. the instrument brings into focus one or more potential active ingredients in the MI-process and/or their effect on client behaviour;
3. the measurements are based on observations;
4. the instrument collects detailed information.

Based on this systematic literature study, we selected a combination of two measurement instruments to measure the process of motivational interviewing in our next studies: the Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE) [4], and the Motivational Interviewing Skill Code (MISC) [5,6]. The SCOPE [4] shows the sequence of the conversational behaviours of the counsellor-patient interaction, described in verbal codes. This might reveal patterns in the MI-sessions. In addition to the SCOPE we used the global ratings of the MISC [5,6] to rate the overall counsellor relational skills, and to rate the patient's level of self-exploration. We assumed that the trusting relationship would be reflected in this level of self-exploration of the patient, because a trusting relationship supports the patient to open up in a safe conversational atmosphere. Thus, we considered a rating of $\geq$4 on the client's self-exploration (7-point scale) as an indication of the presence of a trusting relationship.

However, we detected that the SCOPE and the MISC do not measure active ingredients nor mechanisms of change, because they do not measure the content of the conversations. To analyse the patient's motivational process and the counsellor's MI-strategy, we needed to study the sessions beyond these instruments, with a focus on the content of the conversations. Therefore, we employed a qualitative multiple case study analysis design [7], with a focus on prospectively established themes or questions, of which the first question was: "What is happening in this session?".

The SCOPE enabled the observation of patterns in conversational techniques and the patient's responses to these techniques. This instrument also allowed for statistical estimation of transitional probabilities between the MI-techniques employed by the counsellor, and the subsequent patient reaction in terms of 'change talk', 'sustain talk' or 'neutral talk'. The global ratings of the MISC showed the overall level of the MI-relational skills of the counsellor. These scores referred to the first fundamental characteristic

according to Miller and Rollnick: a person-centred non-authoritarian counselling style [8]. One specific global rating indicated the level of the overall counsellor's evocation skill, which refers to the skill of eliciting change talk, a central skill in MI. In addition to the knowledge derived from analyses of the SCOPE- and MISC-measurements, and due to its focus on the content of the conversation, the qualitative multiple case study analysis enabled an exploration of the patient's motivational process and the counsellor's MI-strategies.
We argue that this qualitative, inductive approach leads to a deeper understanding of the MI-processes, and contributes to avoiding a premature focus. The latter means that an isolated focus on the potential active ingredients and mechanisms of change that are suggested in the existing literature, may deprive the researcher of the openness to recognise and explore unexpected potential ingredients and mechanisms [9].

Detecting and finding active ingredients and mechanisms of change in motivational interviewing

Motivational interviewing is a complex behavioural psychological process intervention, with many ingredients contributed by both counsellor and patient. The value of ingredients may depend on context, dose (both frequency and depth), sequence, and may be patient-related or counsellor-related [see also 8,10]. Until now, mainly quantitative research has contributed to the research body of knowledge on active ingredients in MI [e.g. 11-13]. Quantitative research, however, tests whether the presence of a potential active ingredient is associated with a positive change in motivation strength, or with the occurrence of the target behaviour. It does not detect contextual, sequential, patient-related influences, nor can it detect the exact conditions under which a specific ingredient is and is not (part of) an active ingredient [see also 9].

The four potential mechanisms of change are psychological processes, derived from MI-theory [especially 10 and 14]. The appearance of these processes is difficult to measure. In quantitative research, the difference between pre- and post-test scores on questionnaires on potential mechanisms of change, such as 'increasing motivation to change', 'increasing self-efficacy/confidence', is a measure leading to the assumption that the corresponding psychological process must (not) have taken place [e.g. 13]. However, for the potential mechanism of change 'arguing oneself into change', there is no valid questionnaire available. And, according to Miller and Rollnick, 'arguing oneself into change' is the most important mechanism of change in MI [10]. In qualitative research, these psychological processes are also impossible to observe or to measure directly. Our approach was to listen carefully to the recorded MI-sessions and to listen for clues in the patient's speech indicating that one of these processes was taking place. We argue that this indirect observation of these psychological processes is the closest possible observation of these processes. Although our qualitative approach also had its limitations, especially in the context of generalization of the findings, our approach enabled us to observe 'MI at work' in a way that is impossible through a quantitative study design. We therefore argue that we were only able to determine our findings (see below) owing to the fact that we used a qualitative design.

Active ingredients

First, based on a systematic literature study, we composed a model in which we organised the clinician factors and client factors which are mentioned as (potential) active ingredients in MI-theory and/or in MI-research literature, and, through the same procedure, the potential mechanisms of change in MI. In the subsequent studies, we did not add new factors to the model, but we confirmed the presence of all but one factor in the MI-sessions. In both target groups (patients with schizophrenia and patients with coronary artery disease [CAD]) 'Eliciting change talk' and 'Change talk' were the most frequent clinician factor and

client factor, respectively. The proportion of these factors was over 50% in both groups. In neither of the target groups the clinician factor 'Creating a change plan' was observed. Besides, there were also differences between the employment of clinician factors and the activation of client factors between the two target groups/ target behaviours. In MI for smoking cessation in CAD-patients (the RESPONSE-2 study), the clinician factors 'Discussing ambivalence/barriers' and 'Supporting self-efficacy/competency' were employed about twice as often in comparison with the MI for medication adherence in patients with schizophrenia (the MATCH-study). The client factor 'Experiencing self-efficacy/competency' was activated about six times more frequently in the MI-sessions in the RESPONSE-2 study than in the MI-sessions in the MATCH-study. These differences can be explained by the differences in the type of ambivalence of the patients in both groups. The ambivalence in 'ability' was dominant in the smoking cessation group. Thus, self-efficacy/competency was an important factor to focus on in this patient group. In the medication adherence group, on the other hand, ambivalence in willingness was dominant, which required activation of other client factors, and, as a consequence, the use of other clinician factors.

In MI in the MATCH-study, other clinician factors were employed proportionally more: 'Influencing the patient's sense making' (about three times more), and 'Supporting autonomy' (about six times more). Likewise, the client factors 'Experiencing autonomy' (about three times more) and 'Changing sense making' (about two and a half times more) were activated in a greater proportion. These differences can also be explained by the differences between both groups including target behaviours. Autonomy was an important value in relation to medication adherence. And, the sense making of the role of medication when the patient is stabilised after a psychotic episode, was an important determinant in the patients who solved their ambivalence.

However, the small samples in the current study (MI for smoking cessation: n=24; MI for medication adherence: n=14), and the low prevalence of some of the clinician factors and

some of the client factors, urges prudence in the interpretation of these differences because of its risk of bias.

The presence of the clinician and the client factors in the sessions does not automatically mean that the factors are also active ingredients. In the literature, to our knowledge, the potential active ingredients in MI are presented as a single factor or a combination of two factors (e.g. the counsellor evoking change talk, and the patient uttering change talk). We found no example of this kind of active ingredients. Based on repeated observations in the two patient groups, we suggest that active ingredients represent a more complex phenomenon than a single factor or two combined factors. We observed a series of interactions between the counsellor and the patient over larger parts of the MI-sessions, and sometimes over two sessions, with different clinician and client factors involved, which in that particular conversation became an active ingredient and triggered a mechanism of change. On the basis of these observations, we argue that these combinations and interactions of clinician and client factors are related to the specific patient processes. To put it differently: in other cases, with other counsellors and other patients, that specific combination of clinician and client factors would not have turned into an active ingredient *because* the patient processes of becoming increasingly motivated differs. This means that we suggest that there may not be fixed active ingredients in MI. The building blocks of active ingredients in MI can be regarded as a pool of clinician and client factors; how these building blocks are combined, and in which combination they lead to active ingredients depends on the specific combination of client, counsellor and context.

We consider this finding from this dissertation our most important contribution to the body of research knowledge on, and understanding of, motivational interviewing. We observed this phenomenon in two different patient groups and for two different target behaviours. However, an important limitation is the absence of audio-recorded sessions in the majority of the cases. In the missing sessions of the incomplete cases (for RESPONSE-2, there were

109 recorded sessions and 42 sessions were not recorded; for MATCH, there were 66 recorded sessions and 10 to 34 sessions were not recorded) there may have been active ingredients, and, if there were, we do not know in which form these active ingredients occurred. Therefore, caution is warranted, and replication of our findings is required. However, the fact that all active ingredients we did observe were composed in the way as described above, increases the credibility of these findings.

The inductive character of both studies does not support generalization of these findings, it only allows for potential transferability to similar target groups and same target behaviours. We expect however, that in other patient groups and other target behaviours the clinician factors and the client factors are in the same way involved in forming active ingredients. We also expect that the same clinician factors and client factors are the potential components of the active ingredients, but other factors, which are currently unknown, may also contribute to active ingredients. In this regard we consider this knowledge of the formation of the active ingredients as a building block in MI-theory, and a step in scientifically understanding MI.

Mechanisms of change

Through the same procedure, a systematic literature study, we added the potential mechanisms of change in MI to the model. To our knowledge, this is the first model that organises the potential active ingredients and potential mechanisms of change in MI. This model enables researchers to comprehensively study the active ingredients and mechanisms of change in MI. Further, it allows counsellors to strengthen their MI-strategies and to focus on the appearance of a mechanism of change.

The model comprises four potential mechanisms of change:

1. arguing oneself into change,
2. increasing motivation to change,
3. increasing self-efficacy/confidence,
4. changing self-perception.

In both subsequent studies, we observed three out of the four potential mechanisms of change from our model. In the study on MI for medication adherence in patients with schizophrenia we did not observe patient expressions that indicated the occurrence of the mechanism of change 'increasing self-efficacy/confidence'. In contrast, in the study on MI for smoking cessation in patients with CAD, we 13 times observed patient speech indicating the presence of this mechanism of change. These differences may be explained by differences in target behaviour. Many smokers in the sample of patients with CAD found it hard to quit smoking, and had initially low confidence in their ability to completely stop smoking and to persist in non-smoking, while none but one of the patients with schizophrenia expressed low confidence in their ability to take prescribed medication. Their ambivalence was about their willingness and perceived importance to use antipsychotic medication on a long-term basis. Both ambivalences relate to cognitions of the patients and, hereby, to the mechanisms of change. Only once, in the study on MI for medication adherence, we observed clues for the mechanism of change 'changing self-perception'. We don't have an explanation for the low frequency in our samples of this potential mechanism of change. Still, we consider all four potential mechanisms of change in our model as plausible mechanisms of change.

In both the active ingredients and the mechanisms of change we found differences between the patient groups/target behaviours. For both active ingredients and mechanisms of

change, these differences can be explained on the basis of differences in ambivalence, potential barriers for the behavioural change, and cognitions of the patients. We argue that understanding of these MI-processes can be facilitated by our model of potential active ingredients and potential mechanisms of change. This model, and, thereby, the understanding of the MI-processes, enables counsellors to tune their MI-strategies to the patient's motivational process.

MI-quality, fidelity measures, measurement instruments

"The behavioral intervention that was intended to be tested, even if well specified, may bear little resemblance to what was actually provided if there is inadequate quality assurance." [8, p.235]. Treatment fidelity in complex behavioural process interventions is a complex topic. Not only because of practice variation between counsellors, but also because of differences between patients and contextual variations. This demands high skill proficiency of the counsellors, a flexibility and ability to navigate well, and applying MI-strategies tuned to the patient process. However, the quality assurance instruments that are usually applied in MI, the Motivational Interviewing Treatment Integrity (MITI) [15] and the MISC [5,6] fall short in detecting these MI-strategies. Furthermore, these instruments are not directed at the active ingredients and mechanisms of change, but at global ratings of counsellor attitudes over the MI-session as a whole, and at counsellor behaviour counts of conversational techniques applied at a session. So, although the summary scores of the instruments do give an indication of the fidelity and of the grade of MI delivered, they don't measure what we regard as the most important aspect of high-quality MI: the fit between the counsellor's MI-strategy and the patient's motivational process. At the start of this PhD-study we found seventeen measurement instruments designed to measure (aspects of) MI. Recently Lundahl et al. [3] identified 49 MI-adherence measures. In light of the current knowledge on active ingredients of MI and mechanisms of change in MI, there is a need to

reconsider the validity of these instruments: which (combination of) instruments, if any, measures the essence of MI? This essence is to influence the patient's motivational process in a way that respects the patient's autonomy, and in a collaborative, guiding and supportive way, evoking the patient's own motives for long-lasting behaviour change. The fit of the MI-strategies of the counsellor, i.e. his/her use of clinician factors in relation to the activated client factors during the MI-sessions and its fit with the mechanisms of change, should be part of the MI-quality measures.

Developing MI-skills

According to Lundahl et al. [3], and based on previous research [16,17], MI can best be learned by a 9-16 hour interactive workshop [16], with a follow-up of three or four feedback and coaching sessions, spread over a period of six months [17]. For the RESPONSE-2 study [18] we trained MI-skills in the nurses involved in the study. However, the training time of the nurses was restricted, and we knew if we would limit the learning of nurses to 'a workshop only' this most likely would lead to fading of the MI-skills within months [17]. Therefore, we decided to test the effects of a learning strategy in which the acquired MI-skills in a three-hour workshop were strengthened through four 'telephone personal feedback and coaching sessions' based on audio-recorded nurse-patient conversations. The nurses who completed all four sessions (13/24), on average improved their MI-skills in a statistically significant and a practice relevant size. Besides, the feedback and coaching time took little nursing time (four times 15 to 30 minutes in one year), and the nurses expressed high satisfaction with this learning strategy.

Despite of this success, we question the efficiency of this learning strategy. On the one hand, it was an effective strategy, leading to individual development of the nurses' MI-skills. Furthermore, the nurses involved highly valued the method and the content of frequent personal feedback and coaching. On the other hand, this approach took a large amount of

coaching time for the reason that transcribing, coding and the preparation of the feedback etcetera, was time consuming. On average, a patient consult of half an hour took about five hours of time on the coaching side. This investment is possible under research conditions, but is unlikely to be accepted as 'the usual practice'. In addition, we did not follow-up the sustainability of the acquired skills, but we also question the durability of the MI-skills after the termination of the feedback and coaching sessions.

Still, it shows that such an individual and in-depth approach seems a fruitful direction in learning and ongoing development of complex communication skills. It enables the coached nurse to elaborate on understanding the effects and functions of MI-techniques, allowing them to build MI-strategies.

Our study on the development of MI-skills corroborates the findings of previous research [17] on the utility of coaching and feedback after a MI-workshop, on the maintenance, increase and deepening of the MI-skills, and on the ability to construct a MI-strategy. Nonetheless, doubts remain about the sustainability of these skills after the closure of the coaching. Future research should address the topic of the sustainability of MI-skills (see: future directions).

MI practice

For MI-counsellors, it is important to be aware of the necessity of the occurrence of mechanisms of change in the patient. While performing MI, counsellors should bear this in mind and align their MI-strategy and navigation during the session in accordance with this key aspect of effective MI. Hereto, MI-training should integrate knowledge on the active ingredients and mechanisms of change in MI. Furthermore, MI-training should implement exercises to practise navigation guided by the enabling of the occurrence of mechanisms of change.

Further, counsellors should first of all build rapport with the patient and develop a trusting relationship, and learn to know and understand the patient's perspective on the target behaviour. In both samples of this study, counsellors succeeded in building rapport by showing interest in the patient's experience of his/her illness. Active listening and empathetic reflections, and making an effort to understand the patient's perspective without judging, advising or correcting was fundamental to establish such a trusting relationship. This is not only in the spirit of MI as a fundamental characteristic of the patient-centred intervention that MI is. It is also of importance for the counsellor to be able to build a MI-strategy with good fit with the patient's motivational process, since knowledge of the patient's perspective promotes the fit of the counsellor's MI-strategy with the motivational process. Furthermore, the trusting relationship facilitates the patient experience of a safe environment in which the patient is able to be more open and to engage in an in-depth self-exploration on the target behaviour.

Additionally, knowing and understanding how and which clinician factors and client factors can play a role as components of active ingredients, is a powerful resource in conducting the conversation and to navigate adequately. For this, understanding the model of hypothetical active ingredients and mechanisms of change can be helpful.

MI practice for medication adherence in patients with schizophrenia

There are some implications of this study, especially for MI practice for medication adherence in patients with schizophrenia. First, taking extra time for, and paying extra attention to the patient's story and his/her experiences with psychoses and antipsychotic drug treatment, adds to the success of the MI. Apart from its contribution to the establishment of a trusting relationship, the patient's story often reveals important values and life goals of the patient. The values and life goals may, later in a session, be strong

motivators if the counsellor helps the patient to relate one of these values or goals to medication adherence.

Second, in their textbook on motivational interviewing, Miller and Rollnick state: “So how, then, should one respond to sustain talk? First of all, don’t go fishing for it.” [10, p.198]. However, this may be different in MI for medication adherence in patients with schizophrenia. In contrast to target behaviours in the field of addiction, medication adherence is not an ‘obvious healthy behaviour’. It is not a value, and many people consider taking medication as unnatural. If the counsellor does not give sufficient attention to the cons of long-term medication adherence, there may be an insufficient base for a conversation about the pros of long-term medication adherence.

MI practice for smoking cessation in patients with CAD

There are two implications of this study that we would like to point out in the light of MI practice for smoking cessation in patients with CAD. First, a study by Snaterse et al. [19] revealed that about 40% of the smokers successfully stops smoking immediately after an Acute Coronary Syndrome event, without professional support. In the current study, the MI for smoking cessation was conducted in the group of patients who did not quit their smoking after the event. So, this patient group was a selected subgroup, for which we assumed that smoking cessation is considerably more difficult than for the about 40% successful quitters immediately after the event [19]. For the vast majority of these patients, the reason for not quitting smoking yet, was the existence of ambivalence about the ability to stop (or ambivalence in the ability to persist in non-smoking). A few patients also experienced ambivalence about willing to quit. But for most patients with CAD, especially shortly after a myocardial infarction or a coronary revascularization, this event, or their health, is an important motivation for smoking cessation. However, over time, when the event became more distant, for some patients the importance of this value seemed to decrease as a

motive for smoking cessation. It is, therefore, important in MI for smoking cessation, not to focus solely on the ability to quit, but also to remain paying attention to the willingness / importance of smoking cessation. If, in the first MI-session, the counsellor discusses the patient's reasons for smoking cessation, he/she should elaborate not only on the cardiac event as the reason to stop smoking, but also on other motives. In most cases, these motives remained important for the patient, both in short-term and long-term. In the succeeding MI-sessions all motives should regularly be addressed by the counsellor, preferably in relation with proven success in adopting a healthier lifestyle, and the experienced benefits of non-smoking (e.g. a better condition, not smelling after smoke). This helps the patient to keep his/her own motives in mind, and it supports and strengthens the long-term motivation of the patient. In addition, the effects of MI may be enhanced if the treating cardiologist and the cardiac rehabilitation nurse also ask for the patient's motives beyond the prevention of another cardiac event.

Second, in our study some patients relapsed from a 'quitter status' back to smoking. This may partly be explained by the concept 'dynamic inconsistency' [20] which refers to the phenomenon that people decide to change their behaviour but later return to this decision and decide otherwise. Loewenstein [21] describes this decision making in terms of 'cool' and 'hot' emotional situations or states: the hot-cold empathy gap. Translated to MI for smoking cessation this means that the patient, while engaged in the 'cool' situation of a MI-session, experiences a close connection between perceived self-interest and the decision to stop smoking. Later on, when the patient sits out in a café and catches the smoke of someone sitting at the next table (hot situation), he or she may impulsively decide to ask this neighbour for a smoke. In none of the cases the clinician factor 'creating a change plan' was employed. However, creating a change plan may bridge this hot-cold empathy gap, and if the counsellor and the patient, instead of discussing general coping strategies for hot situations, create a concrete plan for these potential pitfalls, the patient may obtain a higher

level of self-efficacy to deal with these 'hot' situations. Creating a change plan if the patient explicitly agrees to the composition of this plan, is a part of regular MI-practice, but was omitted in the MI-sessions in this study. We recommend addition of this component in the standard MI-strategy in MI for smoking cessation. Also, we recommend a study of the effects if this addition is routinely made.

Future directions

Motivational interviewing is a widely used behavioural intervention for behaviour change. However, the success of MI is far from optimal and, as a consequence, patients treated with MI cannot be assured of a positive outcome. The efficacy of MI varies considerably [8], which may be partly due to variation in the ingredients and in the execution of the intervention itself. Although Miller and Rollnick described the distinction between "MI" and "not-MI" in several publications [e.g. 22], there is no standard method or protocol for the intervention. This is not surprising, as the active ingredients of MI are not well understood. The results of our study are a step in the direction of a better understanding of the active ingredients of MI and the mechanisms of change in MI.

For counsellors, the most important implication is to understand how the formation of active ingredients takes place, and which mechanisms of change exist in MI. Further, it is important to know which clinician factors and which client factors may contribute to the active ingredients. In their MI-practice, counsellors should be able to transfer this knowledge and understanding to their MI-strategy, to their navigation on the basis of potential mechanisms of change, and to the recognition of the appearance of mechanisms of change. If counsellors adopt these insights in their execution of MI, we assume that it will enhance the effects of MI. These effects would probably be even further enhanced if the counsellor is aware of the existence of target group-related and target outcome-related motivational processes, and its consequences for the relevance of specific clinician factors, client factors,

and mechanisms of change. We also assume that adoption of these insights will decrease the amount of undesirable practice variation, since these insights help the counsellor to include the ingredients that may form active ingredients.

For a future study, we suggest a randomised controlled trial (RCT), in which it is important to collect the complete audio recordings of all MI-sessions of the study. The RCT-design allows to establish an overall effect for MI for the target group and the target behaviour under study, and, by using qualitative analysis, two subgroups can be distinguished in the intervention groups. One subgroup of participants exposed to active ingredients and one or more mechanisms of change, and another subgroup of participants not exposed to active ingredients and mechanisms of change (control group). These sessions should be separately analysed in both a qualitative and a quantitative way to, first, qualitatively establish the presence of potential active ingredients and mechanisms of change, and, second, quantitatively test possible associations between these active ingredients, mechanisms of change and the patient outcomes. All analysts should be blinded for the outcome.

For the suggested research, we need a valid MI-measurement instrument. Although there are many MI-measurement instruments, their validity can be questioned in light of the current knowledge on MI. There is a clear need for validated instruments in this context. For now, we suggest that the current state of the art measurements of MI-quality should be complemented with a measurement of the counsellors MI-strategy in relation with the active ingredients and the mechanism of change. Although this would be a time costly procedure, we argue it would enhance the validity of the measurements.

If we can take these steps, we may be able to help MI-counsellors to better stimulate their patients' motivation to change lifestyle behaviour.

REFERENCES

1. De Regt HW. Understanding scientific understanding. New York: Oxford University Press; 2017.
2. CASAA. https://casaa.unm.edu/codinginst.html
3. Luhndahl B, Droubay BA, Butters RP, Nelford K, Hardy C, Keovongsa K, et al. Motivational interviewing adherence tools: A scoping review investigating content validity. Patient Educ Couns. 2019. Epub 25 July 2019.
4. Martin T, Moyers TB, Houck J, Christopher P, Miller WR. Motivational interviewing Sequential Code for Observing Process Exchanges (SCOPE) Coder's manual. Available from: https://casaa.unm.edu/download/scope.pdf
5. Miller WR, Moyers TB, Ernst D, Amrhein P. Manual for the Motivational Interviewing Skill Code (MISC). Version 2.0. 2003. Available from: https://casaa.unm.edu/download/misc2.pdf
6. Miller WR, Moyers TB, Ernst D, Amrhein P. Manual for the Motivational Interviewing Skill Code (MISC). Version 2.1. 2008. Available from: https://casaa.unm.edu/download/misc.pdf
7. Stake RE. Multiple case study analysis. New York: Guilford Press; 2006.
8. Hilton CE, Lane C, Johnston LH. Has motivational interviewing fallen into its own premature focus trap? Int J Adv Counselling. 2016;28:145-58.
9. Miller WR, Rollnick S. The effectiveness and ineffectiveness of complex behavioural interventions: impact of treatment fidelity. Contem Clin Trials. 2014;37:234-41.
10. Miller WR, Rollnick S. Motivational interviewing: helping people change. 3rd ed. New York: Guilford Press; 2013.
11. Apodaca TR, Longabough R. Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. Addiction. 2009;104:705-15.

12. Copeland L, McNamara R, Kelson M, Simpson S. Mechanisms of change within motivational interviewing in relation to health behaviors outcomes. A systematic review. Patient Educ Couns. 2015:98;401-11.
13. Magill M, Colby SM, Orchowski L, Murphy JG, Hoadley A, Brazil LA, et al. How does brief motivational intervention change heavy drinking and harm among underage young adult drinkers. J Consult Clin Psychol. 2017;85:447-58.
14. Miller WR, Rollnick S. Motivational interviewing: preparing people for change. 2nd ed. New York: Guilford Press; 2002.
15. Moyers TB, Manuel JK, Ernst D. Motivational Interviewing Treatment Integrity. Coding Manual 4.2.1. 2015. Available from: https://casaa.unm.edu/download/MITI4_2.pdf
16. Madson MB, Loignon AC, Lane C. Training in motivational interviewing: A systematic review. J Subst Abuse Treat. 2013;44:330-5.
17. Schwalbe CS, Oh YH, Zweben A. Sustaining motivational interviewing: A meta-analysis of training studies. Addiction. 2014;109;1287-94.
18. Minneboo M, Lachman S, Snaterse M, Jørstad HT, Ter Riet G, Boekholdt SM, et al. Community-based lifestyle intervention in patients with coronary artery disease: The RESPONSE-2 trial. J Am Coll Cardiol. 2017;70:318-27.
19. Snaterse M, Scholte op Reimer WJM, Dobber J, Minneboo M, Ter Riet G, Jørstad HT, et al. Smoking cessation after an acute coronary syndrome: immediate quitters are successful quitters. Neth Heart J. 2015;23(12):600-7.
20. Thaler RH, Sunstein CR. Nudge: Improving decisions about health, wealth and happiness. New Haven: Yale University Press; 2008.
21. Loewenstein G. Hot-cold empathy gaps and medical decision making. Health Psychol. 2005:24;S49-S57.
22. Miller WR, Rollnick S. Ten things that motivational interviewing is not. Behav Cogn Psychother. 2009:37;129-40.

Summary

SUMMARY

Motivational Interviewing (MI) is intended as an intervention to strengthen patient motivation for a healthy (or healthier) life. The inventor if this intervention is Dr. W.R. Miller, an American psychologist from the field of addiction. Dr. Miller's approach of persons with severe alcohol dependency differed from the usual care. Reflective listening to show his active interest to understand what the patient was saying, was central to his approach. He emphasized the importance of understanding the patient's perspective on his/her alcohol use, and of the cooperation with the patient in order to work together to enhance the patient's own motivation (intrinsic motivation) to solve the problematic alcohol use. Intrinsic motivation is distinguished from external motivation, which is characterized by external regulation and meeting the desires and demands from other persons. The intrinsic motivation of many patients in Dr Miller's practice was highly influenced by the patient's feeling of ambivalence about the behavioural change. On the one hand, the patient knew very well that stopping his/her alcohol use was best for his/her health, while on the other hand they needed the alcohol e.g. to cope with stress. But while feeling ambivalent, the patients would not decide to change their drinking behaviour. Thus, in MI, supporting and helping the patient to solve his/her ambivalence is an important task for the MI-counsellor. This method turned out to be effective. In cooperation with the British psychologist Dr. S. Rollnick, Dr. Miller elaborated on MI, and described this intervention in textbooks.

Miller and Rollnick give the following definition of MI (textbook, 3rd edition): "Motivational interviewing is a collaborative conversation style for strengthening a person's own motivation and commitment to change." (2013, p.29 [1]). According to Miller and Rollnick, the fundamental characteristics of MI are:

1. “a person-centred non-authoritarian counselling style as originally described (in 1965) by Carl Rogers;
2. a clearly identified change goal toward which the conversation is directed;
3. differential evoking and strengthening of the person’s own motivations for change.”

(Miller & Rollnick; 2014, p.235 [2]).

As a consequence, in MI, the counsellor’s attitude is important. The counsellor should make an effort to accurately understand the patient’s perspective and empathize with the patient. Furthermore, the counsellor avoids to confront the patient and makes sure not to overtly disagree with the patient. Clearly, confronting does not help the patient, but instead causes friction in the relationship between patient and counsellor (Miller et al.; 1993, p.458 [3]). Finally, the counsellor strives to navigate the conversation in such a way that during the conversation the patient talks more frequent in a positive way about the behavioural change, and less frequent in a negative way. Positive patient speech about the behavioural change is called ‘change talk’, while negative patient speech is called ‘sustain talk’ (Miller & Rollnick; 2013, p.7 [1]).

After studies were showing MI to be an effective intervention for alcohol dependency, the effect of MI on other lifestyle and health-related behaviours and problems was investigated. Often, MI proved to be effective for these behaviours and problems (e.g.: overweight, dental care, the use of medication in accordance with the prescription). However, MI is developed empirically in Dr. Miller’s own practice, and it is unclear *why* MI is effective. The MI-conversations seem to be effective if they are conducted in accordance with the method of MI, but it is unknown which components or ingredients in the conversation are responsible for the effect of the conversation. MI-conversations, as it turns out, are in many occasions not effective, or less effective than expected. This may be caused, at least in part, by

omitting ingredients responsible for the effect in the conversations. Thus, the question is: what ingredients are responsible for the effect of MI (the so-called 'active ingredients')?

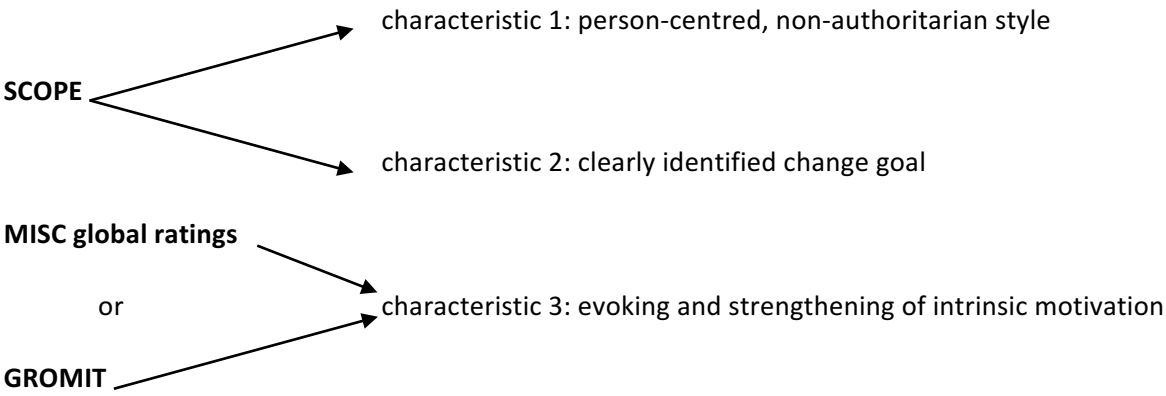
In this dissertation, we explore what ingredients can be identified and which of these qualify for being 'an active ingredient', and how these ingredients lead to behaviour change. The latter refers to one or more psychological processes, triggered by the active ingredients, and leading to altered cognitions or beliefs or ways of thinking in the patient about the target behaviour, and to the subsequent decision for behaviour change. These psychological processes are called 'mechanisms of change'.

We studied these ingredients and these mechanisms in this dissertation. In different sub-studies, we searched for methods to measure the active ingredients and mechanisms of change. To this end, we analysed a total of 244 recorded MI-conversations between various health professionals and patients (66 MI-conversations for medication adherence in patients with schizophrenia; 109 MI-conversations for smoking cessation in heart disease patients; 69 nursing consultations with heart disease patients about lifestyle change). We developed a model of potentially active ingredients and potential mechanisms of change. And we analysed how, and under what conditions, ingredients may become 'active ingredients'. Furthermore, we studied whether feedback and coaching can support nurses to further develop their MI-conversational skills.

In **Chapter 2** we describe how we investigated which measurement instrument is best qualified to measure the active ingredients in MI. We systematically searched on specialized databases and in specialized websites for science papers reporting on such measurement

instruments. We found 406 papers, reporting on 17 measurement instruments. We could use 15 of these papers, reporting on seven different measurement instruments.
For our purpose, an instrument should at least measure the three fundamental MI-characteristics: person-centred, non-authoritarian conversational style; clearly identified change goal; evoking and strengthening of intrinsic motivation (see description above), or a combination of two or more instruments which jointly measure the three fundamental characteristics. It turned out that a combination of two measurement instruments had the best fit. The instrument Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE) measures the second and third fundamental characteristic, but is does not measure the first characteristic. To measure the first characteristic, we could use the global ratings of the Motivational Interviewing Skill Code (MISC) or the global ratings of the Motivational Interviewing Therapist (GROMIT) (see scheme 1).

Scheme 1.



In **chapter 3**, we describe the analysis of the patient process in MI. This patient process refers to the motivational process of the patient during the MI-sessions. MI is meant to strengthen the patient's motivation, leading to the patient's experience of increased intrinsic motivation. We analysed 66 audio-recorded MI-sessions of in total 14 patients with schizophrenia (14 'cases'). These MI-sessions aimed at strengthening the patient motivation

for long-term medication adherence to prevent psychosis. Our analysis was intended to gain a better understanding of the psycho-social process of influencing the patient's motivational process.

We used the method of Multiple Case Study Analysis. In this qualitative research method, we first performed a single case analysis. We listened to all audio-recorded MI-conversations, and used the transcripts on which a trained coder had coded the conversation using the SCOPE measurement instrument. In addition, the MISC global ratings of all conversations were part of the case. The analyst used a list of themes (or questions) that added focus to the single case analysis. An example of a question on this list is "Does the counsellor pay attention to what the patient wants, and to the question whether the patient thinks it is worth changing for?". During analysis, to make notes, the analyst used prospectively developed worksheets related to the list of themes. After the completion of the single case analysis, we performed a cross case analysis. For this, we searched for patterns and relations between the results of the analyses of the separate cases. The third and last phase was the cross case synthesis. In this phase, we searched for the meaning of our findings in order to gain a better understanding of the psycho-social process of influencing the patient's motivational process. Thus, we addressed the following two questions, based on all individual conversations. What can be concluded on the patient process in MI? Can we find sufficient evidence to support these conclusions in the actual MI-sessions?

Based on the course of the patient's ambivalence, we found four patterns of the patient process (scheme 2). Furthermore, we found three factors of importance for influencing the patient process. The first factor was the presence or absence of a trusting relationship between the patient and the counsellor. If a trusting relationship was established, this facilitated the patient to open-up, to be prepared to engage in a more in-depth self-exploration, and to discuss perspectives on, and his/her motives pro and contra long-term

use of medication, and the meaning and importance of these perspectives and motives. The second factor was the ability of the counsellor to adapt his/her MI-strategy to the patient process, causing allignment between the MI-conversation and the current patient concerns. The third factor was the explicit relation between life goals, values and medication adherence. If the counsellor helped the patient to relate these life goals and values to medication adherence, this turned out to be powerful motivators, which could become decisive factors to solve ambivalence.

Scheme 2. Patterns of the patient process, based on the presence and absence of ambivalence*

Baseline	**Development during the MI-sessions**		**Motivation for medication adherence in the last session**	**Observed**
Not ambivalent	Remained not ambivalent		Motivated	In 4 cases
			Not motivated	In 2 cases
	Became ambivalent	Ambivalence solved	Motivated	Not observed
			Not motivated	Not observed
		Ambivalence not solved	Ambivalent	Not observed
Ambivalent	Ambivalence solved		Motivated	In 3 cases
			Not motivated	Not observed
	Ambivalence not solved		Ambivalent	In 4 cases

*In one case the pattern remained unclear during all sessions

Chapter 4 may be read as a continuation of the content of chapter 3. In chapter 4, we first describe how we systematically developed a model in which we organised the potential active ingredients and mechanisms of change in MI. We subsequently constructed worksheets in accordance with the model, in order to facilitate a systematic analysis. MI is a 'process intervention' which means that the counsellor executes the intervention in interaction with the patient, both counsellor and patient contribute to the intervention. Therefore, we made a distinction in potential active ingredients that are 'clinician factors'

and potentially active ingredients that are 'client factors'. Since we also explored *how* the counsellor applied the active ingredients, we developed a worksheet to facilitate this analysis. Hereafter, we performed another Multiple Case Study Analysis on the 14 cases. This time, our themes/questions focussed on the prevalence of active ingredients and mechanisms of change, and on the counsellor's strategy to apply these active ingredients.

It is impossible to exactly know what during the MI-sessions happens in the patient's mind and what his/her thoughts are. Mechanisms of change are psychological processes, which take place in the patient's mind (e.g. arguing oneself into change; changing self-perception). Thus, while listening to the audio-recordings of the MI-sessions and the analysis of the coded transcripts, we needed to confine ourselves to the recognition of clues indicating that one of these psychological processes might take place. This means that the content of the patient's speech must be indicate the presence of these specific psychological processes: 'if the patient says this, this must mean that the patient has convinced him- or herself'. In this qualitative analysis, we found the mechanism of change 'arguing oneself into change' as the most frequently appearing mechanism of change. We also found that most mechanisms of change appeared as a result of a MI-strategy with a set-up of 20 minutes or longer, and hardly ever as an immediate result of one or two potentially active ingredients. Usually, a variation of interacting clinician and client factors were involved in the formation of an active ingredient.

Reflections and questions querying the (intention for) long-term medication use were the most important counsellor's conversational techniques in order to shape the active ingredients. In about 70% of the application of one of these techniques, change talk was evoked.

Clearly, the relation between the appearance of mechanisms of change in the MI-conversation, and the actual long-term medication adherence of the patient is key in determining the clinical outcome. We did not investigate this relation, and that is an

important limitation in our study. However, our study does show that in these 14 cases potentially active ingredients were followed by potential mechanisms of change. This is in line with the MI-theory as described in the textbooks by Miller and Rollnick.

From **chapter 5** the studies concentrate on a different patient group, namely patients with coronary heart disease (coronary arteries supply the heart of blood and oxygen. Narrowing or blocking of one or more coronary arteries may cause a myocardial infarction). In chapter 5 we describe the test of a learning strategy to develop MI-skills in nurses at outpatient clinics in 15 Dutch hospitals. As a part of the RESPONSE-2 study, the nurses conducted four scheduled visits with patients with a coronary heart disease. Patients participating in this study, had, on top of their coronary heart disease, at least one of the following lifestyle-related risk factors: overweight, smoking, physical inactivity. During the four visits, the nurses performed a prevention programme, aimed at a (more) healthy lifestyle, and at the prevention of new complications. The nurses discussed lifestyle topics, and the motivation of the patient to change his/her lifestyle. If the patients were willing to change their lifestyle, they were referred by the nurse to an existing commercial lifestyle programme in their own neighbourhood: Weight Watchers (weight), Philips Direct Life (physical activity), and/or Luchtsignaal (smoking). After referral, in the subsequent visit the nurse discussed the progress and the patient's satisfaction with the lifestyle programme, and also if and how the patient succeeded in the implementation of the behavioural change in his/her daily life. In all visits, the nurse applied a MI conversational style.

To enable the nurses to converse in a MI-style, we trained the nurses in MI during a short MI-workshop. However, if there is no follow-up after this workshop, the MI-skills of the workshop participants usually fade within months. We attempted to prevent this fading of skills, of maybe even reverse it, and support the nurses in a further development of their MI-skills. Hence, we developed a learning strategy in which the nurses received telephone

feedback and coaching four times, based on an audio-recorded visit with one of their patients. The feedback and coaching sessions were four months apart on average. We used the Motivational Interviewing Target Scheme (MITS) to measure the MI-skills level of the nurse, and to determine the topics to coach upon. In the MITS, there are five levels of MI-skills.

We recorded, analysed, and gave feedback and coaching on 69 MI-conversations. In 13 out of 24 nurses we performed all four telephone feedback and coaching sessions. For these 13 nurses we found a significant and clinically relevant progression of one MITS-level on average.

Finally, in **chapter 6**, we describe an investigation of the active ingredients and mechanisms of change in MI, in patients with a coronary heart disease. These patients received telephone coaching by Luchtsignaal®, as a lifestyle intervention in which they are coached to support them in smoking cessation. Luchtsignaal is a foundation specialised in MI-based telephone coaching to support persons in smoking cessation.

In this study, we used the same model of potentially active ingredients and potential mechanisms of change as in chapter 4. In chapter 4 we studied MI for medication adherence in patients with schizophrenia, while in chapter 6 the target behaviour and target group is smoking cessation in patients with a coronary heart disease. We analysed 109 MI-sessions in 24 patients (24 cases). In consistence with chapter 4, we found that mechanisms of change appeared as a consequence of a MI-strategy over a longer part of the MI-session. The composition of the active ingredients varied between the separate cases, like the patient process and the MI-coaching strategy varied between the patients. In the MI-sessions, many patients expressed their ambivalence on smoking cessation. On the one hand, they intended to stop smoking for their heart and for their health, but on the other hand, they did not feel able to quit smoking without professional support. They expressed low confidence on this

topic. Consequently, the MI-strategy of the counsellors often focussed on increasing the patient's self-confidence. In twelve out of 24 patients, we observed active ingredients leading to a mechanism of change. The most frequently appearing mechanisms of change were 'arguing oneself into change' and 'increasing self-efficacy/confidence'.

This study's results raise questions about the characteristics of a sufficient level of MI. Currently, the threshold for MI-proficiency and MI-competency is mainly determined by the ratios between specific conversational techniques in MI, and by the mean score on the global ratings of the MISC (these ratios and mean scores are summarised in five 'summary scores'). This means that the summary scores mainly measure the use of conversational techniques. However, it is possible to correctly use the conversational techniques, while omitting active ingredients. The summary scores, then, would indicate 'good quality MI', even though it would not be effective. As a consequence, the presence or absence of active ingredients is not involved in the determination of the level of MI-performance, although this presence or absence are decisive for the appearance of the mechanisms of change. Therefore, the criterion 'presence of active ingredients' should be a candidate characteristic for the determination of the level of MI-performance.

CONCLUSION

In summary, in our study in two different patient groups we found that active ingredients in MI consist of combinations of clinician factors and client factors. Active ingredients arise in longer interactions between the patient and the counsellor. The development of a trusting relationship between patient and counsellor precedes the formation of active ingredients. A trusting relationship facilitates in-depth conversations, and offers the patient a safe place for self-exploration. Further, it is of major relevance for the counsellor to support the patient in relating his/her values and life goals to the behaviour change. These are powerful motivators. In our study, we found strong indications for the actual appearance in MI-

sessions of the mechanisms of change 'arguing oneself into change' and 'increasing self-efficacy/confidence'. We found indications for the appearance in MI of the mechanisms of change 'increasing motivation for change' and 'changing self-perception'. However, in the patient groups in our study, the latter two mechanisms of change appeared in a much lower frequency than the first two mechanisms of change.

Last but not least, our study showed how a follow-up on a MI-workshop by frequent feedback and coaching of nurses on their MI-skills in real patient conversations, can lead to further development of these skills. However, it is unclear what the optimal amount of feedback and coaching is, and what period of time is needed to achieve a stable and clinical relevant MI-skills level.

This study provokes a discussion on the method of determining the MI-quality of conversations. In the current method, the formation of active ingredients and the appearance of mechanisms of change are not involved. MI-quality is solely determined by the way in which the counsellor executes conversational techniques, and the extent to which the counsellor shows an attitude that fits MI. These are important aspects and they should remain as criteria for MI-quality. Based on our study, we suggest that the presence or absence of active ingredients and the subsequent mechanisms of change in MI are of such importance that they should serve as an additional criterion for MI-quality.

The implication for MI-practice is that, during the execution of MI, MI-counsellors must be aware of the necessity of the appearance of mechanisms of change during the MI-sessions. The counsellor is able to develop an appropriate MI-strategy if he/she is alert to patient statements on values and life goals in relation to the desired behaviour change, to patient statements on confidence to change, and to patient statements on the patient's self-perception. Using this kind of information to navigate the MI-sessions increases the probability of the appearance of mechanisms of change. This way of thinking should be

integrated in MI-training and coaching. This includes knowledge and understanding by counsellors of the clinician factors and the client factors that may add to the formation of active ingredients. After all, these active ingredients trigger the mechanisms of change.

Future research in active ingredients and mechanisms of change in MI should be focussed on studies of sufficient size, in order to be able to combine qualitative and quantitative research methods leading to significant and relevant assertions. Studies should investigate the active ingredients and mechanisms of change in MI in a variety of patient groups and target behaviours (e.g. alcohol use, all types of lifestyle factors, long-term medication use). It is essential that all MI-sessions in all studies are audio-recorded. First, using qualitative research the presence of (which) active ingredients and mechanisms of change can be determined. And, if present, qualitative analysis may reveal how active ingredients are formed, and how they lead to mechanisms of change. Second, using quantitative research and the causal guidelines can be tested in relation to the actual behaviour change. Finally, it is important to initiate research aimed at the development and subsequent validation of a method to involve the presence of active ingredients and mechanisms of change in the determination of MI-quality.

REFERENCES

1. Miller WR, Rollnick S. Motivational interviewing: helping people change. 3rd ed. New York: Guilford Press; 2013.
2. Miller WR, Rollnick S. The effectiveness and ineffectiveness of complex behavioral interventions: impacts of treatment fidelity. Contem Clin Trials. 2014;37:234-41.
3. Miller WR, Benefield RG, Tonigan JS. Enhancing motivation for change in problem drinking: a controlled comparison of two therapist styles. J Consult Clin Psychol. 1993;61:455-61.

Nederlandstalige samenvatting

SAMENVATTING

Motivational interviewing (afgekort als MI, in het Nederlands 'motiverende gespreksvoering') is een interventie die gericht is op het versterken van de motivatie van patiënten om gezond (of gezonder) te leven. De bedenker van deze interventie is Dr. W.R. Miller, een Amerikaanse psycholoog die in de verslavingszorg werkte. Hij gebruikte een andere benadering van mensen met ernstige alcoholproblemen dan gebruikelijk was. In zijn benadering stond het goed naar de patiënt luisteren centraal. Hij probeerde het perspectief van de patiënt op diens alcoholgebruik te begrijpen, en met de patiënt samen te werken aan het probleem en aan diens eigen motivatie (intrinsieke motivatie) om het probleem op te lossen (dit ter onderscheiding van extrinsieke motivatie, die gekenmerkt wordt door het tegemoet komen aan de wensen en eisen van anderen). De intrinsieke motivatie van veel patiënten werd sterk beïnvloed door hun ambivalentie ten opzichte van de gedragsverandering. Aan de ene kant wisten ze heel goed dat het voor hun gezondheid beter was om met de drank te stoppen, terwijl ze aan de andere kant de drank nodig hadden om bijvoorbeeld hun stress te hanteren. En zolang deze ambivalentie aanwezig was, kozen de patiënten niet voor gedragsverandering. Binnen MI is het dan ook een belangrijke taak voor de professional om de patiënt te ondersteunen bij het oplossen van deze ambivalentie. Deze werkwijze bleek effectief te zijn. Samen met de Britse psycholoog Dr. S. Rollnick heeft Dr. Miller MI verder uitgewerkt en de interventie in handboeken beschreven.

In de derde druk van hun handboek definiëren Miller en Rollnick MI als volgt: "Motiverende gespreksvoering is een op samenwerking gerichte gesprekstijl die iemands eigen motivatie en bereidheid tot verandering versterkt." (2014, p.48 [1]). In deze MI-gesprekken moeten volgens Miller en Rollnick in ieder geval de volgende drie fundamentele kenmerken van MI aanwezig zijn:

1. “een persoonsgerichte niet-autoritaire begeleidende gesprekssstijl zoals origineel door Carl Rogers (in 1965) beschreven is;
2. een duidelijk vastgesteld doel voor gedragsverandering, waar in het gesprek naartoe wordt gewerkt;
3. ontlokken en versterken van de eigen motieven en motivatie voor verandering.”

(Miller & Rollnick; 2014, p.235 [2]).

Bij MI is de houding van de professional dus belangrijk. De professional moet zich proberen in te leven in de situatie en het perspectief van de patiënt: hem/haar echt proberen te begrijpen. Verder zorgt de professional ervoor de patiënt niet te confronteren, door te vermijden het openlijk met de patiënt oneens te zijn. Immers, confronteren helpt de patiënt niet verder, maar zorgt ervoor dat de vertrouwensrelatie tussen de patiënt en de professional slechter wordt (Miller et al.; 1993, p.458 [3]). Ten slotte probeert de professional het gesprek zo te laten verlopen dat de patiënt steeds vaker en sterker positief spreekt over gedragsverandering, en steeds minder negatief. Als de patiënt positief over gedragsverandering spreekt wordt dit ‘change talk’ ofwel ‘verandertaal’ genoemd, negatief spreken heet ‘sustain talk’ ofwel ‘behoudtaal’ (Miller & Rollnick; 2014, p.23 [1]).
Toen uit onderzoek bleek dat MI een effectieve interventie is om patiënten te helpen bij het stoppen met hun alcoholgebruik, is het effect van MI bij andere leefstijl- en gezondheidsgerelateerde gedragingen en problemen ook onderzocht en veelal effectief gebleken (bijvoorbeeld overgewicht, mondzorg, adequaat medicatiegebruik). Echter, MI is ontwikkeld vanuit de eigen praktijkvoering van Dr. Miller, en het is niet duidelijk *waarom* het effectief is. De gesprekken lijken effectief te zijn als ze volgens de MI-methode worden uitgevoerd, maar welke onderdelen binnen dat gesprek, ofwel welke ingrediënten ervoor zorgen of het gesprek effectief is, is onbekend. MI-gesprekken blijken dan in veel gevallen ook niet effectief, of minder effectief te zijn dan mocht worden verwacht. Waarschijnlijk

wordt dit onder andere veroorzaakt doordat in een deel van de gesprekken of bij sommige patiënten juist die effectieve ingrediënten niet in de gesprekken aanwezig zijn geweest. De vraag is dus: welke ingrediënten zijn verantwoordelijk voor het succes van MI (de zogenaamde 'actieve ingrediënten')?

In dit proefschrift exploreren we welke ingrediënten in aanmerking komen om als 'actieve ingrediënten' te worden aangemerkt, en op welke wijze deze ingrediënten tot gedragsverandering leiden. Met dit laatste wordt bedoeld dat die actieve ingrediënten een psychisch proces in gang zetten waardoor de patiënt anders over het gedrag gaat denken en vervolgens besluit dit gedrag te veranderen. Deze psychische processen worden de verandermechanismen genoemd.

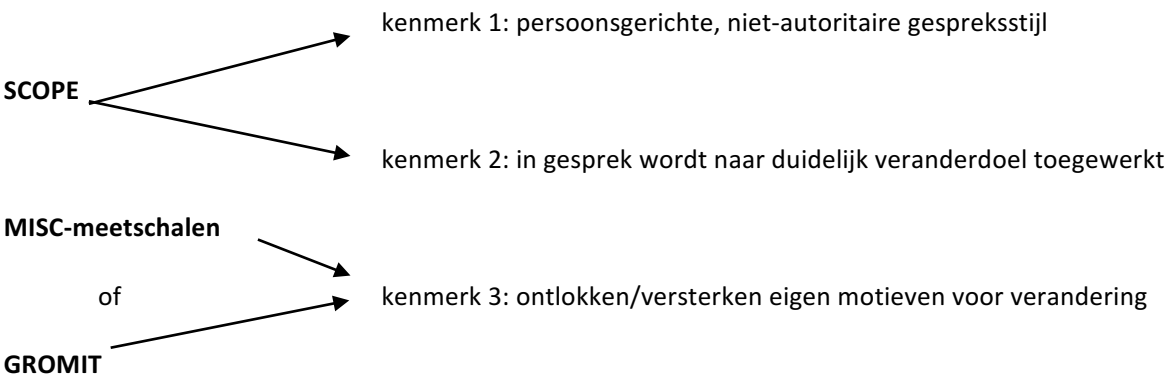
Wij onderzoeken deze ingrediënten en deze mechanismen in dit proefschrift. In verschillende deelstudies zochten we naar manieren om de actieve ingrediënten en verandermechanismen te meten. Daarvoor beluisterden en analyseerden we in totaal 244 MI-gesprekken van verschillende gezondheidszorgprofessionals met patiënten (66 MI-gesprekken met patiënten met schizofrenie over langdurig medicatiegebruik; 109 MI-gesprekken met hartpatiënten over stoppen met roken; 69 consultgesprekken tussen verpleegkundigen en hartpatiënten over leefstijlverandering). We ontwikkelden een model met potentiële actieve ingrediënten en potentiële verandermechanismen. En wij analyseerden op welke wijze en onder welke voorwaarden de ingrediënten 'actieve ingrediënten' konden worden. Daarnaast gingen we na of feedback en coaching verpleegkundigen kon ondersteunen bij hun ontwikkeling in MI-gespreksvoering.

Hoofdstuk 2 geeft weer hoe we onderzochten welk meetinstrument het meest geschikt is om de actieve ingrediënten van MI te meten. Daartoe zochten we systematisch in

gespecialiseerde databases en op gespecialiseerde websites naar wetenschappelijke artikelen waarin over dit soort meetinstrumenten wordt gerapporteerd. In de 406 artikelen die we vonden werd over 17 meetinstrumenten gerapporteerd. Uiteindelijk konden we 15 artikelen gebruiken. In die 15 artikelen werd over zeven verschillende meetinstrumenten geschreven.

Om voor ons doel geschikt te zijn moet een instrument in ieder geval de drie fundamentele kenmerken van MI meten (persoonsgerichte, non-autoritaire gespreksstijl, duidelijk veranderdoel, ontlokken en versterken intrinsieke motivatie, zoals boven beschreven), of moeten twee of meer instrumenten in combinatie met elkaar samen de drie fundamentele kenmerken meten. Hiertoe bleek een combinatie van twee meetinstrumenten het meest geschikt. Het instrument Motivational Interviewing Sequential Code for Observing Process Exchanges (SCOPE) meet het tweede en derde fundamentele kenmerk, maar niet het eerste. Om ook het eerste fundamentele kenmerk te meten kunnen de meetschalen van de Motivational Interviewing Skill Code (MISC) gebruikt worden of kan de Global Rating of Motivational Interviewing Therapist (GROMIT) gebruikt worden (zie schema 1).

Schema 1.



In **hoofdstuk 3** beschrijven we de analyse van het patiëntproces in MI. Daarmee bedoelen we het motivatieproces dat de patiënt doorloopt gedurende de MI-gesprekken. Als het goed

is versterkt MI de motivatie van de patiënt en ervaart de patiënt een toename van diens intrinsieke motivatie. Hiertoe analyseerden we de geluidsopnamen van 66 MI-gesprekken met in totaal 14 patiënten met schizofrenie (14 'cases'). Het doel van de MI-gesprekken was het versterken van de motivatie van de patiënten om langdurig medicatie tegen psychoses te blijven gebruiken. Onze analyse was bedoeld om het psychosociale proces van het beïnvloeden van het motivationeel proces van de patiënt beter te begrijpen.

Om dit begrip te bereiken, gebruikten we Multiple Case Study Analysis als methode. Dit is een kwalitatieve onderzoeksmethode. Hierbij zijn alle 14 cases eerst apart geanalyseerd (single case analysis). Alle gespreksopnamen zijn beluisterd, met daarnaast de letterlijk uitgeschreven gesprekstekst (het 'transcript') waarop een getrainde codeur gesprekscodes vanuit het meetinstrument SCOPE had aangebracht. Ook de voor elk gesprek gescoorde meetschalen uit het meetinstrument MISC behoorden tot de case. Bij het beluisteren van de gespreksopname en het analyseren van het gecodeerde transcript gebruikte de analist een lijst met thema's (of vragen) die richting aan de analyse gaven. Een voorbeeld van zo'n vraag in deze analyse is: "Is er in de sessies stil gestaan bij wat de patiënt wil, en of zij/hij daarvoor wil veranderen?". De analist maakte tijdens de analyse aantekeningen op vooraf vanuit de themalijst ontworpen werkbladen. Na de analyse van de afzonderlijke cases werden de analyseresultaten van de afzonderlijke cases met elkaar in verband gebracht: de analyse van alle cases tezamen ('cross case analysis'). In de laatste fase, de synthese van de bevindingen over alle cases tezamen ('cross case synthesis'), gingen we na wat de betekenis was van hetgeen we gevonden hadden voor het psychosociale proces van het beïnvloeden van de motivatie van de patiënt. Welke conclusies over het patiëntproces in MI konden er getrokken worden op grond van alle individuele gesprekken tezamen? Ten slotte controleerden we de onderliggende evidence voor deze conclusies.

We vonden vier verschillende patronen (zie schema 2) van het patiëntproces, gebaseerd op de aan- of afwezigheid van ambivalentie. Verder bleek dat drie factoren een belangrijke rol

speelden bij het beïnvloeden van het patiëntproces. Dat was allereerst de aan- of afwezigheid van een vertrouwensrelatie tussen de patiënt en de professional. Als er een vertrouwensrelatie was hielp dit de patiënt zich open op te stellen, en bereid te zijn dieper te onderzoeken en te bespreken welke kanten en motieven er aan langdurig medicatiegebruik voor hem/haar zitten, wat deze kanten en motieven betekenen en hoe belangrijk ze voor hem/haar zijn. De tweede factor was het vermogen van de professional om zijn/haar MI-strategie aan te passen aan het patiëntproces, waardoor het gesprek steeds aansloot bij hetgeen de patiënt op dat moment bezighield. En als derde factor vonden wij dat waarden en levensdoelen van de patiënt krachtige motivatoren waren, die, als ze door de patiënt aan diens medicatiegebruik gekoppeld werden, de doorslag konden geven bij het oplossen van de ambivalentie.

Schema 2. Patronen van het patiëntproces, gebaseerd op aan- en afwezigheid van ambivalentie*

Baseline	**Verloop gedurende de MI-sessies**		**Motivatie voor medicatietrouw in de laatste sessie**	**Wel/niet geobserveerd**
Niet ambivalent	Blijvend niet ambivalent		Gemotiveerd	In 4 cases
			Niet gemotiveerd	In 2 cases
	Ambivalentie ontstaat	Ambivalentie opgelost	Gemotiveerd	Niet geobserveerd
			Niet gemotiveerd	Niet geobserveerd
		Ambivalentie niet opgelost	Ambivalent	Niet geobserveerd
Ambivalent	Ambivalentie opgelost		Gemotiveerd	In 3 cases
			Niet gemotiveerd	Niet geobserveerd
	Ambivalentie niet opgelost		Ambivalent	In 4 cases

*Bij een case bleef het patroon gedurende alle sessies onduidelijk

Hoofdstuk 4 is te lezen als een vervolg op hetgeen in hoofdstuk 3 beschreven is. In dit hoofdstuk beschrijven wij eerst kort hoe we op systematische wijze een model hebben ontwikkeld waarin de potentiële actieve ingrediënten en verandermechanismen van MI samen zijn gebracht. Vervolgens is dit model vertaald in werkbladen ter ondersteuning van de analyse. Omdat MI een zogenaamde 'procesinterventie' is (dat wil zeggen dat de professional de interventie in interactie met de patiënt uitvoert; zowel de professional als de patiënt hebben een aandeel in de interventie), hebben we de potentiële actieve ingrediënten onderscheiden in 'zorgverlenerfactoren' (Engels: 'clinician factors') en 'patiëntfactoren' (Engels: 'client factors'). Omdat we ook wilden weten op welke manier de professional actieve ingrediënten toepaste, hebben we een werkblad ontwikkeld die de analyse van deze vraag mogelijk maakte. Vervolgens voerden we opnieuw een Multiple Case Study Analysis uit bij de 14 cases. Maar dit keer dus met andere thema's/vragen, namelijk over het vóórkomen van actieve ingrediënten en verandermechanismen, en over de manier waarop de professional de actieve ingrediënten gebruikt.

Het is onmogelijk om te weten wat er tijdens de MI-gesprekken precies in de hersenen en de gedachten van een patiënt gebeurt. Toch wilden wij weten of er tijdens een MI-gesprek verandermechanismen optraden bij de patiënt. Echter, die verandermechanismen zijn psychische processen die in het denken en in het brein van de patiënt plaatsvinden (zoals: zichzelf overtuigen, het zelfbeeld aanpassen). Dus wij moesten ons bij het beluisteren van de gespreksopnamen en het analyseren van de gecodeerde transcripts beperken tot het herkennen van aanwijzingen dat het betreffende psychische proces, op basis van hetgeen de patiënt zegt, daadwerkelijk plaatsvindt. Dus, hetgeen de patiënt zegt moet overtuigend zijn voor de aanwezigheid van dat psychische proces: 'als de patiënt dit zegt, betekent dat dat hij/zij zichzelf overtuigd moet hebben'. In deze kwalitatieve analyse vonden we dat het verandermechanisme 'zichzelf overtuigen' het meeste voorkwam (Engels: 'arguing oneself into change'). Verder vonden wij dat de verandermechanismen meestal optraden als

resultaat van een MI-strategie die vrijwel nooit onmiddellijk tot een actief ingrediënt leidde, maar een opbouw van meestal zo'n 20 minuten of langer kende in het MI-gesprek. Daarbij was een variatie aan zorgverlenersfactoren en patiëntfactoren betrokken, die met elkaar interacteerden. Tezamen vormden deze ingrediënten in deze interactie dan een actief ingrediënt.

De belangrijkste gesprekstechnieken die de professional gebruikte om de actieve ingrediënten vorm te geven, waren reflecties en vragen gericht op het blijven gebruiken van medicatie, of op de intentie dit te doen. Deze technieken ontlokten in ongeveer 70% van de gevallen verandertaal.

Het is van belang daarbij te bedenken dat het er uiteindelijk om gaat of het optreden van dat verandermechanisme in het MI-gesprek ook daadwerkelijk leidt tot langdurig medicatiegebruik door de patiënt. Dit laatste hebben we niet onderzocht, en dat is een belangrijke beperking bij dit onderzoek. Onze studie toont wel aan dat er in deze 14 cases potentiële actieve ingrediënten optraden die gevolgd werden door potentiële verandermechanismen. Dit is in lijn met de theorie van MI zoals deze in de handboeken van Miller en Rollnick is beschreven.

Vanaf **hoofdstuk 5** verschuift de studie naar een andere patiëntengroep, namelijk patiënten met een coronaire hartziekte (coronairen, ofwel kransslagaders, verzorgen de toevoer van bloed en zuurstof naar het hart. Als een of meer coronairen vernauwd of afgesloten zijn kan dat tot een hartinfarct leiden). In dit hoofdstuk gaan we in op een leerstrategie om MI-vaardigheden te ontwikkelen bij verpleegkundigen die op de hartpolikliniek van 15 verschillende ziekenhuizen in Nederland vier consultgesprekken voerden met patiënten met een coronaire hartziekte. Dit maakte onderdeel uit van een grotere studie, de RESPONSE-2 studie. Aan dit onderzoek namen patiënten met een coronaire hartziekte deel, die ten minste één van de volgende drie leefstijlrisicofactoren hadden: overgewicht, te weinig

lichaamsbeweging, roken. Gedurende de consulten voerden de verpleegkundigen een preventieprogramma uit, gericht op het bevorderen van een gezonde leefstijl en op het voorkomen van nieuwe complicaties. Daarbij besprak de verpleegkundige de motivatie van de patiënt om de leefstijl te veranderen. Als de patiënten bereid waren om een of meer leefstijlaspecten te veranderen, verwees de verpleegkundige hen naar een bestaand commercieel leefstijlprogramma in de eigen omgeving van de patiënt: Weight Watchers (gewicht), Philips Direct Life (lichaamsbeweging) en/of Luchtsignaal (roken). In het volgende consult ging de verpleegkundige dan in op de tevredenheid met, en de voortgang van het leefstijlprogramma, en op de mate en de manier waarop het de patiënt lukte om de verandering in het eigen leven door te voeren. Bij dit alles gebruikte de verpleegkundige een MI-gesprekstijl.

Om de verpleegkundigen in staat te stellen het gesprek in MI-stijl te voeren, verzorgden we voorafgaand aan de interventie een korte MI-workshop voor de verpleegkundigen. Echter, het is bekend dat als er geen vervolg op de workshop is, de MI-vaardigheden van de deelnemers aan de workshop afvlakken. Wij vroegen ons af of we deze afvlakking tegen konden gaan of misschien zelfs konden ombuigen in een zich verder ontwikkelen in MI-gespreksvaardigheden. Daartoe ontwierpen we een leerstrategie waarin met een interval van ongeveer vier maanden de verpleegkundigen vier keer telefonisch feedback en coaching ontvingen, gebaseerd op een opgenomen consultgesprek met een van hun patiënten. Om het MI-gehalte van de consultgesprekken te meten en de coachingsbehoefte van de verpleegkundige in te schatten, gebruikten we het meetinstrument Motivational Interviewing Target Scheme (MITS). De MITS deelt het MI-gehalte in vijf niveaus in.

In totaal hebben wij 69 consultgesprekken tussen verpleegkundigen en patiënten opgenomen, geanalyseerd, en van feedback en coaching voorzien. Bij 13 van de 24 verpleegkundigen zijn alle vier feedback- en coachingsgesprekken uitgevoerd. Wij vonden

voor deze 13 verpleegkundigen na voltooiing van de coaching een betekenisvolle en klinisch relevante gemiddelde stijging van één niveau op de MITS.

In **hoofdstuk 6**, ten slotte, beschrijven we het onderzoek naar de actieve ingrediënten en verandermechanismen van MI bij patiënten met een coronaire hartziekte, die telefonisch en via MI gecoacht worden om met roken te stoppen. De telefonische coaching is uitgevoerd door Luchtsignaal®, een stichting gespecialiseerd in telefonische coaching als ondersteuning bij het stoppen met roken.

In deze studie gebruikten we hetzelfde model van potentiële actieve ingrediënten en potentiële verandermechanismen als in hoofdstuk 4, maar waar dit in hoofdstuk 4 over langdurig medicatiegebruik bij patiënten met schizofrenie ging, gaat het in hoofdstuk 6 dus over stoppen met roken bij patiënten met een coronaire hartziekte. In totaal analyseerden we 109 MI-gesprekken bij 24 patiënten (24 cases). Net als in hoofdstuk 4 vonden we dat verandermechanismen optraden als gevolg van een MI-strategie over een langere gespreksperiode. Daarbij varieerde de samenstelling van de actieve ingrediënten tussen de verschillende cases, net zoals het patiëntproces en de MI-coaching-strategie tussen patiënten varieerden. Uit de MI-gesprekken over stoppen met roken bleek dat veel patiënten ambivalent waren over stoppen met roken, omdat ze enerzijds wel wilden stoppen met roken voor hun hart en voor hun gezondheid in het algemeen, maar dat ze zich anderzijds niet in staat voelden om zelfstandig met roken te stoppen. Hun zelfvertrouwen op dit punt was laag. Het is dan ook niet vreemd dat MI-strategieën op het versterken van het zelfvertrouwen veel gebruikt werden. Bij twaalf van de 24 patiënten observeerden wij actieve ingrediënten die tot een verandermechanisme leidden. De verandermechanismen die het meeste voorkwamen zijn ‘zichzelf overtuigen’ en ‘toegenomen zelfvertrouwen’.

De resultaten van deze studie roepen de vraag op wanneer er sprake is van een voldoende niveau van MI. In de huidige situatie wordt de vraag of dit niveau voldoende is voornamelijk

bepaald aan de hand van de verhoudingen tussen het gebruik van specifieke gesprekstechnieken in MI, en door de gemiddelde score op de meetschalen van de MISC (deze scores worden samengevat in vijf 'summary scores'). Met de summary scores wordt dus vooral het gebruik van gesprekstechnieken gemeten. Echter, het is goed mogelijk om de gesprekstechnieken op een goede manier te gebruiken, zonder dat in het gesprek actieve ingrediënten voorkomen. Bij het bepalen van het niveau van MI wordt dus geen gebruik gemaakt van de aan- en afwezigheid van actieve ingrediënten, hoewel de aan- en afwezigheid hiervan het optreden van verandermechanismen bepalen. Om deze reden zou het criterium van 'aanwezigheid van actieve ingrediënten' een kandidaat-kenmerk voor de bepaling van het MI-niveau kunnen zijn.

CONCLUSIE

Samengevat heeft ons onderzoek in twee patiëntengroepen laten zien dat de actieve ingrediënten in MI uit een wisselende combinatie van zorgverlenerfactoren en patiëntfactoren bestaan. Actieve ingrediënten ontstaan gedurende een langer lopende interactie tussen patiënt en professional. De ontwikkeling van een vertrouwensband tussen patiënt en hulpverlener gaat vooraf aan het optreden van actieve ingrediënten. De vertrouwensband maakt het mogelijk om gesprekken met meer diepgang te voeren, en biedt de patiënt de veiligheid dieper over de eigen beweegredenen na te denken. Daarnaast is het van belang dat de professional de patiënt helpt diens waarden en levensdoelen te koppelen aan de gedragsverandering. Dit zijn sterke motivatoren. Uit ons onderzoek blijkt verder dat er sterke aanwijzingen bestaan dat de verandermechanismen 'zichzelf overtuigen' en 'toegenomen zelfeffectiviteit/zelfvertrouwen' daadwerkelijk optreden in MI-gesprekken. In ons onderzoek hebben we ook aanwijzingen verkregen voor het voorkomen van de verandermechanismen 'toegenomen motivatie om te veranderen' en 'veranderd

zelfbeeld'. Echter, deze laatste twee verandermechanismen kwamen in onze onderzoeksgroepen veel minder voor.

Ten slotte bleek uit ons onderzoek dat vervolging van een MI-workshop met frequente feedback en coaching van verpleegkundigen over hun MI-vaardigheden tijdens hun gesprekken met patiënten, tot een verdere ontwikkeling van deze vaardigheden leidt. Het is echter onduidelijk hoeveel feedback en coaching optimaal is, en over welke periode de feedback en coaching nodig is om een stabiel en klinisch relevant MI-vaardighedenniveau te bereiken.

Verder leidt dit onderzoek tot discussie over de manier waarop de kwaliteit van de MI-gesprekken wordt vastgesteld. In de huidige manier speelt het vormen van actieve ingrediënten en het optreden van verandermechanismen geen rol. Bij deze manier wordt de kwaliteit bepaald door de wijze waarop de professional gesprekstechnieken uitvoert, en door de mate waarin de professional in het gesprek een attitude toont die bij MI past. Deze aspecten zijn belangrijk en moeten een rol in de kwaliteitsbeoordeling blijven spelen. Op grond van ons onderzoek kan daaraan worden toegevoegd dat de aan- of afwezigheid van actieve ingrediënten en daaropvolgende verandermechanismen in MI-gesprekken belangrijk genoeg zijn om hiervoor eveneens een plaats in de kwaliteitsbeoordeling in te ruimen.

Voor de praktijk betekent dit dat professionals, bij het uitvoeren van MI, zich ervan bewust moeten zijn dat het gesprek ertoe moet leiden dat de verandermechanismen plaatsvinden. De professional kan een passende strategie ontwikkelen als deze vanaf het begin van het gesprek alert is op uitspraken van de patiënt over waarden en levensdoelen in relatie tot het te veranderen gedrag, op uitspraken over belangrijkheid van het te veranderen gedrag, over het vertrouwen dit te kunnen veranderen, en op uitspraken over het zelfbeeld van de patiënt. Door gedurende de MI-gesprekken het gesprek op het bovenstaande te sturen vergroot dit de kans dat er verandermechanismen optreden. MI-trainingen en vervolg-

coaching van professionals zullen deze manier van denken en handelen in de training en coaching moeten verwerken. Daarbij hoort ook dat professionals weten en begrijpen welke zorgverlenerfactoren en welke patiëntfactoren bij kunnen dragen aan de vorming van actieve ingrediënten. Immers deze actieve ingrediënten zetten de verandermechanismen in gang.

Toekomstig onderzoek naar actieve ingrediënten en verandermechanismen in MI moet zich richten op onderzoeken van voldoende grootte om zowel via kwalitatieve als via kwantitatieve analyse tot betekenisvolle uitspraken te kunnen komen. Er zijn onderzoeken nodig in een variatie aan verschillende patiëntengroepen met verschillende veranderdoelen (bijvoorbeeld alcoholgebruik, andere leefstijlfactoren, langdurig medicatiegebruik). Bij deze onderzoeken moeten alle MI-gesprekken op audiospoor opgenomen worden. Via kwalitatief onderzoek kan eerst worden vastgesteld of, hoe, en welke actieve ingrediënten en verandermechanismen voorkomen. Via kwantitatief onderzoek kan de lijn van causaliteit getoetst worden, in relatie met het veranderde gedrag.
Daarnaast is het van belang dat onderzoek zich richt op het ontwikkelen en vervolgens valideren van een wijze waarop de aan- of afwezigheid van actieve ingrediënten en verandermechanismen een rol spelen bij het bepalen van de kwaliteit van MI.

REFERENCES

1. Miller WR, Rollnick S. Motiverende gespreksvoering: mensen helpen veranderen. 3de editie. ZP: Ekklesia; 2014.
2. Miller WR, Rollnick S. The effectiveness and ineffectiveness of complex behavioral interventions: impacts of treatment fidelity. Contem Clin Trials. 2014;37:234-41.
3. Miller WR, Benefield RG, Tonigan JS. Enhancing motivation for change in problem drinking: a controlled comparison of two therapist styles. J Consult Clin Psychol. 1993;61:455-61.

List of publications

Dobber J, Van Meijel B, De Winter CF. Medicatie-compliance bij mensen met schizofrenie. Een literatuurstudie naar de bijdrage van verpleegkundigen. Verpleegkunde 2004;19:283-299.

Dobber J, Boter H, Van Meijel B. Medicatietrouw. In: Van Meijel B, Kuijpers T, redactie. Zorg rondom schizofrenie. Houten: BSL; 2006. p.59-77

Dobber J, Perez R. Motivational interviewing and health behavior change in complex patients. In: Kathol RG, Perez R, Cohen JS. The integrated case management manual. New York: Springer; 2010. p.51-58.

Dobber J. Wat maakt motivational interviewing tot een effectieve interventie? Nurse Academy GGZ 2013;1:14-18.

Dobber J, Van Meijel B, Barkhof E, Scholte op Reimer W, Latour C, Peters R, Linszen D. Selecting an optimal instrument to identify active ingredients of the motivational interviewing-process. Journal of Psychosomatic Research 2015;78:268-276.

Snaterse M, Scholte op Reimer WJM, **Dobber J**, Minneboo M, Ter Riet G, Jørstad H, Boekholt SM, Peters RJG. Smoking cessation after an acute coronary syndrome: immediate quitters are successful quitters. Netherlands Heart Journal 2015;23:600-607.

Snaterse M, **Dobber J**, Jepma P, Peters RJG, Ter Riet G, Boekholt SM, Buurman BM, Scholte op Reimer WJM. Effective components of nurse-coordinated care to prevent recurrent coronary events: a systematic review and meta-analysis. Heart 2016;102:50-55.

Dobber J, Harmsen J, Van Iersel M. Klinisch redeneren en evidence-based practice. Weloverwogen besluitvorming door verpleegkundigen. Houten: BSL; 2016.

Dobber J, Latour C. Motivational interviewing and shared decision making for the medically complex patient and family caregiver. In: Fraser K, Perez R, Latour C. CMSA's Integrated case management. New York: Springer; 2018. p.149-173.

Dobber J, Latour C, De Haan L, Scholte op Reimer W, Peters R, Barkhof E, Van Meijel B. Medication adherence in patients with schizophrenia: a qualitative study of the patient process in motivational interviewing. BMC Psychiatry 2018;18:135.

Dobber J, Latour C, Snaterse M, Van Meijel B, Ter Riet G, Scholte op Reimer W, Peters R. Developing nurses' skills in motivational interviewing to promote a healthy lifestyle in patients with CAD. European Journal of Cardiovascular Nursing 2018. Epub 15 juni 2018.

Dobber J, Latour C, Van Meijel B, Ter Riet G, Barkhof E, Peters R, Scholte op Reimer W, De Haan L. Active ingredients and mechanisms of change in motivational interviewing for medication adherence. A mixed methods study of patient-therapist interaction in patients with schizophrenia. Submitted. 2019.

Dobber J, Snaterse M, Latour C, Peters R, Ter Riet G, Scholte op Reimer W, De Haan L, Van Meijel B. Active ingredients and mechanisms of change in motivational interviewing for medication adherence. A mixed methods study of patient-therapist interaction in patients with schizophrenia. Submitted. 2019.

PhD Portfolio

Name PhD student: Jos Dobber
PhD period: 2009 - 2019
Name PhD supervisor: Prof. Dr. RJG Peters, Prof. Dr. WJM Scholte op Reimer
Name co-supervisors: Dr. CHM Latour, Prof. Dr. BKG van Meijel

1. PhD training

	Year	Workload (ECTS)
General courses		
- Practical Biostatistics	2015	1.1
- Basic Course on Legislation and Organisation for Clinical Researchers (eBROK)	2018	1.0
Specific courses, training, coaching		
- Training Motivational Interviewing Skill Code (Molly Magill, Brown University, CAAS, Providence, RI, USA)	2009	1.5
- Coaching on Motivational Interviewing Sequential Code for Observing Process Exchanges (Tim Martin, CVS, University of Rochester, Rochester, NY, USA)	2009 – 2011	0.5
- Coaching on Scientific Writing in English for Publication	2012	1.0
Presentations at conferences		
- Zorg voor mensen met schizofrenie, Ede, Netherlands, oral presentation	2010	0.5
- Nurse Academy in de Praktijk, Den Bosch, Netherlands, oral presentation	2102	0.5
- Bevlogenheid in het werk, Amsterdam, oral presentation	2013	0.5
- Motiverende Gespreksvoering in Nederland, Zwolle, Netherlands, oral presentation	2015	0.5
- CarVasZ, Ede, Netherlands, oral presentation	2016,	0.5
	2017	0.5
- ICMI, Philadelphia, USA, three oral presentations	2017	1.5
- AMEE, Helsinki, Finland, oral presentation	2017	0.5
- Motiverende Gespreksvoering op Maat, Amsterdam, Netherlands, two oral presentations	2017	1.0
- EAOF, Verona, Italy, oral presentation	2019	0.5
Visiting scientific conferences		
- ICMI, Stockholm, Sweden	2010	0.5
- ICMI, Venice, Italy	2012	0.5
- Motiverende Gespreksvoering, Zwolle, Netherlands	2015	0.25
- ICMI, Philadelphia, USA	2017	0.5
- AMEE, Helsinki, Finland	2017	0.5
- Motiverende Gespreksvoering, Amsterdam, Netherlands	2017	0.25
- EAOF, Verona, Italy	2019	0.5
Other		
- Organizing the conference 'Motiverende Gespreksvoering op Maat, Amsterdam, Netherlands	2017	3.0

2. Teaching

	Year	Workload (ECTS)
Lecturing		
- Lecturer at the Nursing Bachelor Education, Amsterdam University of Applied Sciences	2009 - present	12
- Workshops and coaching in Motivational Interviewing RESPONSE-2 trial, and Capio-trial	2014 - 2016	10

3. Parameters of Esteem

	Year
Grants	
- Dutch Organisation for Scientific Research NOW, Ph.D. Grant	2015 - 2019

4. Publications

	Year
Book, chapters in books	
- Dobber J, Perez R. Motivational Interviewing and health behaviour change in complex patients. In: Kathol RG, Perez R, Cohen JS. The integrated case management manual. New York: Springer; 2010.	2010
- Dobber J, Harmsen J, Van Iersel M. Klinisch redeneren en evidence-based practice. Houten: BSL; 2016	2016
- Dobber J, Latour C. Motivational Interviewing and Shared Decision Making for the medically complex patient and family caregiver. In: Fraser K, Perez R, Latour C. CMSA's integrated case management. New York: Springer; 2018.	2018

Dankwoord

About the author

What

Name: Jos Dobber

Born: 8 September 1958 (Amsterdam, the Netherlands)

Profession: Mental health nurse, educational scientist, health scientist, senior lecturer (at the bachelor education in Nursing, Hogeschool van Amsterdam / Amsterdam University of Applied Sciences, Amsterdam, the Netherlands)

Who

My brother Bruno taught me to see and to understand how vulnerable life is, and the value of the moral consciousness of the Other (Emmanuel Levinas). Bruno had a serious mental disability, he was not able to speak, nor could he take care of himself. I learned from him to completely 'put myself between brackets' for him, to look at his face and in his eyes, to understand who he was. And, in return, he showed himself in complete and total trust, complete openness, and he offered the purest relationship possible. Although I've learned from Bruno how important the value of 'passiveness of the self' to the Other is, and not to judge on the basis of superficial and subjective impressions, in everyday life I experience how hard it is to live up to it.

Bruno passed away in 2017. I still miss him every day.

Acting and speaking (Hannah Arendt), the value and need to, after careful inner dialogue, come to a (moral) judgment, to take a position in (public) debate, and to judge and act conform in situations when applicable. I admire the 'phronèsis' that some persons have and show: practical and moral wisdom. I aspire to one day have this wisdom, though sometimes I think I am hindered by my rational way of thinking (see below). But I can always begin anew, I've learned that form Hannah Arendt as well.

Contemplation, thinking, understanding. Analytic thinking, coming to pragmatic understanding is important for me. Daniel Kahneman's 'Thinking, fast and slow' is a very dear book to me. I read it in 2011, but I still keep it at hand and use it regularly. During my PhD-study it fed my mind with cautions of proper interpretation: what is the exact meaning of the findings, and what are the boundaries? Kahneman and others kept me on track.