**Ridder DT de, Theunissen NC, Dulmen SM. Van**
**Does training general practitioners to elicit patients' illness representations and action plans influence their communication as a whole?**
**Patient Education Counseling. Vol. 66, 2007, nr. 3 p. 327-36.**



# Does training general practitioners to elicit patients' illness representations and action plans influence their communication as a whole?

DENISE T.D. DE RIDDER[A], NICOLET C.M. THEUNISSEN[B] AND SANDRA M. VAN DULMEN[C]

aDepartment of Health Psychology, Utrecht University, P.O. Box 80140, 3508 TC Utrecht, The Netherlands
bTNO Human Factors, The Netherlands
cNivel (Netherlands Institute of Health Services Research), The Netherlands

## ABSTRACT

**Objective**: To examine whether the discussion of illness representations and action plans during medical encounters affects the way patients and general practitioners (GPs) communicate.

**Methods** : In a quasi-experimental design, 10 GPs first performed care-as-usual conversations with patients. After a 6 h training they performed consultations either emphasizing patients' illness representations or action plans. Data were collected from 70 videotaped consultations with hypertensive patients, which were analyzed using the Roter Interaction Analysis System.

**Results**: Compared with care-as-usual consultations, communication in the action plan condition resulted in an increased discussion of lifestyle issues whereas communication in the illness representation condition resulted in more discussion of patient concerns. In both experimental conditions the proportion of affective GP utterances was higher while patients contributed more to the conversation. When GPs changed their communication style, patients did accordingly.

**Conclusion**: The explicit address of illness representations or action plans during consultations results in more attention to patient concerns and lifestyle issues and an

overall improvement in patient–GP communication in terms of affective atmosphere and patient involvement.

**Practice implications**: These findings show that after a brief training GPs are able to change their communication style in a way that allows for a more thorough consideration of patient self-management.

## 1. INTRODUCTION

Although patient beliefs have been shown to affect a variety of responses to illness (e.g., self-management and adherence) [1], [2] and [3], such beliefs are rarely discussed during medical consultations [4] and [5]. In a similar vein, general practitioners often urge patients to adhere to the prescribed regimen but they rarely discuss specific patient behaviors that are required to become more adherent [3]. Both patient beliefs (‘illness representations’) and plans for implementing health behavior (‘action plans’) are the essential components of Leventhal's self-regulatory model of illness, which aims to explain patients’ responses to illness from the cognitive representations patients hold about their medical condition [1] and [2]. Although considerable research efforts have been spent on this model, insight is lacking into the way patients and general practitioners communicate about these issues during consultations. Still, knowing how doctor–patient communication can facilitate the discussion of illness representations and action plans during medical encounters is important because it may subsequently promote the discussion of self-management and adherence [2]—both issues that are rarely a topic of explicit consideration during medical encounters.

Previous research has demonstrated that patients hold strong, sometimes medically incorrect, beliefs about the nature of their physical condition. These beliefs are derived from various sources like patients’ own experience with illness or the media and allow patients to identify the meaning of their illness. Five main domains of illness representations have been identified: (1) *identity* or disease label (e.g., ‘chronic high blood pressure’) with associated emotions (‘it makes me afraid’) and symptoms (‘trembling, headaches’); (2) *timeline*, reflecting patients’ expectations about the duration of the condition and its characteristic course (acute, chronic, or episodic); (3) patient's expectations about the physical, social, economic and emotional *consequences* of disease; (4) *cause*, reflecting the causal attributions about how one gets the disease (e.g., stress or viral agents); (5) beliefs about *cure* or *controllability* of the condition [1], [2], [6] and [7]. Two additional types of representations that are often considered are *medication representations* (e.g., worry about side-effects) and *lifestyle representations* (e.g., mixing up a healthy diet with dieting) [8]. Leventhal's model states that illness representations guide the development of so-called action plans, which comprise the planning of a response to illness into one's daily routines [9] and [10].

Despite their importance for the way patients manage their physical condition, illness representations are rarely discussed during medical consultations. This may, on the one hand, relate to patients’ reluctance to express their views of illness in the presence of the physician because they believe their own ideas differ from medical views (e.g., when they have an aversion against medication use) [11]. On the other hand, it may relate to physicians being unfamiliar with discussing such private issues like patients’ beliefs about illness or being hesitant to advise how a medical treatment should be implemented in patients’ lives. Physicians may also feel uncomfortable in telling patients that patients’ ideas disagree with medical knowledge. Patients may interpret this as a lack of attention to their perspective. In turn, physicians may feel frustrated because they are not ‘getting through’ to the patient [12]. Therefore, any effort to find out which communication strategies facilitate a discussion about patients’ ideas and actions plans is highly recommended. Such an explicit consideration of illness representations and action plans may promote communication beyond the mere exchange of medical information and facilitate patients’ contribution to communication. As better communication between patients and general practitioners (GPs) has been shown to be the most important factor in promoting patient adherence to the prescribed regimen, finding ways to improve communication is of utmost importance.

Discussing illness representations and action plans during medical consultations is expected to require more active patient participation [13] and [14]. This study aims to investigate (1) what clusters

of communication behaviors can be discerned in GPs who have been trained in discussing illness representations or action plans during medical visits with hypertensive patients and (2) if patient communication behaviors change accordingly as a result of GPs altered communication behavior.

## 2. METHODS

### 2.1. Study design and participants

This study employs a quasi-experimental design in which communication about illness representations or action plans was manipulated in two separate conditions. Both conditions use a semi-structured protocol to ensure that relevant issues are covered (see Appendix A; details of the training program are discussed in a previous study [3]). The first condition (‘discussing illness representations’) highlights patients’ cognitive representations that might hinder adherence and provides the GP with a protocol that covers the main domains of illness representations as found in hypertension literature [15], [16] and [17] within the format of the Dutch general practitioners standard for hypertension treatment [18]. The second experimental condition (‘discussing action plans’) addresses the management of affect and self-efficacy as well as the ability to plan action for performing the required self-management behaviors. In both experimental consultations, physicians were required to employ a consultation duration of 15 min maximum. A care-as-usual consultation was added as a control condition. According to the literature, during care-as-usual consultations physicians employ a strategy of emphasizing the importance of following the prescription regimen and provide medical information [19] and [20]. GP trainees first performed care-as-usual consultations (Condition 0), followed by one of the experimental conditions (either Condition 1 or Condition 2). The experimental design of the study is presented in Fig. 1. The criteria about informed consent and anonymity were met according to the Medical Ethics Committee of the local University Medical Center.

**[FIGURE. 1]**

Data were collected from 70 videotaped consultations with 10 GP trainees (8 female; age range 28–31 years). All consultations focused on patients’ hypertension control. The GP trainees had on average 3 years of occupational experience as a physician, of which 1 year as a GP trainee. The consultations were systematically observed by two observers blinded for the three conditions.

Table 1 presents the distribution of patient characteristics amongst the three conditions. Patient characteristics did not differ between groups, except for occupation: patients in Condition 2 more often had a full-time job.

**[TABLE 1].**

Distribution of patient characteristics amongst the three conditions

### 2.2. Measures

*Discussing illness representations and action plans* (*DIRAP*). To determine whether GPs adhered to the experimental protocol we observed communication during consultations using the DIRAP coding system. This system was designed and piloted using a set of 36 videotaped consultations about hypertension by GPs participating in the EUROCOM project [21]. The final DIRAP used in the current study contains eight mutually exclusive clusters (see Appendix B), relating to five major illness representations (identity, timeline, consequences, cause, and control-or-cure), two specific illness representation categories (medication and lifestyle representations), and action plans. The categories control-or-cure and lifestyle had disappointing inter-rater reliability (IRR) scores ($r < .60$). Therefore, these two scales were excluded from further analyses. The overall average IRR of the remaining scales was .75 (range .62–.92).

*The Roter Interaction Analysis System* (*RIAS*). RIAS was used to analyze the verbal communication during consultation. The 16-cluster version of RIAS [22] and [23] is a system with proven content and discriminant validity [24]. RIAS distinguishes between affective and instrumental verbal utterances on the part of the doctor and the patient. Each verbal utterance is coded into one of these mutually exclusive categories. Affective categories refer to communication required to establish a therapeutically effective relationship, such as social talk, signs of agreement or understanding, providing comfort and reassurance, and showing empathy, concern and understanding. Instrumental communication categories refer to those communication aspects which primarily focus on solving problems: for example, providing information or advice and asking questions about medical or psychosocial/lifestyle topics. The overall average IRR for categories that were observed in at least 2% of the total amount of utterances [25] was .97. Physician categories had a mean IRR of .97 (range .70–.97) while the average IRR for patient categories was also .97 (range .70–.98).

*Non-verbal behavior*. One particular type of non-verbal behavior is patient-directed gaze, referring to the time the GP looks directly into the patient's face. Patient-directed gaze is associated with affective verbal behavior and instrumental behavior on psychosocial topics [26]. Patient-directed gaze was measured and adjusted for the time the GP was in sight. The overall IRR of the duration of patient-directed gaze was .99. The duration of the physical examination and interruptions (e.g., telephone calls) was measured and subtracted from the total consultation time to calculate consultation length.

*Patient characteristics.* As communication between patient and GP may be influenced by patients' background, patients were asked to complete a questionnaire sent by mail about a week before the consultation (see Table 1), including sociodemographic measures (sex, age, education, and employment) and medical information (health status, duration of anti-hypertensive medication, and adherence).

## 2.3. Data analyses

RIAS categories were measured in frequency of utterances. DIRAP and non-verbal categories were measured in duration of utterances. To control for potential differences in lengths of visits, scores were divided by total occurrences of communication categories. Although the 70 videotaped consultations might not be independent because of systematic variation at the level of the physician the intra-class correlation proved to be non-significant, indicating that the consultations can be considered as independent observations.[1]

Differences between the three conditions on the main dependent variables concerning the quality of patient–physician communication (as measured by RIAS and patient-directed gaze) were analyzed with multivariate analysis of variance for general linear modeling (Multivariate-GLM) [27]. Next to multivariate results, this analysis provides univariate test results and contrasts between groups. Patient characteristics were added as covariates for the Multivariate-GLM test to correct for initial differences between patients. Results were summarized with the estimated marginal means and the standard errors.

To further examine the effects of experimental conditions on communication, we used principal component analysis allowing for categorical data (CATPCA), with additional Multivariate-GLM [28], [29], [30] and [31]. This analysis identifies a small number of dimensions that explain the variance observed in a large number of variables.

# 3. RESULTS

## 3.1. Discussing illness representations and action plans across conditions

Table 2 shows the content of patient–GP communication for the three conditions. As expected, the contents of communication differed across conditions. All illness representation clusters, except consequences, gave significantly higher scores for Condition 1 (illness representations) when compared to the other conditions. The action plans cluster gave significantly higher scores for Condition 2 (action plans) when compared to Condition 0 (care-as-usual). Although a tendency was found for Condition 2 to result in higher action plans scores than Condition 1, this difference was not

significant. This suggests that discussing illness representations triggers some action plan discussion as well.

**[TABLE 2.]**

## 3.2. General experimental effects on patient–GP communication

Table 3 shows that the duration of consultations in Conditions 1 and 2 was significantly longer than in Condition 0 (care-as-usual), although the GP trainees had been asked to limit the duration of experimental consultations to 15 min. As a result the amount of utterances was higher for both experimental groups. As expected, in both experimental conditions the percentage of affective communication was higher. In addition, patient-directed gaze was significantly higher for both experimental conditions.

**[TABLE 3.]**

Table 3 also shows that patients talked significantly more in the experimental conditions. Higher scores for affective utterances by GPs in the experimental condition coincided with significantly higher scores for instrumental utterances by patients. This seemingly contradictive result may be explained by patients feeling more comfortable to discuss medical issues encouraged by the GP's affective communication.

## 3.3. Patterns of communication

The communication categories discussed in Table 3 represent a broad spectrum. Restricting analyses to the broad categories of affective and instrumental communication inevitably leads to loss of information about the communication between GPs and patients. To find patterns of communication, both patient and GP communication categories were imported in a CATPCA analysis, with ‘condition’ added as a supplementary variable. The analysis accounted for a proportion of total variance of 32%. According to the multivariate GLM the position of t he conditions within the CATPCA model significantly differed, $F(4,132) = 31.25$, $p < .001$.

The analysis resulted in one chart (Fig. 2) displaying the relationships between all variables. The zero-point in Fig. 2 represents the mean component score of the sample. The positions of the variables and their distance to the center of the graph (zero point) are determined by their correlations with the principal components (dimensions). The distances between the variables (inversely) represent the correlations between them, allowing for the calculation of an alpha coefficient between clusters of variables.

**[FIGURE 2]**

Two dimensions (displayed on the *x*- and *y*-axis, respectively) represent two basic communication styles that may underlie the patient–GP communication. The content of the dimensions can be interpreted by examining the position of the variables in relation to the dimension. There is a very strong first component (Dimension 1 on the *x*-axis) accounting for a proportion of variance of 24% (Cronbach's alpha .90). This dimension represents a continuum of GP–patient communication from ‘Medical talk’ (left side of the figure) to ‘Psychosocial talk’ (right side). Considering the scores of the three conditions in relation to this continuum, care-as-usual consultations are characterized by ‘Medical talk’, action plan consultations by ‘Psychosocial talk’, whereas illness representation consultations are somewhere in between. The three conditions significantly differed in their relationship to this communication dimension according to Multivariate-GLM, $F(2) = 215.73$, $p < .001$.

Dimension 2 (the *y*-axis in Fig. 2) represents a second communication style and has a much lower proportion of explained variance of 8% (Cronbach's alpha .61). Dimension 2 is for the greater part

defined by variables with a positive score, forming a mixture of affective and instrumental patient categories. These results suggest that a positive score on Dimension 2 indicates communication about patients' concerns with their physical condition, whereas a negative score indicates communication about general concerns and reflections. Considering the scores of the three experimental conditions on this dimension, illness representations consultations have high scores on the second style of communication whereas care-as-usual consultations and action plan consultations are characterized by less emphasis on patients concerns with the physical condition. The Multivariate-GLM for Dimension 2 showed a significant effect, $F(2) = 3.89$, $p < .05$. However, although Condition 1 (illness representations) differed significantly from Conditions 0 (care-as-usual, $p < .01$) and 2 (action plans, $p < .05$), Conditions 0 and 2 did not differ significantly on this second style of communication.

The relationship between GP and patient communication provides information about patterns in the GP–patient dialogue: Fig. 2 shows that patient clusters are often close to the corresponding GP clusters, which indicates high correlations between them. For example, the psychosocial information clusters of patients and GPs are close to each other, as are the concerns clusters when related to Dimension 1 (the *x*-axis). So, when GPs used a certain style, patients did so accordingly.

Patient characteristics did not affect the communication dimensions identified by the CATPCA analysis, with the exception of patients' age: younger patients (<55 years) engaged more frequently in 'Psychosocial talk', irrespective of condition, $F(2) = 4.16$, $p < .05$.

## 4. DISCUSSION AND CONCLUSION

### 4.1. Discussion

The present study is the first to apply Leventhal's self-regulatory model of illness to an observational patient–GP communication study in medical practice. Leventhal's model highlights the concepts of patients' illness representations and action plans, which have proven to be important factors in the way patients manage their disorders. We examined whether discussion of illness representations and action plans improved the quality of patient–GP communication compared to care-as-usual communication.

As in previous studies [4] and [5], in the care-as-usual condition only few illness representations and action plans were discussed. However, after only 6 h of training GP trainees were able to elicit patient's illness representations or action plans (depending on the condition GPs were assigned to). The causal nature of this association must be interpreted with some caution because of the quasi-experimental design (GP trainees had different patients before and after training). However, the finding that a change in communication was irrespective of patient characteristics supports our interpretation of training effects as does the systematic variation in GP trainees' communication behavior across conditions.

It appeared that discussing illness representations triggered some action plan discussion as well. For example, communicating about control/cure (*what* can be done to lower the blood pressure) may invite discussion about *how* it can be done. Nevertheless, communication styles were completely different between groups: the 'Medical talk' focus in care-as-usual consultations agrees with physicians overall disease-orientated orientation during regular consultations [9]. Because of this orientation, physicians expect patients to provide information to enable them to diagnose and treat the disease. In contrast, action plan consultations were characterized by 'Psychosocial talk', which brings high blood pressure management in relation with patients' lifestyle and their personal situation. This agrees with the idea that action plans should be specific and appropriate for the patient. As intended, illness representations consultations were characterized by an emphasis on patient's concerns with their physical condition.

We found that patients younger than 55 years, irrespective of condition, discussed more 'psychological talk' (including lifestyle) with there physician than older patients. Age differences in type of communication were found in a review study as well [32], but it is not certain who is responsible for this difference, the patient or the physician.

According to other studies, both illness representations and action plans are relevant for promoting adherence [13] and [14]. Earlier research indicated that illness representations and action plans both need to be attended, because changes in the way the patient perceives one factor has consequences for

patient perceiving of the other [3]. In order to address both aspects, ideally a consultation should include more attention to patients' concerns as well as to psychosocial/lifestyle issues.

A limitation of this study is the fact that the patients were seen by a GP trainee and not by their regular GP. Although the consultations in this study involved repeated visits for all patients as they had been using anti-hypertensive medication for at least 6 months, they did not have a long-term relationship with the GP trainees. As a result it is uncertain if the care-as-usual consultations performed by GP trainees were representative of regular consultations. However, the 'Medical talk' focus in care-as-usual consultations agrees with the orientation of physicians during regular consultations [9]. Furthermore, in a related study patient questionnaires showed that the care-as-usual consultations were considered very similar to regular consultations [3]. All together, the behavior of the physicians and patients during the care-as-usual condition may be generalized to regular consultations. Therefore, despite the limited amount of video-observations, it can be assumed that the findings in the other conditions can be reproduced if physicians receive similar trainings.

It may be somewhat worrying that the experimental consultations were about 7 min longer than the care-as-usual consultations. This might deter GPs to actually use this new approach. However, we consider the longer experimental consultations as a temporary effect of introducing a new style of communication to the patient. Whereas the GPs in our study had the opportunity to get used to the new way of communicating with patients during the training sessions, patients may have felt somewhat overwhelmed by the new approach because they were not prepared for the new consultation styles in the way the GP trainees were. It is known that training patients improves their communication skills in information exchange [33] and [34], but so far there are no studies that have examined whether patients can be 'trained' indirectly by training their physicians. Our study allowed for one consultation only to guide patients through this whole new role. Nevertheless, the results of our study are promising for improving patient–GP communication in a way that when GPs adopted a particular way of communication, patients were able and willing to do so accordingly. This result corresponds with the finding that physicians tend to set the consultation agenda and patients are used to be receptive for the physicians' initiative [35]. One might argue that the increased consultation duration in the experimental conditions is also responsible for the altered communication between patients and providers. However, from a study comparing primary care consultations in The Netherlands and the USA it appears that longer consultations do not automatically result in improved communication as the longer consultations in the USA (15.4 min) were more often characterized as bio-medically oriented whereas the consultations of shorter duration in The Netherlands (9.5 min) were primarily characterized as socio-emotionally oriented [36].

Both types of experimental consultations showed a significant increase in patient contributions. This agrees with a more patient-centered approach in medicine, which advocates that GPs should be receptive to patients' opinions and expectations and must explore their preferences to help them to make the right decisions [37]. In addition, patients in the experimental conditions were better able to communicate their views and concerns about their illness as well as think of ways how they would deal with their illness. A previous study demonstrated that these effects affected patients' self-regulation behavior for at least 1 month after the consultation [3]. A large number of studies have shown that better communication with patients' results in increased patient satisfaction, greater medication adherence, and improved clinical outcomes [38], [39], [40] and [41]. Our study suggests that communication of illness representations and action plans does affect communication as a whole, but may also result in better self-regulation of patients. Future research should examine in further detail how provider communication techniques may increase patients' self-regulation behavior. A number of authors have pointed to obstacles that may threaten high quality patient provider communication. These include insufficient time allotted for consultations and competing incentives such as pressure to generate revenue [42] and [43]. Communication training has been proposed as an important factor to decrease the threat of insufficient time for consultation with patients [44]. Our study has demonstrated that a training program that includes the explicit discussion of self-regulation in terms of illness representations and action plans may be a promising area of future research. As other studies have shown that it may be difficult to retain training effects after some time (see [45] for an exception), it is especially important that GPs learn to recognize the benefits of their altered communication behavior. Finding that patients are better able to deal with their illness in terms of self-

regulation skills may prove a powerful reinforcement to maintain their altered communication behavior.

## 4.2. Conclusion

In conclusion, compared with care-as-usual communication the proportion of affective GP utterances was higher, and the patients contributed more to the conversation in both experimental conditions. In addition, it was found that when GPs changed their style of communication patients did accordingly, irrespective of patient characteristics. The explicit consideration of illness representations or action plans during medical consultation results in the improvement of patient–GP communication as it enables GPs to pay more attention to patients' concerns and psychosocial/lifestyle issues.

## 4.3. Practice implications

The findings of the present study are relevant for medical practice in two ways. First, it is important that general practitioners after only six hours of training were able to incorporate the skills to discuss illness representations or actions plans in regular consultations with patients, even though they showed some initial skepticism about the relevance of discussing psychosocial topics. Second, our study demonstrates that a relatively small change in the agenda of consulting with patients has a large impact on the way patient–provider communication proceeds. Together, our study shows promise for improving patient–provider communication about patients' illness representations and action plans, both factors that have demonstrated their relevance for affecting the way patients deal with their illness in previous research.

The authors confirm that all patient/personal identifiers have been removed or disguised so the patient/person(s) described are not identifiable and cannot be identified through the details of the story.

## REFERENCES

[1] H. Leventhal, M. Diefenbach and E.A. Leventhal, Illness cognition: using common sense to understand treatment adherence and affect cognition interactions, Cogn Ther Res 16 (1992), pp. 143–163.
[2] In: L.D. Cameron and H. Leventhal, Editors, The Self-regulation of Health and Illness Behavior, Routledge, NewYork (2003).
[3] N.C.M. Theunissen, D.T.D. De Ridder, J.M. Bensing and G.E.H.M. Rutten, Manipulation of patient–provider interaction: using the self-regulatory model of illness to discuss adherence, Patient Educ Couns 21 (2003), pp. 247–258.
[4] M.Z. Cohen, R.T. Tripp, C. Smith, B. Sorofman and S. Lively, Explanatory models of diabetes: patient practitioner variation, Soc Sci Med 38 (1994), pp. 59–66.
[5] C.G. Helman, Communication in primary care: the role of patient and practitioner explanatory models, Soc Sci Med 20 (1985), pp. 923–931.
[6] M.S. Hagger and S. Orbell, A meta-analytic review of the common-sense model of illness representations, Psych Health 18 (2003), pp. 141–184.
[7] M. Heijmans, Cognitive representations of chronic disease: an empirical study among patients with chronic fatigue syndrome and Addison's disease, Utrecht University, Utrecht (1998).
[8] R. Horne, Representations of medication and treatment: advances in theory and measurement. In: K.J. Petrie and J. Weinman, Editors, Perceptions of health and illness: current research and applications, Harwood Academic Publishers, Singapore (1997), pp. 155–188.
[9] H. Leventhal, D.R. Nerenz and D.J. Steele, Illness representations and coping with health threats. In: A. Baum, S.E. Taylor and J.E. Singer, Editors, Handbook of psychology and health, vol. IV. Social psychological aspects of health, Erlbaum, Hillsdale, NJ (1984), pp. 219–252.
[10] M. Scharloo and A. Kaptein, Measurement of illness perceptions in patients with chronic somatic illness: a review. In: K.J. Petrie and J.A. Weinman, Editors, Perceptions of health and illness, Harwood Academic Publishers, Reading (1997), pp. 103–154.
[11] K. Insel, P.M. Meek and H. Leventhal, Differences in chronic illness representation among pulmonary patients and their providers, J Health Psych 10 (2005), pp. 147–162.
[12] W. Levinson, W.B. Stiles, T.S. Inui and R. Engle, Physician frustration in communicating with patients, Med Care 31 (1993), pp. 285–295.

[13] R. Horne and J. Weinman, Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness, J Psychosom Res 47 (1999), pp. 555–567.
[14] R. Horne and J. Weinman, Predicting treatment adherence: an overview of theoretical models. In: L.B. Myers and K. Midence, Editors, Adherence to treatment in medical conditions, Harwood Academic Publishers, Amsterdam (1998), pp. 25–50.
[15] D. Meyer, H. Leventhal and M. Gutmann, Common-sense models of illness: the example of hypertension, Health Psychol 4 (1985), pp. 115–135.
[16] Y. Gidron, Adherence in hypertension and coronary heart disease. In: L.B. Myers and K. Midence, Editors, Adherence to treatment in medical conditions, Harwood Academic Publishers, Amsterdam (1998), pp. 473–496.
[17] L. Lisper, D. Isacson, P.O. Sjoden and K. Bingefors, Medicated hypertensive patients' views and experience of information and communication concerning antihypertensive drugs, Patient Educ Couns 32 (1997), pp. 147–155.
[18] Walma EP, Grundmeijer HGLM, Thomas S, Prins A, Van der Hoogen JPH, Van der Laan J. NHG-Standaard Hypertensie [Dutch protocol for treating hypertension in primary care] Huisarts en Wetenschap. 1997;40:598–617.
[19] E. Arborelius, Using doctor-patient communication to affect patients' lifestyles. Theoretical and practical implications, Psychol Health 11 (1996), pp. 845–855.
[20] K.I. Kjellgren, S. Svensson, J. Ahlner and R. Säljö, Antihypertensive medication in clinical encounters, Int J Cardiol 64 (1998), pp. 161–169.
[21] A. Van de Brink-Muinen, P. Verhaak, J. Bensing, O. Bahrs, M. Deveugele, L. Gask, F. Leiva, N. Mead, V. Messerli and L. Oppizzi, Doctor–patient communication in different European health care systems: relevance and performance from the patients' perspective, Patient Educ Couns 39 (2000), pp. 115–127.
[22] D.L. Roter, The Roter method of interaction process analysis, Johns Hopkins University, Baltimore (1989).
[23] A.M. Van Dulmen, P.F.M. Verhaak and H.J.G. Bilo, Shifts in doctor–patient communication during a series of outpatient consultations in non-insulin-dependent diabetes mellitus, Patient Educ Couns 30 (1997), pp. 227–237.
[24] L.M.L. Ong, M. Visser, I.P.M. Kruyver, J. Bensing, A. Van de Brink-Muinen, J. Stouthard, F. Lammes and J. De Haes, The Roter interaction analysis system (RIAS) in oncological consultations: psychometric properties, Psychooncology 7 (1998), pp. 387–401.
[25] S. Ford, L. Fallowfield and S. Lewis, Doctor–patient interactions in oncology, Soc Sci Med 42 (1996), pp. 1511–1519.
[26] J.M. Bensing, J.J. Kerssens and M. Van der Pasch, Patient-directed gaze as a tool for discovering and handling psychosocial problems in general practice, J Nonverbal Behav 19 (1995), pp. 223–242.
[27] GLM. Univariate and multivariate, statistical support – algorithms [SPSS website]. Available at: http://www.spss.com/tech/stat/Algorithms.html; April 24, 2003 [accessed May 5, 2003].
[28] A. Gifi, Nonlinear multivariate analysis, Wiley, Chichester (1990).
[29] CATPCA. Statistical support – algorithms [SPSS website]. Available at: http://www.spss.com/tech/stat/Algorithms.html; September 12, 2001 [accessed May 5, 2003].
[30] J.J. Meulman and W.J. Heiser, Inc. S. SPSS categories, SPSS Inc., Chicago (1999).
[31] N.C.M. Theunissen, J.J. Meulman, A.L. Den Ouden, H.M. Koopman, E. Verrips, S.P. Verloove-Vanhorick and J. Wit, Changes can be studied when the measurement instrument is different at different time points, Health Serv Outcome Res Meth 4 (2003), pp. 109–126.
[32] D.L. Roter, The outpatient medical encounter and elderly patients, Clin Geriatr Med 16 (2000), pp. 95–107.
[33] S. Greenfield, S.H. Kaplan and J.E.J. Ware, Patients' participation in medical care: effects on blood sugar control and quality of life in diabetes, J Gen Intern Med 3 (1988), pp. 448–457.
[34] D.J. Cegala, L. McClure, T.M. Marinelli and D.M. Post, The effects of communication skills training on patients' participation during medical interviews, Patient Educ Couns 41 (2000), pp. 209–222.
[35] D.J. Cegala, A study of doctors' and patients' communication during a primary care consultation: implications for communication training, J Health Commun 2 (1997), pp. 169–194.
[36] J.M. Bensing, D.L. Roter and R.L. Hulsman, Communication patterns of primary care physicians in the United States and The Netherlands, J Gen Inter Med 18 (2003), pp. 335–342.
[37] J.M. Bensing, P.F.M. Verhaak, A.M. Van Dulmen and A.P.H. Visser, Communication: the royal pathway to patient-centered medicine, Patient Educ Couns 39 (2000), pp. 1–3.
[38] J.B. Brown, M. Boles, J.P. Mullooly and W. Levinson, Effects of clinician communication skills training on patient satisfaction, Ann Int Med 131 (1999), pp. 822–829.

[39] P. Franks, A.F. Jerant, K. Fiscilla, C.G. Shields, D.J. Tancredi and R.M. Epstein, Studying physician effects on patient outcomes. Physician interactional style and performance on quality of care indicators, Soc Sci Med 62 (2006), pp. 422–432.
[40] S.J. Griffin, A. Kinmonth, M.W.M. Veltman, S. Gillard, J. Grant and M. Stewart, Effects on health-related outcomes of interventions to alter the interaction between patients and practitioners: a systematic review of trials, Ann Fam Med 2 (2004), pp. 595–608.
[41] M.A. Stewart, Effective physician–patient communication and health outcomes: a review, CMAJ 152 (1995), pp. 1423–1433.
[42] I. Morrison and R. Smith, Hamster health care [Editorial], BMJ 321 (2000), pp. 1541–1542.
[43] J.G. Howie, D.J. Heaney, M. Maxell, J.J. Walker, G.K. Freeman and H. Rai, Quality at general practice consultations cross sectional survey, BMJ 319 (1999), pp. 738–743.
[44] S.J. Weiner, B. Barnet, T.L. Cheng and T.P. Daaleman, Processes for effective communication in primary care, Ann Int Med 142 (2005), pp. 709–714.
[45] N.M. Clark, M. Gong, M.A. Schork, N. Kaciroti, D. Evans, D. Roloff, M. Hurwitz, L.A. Maiman and R.B. Mellins, Long-term effect of asthma education for physicians on patient satisfaction and use of health services, Eur Respir J 16 (2000), pp. 15–21.

## FIGURES AND TABLES

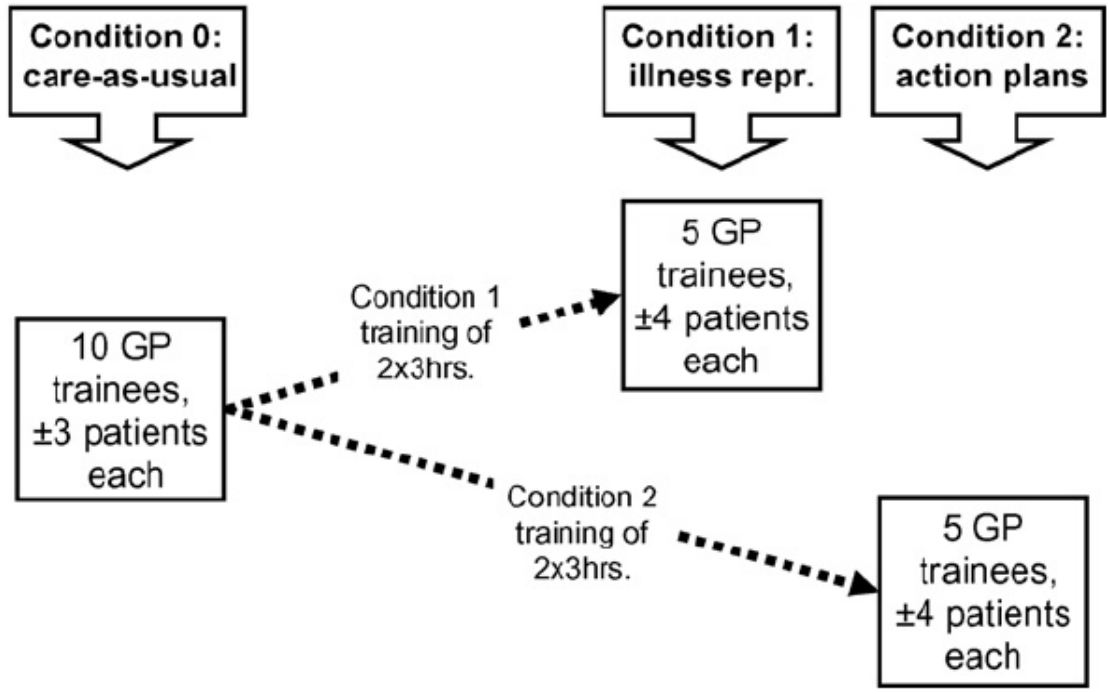



Fig. 1. Experimental design of the study.

Table 1
Distribution of patient characteristics amongst the three conditions

| | Condition 0, care-as-usual | Condition 1, illness representations | Condition 2, action plans |
|---|---|---|---|
| | *N* (%)[a] | *N* (%) | *N* (%) |
| Observed consultations | 31 | 20 | 19 |
| Sex | | | |
| Female | 17 (55) | 12 (60) | 10 (53) |
| Age | | | |
| <55 years | 12 (39) | 6 (30) | 5 (26) |
| 55–65 years | 8 (26) | 8 (40) | 9 (48) |
| >65 years | 11 (35) | 6 (30) | 5 (26) |
| Duration anti-hypertensive medication | | | |
| 0.5–4 years | 9 (29) | 8 (40) | 6 (32) |
| 4–6 years | 13 (42) | 3 (15) | 8 (42) |
| >6 years | 9 (29) | 9 (45) | 5 (26) |
| Level of education[b] | | | |
| Low | 13 (42) | 11 (55) | 7 (37) |
| Medium | 10 (32) | 3 (15) | 6 (31) |
| High | 8 (26) | 6 (30) | 6 (32) |
| Living situation | | | |
| Alone | 4 (14) | 2 (10) | 5 (26) |
| With others | 24 (86) | 18 (90) | 14 (74) |
| Paid occupation | | | |
| None | 4 (13) | 3 (15) | 0 (0) |
| Retired | 17 (55) | 9 (45) | 5 (26) |
| Part-time | 6 (19) | 5 (25) | 6 (32) |
| Full-time | 4 (13) | 3 (15) | 8 (42) |
| | | *M* (S.D.) | *M* (S.D.) | *M* (S.D.) |
| Self-reported health (global health status measure)[c] | | 79 (18) | 73 (17) | 79 (10) |
| Self-reported adherence to medication prescriptions (MARS-5)[c] | | 96 (5) | 97 (4) | 94 (7) |
| Self-reported adherence to lifestyle recommendations (LARS-5)[c] | | 77 (21) | 77 (19) | 72 (19) |

[a] Percentage within condition; *M* = mean score, range 0–100, S.D. = standard deviation.
[b] Low = vocational education; medium = general secondary education; high = senior secondary and university education.
[c] Means were transformed to a 1–100 scale.

Table 2
Discussing illness representations and action plans, estimated marginal means (in % of total consultation length) and the standard deviations for three conditions

| Content** | Condition 0, care-as-usual | | Condition 1, illness representations | | Condition 2, action plans | | Contrasts between groups |
|---|---|---|---|---|---|---|---|
| | *M* | S.E. | *M* | S.E. | *M* | S.E. | |
| Identity* | 7.96 | 1.05 | 11.20 | 1.27 | 0.50 | 1.42 | (0 > 2, 1 > 2) |
| Time line* | 0.95 | 0.46 | 4.59 | 0.56 | 0.17 | 0.63 | (0 < 1, 1 > 2) |
| Consequences | 1.37 | 0.44 | 1.60 | 0.54 | 0.11 | 0.60 | |
| Cause* | 2.75 | 0.54 | 3.87 | 0.66 | 0.77 | 0.73 | (0 > 2, 1 > 2) |
| Medication* | 3.70 | 1.02 | 9.10 | 1.23 | 0.00 | 1.38 | (0 < 1, 0 > 2, 1 > 2) |
| Action plans* | 5.48 | 1.48 | 9.29 | 1.79 | 11.71 | 2.00 | (0 < 2) |

* Significant difference between groups using univariate tests from multivariate GLM.
** Significant difference between groups using multivariate GLM: hyp df = 12, error df = 106, $F = 5.4$, $p < .001$.

Table 3
Overall consultation characteristics, estimated marginal means[a] (in % of total frequency) and the standard errors for three conditions

| | Condition 0, care-as-usual | | Condition 1, illness representation | | Condition 2, action plans | | Contrasts between groups |
|---|---|---|---|---|---|---|---|
| | *M* | S.E. | *M* | S.E. | *M* | S.E. | |
| Consultation length (min)* | 10.47 | 0.84 | 16.94 | 1.02 | 18.09 | 1.12 | (0 < 1, 0 < 2) |
| Total utterances* | 251.15 | 27.41 | 427.33 | 33.13 | 457.35 | 36.21 | (0 < 1, 0 < 2) |
| %[b] patient-directed gaze* | 67.77 | 2.79 | 85.30 | 3.37 | 83.92 | 3.79 | (0 < 1, 0 < 2) |
| Multivariate test** | | | | | | | |
| % utterances GP* | 55.88 | 0.94 | 48.91 | 1.13 | 51.00 | 1.24 | (0 > 1, 0 > 2) |
| % utterances patient* | 44.12 | 0.94 | 51.10 | 1.13 | 49.00 | 1.24 | (0 < 1, 0 < 2) |
| Multivariate test# | | | | | | | |
| % affective utterances GP* | 21.53 | 0.90 | 26.43 | 1.09 | 28.97 | 1.19 | (0 < 1, 0 < 2) |
| % instrumental utterances GP* | 34.35 | 1.41 | 22.49 | 1.70 | 22.03 | 1.86 | (0 > 1, 0 > 2) |
| % affective utterances patient* | 16.03 | 0.88 | 11.64 | 1.06 | 9.94 | 1.16 | (0 > 1, 0 > 2) |
| % instrumental utterances patient* | 28.09 | 1.29 | 39.45 | 1.56 | 39.07 | 1.71 | (0 < 1, 0 < 2) |

[a] Estimated marginal means were calculated with GLM using correction for covariates.
[b] % of total utterances.
* Significant difference between groups using univariate tests from multivariate GLM.
** Significant difference between groups using multivariate GLM: hyp df = 2, error df = 58, $F = 11.8$, $p < .001$.
# Significant difference between groups using multivariate GLM: hyp df = 6, error df = 114, $F = 6.7$, $p < .001$.

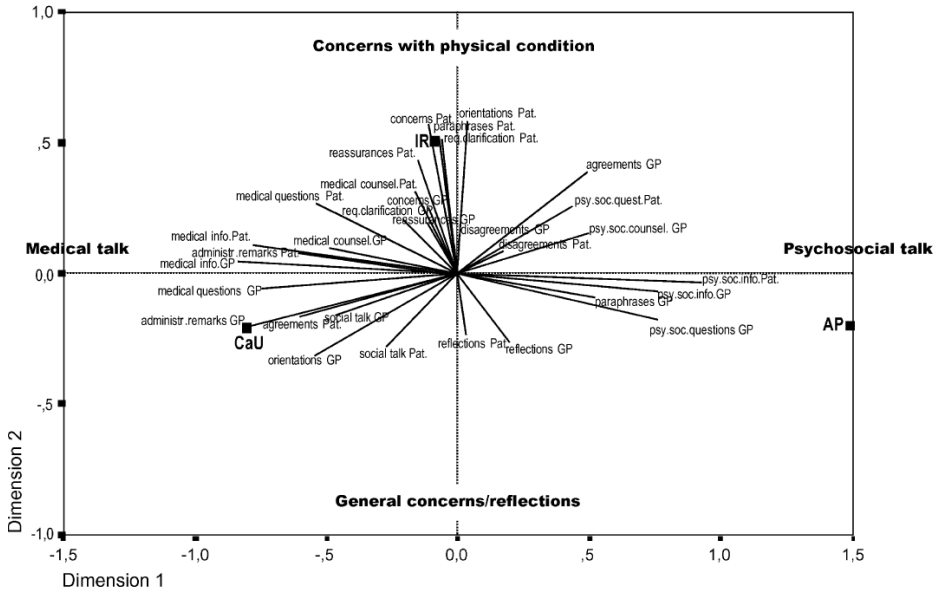
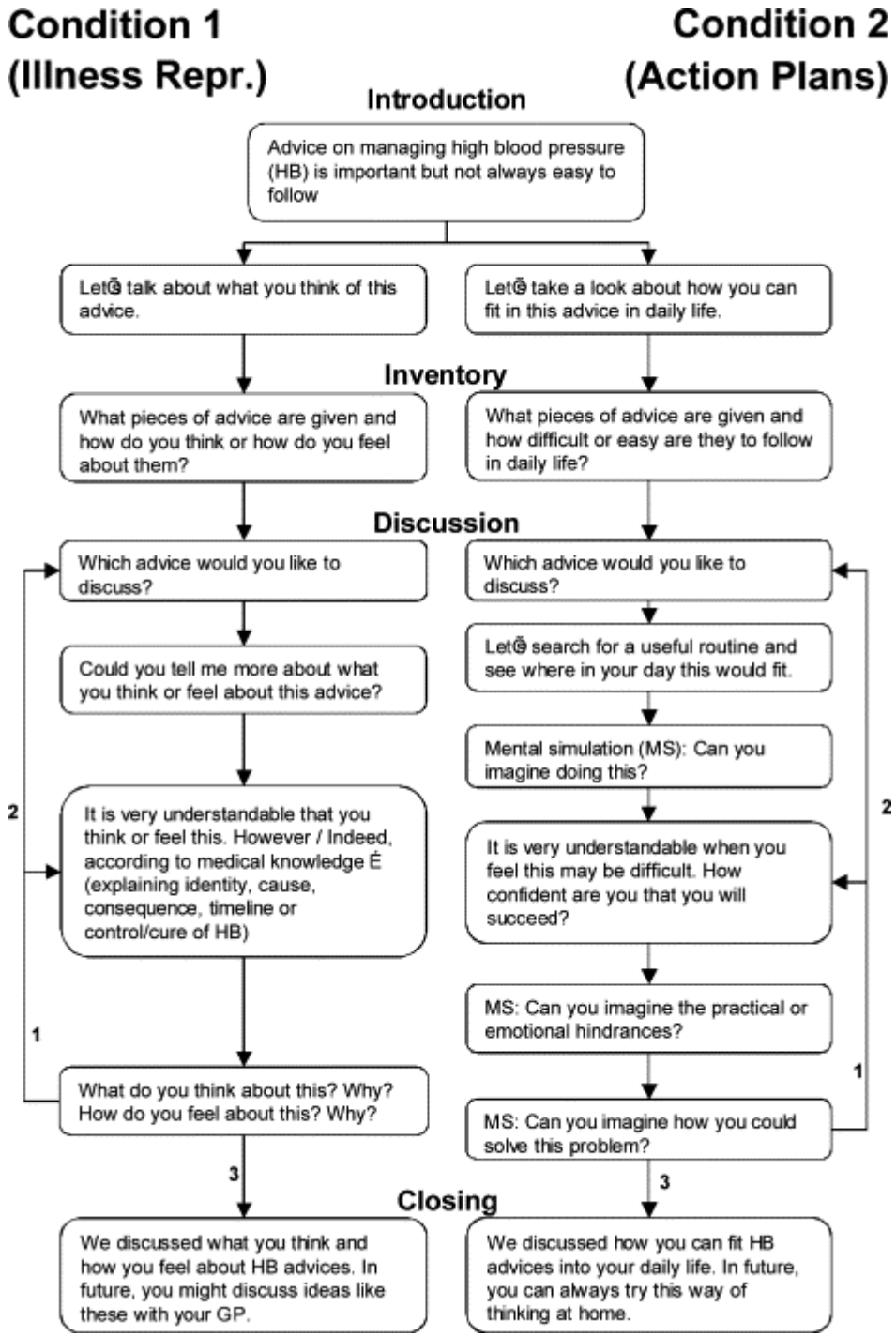



Fig. 2. Relationships between patients' and GPs' communication categories according to principal component analysis. Dimension 1 represents 'Medical talk' vs. 'Psychosocial talk'. Dimension 2 represents 'concerns with physical condition' vs. 'general concerns/reflections'. The terms in the graph represent the position of the variables on both dimensions. CaU, care-as-usual condition (Condition 0); IR, discussing illness representations (Condition 1); AP, discussing action plans (Condition 2): these terms represent the scores on both dimensions in terms of the three conditions.

**APPENDIX A.**


Condition 1
(Illness Repr.)
Condition 2
(Action Plans)
Introduction
Advice on managing high blood pressure (HB) is important but not always easy to follow
Let's talk about what you think of this advice.
Let's take a look about how you can fit in this advice in daily life.
Inventory
What pieces of advice are given and how do you think or how do you feel about them?
What pieces of advice are given and how difficult or easy are they to follow in daily life?
Discussion
Which advice would you like to discuss?
Which advice would you like to discuss?
Could you tell me more about what you think or feel about this advice?
Let's search for a useful routine and see where in your day this would fit.
Mental simulation (MS): Can you imagine doing this?
2
It is very understandable that you think or feel this. However / Indeed, according to medical knowledge É (explaining identity, cause, consequence, timeline or control/cure of HB)
It is very understandable when you feel this may be difficult. How confident are you that you will succeed?
2
MS: Can you imagine the practical or emotional hindrances?
1
1
What do you think about this? Why? How do you feel about this? Why?
MS: Can you imagine how you could solve this problem?
3
3
Closing
We discussed what you think and how you feel about HB advices. In future, you might discuss ideas like these with your GP.
We discussed how you can fit HB advices into your daily life. In future, you can always try this way of thinking at home.

## APPENDIX B. DISCUSSING ILLNESS REPRESENTATIONS AND ACTION PLANS (DIRAP) CLUSTERS; OPERATIONALISATIONS AND EXAMPLES

| Content | Operationalisation | Examples |
|---|---|---|
| Identity | Discussing the patients disease label and associated knowledge and emotions | GP: "Do you connect headache to your high blood pressure?" P: "Yes, but I didn't experience any symptoms lately. This high blood pressure frightens me" |
| Time line | Discussing patients beliefs about course of the disease | P: "I think I will never get better" GP: "That might be correct, most people keep this disorder" |
| Consequences | Discussing the effects of the disease on the patients life | GP: "Are you worried about the consequences of your high blood pressure?" P: "I am afraid to get a heart attack" |
| Cause | Discussing patients beliefs about what caused the disease (e.g., degree of personal responsibility) | P: "No wonder my blood pressure is high, I worked too hard this week". GP: "But according to medical knowledge temporary work stress does not relate to chronic high blood pressure" |
| Control/cure | Discussing patients beliefs about the possibility to control or cure the disease | GP: "You can control your blood pressure, don't you think?" P:"I thought so, but not any more" |
| Medication | Discussing patients' beliefs about medication prescriptions | P: "I don't want to get addicted to these pills". GP: "Don't worry, the chemicals used in high blood pressure medicine do not cause addiction" |
| Lifestyle recommendations | Discussing patients beliefs about lifestyle recommendations | GP: "It will help if you lose weight, what do you think about that?" P: "I can not change my weight, even if I want" |
| Action plans | Discussing patients' daily routines that might hinder or facility performing an activity; using mental simulation of situation | P: "When I watch TV I forget to take my medication". GP: "What would be a better time for you to take them? Can you imaging this situation?" |

[1] Intra-class correlations (ICCs) were calculated using (co)variances with maximum likelihood estimation. ICCs with the random factor 'GP' proved non-significant and were not substantial (mean .08; all < .16).