

Postprint Version	1.0
Journal website	http://www.pec-journal.com/article/S0738-3991(13)00214-0/abstract
Pubmed link	http://www.ncbi.nlm.nih.gov/pubmed/23786807
DOI	10.1016/j.pec.2013.05.014

This is a NIVEL certified Post Print, more info at <http://www.nivel.eu>

Nonverbal communication and conversational contribution in breast cancer genetic counseling: Are counselors' nonverbal communication and conversational contribution associated with counsees' satisfaction, needs fulfillment and state anxiety in breast cancer genetic counseling?

HENRIËTTA DIJKSTRA ^A, AKKE ALBADA ^{B,*}, CHRISTINA KLÖCKNER CRONAUER ^C, MARGREET G.E.M. AUSEMS ^B, SANDRA VAN DULMEN ^{A,D,E}

^a Netherlands Institute for Health Services Research (NIVEL), Utrecht, The Netherlands

^b Department of Medical Genetics, University Medical Centre Utrecht, Utrecht, The Netherlands

^c University of Neuchatel, Neuchatel, Switzerland

^d Department of Primary and Community Care, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

^e Department of Health Sciences, Buskerud University College, Drammen, Norway

ABSTRACT

Objective: The current study aimed to examine how counselors' nonverbal communication (i.e. nonverbal encouragements and counselee-directed eye gaze) and conversational contribution (i.e. verbal dominance and interactivity) during the final visit within breast cancer genetic counseling relate to counselee satisfaction, needs fulfillment and anxiety.

Methods: Breast cancer counsees (N = 85) completed questionnaires measuring satisfaction, needs fulfillment and anxiety after the final consultation and anxiety before the initial visit. Consultations were videotaped. Counselor nonverbal encouragements and counselee-directed eye gaze were coded. Verbal dominance and interactivity were measured using the Roter Interaction Analysis System (RIAS). **Results:** More counselor nonverbal encouragements and higher counselor verbal dominance were both significantly related to higher post-visit anxiety. Furthermore, counselor verbal dominance was associated with lower

perceived needs fulfillment. No significant associations with eye gaze and interactivity were found.

Conclusion: More research is needed on the relationship between nonverbal encouragements and anxiety. Given the unfavorable association of counselor verbal dominance with anxiety and needs fulfillment, more effort could be devoted to involve counselees in the dialog and reduce the counselor's verbal contribution during the consultation.

Practice implications: Interventions focused on increasing counselees' contribution in the consultation may be beneficial to counselees.

INTRODUCTION

The medical consultation is a communicative event in which clinicians and patients exchange information, build a trusting relationship and make health-related decisions [1]. Apart from verbal communication, clinicians and patients use nonverbal behavior to communicate. Nonverbal behavior (e.g. head movements and eye gaze) is widely recognized as conveying affective and emotional information although it has other functions as well such as regulating turn-taking in conversation [2,3] and communicating dominance [4]. It is claimed that more than half of the meaning in human encounters is communicated nonverbally [5] which suggests that nonverbal behavior plays an important role in the medical encounter. Indeed, nonverbal behavior has been found to influence clinically relevant outcomes such as patient satisfaction and adherence [2] in either a facilitating or inhibiting way [6]. Most research on physician nonverbal communication during clinical interactions has focused on patient satisfaction. Although physicians' nonverbal communication is unlikely to immediately affect patient physical or mental health, it may lead to changes in health (e.g. adherence, self-management skills and social support) that are mediated through patient satisfaction [7–9]. More nodding [2,10,11], smiling [11] and eye contact with the patient [2,10–13] were found to be related to higher patient satisfaction.

Another aspect of interaction that seems to influence patient satisfaction is the conversational contribution (i.e. verbal dominance and interactivity). The individual with the most utterances in the consultation is called verbally dominant and this is mostly the physician [14]. However, physician verbal dominance has clearly shown to influence patient satisfaction negatively [15–18]. Also, more interactivity, i.e. the number of turns during the consultation, was shown to be significantly related to receiving more tailored information from the physician and higher satisfaction, but evidence is limited to a study with simulated clients [14]. With higher interactivity there is ample opportunity for patients to express their views which enhances satisfaction [1,19].

Although there is a substantial body of evidence indicating that health care providers' nonverbal communication and conversational contribution influence satisfaction with the medical consultation, these aspects have received little attention so far in breast cancer genetic counseling. In genetic counseling the main goals are promoting counselees' health-enhancing behaviors, enhancing accurate risk perception, facilitating adaptation to genetic risk and preventing disease [20]. These

goals can be reached only through communication of complex, probabilistic and uncertain genetic information [20–22]. In this subtle process nonverbal communication should not be overlooked and should be related to counselee satisfaction, but also to more relevant and sensitive, counselee reported outcomes such as the perceived fulfillment of needs and anxiety.

As opposed to satisfaction, needs fulfillment questionnaires are disease-specific and assess counsees' experiences with how needs were addressed [23]. Currently, needs fulfillment is an under-researched visit outcome in genetic counseling [24,25]. Needs fulfillment was shown to be associated with higher levels of perceived personal control and lower anxiety [26]. Many counsees report high anxiety [27] which may exert a profound influence on visit outcomes, such as recall and decision making [28]. Physicians' communication style can moderate patients' anxiety [29]. Especially, patient-centered and facilitative styles, including affective communication (e.g. empathy), were found to be effective in reducing a patient's anxiety. As nonverbal behavior is seen as essential in conveying affective information [2] and affective communication is an important counselee need [30], nonverbal behavior might also be associated with anxiety and needs fulfillment. Facilitative styles involve counselor's attempts to engage the counselee more fully in the dialog [29], thus higher interactivity and lower verbal dominance could be related to reduced counselee anxiety. However, the associations of nonverbal behaviors, dominance and interactivity with needs fulfillment and anxiety are unstudied yet. To our knowledge, nonverbal communication is only studied in relation with counselee satisfaction, anxiety and needs fulfillment in the first visits for cancer genetic counseling [25]. Results suggest that there is no relationship with counselee satisfaction and needs fulfillment. However, longer counselor eye gaze did appear to be related to higher anxiety scores. Research on counselors' dominance and interactivity has furthermore shown that in genetic counseling counselors' speak more than clients [24,31,32]. The visits might have to become more interactive to facilitate discussion of counsees' views [33], to enhance their understanding [24,31] and to better fulfill needs. A recent review [34] suggests that lower levels of counselor verbal dominance are associated with more satisfaction. However, these results were based on simulated first consultations. Final visits are fundamentally different as these aim to increase accurate risk perception and adherence to preventive recommendations, whereas the goal of the first visit is to educate counsees about hereditary breast cancer for them to make an informed choice about DNA-testing [20,31,34]. How counsees think and feel after the final visit influences their subsequent cognitions and behavior, e.g. surveillance behavior [35]. To our knowledge, there are no studies on nonverbal behavior, verbal dominance and interactivity in final genetic consultations and its impact on the outcomes. Therefore, we will study nonverbal encouragement (i.e. smiling, nodding and shaking head), eye gaze, verbal dominance and interactivity in these visits and explore relations with visit outcomes (i.e. counselee satisfaction, anxiety and needs fulfillment).

2. METHODS

2.1. Participants

Participating counsees were recruited from the department of Medical Genetics of the University Medical Center (UMC) Utrecht. This department offers breast cancer

genetic counseling according to the Dutch guidelines [36]. Counselees enrolled from February 2008 to April 2010. Counselees who were aged 18 years or older, female and the first in their family to request breast cancer genetic counseling were sent study information and an opt-out form. Counselees were ineligible when they lacked Internet or e-mail access.

The study was approved by the medical ethical committee of UMC Utrecht and is registered in the Dutch Trial Register (ISRCTN82643064). Data were gathered as part of a randomized controlled trial (RCT) on the effects of a pre-visit tailored website on genetic counseling outcomes in which participants were randomized to receive usual care or usual care plus an educational website [37,38]. In the current study, this group allocation was controlled for.

2.2. Response

During 27 months, 336 eligible counselees received information about the study and 197 were willing to participate. The response rate was 58.6%. Almost half of the decliners gave a reason (43.9%). Most preferred the visit not to be videotaped (65.7%). Of the 197 participants, 96 (48.7%) had a follow-up consultation which was videotaped. The present study focuses on these final visits. 11 counselees were videotaped but failed to fill in the questionnaires, so the present sample exists of 85 participants (see Fig. 1).

2.3. Procedure

Genetic counseling usually consists of one or two consultations. In the initial consultation the counselees' pedigree and details about family history of cancer are discussed [33]. Furthermore, information on hereditary breast cancer, inheritance and DNA-testing is given [31]. If there is an indication for a DNA-test for the counselee or an affected relative and the counselees proceed with testing, a blood sample will be drawn [33]. The test results and cancer risk estimates are discussed in a follow-up consultation 4–6 months later. The consultations were videotaped. Mostly, recordings showed counselors' full face and counselees from behind. Before the initial visit, counselees completed a questionnaire on anxiety. After the final visit, they completed a questionnaire on satisfaction, needs fulfillment and state anxiety.

2.4. Measures

2.4.1. Counselee characteristics

Counselees' breast cancer disease status and risk to (re-) develop breast cancer (visual analog scale from 0 to 100%) were registered by the counselor after the final visit. When this risk was revised later on, we copied this from the medical file. DNA-test results were collected from the medical files and other counselee characteristics (Table 1) from the baseline counselee questionnaire.

[FIGURE 1]

2.4.2. Satisfaction

Satisfaction with counseling was measured with the Patient Satisfaction Questionnaire [PSQ; 39]. The PSQ consists of six items assessed on a visual analog scale anchored by 'not at all satisfied' (0) and 'extremely satisfied' (100). Items

assess the satisfaction with the level of shared decision-making, the counselee's needs being addressed, the counselee's involvement, information and emotional support received and the interaction in general. The Cronbach's alpha of the scale was .92.

2.4.3. Needs fulfillment

[TABLE 1]

Post-counseling, perceived needs fulfillment was measured using a counselee-centered instrument, the QUOTE-geneca (the quality of counseling through counsees' eyes scale for cancer genetic counseling) [30]. Evaluation scores for how well a need was addressed range from 1 to 4 (inadequate, not really adequate, adequate, more than adequate) with high scores indicating high fulfillment. The QUOTE-geneca includes four generic needs, which refer to what a counselor should do during counseling (25 items) and four cancer genetic information needs, which refer to receiving explanations on hereditary cancer (19 items). The four generic needs include procedural aspects of counseling, counselor's sensitive communication, emotional support and assessment of susceptibility to disease. The four cancer-specific needs are determination and meaning of carrying a cancer gene, (emotional) aspects of counseling for counselee and family, counsees' risk of developing cancer and heredity of cancer in general. The mean score of all items was calculated. The Cronbach's alpha was .97.

2.4.4. Anxiety

Anxiety was assessed before the initial visit and approximately one week after the final visit with the State version of the Dutch shortened 10-item version of the State-Trait Anxiety Inventory [STAI; 40–42]. Scores range from 10 to 40, higher scores indicating greater anxiety. The Cronbach's alpha was .92. Scores 2:22 indicate high anxiety [42].

2.5. Verbal and nonverbal coding

Verbal and nonverbal utterances were coded by two coders with Observer (Noldus Information Technology). Verbal communication was coded with the Roter Interaction Analysis System (RIAS) [43]. Verbal dominance and interactivity were measured using the RIAS-codes. Indicators of nonverbal encouragement (i.e. smiling, nodding and shaking head) and counselee-directed eye gaze were scored in a separate run. Counselors' nonverbal encouragements were relevant as minimal reinforcers with the intention to invite the counselee to express herself and were therefore only coded when the counselee was talking. Shaking head was only coded when it was observed to have a supportive function. When counselors smile, nod and shake their head when they are talking, the behaviors serve to support their words spoken and these were not coded.

As some counselors were still in training a second counselor was present in a few consultations. When two counselors were present, utterances were added to calculate the counselors' verbal dominance. Similarly, utterances of a companion were added to those of the counselee. Smiling, nodding, shaking head and eye gaze of the main counselor were used for the analyses, because the second counselor's role was to

guide the first counselor and he or she might be less attentive to the counselee. In one consultation eye gaze was coded for two counselors as their verbal contribution was approximately equal. We corrected for this by dividing the total amount of eye gaze by two. In another consultation, eye gaze and nonverbal encouragements could not be coded as the counselor's face was not on the video and in one consultation eye gaze could not be coded for a part of the consultation.

2.5.1. Nonverbal encouragements, eye gaze, verbal dominance and interactivity

Counselor nonverbal encouragement was measured as the sum of the standardized behaviors smiling, nodding, and shaking head. There were on average 13 smiles (SD = 9.7), 52 head nods (SD = 37.4) and 7 (SD = 6.8) head shakes per consultation. Counselee-directed eye gaze was calculated as the total seconds of eye gaze divided by the length of consultation x 100. Eye gaze was operationalized as the proportion of gaze relative to consultation length because of large variation in consultation duration and because of multicollinearity between the total duration of eye gaze and nonverbal encouragements. Eye gaze is measured apart from the nonverbal encouragements as this allows us to compare the study results with other research in cancer genetic counseling [25]. Verbal dominance was measured as the number of utterances from the counselor divided by the total number of utterances in the consultation x 100. Interactivity was calculated as the mean number of turns between the counselor(s) and counselee(s) per minute [14]. The next turn starts when the other speaker begins with an utterance other than an agreement or a backchannel. Backchannels are minimal prompts like 'Mmmmh' and 'Right' [44] which encourage the other to talk further.

2.6. Inter- and intra-rater reliability

To calculate the inter-rater reliability (intra class correlation, ICC) for the independent variables, both coders coded 7% of the consultations and a third coder also coded these. Inter-rater reliability was on average .77 for nonverbal encouragements (range = .69–.88), .97 for eye gaze (range = .96–.98), .70 for verbal dominance (range = .65–.78) and .93 for interactivity (range = .90–.96). Additionally, the main coder double coded 7% of her own observations. Intra-rater reliability (ICC) was on average .96 for nonverbal encouragements (range = .93–.98), .99 for eye gaze, .98 for verbal dominance and .97 for interactivity. Because verbal dominance and interactivity were calculated based on the RIAS coding, inter- and intra-rater reliability coefficients were calculated for the frequency of all RIAS categories (e.g. backchannel, paraphrase, give information, etc.) with mean occurrence >2% [2]. Inter-coder reliability coefficients for these RIAS categories of counselee utterances averaged .84 (range = .51–.99) and for the RIAS categories of counselor utterances .88 (range = .39–.99). Intra-coder reliability coefficients (ICC) averaged .97 (range = .94–.99) for counselee categories and .95 (range = .75–1) for counselor categories.

2.7. Analysis

To account for the multilevel structure of counsees (level 1) nested within counselors (level 2), multilevel regression analyses with random intercepts were

conducted. The percentage of variance explained (ICC) at the counselor level in the null model ranged from 0 for post-visit anxiety to 16.7 for satisfaction. Analyses were controlled for disease status, breast cancer risk as estimated and communicated by the counselor and RCT group allocation. For analyses on anxiety the control variable of group allocation was replaced by baseline anxiety, because of power. Analyses on needs fulfillment were not controlled for need importance scores as our data and prior research showed that the fulfillment was unrelated to these scores [25]. All analyses were conducted using Stata 11. Multilevel regression analyses were conducted in two steps. First, control variables were included in a model. Second, nonverbal encouragements, counselee-directed eye gaze, verbal dominance and interactivity were added to the model. Additionally, the two models were compared to each other with the likelihood-ratio test. Two-sided tests of significance were performed and results were considered statistically significant when $p < .05$.

3. RESULTS

3.1. Counselees' and counselors' characteristics

Counselees' mean age was 44.8 years (SD = 12.0). Further information on counselee characteristics is shown in Table 1. All fourteen breast cancer genetic counselors of the department participated. Thirteen of them had one or more final consultations; they recorded 1–16 final consultations each. Counselors were clinical geneticists (N = 3), clinical geneticists in training (N = 4), genetic counselors (N = 3) or genetic counselors in training (N = 3). The counselors aged on average 36.2 years (SD = 9.0; min = 26; max = 53) and most were female (2 male).

3.2. Correlations and descriptive statistics

Table 2 shows the correlation matrix for the variables. Nonverbal encouragements were positively correlated with counselee-directed eye gaze and post-visit anxiety, and negatively to verbal dominance. Satisfaction was positively correlated with needs fulfillment. Post-visit, counselees had an average state anxiety score of 18 (Table 3) indicating anxiety scores comparable with the general Dutch population [45]. 23 (27.4%) of the counselees were highly anxious, i.e. scored ≥ 22 .

3.3. The communication variables and satisfaction

[TABLE 2]

As shown in Table 4, none of the independent variables was significantly associated with counselee satisfaction.

3.4. The communication variables and needs fulfillment

Table 4 shows that higher counselors' verbal dominance is associated with lower perceived needs fulfillment ($b = -.24$, $p = .047$). The likelihood-ratio test showed that adding the independent variables to the model did not significantly improve the fit of the model, compared to a model that contains just the control variables ($\chi^2(4) = 4.82$, $p = .31$).

3.5. The communication variables and state anxiety

As shown in Table 4, counselors' nonverbal encouragement was associated with higher post-visit anxiety ($b = .23, p = .02$). Furthermore, counselors' verbal dominance was associated with higher post-visit anxiety ($b = .28, p = .00$). The likelihood-ratio test showed that adding the independent variables to the model as predictor variables resulted in a statistically significant improvement in model fit, compared to a model that only contains control variables ($\chi^2(4) = 14.47, p = .01$).

[TABLE 3]

4. DISCUSSION AND CONCLUSION

4.1. Discussion

[TABLE 4]

This study aimed to explore associations between understudied communication variables and evaluative or affective outcome measures. Results suggest that counselors' nonverbal encouragements during the final breast cancer genetic counseling consultations are positively related to counselee anxiety. Furthermore, it was found that higher counselor verbal dominance is associated with higher post-visit counselee anxiety and lower needs fulfillment. Thus, while nonverbal encouragements and verbal dominance are negatively related, both variables are associated with higher anxiety. As an explanation, both counselors who use many nonverbal encouragements and highly verbally dominant counselors increase feelings of anxiety. Different needs concerning physicians' communication style based on anxiety were reported in general practitioner consultations [46]. It is thus important for counselors to adapt their communication to the counselees' characteristics and preferences [47].

One might expect that showing nonverbal encouragements reduces anxiety as its' supposed function is showing interest and understanding [13]. However, in the current study the reverse was found. In fact, early research has shown that physicians with a highly expressive nonverbal style were perceived negatively by their patients [48]. Very animated physicians might appear overly intense or worried to patients, thus raising their anxiety. Alternatively, cause and effect could be reversed, i.e., counselee anxiety is acknowledged through nonverbal encouragements and therefore counselors increased their nonverbal encouragements. Counselors might have noticed feelings of anxiety and as a consequence have shown more nonverbal facilitators to encourage the counselee to talk about her concerns. Another possible explanation is that consultations with many nonverbal encouragements might differ in content from consultations with less nonverbal encouragements. A higher risk communicated in the visit was associated with higher anxiety and more psychosocial talk ($r = .55, p = .00$), while psychosocial talk was associated with both eye gaze ($r = .27, p = .01$) and nonverbal encouragements ($r = .78, p = .00$; post hoc analyses). Indeed, eye gaze was shown to be related to discussing psychosocial topics before [13,24]. Moreover, discussing emotional matters does not reduce anxiety, even less so if counselees' anxious feelings are addressed as being legitimate [25]. Therefore,

many nonverbal encouragements may be the result rather than the cause of a heightened anxiety level. However, because of power problems we could not include the amount of psychosocial talk in the regression analyses.

In the present study, counselor verbal dominance increased counselee post-visit anxiety and lowered needs fulfillment. If the counselor is verbally dominant little room is left for counsees to ask questions and initiate discussions on topics of counsees' interest. Verbal dominance may have led to counselee submissiveness and reduced engagement [49] with heightened anxiety as a consequence. However, a previous study found that counselors provided more information to counsees in higher need for emotional support [24]. This might indicate that counselors respond to emotional queries and higher anxiety levels by providing information and consequently being more verbally dominant. As counsees find it important to be involved in decision making [30] and high verbal dominance likely counteracts counselee participatory decision making [50], this might be a possible explanation for the lower needs fulfillment with higher verbal dominance. Research with cancer patients demonstrated that they often prefer a higher level of involvement in decision making than experienced [51]. In other studies, experienced involvement in decision making was associated with higher patient satisfaction as needs were probably better fulfilled [52,53].

Satisfaction was unrelated to nonverbal communication and conversational contribution in this study, while earlier studies indicated significant associations [2,10,11,14–18].

Possibly, this is due to ceiling effects as on average, participants were highly satisfied with the consultation. Furthermore, research on cancer genetic counseling has shown that providing medical information increases satisfaction [25]. Perhaps this aspect has such a great influence on counselee satisfaction that none of the examined variables have additional relevance. A third explanation might be the length of the visit as earlier research demonstrated that longer visits increase satisfaction [54,55] and visits in genetic counseling usually are very long [31].

Also, no significant associations were found for eye gaze and interactivity with outcomes. We postulated that nonverbal encouragements have a similar effect as eye gaze and this might explain the non-significant associations of eye gaze. However, a post hoc analysis showed that when deleting nonverbal encouragement from our analysis the association between anxiety and counselee-directed eye gaze was still insignificant. Thus, findings from Pieterse et al. [25] in initial counseling visits could not be replicated, suggesting that communication impacts differently on outcomes in first versus follow up visits. While in the initial visits often no final risk estimation can be given, in the final visit, counsees' are possibly relieved from their doubts as the DNA-test results are discussed and they receive a risk estimation for themselves and their first degree relatives.

4.1.1. Limitations

The focus in the current study was on counselors' nonverbal communication and conversational contribution in the consultation, because these aspects have received far less attention in research than other communication aspects. However, the meaning of a given nonverbal behavior and conversational style depends heavily on contextual factors such as concurrent verbal behavior [56]. It seems likely that verbal

and other aspects of the interaction may have affected the variables of interest. Future studies should take into account the interrelation of verbal and nonverbal communication [8].

Additionally, the camera was positioned to record counselors' eye gaze and nonverbal encouragements. Future studies should take into account counsees' nonverbal communication as well, so that the mutual influence of counselors and counsees during clinical interactions can be examined [8].

[57]. In the current study most of the counselors were female. Therefore, gender differences in nonverbal communication could not be examined. Also, only female counsees were included and generalizability is therefore limited to female counsees.

In this study, we also did not examine differences between clinical geneticists and genetic counselors as had been shown in for example facilitating active involvement and understanding by others [58]. Perhaps there are also observable differences between these two groups in nonverbal encouragements, eye gaze, verbal dominance and interactivity, but the current study lacked power to study these.

Furthermore, counselors and counsees in this study knew they were being videotaped and this may have influenced the interaction [58]. However, earlier research demonstrated that counselors easily get used to the presence of a video camera [58]. Also, there might be a selection bias due to not wanting to be videotaped. Perhaps counsees with the highest anxiety or risk are less inclined to participate. Lastly, power was an issue for this study. Perhaps genetic counselor behaviors will have only small effects on patient outcomes and our sample size was insufficient to detect these [22].

4.2. Conclusion

Results suggest that nonverbal encouragements are of influence on post-visit anxiety and verbal dominance is associated with higher post-visit anxiety and lower perceived needs fulfillment. With respect to counselor verbal dominance, it could be concluded that counselors should listen more and talk less. More effort may need to be devoted to involve counsees in the dialog. When stimulating counsees to participate more in the genetic consultation, their anxiety level might lower and their perceived needs fulfillment might increase. Further research should focus on the interrelation of verbal and nonverbal behavior to understand the combined effect on anxiety.

4.3. Practical implications

While developing interventions to improve counselor' communication skills it should be kept in mind that interventions focused on reducing the contribution of counselors or increasing the contribution of counsees may be beneficial to counsees. For example, training or self-monitoring of behaviors known to facilitate understanding (checking women's medical knowledge, checking understanding, inviting questions, summarizing and using diagrams) may assist counselors to stimulate counsees' participation [21].

Acknowledgements

We would like to thank all participating counselees, genetic counselors and clinical geneticists. Furthermore, we would like to thank the coders Bianca Wiering and Melissa Gu' Itzou.

REFERENCES

- [1] Street RL, Millay B. Analyzing patient participation in medical encounters. *Health Commun* 2001;13:61–73.
- [2] Roter DL, Frankel RM, Hall JA, Sluyter D. The expression of emotion through nonverbal behavior in medical visits: mechanisms and outcomes. *J Gen Intern Med* 2006;21:28–34.
- [3] Jokinen K, Nishida M, Yamamoto S. On eye-gaze and turn-taking. In: *Proceedings of the 2010 workshop on eye-gaze in intelligent human machine interaction*; 2010. p. 118–23.
- [4] Knapp ML, Hall JA. *Nonverbal communication in human interaction*. 6th ed. Belmont, CA: Wadsworth; 2005.
- [5] Burgoon JK. Nonverbal signals. In: Knapp ML, Miller GR, editors. *Handbook of interpersonal communication*. Beverly Hills, CA: Sage Publications; 1985. p. 344–90.
- [6] Zandbelt LC, Smets EMA, Oort FJ, Godfried MH, de Haes HCJM. Patient participation in the medical specialist encounter: does physicians' patient-centred communication matter. *Patient Educ Couns* 2007;65:396–406.
- [7] Baumann C, Rat AC, Osnowycz G, Mainard D, Cuny C, Guillemin F. Satisfaction with care after total hip or knee replacement predicts self-perceived health status after surgery. *BMC Musculoskelet Disord* 2009;10:150.
- [8] Henry SG, Fuhrel-Forbis A, Rogers MAM, Eggly S. Associations between non-verbal communication during clinical interactions and outcomes: a systematic review and meta-analysis. *Patient Educ Couns* 2012;86:297–315.
- [9] Street RL, Makoul G, Arora N, Epstein RM. How does communication heal? Pathways linking clinician–patient communication to health outcomes. *Patient Educ Couns* 2009;74:295–301.
- [10] Hall JA, Harrigan JA, Rosenthal R. Nonverbal behavior in clinician–patient interaction. *Appl Prev Psychol* 1995;4:21–37.
- [11] Griffith CH, Wilson JF, Langer S, Haist SA. House staff nonverbal communication skills and standardized patient satisfaction. *J Gen Intern Med* 2003;181:70–4.
- [12] Schmid Mast M. Review on the importance of nonverbal communication in the physician–patient interaction. *Patient Educ Couns* 2007;7:15–8.
- [13] Bensing JM. Doctor–patient communication and the quality of care. *Soc Sci Med* 1991;3:1301–10.
- [14] Roter DL, Larson SM, Beach MC, Cooper LA. Interactive and evaluative correlates of dialogue sequence: a simulation study applying the RIAS to turn taking structure. *Patient Educ Couns* 2008;71:26–33.
- [15] Bertakis KD, Roter D, Putnam SM. The relationship of physician medical interview style to patient satisfaction. *J Fam Pract* 1991;32:175–81.
- [16] Buller MK, Buller DB. Physician communication style and health care satisfaction. *J Health Soc Behav* 1987;28:375–87.
- [17] Hall JA, Irish JT, Roter DL, Ehrlich CM, Miller LH. Satisfaction, gender, and communication in medical visits. *Med Care* 1994;32:1216–31.
- [18] Schmid Mast M. Dominance and gender in the physician–patient interaction. *J Men's Health Gender* 2004;4:354–8.
- [19] Sullivan LM, Stein MD, Savetsky JB, Samet JH. The doctor–patient relationship and HIV-infected patients' satisfaction with primary care physicians. *J Gen Intern Med* 2000;15:462–9.
- [20] Biesecker BB. Goals of genetic counseling. *Clin Genet* 2001;60:323–30.
- [21] Dolbeault S, Flahault C, Stoppa-Lyonnet D, Bre' dard A. Communication in genetic counselling for breast/ovarian cancer. *Recent Results Cancer Res* 2006;168:23–36.

- [22] Duric V, Butow P, Sharpe L, Lobb E, Meiser B, Barratt A, et al. Reducing psychological distress in a genetic counseling consultation for breast cancer. *J Genet Couns* 2003;12:243–64.
- [23] De Kok M, Scholte RW, Sixma HJ, van der Weijden T, Spijkers KF, van de Velde CJH, et al. The patient's perspective of the quality of breast cancer care: the development of an instrument to measure quality of care through focus groups and concept mapping with breast cancer patients. *Eur J Cancer* 2007;43:1257–64.
- [24] Pieterse AH, van Dulmen AM, Ausems MGEM, Beemer FA, Bensing JM. Communication in cancer genetic counselling: does it reflect counselees' previsit needs and preferences. *Br J Cancer* 2005;92:1671–8.
- [25] Pieterse AH, van Dulmen AM, Beemer FA, Bensing JM, Ausems MGEM. Cancer genetic counseling: communication and counselees' post-visit satisfaction, cognitions, anxiety, and needs fulfillment. *J Genet Couns* 2007;16:85–96.
- [26] Pieterse AH, Ausems MGEM, Van Dulmen AM, Beemer FA, Bensing JM. Initial cancer genetic counseling consultation: change in counselees' cognitions and anxiety, and association with addressing their needs and preferences. *Am J Med Genet A* 2005;137:27–35.
- [27] Bowen DJ, Burke W, McTiernan A, Yasui Y, Andersen MR. Breast cancer risk counseling improves women's functioning. *Patient Educ Couns* 2005;54:79–86.
- [28] Bensing JM, Verheul W, van Dulmen AM. Patient anxiety in the medical encounter: a study of verbal and non-verbal communication in general practice. *Health Educ* 2008;108:373–83.
- [29] Takayama T, Yamazaki Y, Katsumata N. Relationship between outpatients' perceptions of physicians' communication styles and patients' anxiety levels in a Japanese oncology setting. *Soc Sci Med* 2001;53:1335–50.
- [30] Pieterse AH, van Dulmen AM, Ausems MGEM. QUOTE-GENECA. Development of a counselee-centered instrument to measure needs and preferences in genetic counselling for hereditary cancer. *Psychooncology* 2005;14:361–75.
- [31] Butow PN, Lobb EA. Analyzing the process and content of genetic counseling in familial breast cancer consultations. *J Genet Couns* 2004;13:403–24.
- [32] Ellington L, Roter D, Dudley WN, Baty BJ, Upchurch R, Larson S, et al. Communication analysis of BRCA1 genetic counseling. *J Genet Couns* 2005;14:377–86.
- [33] Pieterse AH, van Dulmen S, van Dijk S, Bensing JM, Ausems MGEM. Risk communication in completed series of breast cancer genetic counseling visits. *Genet Med* 2006;8:688–96.
- [34] Meiser B, Irlé J, Lobb E, Barlow-Stewart K. Assessment of the content and process of genetic counseling: a critical review of empirical studies. *J Genet Couns* 2008;17:434–51.
- [35] Kash KM, Holland JC, Osborne MP, Miller DG. Psychological counseling strategies for women at risk of breast cancer. *J Natl Cancer Inst* 1995;17:73–9.
- [36] STOET, Association Clinical Genetics Netherlands. Working group Clinical Oncogenetics: Hereditary tumours: Guidelines for diagnostics and prevention. [Erfelijke tumoren: Richtlijnen voor diagnostiek en preventie]; 2010, www.stoet.nl.
- [37] Albada A, van Dulmen S, Otten R, Bensing JM, Ausems MGEM. The development of E-info geneca: a computer-tailored intervention prior to breast cancer genetic counselling. *J Genet Couns* 2009;18:326–38.
- [38] Albada A, van Dulmen S, Ausems MGEM, Bensing JM. A pre-visit website with question prompt sheet for counselees facilitates tailored communication in the first consultation for breast cancer genetic counseling: findings from a randomized controlled trial. *Genet Med* 2012;11:85–95.
- [39] Zandbelt LC, Smets EMA, Oort FJ, Godfried MH, de Haes HCJM. Satisfaction with the outpatient encounter: a comparison of patients' and physicians' views. *J Gen Intern Med* 2004;19:1088–95.
- [40] Spielberger CD. *Manual of the State-Trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press; 1983.
- [41] Van der Ploeg HM, Defares PB, Spielberger CD. *Handleiding bij de zelfbeoordelingsvragenlijst (ZBV) [manual of the Dutch version of the State Trait Anxiety Inventory]*. Lisse: Swets and Zeitinger; 1980.

- [42] Pieterse AH, Ausems MGEM, Spreeuwenberg P, van Dulmen S. Longer-term influence of breast cancer genetic counseling on cognitions and distress: smaller benefits for affected versus unaffected women. *Patient Educ Couns* 2011;85:425–31.
- [43] Roter DL, Larson SM. The Roter Interaction Analysis System (RIAS): utility and flexibility for analysis of medical interactions. *Patient Educ Couns* 2002;46:243–51.
- [44] Roter DL. The Roter method of interaction process analysis. Johns Hopkins School of Public Health; 2006, www.riasworks.com.
- [45] Van der Ploeg HM. De Zelf-Beoordelings Vragenlijst (STAI-DY): De ontwikkeling en validatie van een Nederlandstalige vragenlijst voor het meten van angst [The development and validation of a Dutch questionnaire to measure anxiety]. *Tijdschr Psychiatr* 1982;24:576–88.
- [46] Graugaard PK, Eide H, Finset A. Interaction analysis of physician–patient communication: the influence of trait anxiety on communication and outcome. *Patient Educ Couns* 2003;49:149–56.
- [47] Pawlikowska T, Zhang W, Griffiths F, van Dalen J, van der Vleuten C. Verbal and non-verbal behavior of doctors and patients in primary care consultations – how this relates to patient enablement. *Patient Educ Couns* 2012;86:70–6.
- [48] Street RL, Buller DB. Nonverbal response patterns in physician–patient interactions: a functional analysis. *J Nonverbal Behav* 1987;11:234–53.
- [49] Schmid Mast M, Hall JA, Roter DL. Caring and dominance affect participants' perceptions and behaviors during a virtual medical visit. *J Gen Intern Med* 2008;23:523–7.
- [50] Roter DL. The medical visit context of treatment decision-making and the therapeutic relationship. *Health Expect* 2000;3:17–25.
- [51] Tariman JD, Berry DL, Cochrane B, Doorenbos A, Schepp K. Preferred and actual participation roles during health care decision making in persons with cancer: a systematic review. *Ann Oncol* 2010;21:1145–51.
- [52] Gattellari M, Butow PN, Tattersall MH. Sharing decisions in cancer care. *Soc Sci Med* 2001;52:1865–78.
- [53] Kaplan SH, Greenfield S, Gandek B, Rogers WH, Ware Jr JE. Characteristics of physicians with participatory decision-making styles. *Ann Intern Med* 1996;124:497–504.
- [54] Hall JA, Roter DL, Katz NR. Meta-analysis of correlates of provider behavior in medical encounters. *J Med Care* 1988;26:657–75.
- [55] Mead N, Bower P, Hann M. The impact of general practitioners' patient-centredness on patients' post-consultation satisfaction and enablement. *Soc Sci Med* 2002;55:283–99.
- [56] Hall JA, Coats EJ, LeBeau LS. Nonverbal behavior and the vertical dimension of social relations: a meta-analysis. *Psychol Bull* 2005;131:898–924.
- [57] Schmid Mast M, Hall JA, Klöckner Cronauer C, Cousin G. Perceived dominance in physicians: are female physicians under scrutiny? *Patient Educ Couns* 2011;83:174–9.
- [58] Lobb EA, Butow PN, Barratt A, Meiser B, Tucker K. Differences in individual approaches: communication in the familial breast cancer consultation and the effect on patient outcomes. *J Genet Couns* 2005;14:174–86.

TABLES

Fig. 1. Flow chart.

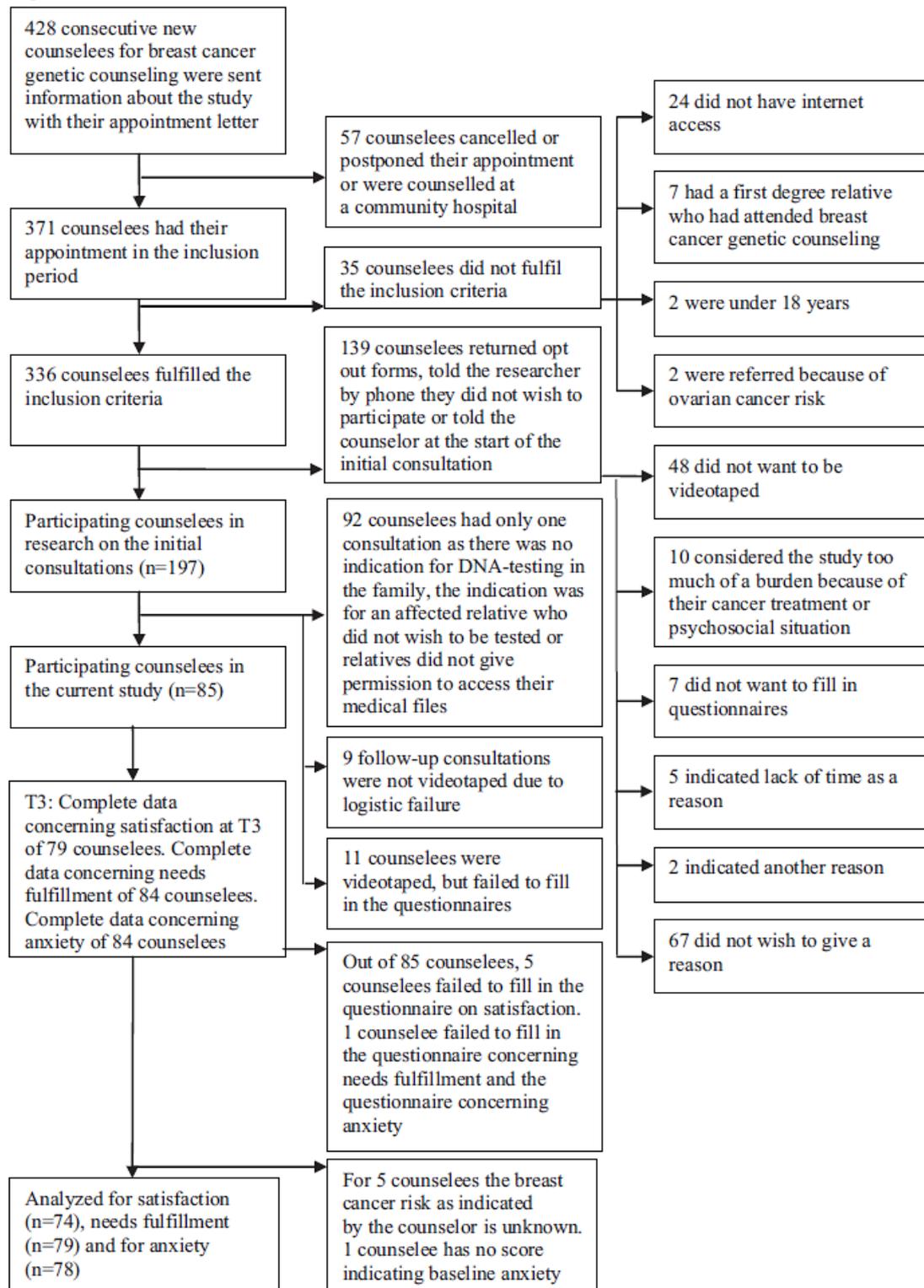


Table 1
Counselees' characteristics (N= 85).

	N	%
Having a partner	75	88.2
Having children	67	78.8
Personal history of breast cancer (affected)	57	67.1
First degree relatives affected with breast cancer ^a	44	52.4
BRCA1/2 gene mutation	6	7.1
Unclassified variant in BRCA1/2 gene	5	5.9
<i>Educational attainment^a</i>		
University (MSc/BSc)/higher vocational education (BSc)	34	40.5
Middle vocational education	27	32.1
High school/secondary education	21	25.0
<High school level	2	2.4
<i>Breast cancer risk category (as estimated by counselor)^b</i>		
Low (<20% lifetime risk)	39	48.8
Moderate (20–30% lifetime risk)	27	33.8
High (≥30% lifetime risk)	14	17.5

^a One missing value.

^b Five missing values.

Table 2
Correlations between the variables.

	Nonverbal encouragements	Eye gaze	Verbal dominance	Interactivity	Satisfaction	Needs fulfillment	Anxiety
Nonverbal encouragements	–						
Percentage of eye gaze	.46**	–					
Verbal dominance	–.27*	–.12	–				
Interactivity	.05	.05	–.18	–			
Satisfaction	.02	–.06	–.19	.06	–		
Needs fulfillment	.02	.07	–.15	–.02	.23*	–	
Post-visit anxiety	.32**	.19	.19	.13	–.01	–.06	–

Note: Correlations between the independent variables were calculated for checking on multicollinearity.

* $p < .05$.

** $p < .01$.

Table 3
Descriptive statistics of the independent and dependent variables.

	Mean	SD	Min	Max
Nonverbal encouragement (N= 84)	71.8	49.4	4.0	238
Percentage of eye gaze (N= 84)	74.3	15.0	32.7	96.8
Verbal dominance (N= 85)	52.2	6.0	36.2	68.0
Interactivity (N=85)	6.1	1.7	3.0	11.2
Satisfaction (N= 79)	87.9	17.1	0.0	100
Needs fulfillment (N= 84)	3.4	0.4	2.4	4.0
Pre-visit anxiety (N= 84)	19.4	5.3	2.0	31
Post-visit anxiety (N= 84)	18.0	6.2	10	38

Table 4

Predictors and covariates of counselees' post-visit satisfaction ($N=74$), needs fulfillment ($N=79$) and anxiety ($N=78$).

	Counselee satisfaction			Counselee needs fulfillment			Counselee anxiety		
	Model 1			Model 1			Model 1		
	β	95% CI	p	β	95% CI	p	β	95% CI	p
Baseline anxiety	–	–	–	–	–	–	.35	.19–.52	.00**
Disease status	–.20	–.65 to .25	.38	.05	–.41 to .51	.83	.65	.31 to .99	.00**
Breast cancer risk	–.02	–.04 to –.00	.02*	–.00	–.02 to .01	.72	.03	.02 to .04	.00**
Group allocation	.36	–.07 to .80	.10	.19	–.26 to .64	.42	–	–	–
	<i>Log likelihood</i>		<i>AIC</i>	<i>Log likelihood</i>		<i>AIC</i>	<i>Log likelihood</i>		<i>AIC</i>
	–101.49		214.98	–112.12		236.24	–86.79		185.57
	Model 2			Model 2			Model 2		
	β	95% CI	p	β	95% CI	p	β	95% CI	p
Baseline anxiety	–	–	–	–	–	–	.31	.15 to .46	.00**
Disease status	–.15	–.60 to .31	.52	.08	–.39 to .55	.74	.60	.27 to .93	.00**
Breast cancer risk	–.03	–.04 to –.01	.009**	–.00	–.02 to .02	.81	.03	.01 to .04	.00**
Group allocation	.40	–.04 to .84	.07	.19	–.26 to .64	.40	–	–	–
Nonverbal encouragements	.22	–.07 to .51	.13	–.05	–.33 to .24	.76	.23	.04–.43	.02*
Percentage of eye gaze	–.12	–.38 to .14	.37	.10	–.14 to .34	.43	.00	–.17 to .17	.97
Verbal dominance	–.11	–.34 to .12	.35	–.24	–.48 to –.00	.047*	.28	.11 to .44	.00**
Interactivity	.01	–.21 to .23	.93	–.06	–.29 to .17	.62	.14	–.03 to .30	.10
	<i>Log likelihood</i>		<i>AIC</i>	<i>Log likelihood</i>		<i>AIC</i>	<i>Log likelihood</i>		<i>AIC</i>
	–99.39		218.78	–109.70		239.41	–79.55		179.10
	<i>Likelihood-ratio</i>			<i>Likelihood-ratio</i>			<i>Likelihood-ratio</i>		
	$\chi^2 = 4.21$		$p = .38$	$\chi^2 = 4.82$		$p = 0.31$	$\chi^2 = 14.47$		$p = .01$

Note: Multilevel analyses with random intercepts were executed. Analyses on satisfaction and needs fulfillment were controlled for disease status, breast cancer risk and group allocation. For post-visit anxiety, control variables were baseline anxiety, disease status and breast cancer risk.

* $p < .05$.

** $p < .01$.