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Patient Education and Counseling 66 (2007) 223–234

Patient Education and Counseling

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Nonverbal communication in doctor–elderly patient transactions (NDEPT): Development of a tool☆,☆☆

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Received 7 December 2005; received in revised form 13 November 2006; accepted 9 December 2006

Abstract

Objective: There are several measurement tools to assess verbal dimensions in clinical encounters; in contrast, there is no established tool to evaluate physical nonverbal dimensions in geriatric encounters. The present paper describes the development of a tool to assess the physical context of exam rooms in doctor–older patient visits.
Method: Salient features of the tool were derived from the medical literature and systematic observations of videotapes and refined during current research.
Results: The tool consists of two main dimensions of exam rooms: (1) physical dimensions comprising *static* and *dynamic* attributes that become operational through the *spatial configuration* and can influence the manifestation of (2) *kinesic* attributes.
Conclusion: Details of the coding form and inter-rater reliability are presented. The usefulness of the tool is demonstrated through an analysis of 50 National Institute of Aging videotapes. Physicians in exam rooms with no desk in the interaction, no height difference and optimal interaction distance were observed to have greater eye contact and touch than physicians' in exam rooms with a desk, similar height difference and interaction distance.
Practice implications: The tool can enable physicians to assess the spatial configuration of exam rooms (through Parts A and B) and thus facilitate the structuring of kinesic attributes (Part C).

Keywords: Nonverbal communication; Doctor–elderly patient communication; Elderly; Physical dimensions of exam rooms

1. Introduction

Doctor–patient communication has two parallel components – verbal and nonverbal – that unfold during interaction. Prior studies in medical and nonmedical encounters indicate that ''approximately 80% of essential communication between individuals occurs nonverbally, involuntarily and outside of conscious awareness, and only 20% is verbal and voluntary'' [1,2]. Despite its importance, research on nonverbal communication in doctor–patient interaction continues to lag far behind that of verbal interaction [3,4]. There have been a few studies demonstrating the importance of the nonverbal physical setting in clinical encounters [5,6]. For instance, interaction distance, angle of interaction, height difference and physical barriers have been cited to be effective in creating a ''therapeutic milieu'' in exam rooms [7,8].

Changing demographics and the rapidly growing older population, make research in nonverbal physical dimensions of communication in doctor–elderly patient visits even more salient for improving quality of care of geriatric patients for several reasons. First, cognitively and/or verbally impaired,

☆ An earlier draft of this manuscript was presented as a paper at the American Academy on Physician and Patient 2005 Forum ~ International Conference on Healthcare Communication, Chicago, USA.

☆☆ This study was funded by Grant # 1 RO3 HS14088-01A1 for ''How Exam Rooms Enhance Physicians' Patient-centeredness'' from the Agency for Healthcare and Quality (AHRQ) (Drs. Sachs and Gorawara-Bhat).

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doi:10.1016/j.pec.2006.12.005

frail older patients with chronic disease(s) and other comorbidities may feel more vulnerable because their care involves extensive communication and coordination over extended periods. Second, older patients' functional impairments, e.g. hearing deficits, poor vision, etc., may limit their ability to understand and communicate effectively, thus leading to greater reliance on nonverbal communication. Third, since interactional processes rather than content is important for older patient satisfaction [9], it can be extrapolated that *how* that interaction is physically structured, may be salient for communication [10]. Fourth, cognitively and/or verbally impaired older patients perceive the affective climate of their environment to a greater extent than they did prior to their illness [11]. In fact, recent geriatric literature calls for attentiveness to ''gerontologic environmental design so that older patients' needs are considered in the planning and construction of medical offices, furnishings and equipment'' [5]. However, to our knowledge, research on the role of nonverbal physical dimensions in doctor–elder patient communication is extremely limited and therefore the current research is part of an attempt to address this shortcoming. The overall goal of this study was to develop a framework on *how* nonverbal communication evolves and to elucidate the role of the physical setting of the exam room in physicians' communication with elderly patients.

While there are several well known instruments to assess verbal interaction, e.g. RIAS [12], to our knowledge, there is no established tool for identifying and coding physical nonverbal dimensions in clinical settings. Therefore, in the first part of this paper, we describe the development of a new tool for observing and coding nonverbal dimensions in videotapes of doctor–elderly patient interactions in exam rooms. While the development of the tool involved revising it through an iterative process, this paper highlights the final version of the coding system developed for measuring nonverbal communication in doctor–elderly patient transactions (NDEPT). The second part of the paper demonstrates the usefulness of the tool by carrying out a secondary analysis of a subset of an existing NIA archived database. In this study, nonverbal communication is conceptualized as consisting of two major dimensions: (1) the physical setting of exam rooms enclosing interaction and (2) the body language of the physician (kinesic dimensions) unfolding within that exam room.

2. Methods

2.1. Measuring nonverbal dimensions

2.1.1. Description of sample

The present study is a secondary analysis of 50 videotapes of routine exam room visits between physicians and their elder patients. This subset was extracted from a larger dataset of 489 archived tapes (National Institute of Aging Grant # R44 AG 15737) collected to assess verbal communication between doctors and their elderly patients [13]. To explore whether physical setting attributes of exam rooms are a salient factor in physicians' nonverbal communication, videotapes comprising a variety of clinical encounters were selected.

Therefore, a purposive sample of 50 video and corresponding audiotapes including a mix of gender and race characteristics for physicians and elder patients in three types of settings – independent practice, managed care and academic – was selected from the larger dataset. The subset included three sites: two in the Midwest and one in the Southwest. Demographic characteristics for physicians and patients were extracted from the initial study [13]. The single physician–patient dyadic encounter would be the unit of analysis for qualitative observations of the 50 encounters. The initial NIA data collection and the present analysis were fully approved by all Institutional Review Boards.

This is a field study designed to identify primary nonverbal characteristics in physician–older patient encounters and therefore no attempt was made to cluster doctors and patients to specific exam room types. Consequently, while observational based inferences can be made, correlations cannot be established [14]. Since the study aimed to capture only nonverbal dimensions, coding for encounters was conducted through a visual review of videotapes with the volume turned to zero.

2.1.2. Development of the NDEPT coding system

The major steps in the development of the NDEPT coding form included:

(1) *Scope of study and nonverbal variables:* The initial focus of this study was on examining only physical nonverbal dimensions—operationalized as *static* and *dynamic* attributes. A review of initial tapes showed that *kinesic* attributes – referring to physicians' bodily movements – were an integral part of the interaction, and therefore, were subsequently included in the NDEPT coding form. However, these measures need further refinement.
(2) *Training coders:* Two coders received 40 h of training (by the Senior Coder, distributed over 3-weeks) for coding static, dynamic and kinesic attributes.
(3) *Developing coding form* involved independent observations by three coders to verify previously identified static, dynamic and kinesic attributes and their components, and inductively identify new salient attributes, their components, and ranges. Discrepancies in coding attributes were resolved through consensus developed among three coders in weekly meetings. The coding form was revised and the final form was subsequently used for coding 50 tapes.
(4) *Pre-coding steps:* Fifty tapes were subject to two pre-coding steps: phase coding and phase timing. Following Lipkin et al. [15], medical encounters were classified into

three major phases: ''opening,'' ''middle'' (including history taking and post physical exam) and ''closing'' to capture the variation in dynamic and kinesic attributes over the duration of encounters (consistent with the original protocol, the main physical exam was not captured on videotape, therefore is not part of coding). Two coders independently read transcripts of each tape, compared coding and came to consensus in classifying phases. Start and end times for each phase were noted on the coding form. The Middle phase was recorded as 'history taking' (Hx) and 'post physical exam' (Post P.E.).

(5) *Coding nonverbal dimensions and calculating inter-rater reliability:* All 50 tapes were coded by two coders. The senior coder (RGB) coded 20% of tapes. For dynamic attributes, the senior coder explored discrepancies by revisiting videotapes and made clarifications in team meetings. Based on their individual judgment, coders reviewed and sometimes revised their coding in their individual databases. These two datasets were compared to calculate inter-rater reliability.

2.2. Description of NDEPT

2.2.1. Nonverbal communication in doctor–elderly patient transactions (NDEPT) form

The NDEPT form is organized into three parts (Appendix A). The physical nonverbal dimensions enclosing the encounter are operationalized into two parts: Part A—static attributes and Part B—dynamic attributes. Part C details kinesic attributes. The form header allows noting of tape number, coder number, date tape was coded and health condition of patient. Race and gender of physician and patient are also noted.

2.2.1.1. Static attributes. Static attributes are delineated in Part A (Appendix A) and consist of two main items—furniture and equipment. Column 1 lists furniture (items 1–6) and medical equipment (item 7) and notes their presence/absence in column 2. Column 3 provides space to note any special features of the item. The layout of static attributes, e.g. rolling stool, patient chair as used by physician and patient over the major part of the visit is defined as *spatial configuration* and sketched in column 4.

2.2.1.2. Dynamic attributes. Dynamic attributes, evolving between doctor and patient are listed in Part B, and consist of four items defined and operationalized as:

(1) *Interaction distance*, B.1 is measured as the shoulder-to-shoulder shortest distance between doctor and patient. Codes for interaction distance (''too far,'' ''too close'' and ''optimal'') were adapted from the literature [19].
(2) *Vertical height difference*, B.2 is the vertical difference in eye level during interaction.
(3) *Physical barrier(s)*, B.3 refers to external physical accoutrement(s) – existing or modified during encounter – that visually blocks interaction between doctor and patient.
(4) *Angle of interaction*, B.4 is the angle formed between the relative position of doctor and patient and is measured in plan as the angle between an imaginary axis (drawn through doctor's position, parallel to the dominant direction in which s/he faces) and the shortest interaction distance between them.

All four items, listed in coding form, Part B are coded on a three-point scale ranging from 0 to 2 (worst to best). As depicted on the form, column 1 lists the ranges for each dynamic item. Columns 2–4 display the range for each of three phases of the encounter. Column 5 records the most frequent score received for that item over the three phases in the encounter, and is listed as a ''collapsed score.'' (For instance, if the item 'interaction distance' was scored 2 in the opening phase, 2 in history taking, 2 in post P.E. and 1 in closing, the collapsed score for interaction distance would be 2). Additionally, if the physician was not visible on tape over all three phases, the senior coder calculated the collapsed score for any dynamic or kinesic items assuming that physician characteristics would remain constant over phases. Unique features of an item are noted in column 6.

2.2.1.3. Kinesic attributes. Kinesic attributes of physician, listed in Part C, consist of five items:

(1) *Stance*, C.1, is physician's bearing with respect to hands, arms and legs or any combination thereof and is coded as 'open' and/or 'closed.'
(2) *Eye contact*, C.2, refers to doctor making and maintaining gaze with patient.
(3) *Facial expression*, C.3, is limited to ''smiles'' and ''frowns'' of the doctor.
(4) *Gesture*, C.4, refers to the doctor's hand movements and/or head nods (used for supplementing speech).
(5) *Touch*, C.5, is an instrumental/affective expression of physician's helpfulness and empathy for patient (excludes physical exam); can include handshake, hand hold, pat on neutral body part, help with dress items (e.g. shoes) and getting on/off exam table.

Each of these five items is coded on a five-point scale, range 0–4 (lowest to highest). Column 1 lists item and brief description, columns 2–4 is to note codes over each of three phases and column 5 lists collapsed score.

3. Results

3.1. Sample characteristics

Selected demographic characteristics of physicians and elderly patients are listed in Table 1. Physicians are mostly male, white and 34–82 years of age. Patients are

Table 1
Physician and patient characteristics

Characteristic	
Physician	
N	25
Age, years (mean (range))	51 (34–82)
Gender	
% Female	25
% Male	75
Race	
% African-American	20
% White	80
Patient	
N	50
Age, years (Mean (range))	72.5 (65–89)
Gender	
% Female	58
% Male	42
Race	
% African-American and Hispanic	20
% White	80
Health condition (% Acute)[a]	8
% Chronic[b]	62
% Acute and chronic	30
Miscellaneous	
Number of sites	3 [2 in Midwest, 1 in Southwest]
Number of exam rooms	29
Number of videotaped encounters	50
Length of visits, minutes (mean [range])	13.5 (4.5–27.3)

[a] Patients presenting with problematic health condition of short duration, e.g. flu.
[b] Patients presenting with problematic health condition of long duration, e.g. asthma.

mostly female, white, 65–89 years old, and the majority present with a chronic health condition. The average length of visit is 13.5 min. These characteristics noted for the purposive sample are similar to those in the larger NIA study [13].

3.2. Illustrative example—Mr. Jones visits Dr. Taylor

Let's consider a typical encounter to help us grasp the conglomeration of factors unfolding in a physician–older patient encounter.

Mr. Jones, an 89-year-old patient dressed in street clothes, is seated on a chair in the exam room. Facing the patient on the left is an exam table; on the right is a substitute desk – a counter surface mounted on base cabinets – situated in a corner of the exam room such that the physician would have his back to the patient when sitting on the rolling stool and writing on the desk. Dr. Taylor enters, greets Mr. Jones, proceeds to the desk to pick up his chart, *moves the rolling stool so as to face the patient at a comfortable distance*, *sits down*, *makes eye contact with Mr. Jones* (italics added for emphasis) and listens intently:

Pt: Uh, I have a problem that is gonna be up to Dr. Taylor to cure for me ….
Dr.: Oh, okay …. I hope it's something I can, then.
…

Pt: Uh …. I've had an accident … you know … automobile accident …
Dr.: Mmm, Hmmm …
…

Pt: Since I had the accident, they removed my driver's license. Now I gotta get a report from the doctor and the eye doctor as to whether I'm able to drive or not ….
Dr.: Oh, okay … tell me about … tell me about how the accident occurred. I don't recall

(Tape # 259-3371)

In the above scene, the doctor encourages the patient to relate his story; a good example of the doctor's responsiveness to the patient's verbal clues. Further, he moves his rolling stool to seat himself two and a half feet away from, and facing the patient directly. Thus, in addition to being verbally supportive, he has modified and used existing physical setting attributes to enhance the interaction.

3.3. Static, dynamic and kinesic characteristics of exam rooms

Similar to the above example, major static attributes of exam rooms included a rolling stool, chair(s), exam table and desk; minor items included mirrors, lamps, pictures, medical equipment, brochures, etc. The results for the 50 encounters analyzed in this study are summarized in Table 2. Static attributes (Part A) by themselves signal only the intended functionality of exam rooms and are often modified by physicians during a visit. For example, Dr. Taylor does not sit at the desk with his back to Mr. Jones; rather, he moves the rolling stool to position it such that he is at a comfortable distance from, at the same eye level with, and facing Mr. Jones directly. The evolving nature of interaction between physician and patient is captured through four dynamic attributes (Part B), viz. interaction distance (B1), height difference (B2), physical barrier(s) (B3) and angle of interaction between physician and patient (B4). Physicians' affective expressions captured through their stance, eye contact, facial expressions, gestures and touch are summarized in Part C. The data show that two of five attributes (eye contact and touch) were invoked most often (eye contact was made in 31 of 47 and touch was used in 21 of 50 encounters).

Of the sample of 25 physicians, 11 had only one visit per patient (not randomly assigned to patients and no repeat visits of patients) and therefore could not be used for any 'within doctor' analyses. Data from the remainder 14 physicians (2–4 visits with different patients) was used for a statistical analysis (ANOVA and Chi Square tests—extremely low n per cell compared to number of cells). The results did not reveal any significance in eye contact

Table 2
Exam room characteristics (50 visits)

	n (Tapes)	Percent
(A)Static attributes		
Exam rooms are equipped with		
(1) Physician's desk	36	72
(2) Rolling stool	46	92
(3) Patient's chair	46	92
(4) Exam table	47	94
(5) Wall enhancements (e.g. brochures, posters)	15	30
(6) Other (e.g. pictures, mirror)	44	88
(7) Medical equipment (e.g. otoscope)	42	84
Inter-rater reliability[a] (generalized kappa using Cohen's Kappa statistic, κ[b])		0.957
(B) Dynamic attributes[c]		
(B.1) Interaction distance between physician and patient		
0 (4 ft, too far)	16	32
1 (<2 ft, too close)	3	6
2 (2.5–4.0 ft, optimal)	31	62
(B.2) Vertical height difference between physician and patient		
0 (eye level higher)	1	2
1 (eye level lower)	10	20
2 (eye level same)	39	78
(B.3) Physical barrier(s) between physician and patient		
0 = Barriers exist	18	36
1 = Barriers modified (do not exist)	32	64
2 = No barriers	0	0
(B.4) Angle of interaction between physician and patient		
0 = Away from (back towards patient)	3	6
1 = Directly facing (face-to-face with patient)	18	36
2 = Parallel; acute (facing patient at angle)	29	58
Inter-rater reliability[a] (generalized kappa using Cohen's Kappa statistic, κ[b])		0.871

	n (Tapes)
(C) Kinesic attributes[c] (maximum *N* = *50*)	
(C.1) Stance—closed	
0 = 0% Dr. never maintains closed stance with respect to hands, arms, legs or any combination of above during whole interview	22
1 = 1–24% of time Dr. is in closed stance	9
2 = 25–49% of time Dr. is in closed stance	4
3 = 50–74% of time Dr. is in closed stance	10
4 = 75–100% of time Dr. is in closed stance	4
(C.2) Eye contact	
0 = 0% Dr. never makes eye contact with patient during whole interview	1
1 = 1–4% of time Dr. makes eye contact with patient	7
2 = 25–9% of time Dr. makes eye contact with patient	8
3 = 50–4% of time Dr. makes eye contact with patient	19
4 = 75–00% of time Dr. makes eye contact with patient	12
(C.3) Facial Expression—Smiles	
0 = 0% Dr. never smiles at pt during whole interview	12
1 = 1–24% of time Dr. smiles at patient	22
2 = 25–49% of time Dr. smiles at patient	10
3 = 50–74% of time Dr. smiles at patient	5
4 = 75–100% of time Dr. smiles at patient	0
(C.4) Gestures	
0 = 0% Dr. never gestures/nods head at pt during whole interview	1
1 = 1–24% of time Dr. gestures at patient	7
2 = 25–49% of time Dr. gestures at patient	31
3 = 50–74% of time Dr. gestures at patient	10
4 = 75–100% of time Dr. gestures at patient	1
(C.5) Touch	
0 = 0% Dr. never touches pt during whole interview	10

Table 2 (*Continued*)

	n (Tapes)
1 = 1–24% of time Dr. touches patient	9
2 = 25–49% of time Dr. touches patient	10
3 = 50–74% of time Dr. touches patient	6
4 = 75–100% of time Dr. touches patient	15
Inter-rater reliability[a] (generalized kappa using Cohen's Kappa statistic, κ[b])	0.402

[a] Based on two coders observations recorded on nonverbal communication in doctor–elderly patient transactions (NDEPT) coding form.

[b] Cohen's Kappa statistic κ measures Coder 1 and Coder 2 agreements with an adjustment for the possibility of chance agreement. Kappa ranges from 0.0 to 1.0 with 0 indicating no agreement and 1.0 perfect agreement.

[c] Inter-rater reliability is assessed for the middle – history taking – phase.

across patients in this small sample; the combination of low overall numbers and nonrandom design limits the reliability of coefficients and the conclusions that could be drawn from these analyses.

3.4. Inter-rater reliability

As indicated in Section 2.1, all 50 tapes were coded by two coders. To assess the extent of agreement between two coders, inter-rater reliability was calculated using Cohen's Kappa statistic for the Middle phase, specifically – 'history taking' – for those tapes in which physicians and patients both were visible on tape. The results of these calculations are listed in Table 2 for static, dynamic and kinesic attributes separately. As would be anticipated, Cohen's Kappa for static attributes is nearly perfect (0.957). Kappa is high for dynamic attributes ($\kappa = 0.871$) and only fair ($\kappa = 0.402$) for kinesic attributes. The inter-rater reliability data show a decline from the most objective (static) to the most subjective (kinesic) attributes of NDEPT and can be explained as follows. One reason for the comparatively high kappa on dynamic attributes may be the continuing discussion and clarification made for dynamic but not for kinesic attributes by the senior coder. (The original proposal for funding did not envision documenting kinesic attributes). Further, the kappa on individual kinesic attributes of physicians' eye contact, facial expression (smiles) and touch were fairly adequate (0.487–0.571); other attributes, viz. gesture and stance, were fairly low (0.218 and 0.226, respectively). This can be explained by the difficulty coders expressed in determining when a gesture or stance began and ended because some physicians gestured a lot, or were in the same stance (e.g. closed arms position) for long periods, and sometimes continuously. Further, videotapes present panoramas of quickly changing actions and expressions that pose a challenge when coding more than one nonverbal channel [16] (the present study includes three—static, dynamic and kinesic). While, each of these channels was coded separately, there is the possibility that each coder differentially inferred codes rather than coding for discreet beginning/ending of specific items that may have led to greater discrepancy in their codes and thus lower the inter-rater reliability score. This highlights the need for a longer training period for kinesic attributes and also for more precise scales for measuring them.

4. Discussion and conclusion

4.1. Discussion

Systematic observations of 50-videotaped encounters were the basis for developing NDEPT and for conducting a descriptive analysis of nonverbal dimensions in doctor–elderly patient encounters. Since this is a field study, explanations are advanced, but should not be construed as proofs of hypotheses. Nonverbal communication dimensions were conceptualized as encompassing the physical setting of the exam room and the body language of physicians unfolding in that exam room. Observational data showed that when physician–patient dyads use or modify the existing static attributes, unique dynamic characteristics become manifest in terms of interaction distance, height difference, angle of interaction and physical barriers between physician and patient. As the encounter unfolds, any or all four dynamic attributes are repeatedly invoked on an ad hoc basis and a relational pattern emerges between static and dynamic attributes. This pattern, the *spatial configuration* of the exam room either facilitated or impeded the manifestation of physicians' kinesic attributes. For instance, the spatial configuration in the Mr. Jones–Dr. Taylor visit included physicians' stool vis-à-vis patients' chair (static attributes) that determined the angle of interaction (dynamic attribute), height difference – none in this case – and hence determined the extent and degree of eye contact (kinesic attribute) between them.

As mentioned in Section 2.1.1, each videotaped encounter is considered a unit for analysis. And while the 50 encounters include 25 physicians and 29 exam rooms; however, it is the spatial configuration capturing the physician–patient dyad in interaction that is critical for understanding the evolution of the dynamic and kinesic attributes. Therefore, each of the 50 encounters is analyzed independently. Future research is needed to nest the data into various combinations to delineate other aspects.

Fig. 1 is an attempt at systematization of the unfolding and melding of static, dynamic and kinesic attributes in the 50 encounters. Based on observed differences in the nature of interaction between physician and patient in the encounter, the data can be grouped into two main categories. Category 1 encounters included the physicians' desk in the interaction (32 of 50). Category 2 (18 of 50) is similar to that

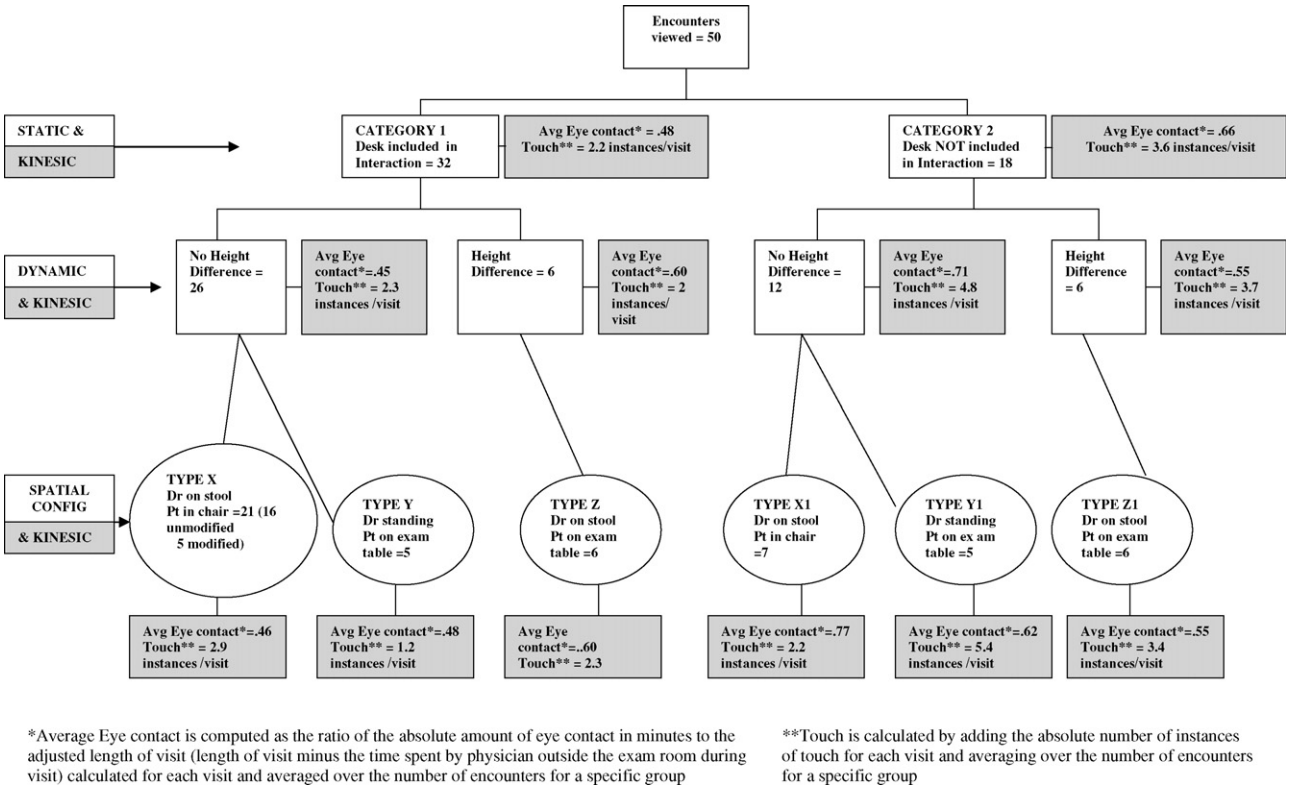

Fig. 1. Evolution of dynamic and kinesic characteristics in exam room encounters.

of Dr. Taylor–Mr. Jones example in that the physicians' desk was not included in the major part of the interaction. As depicted in Fig. 1, greater extent of eye contact and touch are evident in Category 2 compared to Category 1 encounters (average eye contact 0.66 versus 0.48, and touch 3.6 instances/visit versus 2.2 instances/visit). Thus, the static characteristic of 'desk' alone shows a differential influence on the extent of physicians' affective expression of eye contact and touch. Similar analyses can be conducted for other static attributes to gauge the extent of their influence on physicians' kinesic characteristics.

To illustrate the influence of a dynamic characteristic (irrespective of the static) on kinesic attributes, let's consider the influence of height differences between patient and physician eye level within the two main categories. Fig. 1 shows that, Category 2 encounters, with no height difference fare better than Category 2 encounters with a height difference in facilitating eye contact (average eye contact = 0.71 versus 0.55) and touch (4.8 instances/visit versus 3.7 instances/visit). However, the observed difference in eye contact with a height difference, in Category 1, is in reverse order, although the differences are smaller in magnitude.

The third organizing construct examined is the spatial configuration, which is a combination of static and dynamic attributes. As shown in Fig. 1, three types of spatial configuration within each category are analyzed. They include: (i) Dr. on rolling stool/patient in chair (Types X and X1); (ii) Dr. standing, patient on exam table (Types Y and Y1); (iii) Dr. on rolling stool, patient on exam table (Types Z and Z1). The Dr. Taylor–Mr. Jones encounter can be classified as a Category 2, Type X1 encounter. The data show some differences in eye contact and touch based on the three spatial configurations. The exemplary type is a Category 2, Type X1 encounter for eye contact (average eye contact = 0.77) of which the Dr. Taylor–Mr. Jones case is a good illustration (with no height difference and optimal interaction distance, it supported high eye contact of 0.78). Category 2, Type Y1 affords greatest latitude for touch (5.4 instances/visit).

What kinds of spatial configurations can facilitate physicians' affective expressions such as eye contact and touch that may have implications for patient-centeredness? As described in the above paragraphs, our data demonstrate that spatial configurations in which desks are not included in the interaction, height differences are minimized, physician faces patient directly or at an angle, and interpersonal distance is optimal, also exhibit the highest level of manifestation of kinesic attributes. We are led to surmise that encounters that have no desks included in the major part of the interaction provide spatial configurations to better enable physicians to make and maintain eye contact and facilitate affective expressions of touch with patients, through engaging more with patients and less on the records of patients on their desk.

Since eye contact and touch have been shown to be significant for patient satisfaction and patient-centeredness [10,17,18], the results of the present study indicate that certain types of spatial configurations have implications for expressions of patient-centeredness.

Major limitations of this study should be noted. NDEPT has been used to test a small database of 50 tapes. Before NDEPT can become a gold standard it needs to be tested and validated with larger samples. Second, NDEPT was developed for exam room settings, thus may not have captured other nonverbal dimensions that could surface in doctor–older patient communication in different settings. Third, the focus of this research was on physical nonverbal dimensions of communication therefore NDEPT does not capture paralinguistic nonverbal dimensions (e.g. voice tone). Fourth, NDEPT was developed using videotapes of doctor–elderly patient visits in the Midwest and Southwest United States and therefore may not be generalizable to different cultural settings [19,20]. Finally, this study is subject to the limitations of any exploratory field study.

4.2. Conclusion

The present paper underscores the salience of physical (static and dynamic) and kinesic attributes in facilitating (or impeding) interaction in exam rooms. At the start of the project there was, to our knowledge, no tool to assess physical nonverbal dimensions for exam rooms. With this study, we have established a tool for measuring the physical and kinesic attributes unfolding in exam room settings. NDEPT is a 16-item tool consisting of three parts – static, dynamic and kinesic attributes, designed to capture these nonverbal dimensions unfolding in exam rooms – that can be used by providers to assess and subsequently modify spatial configurations to support the simultaneous unfolding of verbal and nonverbal interaction. The use of the tool is illustrated through an analysis of 50-videotaped interactions of physicians and older patients. The spatial configuration of exam rooms forms the ecological context that encloses doctor–patient interaction and thus, is a basic structuring dimension of that interaction. The types of spatial configurations that would support the unfolding of kinesic characteristics are highlighted. Future work will examine the way in which nonverbal physical attributes may have implications for physicians' patient-centeredness.

4.3. Practice implications

Understanding the nature and role of nonverbal physical dimensions in exam rooms can provide insights into best practices for structuring exam rooms so as to support the special needs of physically and/or mentally challenged older patients. Parts A and B of the NDEPT tool enable physicians to make a quick assessment of the spatial configuration in the exam room that may facilitate the structuring of kinesic dimensions vis-à-vis patient (Part C). Consequently, physicians can adjust dynamic attributes for optimum interaction and thus support/enhance verbal communication.

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

Acknowledgements

The authors gratefully acknowledge the detailed review, guidance and statistical advice provided by Carol B. Stocking, Ph.D., Section of Geriatrics and MacLean Center for Clinical Medical Ethics, and Josh Hemmerich, Ph.D., Section of Geriatrics, The University of Chicago. We thank Manasi Tirodkar, M.A. and Annette Iskra, M.A. for coding support.

Appendix A

NDEPT: NONVERBAL COMMUNICATION IN DOCTOR-ELDERLY PATIENT TRANSACTIONS
Tape #_____Coder _____Date_____ Condition: Acute/Chronic

PHYSICAN ATTRIBUTES: White coat: Y/ N Stethoscope: Y/ N Race/Gender: Dr._____ Pt. _____
Start Time for: Opening: ____ (Middle) Hx: _____ P. E. ____ Post P. E._____Closing: _____ End of tape: _____

A. STATIC ATTRIBUTES OF EXAM ROOM: ***(Opening Phase)***

(1)	(2)		(3)	(4)
Attributes	**Y**	**N**	***Notes/Description***	***Spatial Configuration***
1. Physician's desk	1	0	Desk/work surface/table/other	(Draw layout of visible items: Dr position, pt position, exam table, rolling stool, work desk/surface, shelves, computer on desk)
2. Physician's rolling stool	1	0		
3. Patient's chair	1	0		
4. Exam table	1	0		
5. Wall—posters, brochures	1	0		
6. Other (e.g. mirror, lamps)	1	0		
7. Medical equipment	1	0		
Total				

B. DYNAMIC ATTRIBUTES OF EXAM ROOM: ***(Opening, Middle and Closing Phases)***

B. 1. INTERACTION DISTANCE BETWEEN DR & PATIENT

(1)	(2)	(3)		(4)	(5)	(6)
Range	***Opening***	***Middle***		***Closing***	***Collapsed***	***Notes***
		Hx	**Post P.E.**		***Score***	
Too far (>4 ft)	0	0	0	0		
Too close (<2 ft)	1	1	1	1		
Optimal (2.5-4 ft)	2	2	2	2		

B. 2. VERTICAL HEIGHT DIFFERENCE BETWEEN DR & PATIENT

(1)	(2)	(3)		(4)	(5)	(6)
Range	***Opening***	***Middle***		***Closing***	***Collapsed***	***Notes***
		Hx	**Post P.E.**		***Score***	
Doctor Eye-level higher	0	0	0	0		
Doctor Eye-level lower	1	1	1	1		
Doctor Eye-level same	2	2	2	2		

B. 3. PHYSICAL BARRIER(S) BETWEEN DR & PATIENT

(1)	(2)	(3)		(4)	(5)	(6)
Range	***Opening***	***Middle***		***Closing***	***Collapsed***	***Notes***
		Hx	**Post P.E.**		***Score***	
Existing barrier(s)	0	0	0	0		
Barriers modified but problematic (a)	1	1	1	1		
Barriers modified and no barrier (b)	2	2	2	2		

B. 4. ANGLE OF INTERACTION BETWEEN DR & PATIENT

(1)	(2)	(3)		(4)	(5)	(6)
Range	***Opening***	***Middle***		***Closing***	***Collapsed***	***Notes***
		Hx	**Post P.E.**		***Score***	
	Stand/sit	Stand/sit				
Away from (back towards patient)	0	0	0	0		
Directly facing (face-to-face with patient)	1	1	1	1		
Parallel/Acute (facing patient at angle)	2	2	2	2		

Appendix A (*continued*)

NDEPT: NONVERBAL COMMUNICATION IN DOCTOR-ELDERLY PATIENT TRANSACTIONS
Tape #_____Coder _____Date_____ Condition: Acute/Chronic

C. KINESIC NONVERBAL COMMUNICATION EMANATING FROM PHYSICIAN (excluding speech and vocal characteristics)					
(1)	(2)	(3)		(4)	(5)
Dimensions	***Opening***	***Middle***		***Closing***	***Collapsed***
		Hx	***Post P.E.***		***Score***
C.1. STANCE: **O**pen/**C**losed Hands & Arms & Legs	**O** 0 1 2 3 4 **C** 0 1 2 3 4	**O** 0 1 2 3 4 **C** 0 1 2 3 4	**O** 0 1 2 3 4 **C** 0 1 2 3 4	**O** 0 1 2 3 4 **C** 0 1 2 3 4	**O** **C**
C.2. EYE CONTACT: gaze	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	
C.3. FACIAL EXPRESSION: **S**mile/**F**rown	**S** 0 1 2 3 4 **F** 0 1 2 3 4	**S** 0 1 2 3 4 **F** 0 1 2 3 4	**S** 0 1 2 3 4 **F** 0 1 2 3 4	**S** 0 1 2 3 4 **F** 0 1 2 3 4	**S** **F**
C.4. GESTURE: Head nod, hand movements	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	
C.5. TOUCH: Handshake, hand hold, pat, help w dress, on/off ex table	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	

Coding Instructions:
PART A: On NDEPT Coding Form, page 1, code static furniture (items 1-6) and medical equipment (item 7) for presence or absence of each of the items in the videotaped doctor-elderly patient encounter.
PART B: On NDEPT Coding Form, page 1, code dynamic attributes (4 components) according to definitions and specified ranges of components as described below:
1. Interaction Distance between Doctor and Patient: is the shoulder-to-shoulder shortest distance between doctor and patient during the opening, middle [history taking and post physical exam] and closing phases of the medical encounter.
2. Vertical Height Difference: is the vertical difference in eye level between the doctor and patient during interaction in the opening, middle and closing phases of the medical encounter.
3. Physical Barrier(s) between Doctor and Patient: Any external physical accoutrement--that may be existing or modified during the encounter—that blocks the interaction distance between doctor and patient during the opening, middle and closing phases.
4. Angle of Interaction between Doctor and Patient: is the angle formed by the relative position of doctor to patient during interaction in the opening, middle and closing phases of the encounter. The angle of interaction is operationally estimated as the angle between an imaginary axis extended from the location of the physician and the shortest interaction distance between Dr and pt.
PART C: On NDEPT Coding Form, page 2, code kinesic dimensions (5 components) as specified below:
1. STANCE: Open or Closed: Code as percent of length of visit and note for each of 3 phases--Opening, Middle and Closing.
0= 0% -Dr never maintains open/closed stance with respect to hands, arms, legs or any combination over all phases
1= 1% - 24% of time Dr. is in open/closed stance; 2= 25% - 50% of time Dr. is in open/closed stance
3= 51% - 75% of time Dr. is in open/closed stance; 4= 76% - 100% of time Dr. is in open/closed stance
2. EYE CONTACT: Code for percent of time Dr makes eye contact with pt during opening, middle, closing phases of encounter.
0= 0% - Dr never looks at pt during the interview
1= 1% - 24% of time Dr. makes eye contact with patient 2= 25% - 50% of time Dr. makes eye contact with patient
3= 51% - 75% of time Dr. makes eye contact with patient 4= 76% - 100% of time Dr. makes eye contact with patient
3. FACIAL EXPRESSION: Smile(s) and Frown(s): Code for percent of time Dr smiles/frowns at patient.
0= 0% - Dr never smiles/frowns at pt during the interview
1= 1% - 24% of time Dr. smiles/frowns at patient 2= 25% - 50% of time Dr. smiles/frowns at patient
3= 51% - 75% of time Dr. smiles/frowns at patient 4= 76% - 100% of time Dr. smiles/frowns at patient
4. GESTURES: defined as head nod/hand motion accompanying verbal speech and is measured as a percent of length of visit.
0 = 0% Dr. never nods or gestures during the whole interview
1 = 1% -24% of time Dr. nods or gestures 2 = 25 - 50% of time Dr. nods or gestures
3 = 51 – 75% of time Dr. nods or gestures 4 = 76 -100% of time Dr. nods or gestures
5. TOUCH: Count number of times Dr. touches, hugs, pats, shakes hand patient, helps patient on/off table or with clothes.
0 = 0% Dr. never nods or gestures during the whole interview
1 = 1% -24% of time Dr. touches patient 2 = 25 - 50% of time Dr. touches patient
3 = 51 – 75% of time Dr. touches patient 4 = 76 -100% of time Dr. touches patient

Appendix A (*continued*)

NDEPT: NONVERBAL COMMUNICATION IN DOCTOR-ELDERLY PATIENT TRANSACTIONS

Tape #_____Coder _____Date_____ Condition: Acute/Chronic

Pre-Coding Instructions:

Phase Coding of Encounters: Read transcripts of each tape and identify (by line number) the main phases of Opening, Middle and Closing in the encounter according to the following definitions:

Opening Phase: Includes greetings, solicitation of chief complaint by doctor or presentation by patient and/or any social conversation between doctor and patient.

Middle Phase: Includes the history taking, physical exam and any post physical exam discussion between the doctor and patient. (Physical exam is not part of data and analysis for present project).

Closing Phase: Includes a recapitulation of the condition/treatment plan for the patient. It also includes any summary and/or plan for future test(s) for the patient.

Coding Instructions:

Phase timing of Encounters: On NDEPT Coding Form, page 1, line 4, using videotapes and line number demarcation of Opening, Middle and Closing phases (from phase coding of encounters), record start and end times for each phase, for all tapes. Also note end time of the encounter.

PART A: On NDEPT Coding Form, page 1, code static furniture (items 1-6) and medical equipment (item 7) for presence or absence of each of the items in the videotaped doctor-elderly patient encounter.

PART B: On NDEPT Coding Form, page 1, code dynamic attributes (4 components) according to definitions and specified ranges of components as described below:

1. **Interaction Distance between Doctor and Patient:** is the shoulder-to-shoulder shortest distance between doctor and patient during the opening, middle [history taking and post physical exam] and closing phases of the medical encounter.
2. **Vertical Height Difference:** is the vertical difference in eye level between the doctor and patient during interaction in the opening, middle and closing phases of the medical encounter.
3. **Physical Barrier(s) between Doctor and Patient:** Any external physical accoutrement--that may be existing or modified during the encounter—that blocks the interaction distance between doctor and patient during the opening, middle and closing phases.
4. **Angle of Interaction between Doctor and Patient:** is the angle formed by the relative position of doctor to patient during interaction in the opening, middle and closing phases of the encounter. The angle of interaction is operationally estimated as the angle between an imaginary axis extended from the location of the physician and the shortest interaction distance between Dr and pt.

PART C: On NDEPT Coding Form, page 2, code kinesic dimensions (5 components) as specified below:

1. **STANCE: Open or Closed**: Code as percent of length of visit and note for each of 3 phases--Opening, Middle and Closing.
   - 0= 0% -Dr never maintains open/closed stance with respect to hands, arms, legs or any combination over all phases
   - 1= 1% - 24% of time Dr. is in open/closed stance
   - 2= 25% - 50% of time Dr. is in open/closed stance
   - 3= 51% - 75% of time Dr. is in open/closed stance
   - 4= 76% - 100% of time Dr. is in open/closed stance
2. **EYE CONTACT:** Code for percent of time Dr makes eye contact with pt during opening, middle, closing phases of encounter.
   - 0= 0% - Dr never looks at pt during the interview
   - 1= 1% - 24% of time Dr. makes eye contact with patient
   - 2= 25% - 50% of time Dr. makes eye contact with patient
   - 3= 51% - 75% of time Dr. makes eye contact with patient
   - 4= 76% - 100% of time Dr. makes eye contact with patient
3. **FACIAL EXPRESSION: Smile(s) and Frown(s)**: Code for percent of time Dr smiles/frowns at patient.
   - 0= 0% - Dr never smiles/frowns at pt during the interview
   - 1= 1% - 24% of time Dr. smiles/frowns at patient
   - 2= 25% - 50% of time Dr. smiles/frowns at patient
   - 3= 51% - 75% of time Dr. smiles/frowns at patient
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4. **GESTURES**: defined as head nod/hand motion accompanying verbal speech and is measured as a percent of length of visit.
   - 0 = 0% Dr. never nods or gestures during the whole interview
   - 1 = 1% -24% of time Dr. nods or gestures
   - 2 = 25 - 50% of time Dr. nods or gestures
   - 3 = 51 – 75% of time Dr. nods or gestures
   - 4 = 76 -100% of time Dr. nods or gestures
5. **TOUCH**: Count number of times Dr. touches, hugs, pats, shakes hand patient, helps patient on/off table or with clothes.
   - 0 = 0% Dr. never nods or gestures during the whole interview
   - 1 = 1% -24% of time Dr. touches patient
   - 2 = 25 - 50% of time Dr. touches patient
   - 3 = 51 – 75% of time Dr. touches patient
   - 4 = 76 -100% of time Dr. touches patient

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