Nonverbal Interpersonal Interactions in Clinical Encounters and Patient Perceptions of Empathy

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Abstract

Summary: *Objective:* The relationship between nonverbal behaviors and patient perceptions of clinicians has been underexplored. The aim of this study was to understand the relationship between nonverbal communication behaviors (eye contact and social touch) to patient assessments of clinician (empathy, connectedness, and liking). *Methods:* Hypotheses were tested including clinician and patient nonverbal behaviors (eye contact, social touch) were coded temporally in 110 videotaped clinical encounters. Patient participants completed questionnaires to measure their perception of clinician empathy, connectedness with clinician, and how much they liked their clinician. *Results:* Length of visit and eye contact between clinician and patient were positively related to the patient's assessment of the clinician's empathy. Eye contact was significantly related to patient perceptions of clinician attributes, such as connectedness and liking. Conclusion: Eye contact and social touch were significantly related to patient perceptions of clinician empathy. Future research in this area is warranted, particular with regards to health information technology and clinical system design. *Practice Implications:* Clinical environments designed for patient and clinician interaction should be designed to facilitate positive nonverbal interactions such as eye contact and social touch. Specifically, health information technology should not restrict clinicians' ability to make eye contact with their patients.

Keywords: Clinician-patient interaction, communication, relationship, empathy, nonverbal behavior.

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Introduction

The clinician-patient relationship has evolved from an autocratic relationship to a partnership between patient and clinician.[1][2][3][4] Training in teamwork might promote strategies for

positive communication, such as adaptation to stress, group decision making, and coordinated task performance.[5] Communication plays an important role in each phase of teamwork; therefore, factors that affect clinician-patient communication and teamwork should be investigated in depth.[6]

Clinician-patient relationships

The relationship between clinician and patient in the clinical encounter is a fundamental aspect of the health care system.[7] Previous studies have indicated that there is a lack of high-quality research and evaluation regarding consultation dynamics.[8][9][10]

One metric of assessing the quality of the clinician-patient relationship is patient satisfaction.[11] Patient satisfaction is related to the clinician-patient relationship,[12] the quality of health care,[13] and adherence to medical treatment.[14] While many dimensions may contribute to patient satisfaction such as waiting time, hospital location, care delivery, and communication skills,[15][16] the quality of communication with clinicians can influence patient perceptions of their clinicians and the quality of care they are receiving. One report has suggested that 85% of patients changed or were considering changing their physician due to poor communication skills.[17]

Empathy, as it applies to clinicians, is defined as the socio-emotional competence of a physician to be able to understand the patient's situation (perspective, beliefs, and experiences), to communicate that understanding and check its accuracy, and to act on that understanding with the patient in a therapeutic way.[9][18][19] Empathy may be a core component of the medical relationship and has been linked to other important interpersonal interaction variables such as patient trust and satisfaction.[7] Health systems researchers have made connections between empathy and other outcomes, such as enhanced adherence, patient satisfaction, patient enablement, and information exchange.[20][21][22][23][24] Studies have illustrated the importance of these outcomes to patient assessments of their clinician's empathy.[24] Developing empathy is key to building a solid base for the clinician-patient relationship. Empathy has been investigated in clinical encounters,[25][26][27] but there is very little evidence that links empathy, satisfaction, and nonverbal behavior to health encounter outcomes. Investigating these linkages is important since such social processes and outcomes may relate to the effectiveness of clinical encounters regarding behavior changes. For example, emotional rapport may influence the effectiveness of behavior change counseling for overweight and obese patients.[28] The study described in this manuscript explores nonverbal interactions in the clinical encounter in relation to patient perceptions of the clinician's empathy.

Nonverbal behavior in clinician-patient interaction

Nonverbal communication is defined as the aspect of communication that information is exchanged through nonverbal cues which are not purely linguistic in content,[29] such as gesture, touch, posture, facial expression, eye contact, clothing and hairstyle.[30] Investigating the clinician-patient relationship, there were significant amount of research focused on verbal communication between clinician and patient.[31][32] On the contrary, nonverbal behavior

among clinician-patient relationship has been less studied.[30] Many studies focus on how the clinician's nonverbal behavior affects the patient's perspective, such as patient satisfaction.[6] However, there is a growing awareness of the value of nonverbal communication; more and more studies have focused on quantitatively evaluating nonverbal behavior. Coding systems for nonverbal interaction have been developed, such as Nonverbal Communication in Doctor-Elderly Patient Transactions (NDEPT),[33] Nonverbal Accommodation Analysis System (NAAS),[34] Relational Communication Scale for Observational Measurement (RCS-O),[35] and some instruments used in studies of the effects of physician gender on nonverbal behavior.[36] Developing validated methods and reliable analysis tools are still needed to evaluate nonverbal communication in clinician-patient relationship.[37]

Eye gaze is a particular point of interest in nonverbal cues related to understanding trust, empathy, and rapport. The role of directed gaze in clinician-patient interaction has been explored in previous studies. In one study 34 patient-physician visits at a family medical center were videotaped; after the session all patients completed a survey about their satisfaction with the clinician. Each tape was reviewed at 40-second intervals and coded for nonverbal behaviors. The results suggested that the clinician's gazing at the patient was not significantly related to the patient's satisfaction.[38] In addition, studies have explored eye contact with computers in clinical encounters. Margalit and colleagues[39] found that computers affected communication patterns between patients and clinicians, and they recommended using caution regarding the implementation of technologies in clinical encounters. In another study, Harrigan and colleagues [40] conducted an empirical study of 36 videotaped family medicine residents' interviews with patients. Nonverbal behavior was coded using a coding system, and each video was rated for rapport and connection between clinician and patient. Eye contact between the clinician and the patient significantly related to patient ratings of rapport and satisfaction.

Touch is another nonverbal interaction that is important for the development of empathy. For example, clinicians sometimes touch their patients to express caring and empathy.[41] Generally, there are two different types (see Table 1) of touch in the consultation: physical touch and therapeutic touch.[42 Others have described these types of touch as diagnostic touch and healing touch.][43] Although they have different names, the action and purpose of the touch are the same. In this study, task touch and social touch are used to distinguish the two forms of touch. Task touch is touch that has a clinical purpose, such as a clinician's touch during an examination, and social touch has specific social meaning, such as a handshake.

Table 1. Type of Touch [a]

Type of Touch	Definition	Example
Task Touch/ Physical Touch/ Diagnostic Touch	A touch has a clinical purpose/ A natural part of performing nursing activities and tasks/ A necessary maneuver to signal and establish the caregiving bond	Examine the patient's body, such as ear, throat Use stethoscope to listen to the heart rate
Social Touch/ Therapeutic Touch/ Healing Touch	A touch has a specific social meaning/ touch in a caring context/ the meaning is toward the patient	A handshake, hug, or pat on the back

a.

Data from Chang [42] and Bruhn [43]

Goals and Hypotheses

The goal of this study was to explore the relationship between nonverbal behaviors and patient perceptions of clinician empathy in clinical encounters. The following three hypotheses were proposed:

- HI: Eye contact between clinician and patient during the health encounter will be positively related to the patient's perception of the clinician's empathy.
- HII: Social touch will be positively related to the patient's assessment of the care provider and to perception of the clinician's empathy.
- HIII: Eye contact between clinician and patient will be positively related to patient ratings of liking and connectedness.

Methods

Study Design and Sample

The data for this study come from a larger study that assessed the effects of a placebo, Echinacea, and clinician-patient interaction on the common cold. The protocols of both this study and the larger study were reviewed and approved by the Institution Review Board (IRB). A summary of the methodology was published previously.[44] All participants had cold symptoms and were seen by clinicians with whom they did not have a previous relationship. There were 350 participants in the main study, all of whom were at least 12 years of age. Data from 110 of these encounters are included in the study described in this paper, as the videos for these encounters were of high enough quality to reliably evaluate nonverbal interactions. All visits were videotaped, and after each visit the patients completed questionnaires.

There were 110 patients, and the mean age was 34.2 (from 12.2 to 71.8). The patients consisted of 41 male and 69 female patients (see Table 2 for more detail). Six clinicians (five family physicians and one family nurse practitioner) participated in this study. Only videos that were of sufficient quality to analyze nonverbal interaction were evaluated in the study described in this manuscript, totaling 110 videos. The mean length of the interaction was 203.0 seconds, ranging from 26.3 seconds to 642.5 seconds.

Table 2. Demographic Characteristics of the Patients (N=110)

	%(*n*)
Age in Years (mean/SD):	34.16/15.65
<20	23.6(26)
20-29	23.6(26)
30-39	16.4(18)
40-49	19.1(21)
50-59	11.8(13)
60+	5.5(6)
Sex:	
Male	37.3(41)
Female	62.7(69)
Education:	
Some High School	11.1(12)
High School grad/GED	6.3(7)
Some college/Tech School	21.7(24)
College grad/post grad	50.9(56)
No Answer	10.0(11)
Income:	
Less than $15,000	6.4(7)
$15,000 to $25,000	10.0(11)
$25,001 to $50,000	20.0(22)
$50,001 to $75,000	20.0(22)
$75,001 to $100,000	21.8(24)
More than $100,000	14.5(16)
No Answer	7.3(8)

Procedure

Coding is a process of disaggregating data and breaking it down into manageable, measurable units. The videos were coded using a coding scheme developed by Montague and colleagues [45] to temporally classify nonverbal behaviors in the video. Specifically, each behavior was coded for its duration over the course of the visit. Videos were coded with Noldus Observer XT 9.0 computer software. In this program, using a coding scheme, we were able to code the start and stop times of a certain behavior in the video.

The researchers developed a coding procedure for the coders to maintain appropriate reliability between coders and to ensure that the mental workload during the coding was appropriate. Videos were reviewed twice during coding. The coders coded the patient's

behavior during the first review and the clinician's behavior during the second review so that they could concentrate on one individual's behavior at a time. During coding, the video was reduced to half-normal speed in order to ensure that coders were able to precisely capture the moment when a behavior started or ended.

To train the new coders, the researchers developed a manual to introduce the coding software and procedures. A discussion was held between the new coders and the primary coders to explain the definition of the elements in the coding scheme. Afterwards, the new coders carefully observed the primary coders code a video. The new coders then practiced coding individually and compared their results to the primary coders' results. They were considered qualified for coding research data when their proportion of agreement reached 0.70 with the primary coders; otherwise, they were asked to continue practicing. After coding the videos, reliability analyses were performed for the entire data set. All the coded data were exported to SPSS 11.5 for Windows for further analysis.

Three primary coders implemented the coding scheme. Before the final coding process started, each coder coded five training videos to ensure accuracy and reliability in code classification. During final coding, reliability was checked weekly by assigning the same video for all the coders and calculating the proportion of agreements using Cohen's Kappa coefficient. The average value of proportion of agreements and Cohen's Kappa coefficient of all the reliability check videos was 0.54~0.82 and 0.50~0.80, respectively. Reliability was calculated using a conservative metric of 1 second, meaning that disagreements longer than 1 second between coders would lead to a reduction in reliability. According to Bakeman ,[46] a Kappa value of 0.60 to 0.75 is considered good for inter-coder reliability, and over 0.75 could be considered excellent. For our study, the average reliability among high-quality and low-quality videos was 0.76 and 0.74, respectively. A detailed report about the reliability at each checkpoint is shown in Table 3.

Table 3. Reliability Report

		Week 1	Week 2	Week 3
Average	Proportion of agreements	0.70	0.79	0.79
	Kappa	0.67	0.77	0.77
Range	Proportion of agreements		0.78~0.80	0.76~0.82
	Kappa		0.76~0.78	0.74~0.80

Measures and Data Analysis

Participants completed survey instruments immediately following the consultation. Questionnaires measured patient's perception of the clinician's empathy using the CARE instrument, which has been both qualitatively and quantitatively validated and has shown good reliability.[18][47][48] The CARE measure has ten questions, each of which has a scale from 1 to 5; therefore, the maximum total score is 50. All questions are listed in Table 4. After

video coding, the Noldus Observer XT 9.0 program was used to calculate eye contact by recording the percentage of clinician-patient gaze in a consultation.

Table 4. Questions of the CARE Measure and Satisfaction

The CARE Measure
The 10 questions asked of the patients, all of which started with "How was the clinician at…?":
1….making you feel at ease 2….letting you tell your "story" 3….really listening 4….being interested in you as a whole person 5….fully understanding your concerns 6…showing care and compassion 7….being positive 8…explaining things clearly 9….helping you to take control 10….making a plan of action with you
Satisfaction
How much did you like this clinician? How connected did you feel to him/her?

For the variable touch, the coder would code each time the clinician touched the patient. This variable was operationalized into two categories, social touch (eg, handshakes) and task touch (eg, touch related to examination or clinical tasks). The results describe the number of times that the clinician touched the patient and the duration of the touch.

In this study, consultation length was defined as the period starting from the clinician's entrance into the consulting room to the time the clinician left the room. There were three parts to the consultation: the pre-exam period, the physical exam, and discussion after the exam. The coder would code each time period, with the visit time being the entire consultation length minus the exam time. The reason that the exam time was excluded was related to poor video angles. In the videos, the exam table is often out of range for a period of time; impacting the coder's ability to accurately trace the clinician's or the patient's gaze.

Ratings from patients' surveys and interaction data (eye contact and frequency of social touch) attained from Observer XT 9.0 were analyzed. To analyze the data using a linear regression analysis, certain assumptions were required.[49] Independence of errors assumption was taken to be true, as the participants had no contact with each other. Homogeneity of variance was also accepted to be true given that all participants were representative of the population. To ensure that the errors followed a normal distribution, Shapiro-Wilk normality test was used. The results show that the null hypothesis was retained, which means the errors followed a normal distribution.

First, bivariate regression was used to analyze the data set where CARE score was a dependent variable and visit length and percentage of eye contact were separate independent variables. In addition, multiple linear regression was used to test the interaction between visit length and percentage of eye contact. Then, the frequency of touch was conducted as an independent

variable to predict the CARE score. Third, a bivariate linear regression model was fit to the data set using the connectedness and liking scores as dependent variables; visit length and percentage of eye contact were separate independent variables. R2 provided the validity between these variables. Table 5 shows the descriptive statistic of the variables of interest in detail.

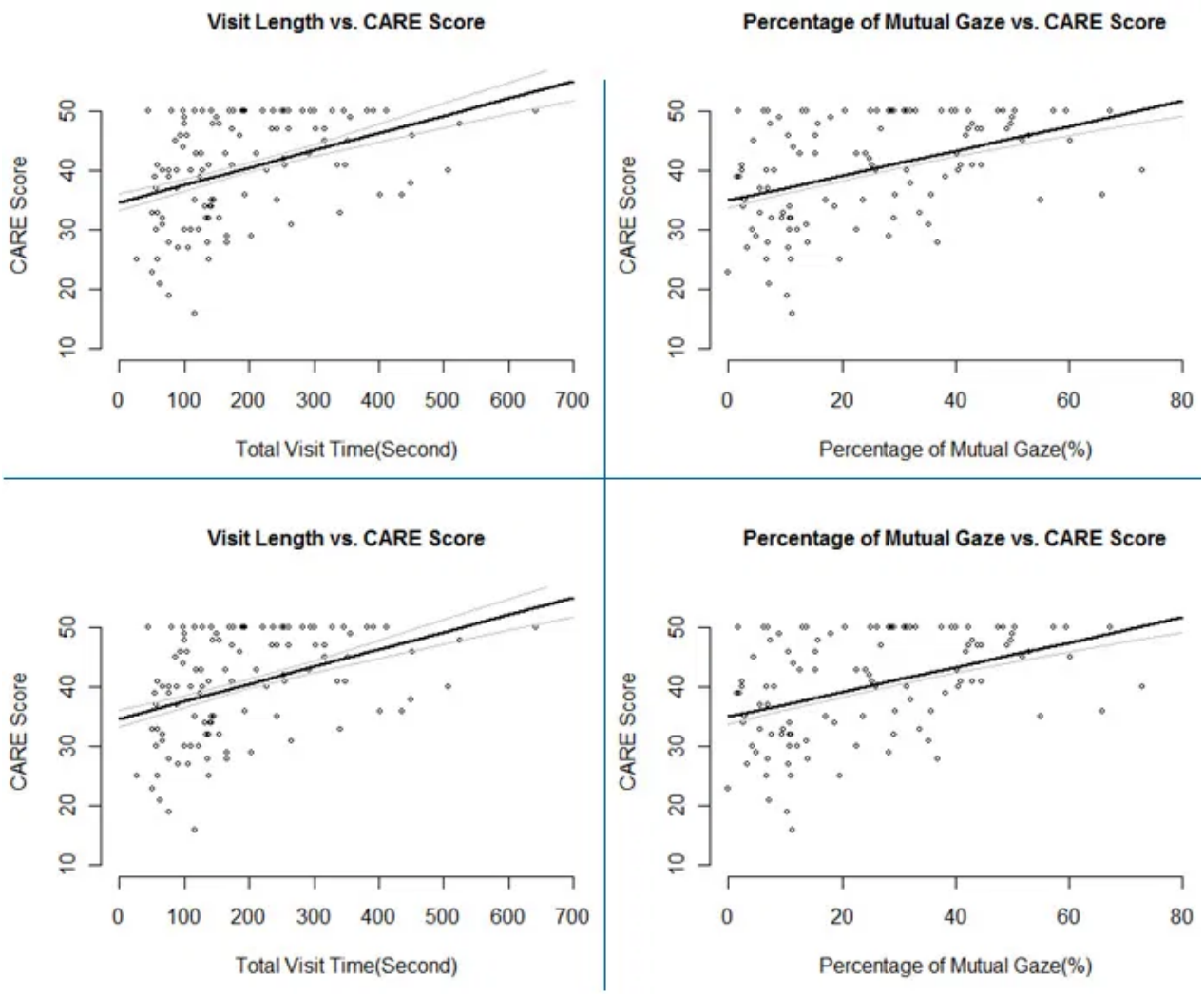
Table 5. Descriptive Statistic for Items in the Model

Variable Description	*M*	*SD*
Visit Length (in seconds)	192.79	122.83
Nonverbal Behavior		
% of eye contact	25.37	17.85
Frequency of social touch	0.93	1.27
CARE Measure	40.34	8.74
Satisfaction		
Liked	4.05	0.99
Connected	3.25	1.22

Results

Behavior, Visit Length, and Empathy

First, the data were analyzed separately with bivariate regression. A significant relationship was found between visit length and empathy, as illustrated in Figure 1 ($F(1,108)=21.84$, $p<0.001$, $R2=0.17$). Patients gave higher scores for empathy when the total visit length was longer. A significant finding was also found between the percentage of eye contact and empathy scores ($F(1,108)=24.01$, $p<0.001$, $R2=0.18$). Patients tended to give higher empathy scores when the percentage of clinician-patient eye contact increased. **Figure 1**. Relationship between CARE score, visit length, and eye contact.

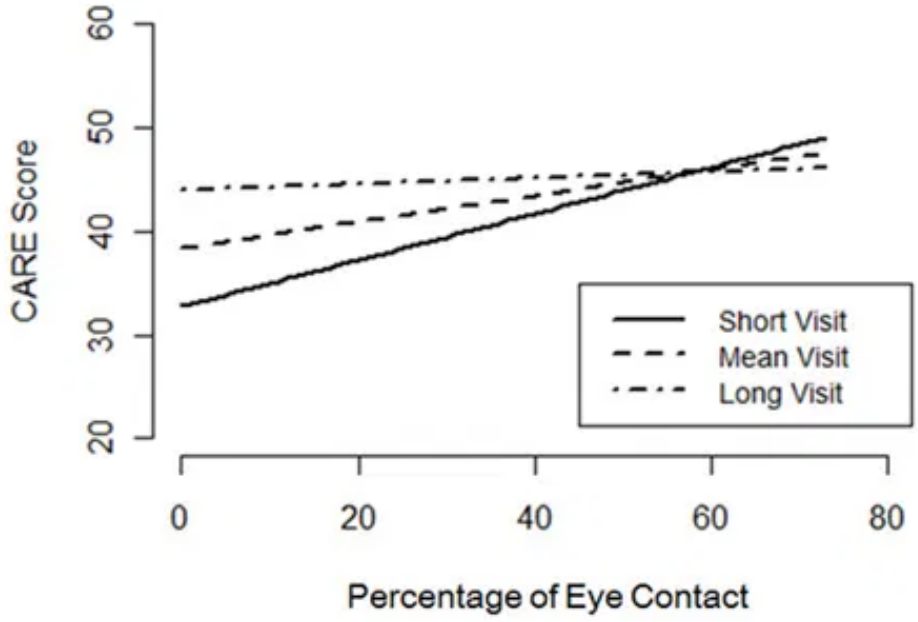


Note: Error bands represent ± 1 standard error of the point estimate in model.

To test the interaction between visit length and the percentage of eye contact, multiple linear regression was used to fit the model. All factors were mean-centered. The overall model accounted for a significant amount of variance in empathy score ($F(3,106)=11.45$, $p<0.01$, $R2=0.25$). A significant main effect of gaze was observed ($b=0.13$, $t(106)=2.09$, $p<0.05$), such that empathy score increased by 0.13 points for every one percent increase in eye contact for participants who experienced average visit time (192.79 seconds). However, visit length significantly moderated the percentage of eye contact at empathy score ($b=-0.0008$, $t(106)=-2.44$, $P<0.05$), indicating the magnitude of percentage of eye contact decreased 0.0008% for every one second increase in visit length. Figure 2 shows the effect of eye contact on empathy scores when the visit time is separated into three groups: short visit, average visit, and long visit. The short visit group is the mean visit length minus one SD. The mean visit group is the mean of visit length. The long visit group is the mean visit length plus one SD.

Figure 2 . Percentage of eye contact effect on CARE score when the visit length is held constant.

The relationship between empathy scores and the percentage of mutual gazing at the chart (shared chart use) was also analyzed. First, the linear model was fitted to the data set using CARE score as the predicted variable and the percentage of mutual gazing chart as the predictor variable. Second, a quadratic model was fitted to the same data set. From the result (see Table 6), the R2 for linear model is 0.04, the R2 for quadratic model is 0.09, and the



△R2=0.05. Therefore, the quadratic model could explain more variables than the linear model, and the results were significant. This means that when the percentage of mutual gazing at the chart is zero, the slope of the tangent line is 0.42. In other words, every one percentage increase in the mutual gazing chart would lead to a 0.42-point increase in empathy score. Figure 3 shows the relationship between the linear and quadratic models.

Table 6. Result of Linear Model and Quadratic Model Fitted for CARE Score and Percentage of Mutual Gazing Chart

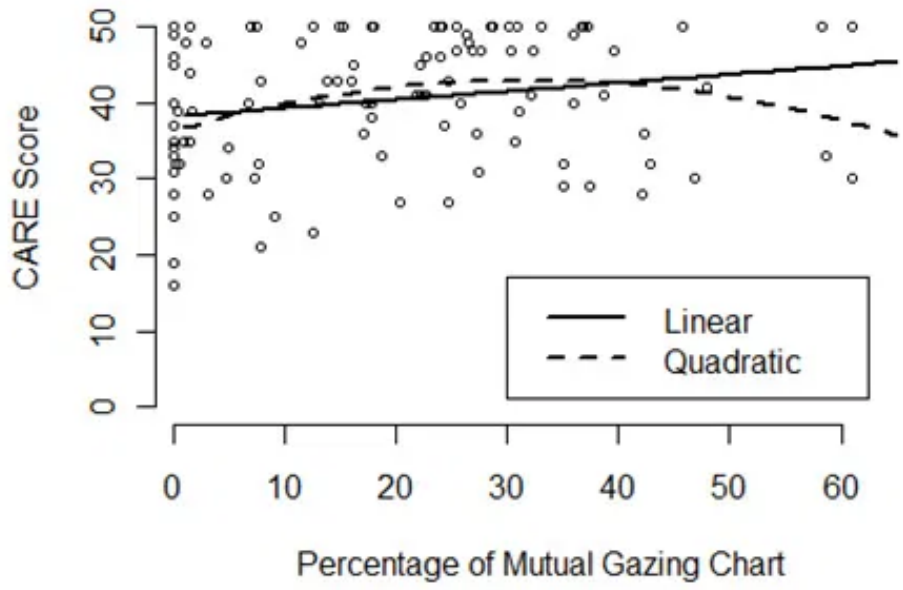
Linear Model: 38.20+0.11*(*Percentage of mutual gazing chart*)					
Residuals:					
Min	1Q	Median	3Q	Max	
-22.20	-6.25	0.68	7.73	11.80	
IV	Estimate	Std. Error	t	P-Value	95%CI(b)
Intercept	38.20	1.29	29.58	< 2e-16 ***	(35.64, 40.76)
Chart	0.11	0.05	2.14	0.038 *	(0.01, 0.21)
F(1,108)=4.58	$R^2 = 0.04$	Adjusted $R^2 = 0.03$		p-value=0.03	
Quadratic Model: 36.36+0.42*(*Percentage of mutual gazing chart*)-0.01*(*Percentage of mutual gazing chart*)^2					
Residuals:					
Min	1Q	Median	3Q	Max	
-20.36	-5.55	0.88	7.11	13.64	
IV	Estimate	Std. Error	t	P-Value	95%CI(b)
Intercept	36.36	1.47	24.67	< 2e-16 ***	(33.44 ,39.28)
Chart	0.42	0.14	3.07	0.002**	(0.15, 0.69)
I(Chart)^2	-0.01	0.00	-2.43	0.016 *	(-0.01, -0.00)
F(2,107)=5.34	$R^2 = 0.09$	Adjusted $R^2 = 0.07$		p-value=0.006	

*Note: Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*

Figure 3. Relationship between linear model and quadratic model fitted for CARE score and percentage of mutual gazing chart.

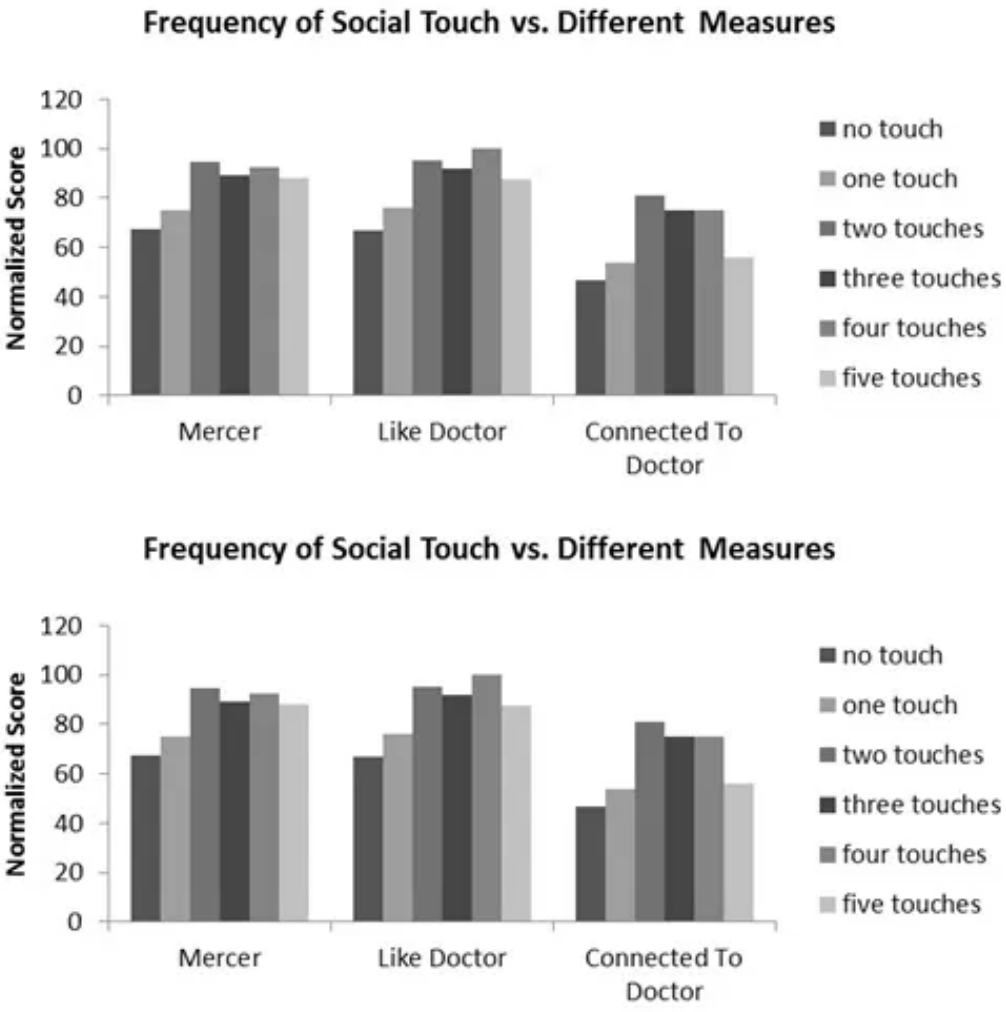
Touch and Empathy

Frequency of touch is also related to the empathy score. Although the simple predictor size is not large enough for statistic validity, the trend was illustrated. First, empathy measure and



satisfaction measures were normalized to a hundred-point system. Based on the frequency of social touch (no touch, 1 touch, 2 touches, to 5 touches), there are six separate groups. Figure 4 shows normalized scores of the different groups. As shown in the figure, there is a pattern among the scales: lower and higher frequency of social touch were related to lower scores.

Figure 4. Frequency of social touch and different scale.



Behavior and Patient Ratings

The relationships between behaviors and patient ratings of clinician exhibit significant differences in the regression linear test. In other words, different behaviors in the clinicians are

associated with significant differences in patient ratings of clinician and perception of empathy.

Summary of Model Testing Results

After examining the hypotheses presented in Section 1.3, the following results were found: (a) length of visit and eye contact between clinician and patient are positively related to the patient's perception of the clinician's empathy; and (b) the behavior is also directly related to the patient's ratings of clinician. Table 7 shows the statistical direct effects of the hypotheses.

Table 7. Hypotheses Test Results, Beta, and R2

	Hypotheses	Beta	R^2	P	Hypothesis supported?
H_1: Longer Visit Length → Higher CARE mercer scale	+	.41	.17	0.000	Yes
H_2: More Eye Contact → Higher CARE mercer scale	+	.43	.18	0.000	Yes
H_3: More Eye Contact → Like Doctor More	+	.44	.79	0.000	Yes
H_4: Longer Visit Length→ Like Doctor More	+	.38	.83	0.000	Yes
H_5: More Eye Contact → More Connected to Doctor	+	.39	.72	0.000	Yes
H_6: More Visit Length → More Connected to Doctor	+	.28	.47	0.003	Yes

Discussion and Conclusion

The results show that longer visit lengths are associated with higher patient perceptions of a clinician's empathy. This is consistent with previous research that shows that time is an important factor in the consultation.[50] Sometimes patients desire more time with the clinician to share their "story,"[51] [52] and they may feel guilty asking for help when the clinician seems rushed.[53] Based on the interaction test between percentage of eye contact and visit length, the percentage of the effect of eye contact is influential in increasing the empathy score when the visit length is short. As the visit length increases in length, the effect of eye contact decreases. In other words, the percentage of eye contact is an important indicator for the patient's perception of empathy when the consultation length is short.

In this paper, the clinicians used a paper-based chart to explain symptoms and to take notes. Hence, the relationship between percentage of mutual gazing chart (or shared chart use) and empathy score was analyzed. Surprisingly, the relationship is not linear, but quadratic (see Figure 3). Increasing percentage of mutual gazing chart does not lead to higher empathy score nor decrease it. Recently, chart use has been replaced by technologies such as mobile devices and electronic health records (EHRs). Therefore, we can put more emphasis on optimizing the length of time for the clinician and the patient to pay attention on the chart being used.

The results also show that increasing social touch during the health encounter does not increase patient ratings as expected, but social touch can lead to better patient assessment of clinician in moderation. Specifically, patient ratings of liking and connectedness increased with social touch to a point, but decreased when done in excess. At this point we cannot infer how much touch is best, but the results shown in Figure 4 hypothesize that two social touches in a consultation may be ideal. Hall and colleagues [[54] mentioned the notion that receiving too

much of a good thing, in terms of nonverbal interaction, may not be desirable and therefore advocates for appropriate nonverbal behavior. Future research should explore the relationship between social touch and patient-clinician outcomes.

In this study, two questions were used to measure patient perceptions of clinicians (connectedness and liking). The results show that the relationship between the empathy measure and the patient liking the clinician are statistically significant. Patient connectedness to the clinician can also be predicted with the empathy measure. The relationship has a positive linear correlation; high scores on the empathy measure are associated with higher ratings of the patient liking the clinician. Results are consistent with previous research that states that patient positive perception of clinician can be increased by increasing the clinician's empathetic behavior.[55]

We expected that eye contact would be associated with higher ratings of empathy. When eye contact between the clinician and the patient is explored through one-way interaction (only patient gazes at the clinician, or only clinician gazes at the patient), the amount of patient gaze at the clinician does not affect the empathy score. However, when the percentage of clinician gaze at the patient increases, the empathy score increases. In conclusion, the nonverbal behavior of clinician gaze directed at the patient is likely important for ratings of empathy.

Technology in Clinical Encounters

Fundamental to the care providing process is the patient-provider relationship. However, this relationship is increasingly mediated with technology. Computer-supported cooperative work scholarship looks at how collaborative activities and their coordination can be supported with technologies such as computer systems.[56] In a computer-supported cooperative work paradigm, technology-mediated interaction includes technologies used by multiple people based on time and place (see Table 8):

- Different time and same place (eg, room schedules, surgical whiteboards).
- Different time and different place (eg, email, newsgroups).
- Same time and different place (eg, virtual mediated communication, remotely shared documents such as physicians sharing x-rays, MRIs, virtual communities).
- Same time and same place, such as using a device or technology in the same place collaboratively (eg, electronic health records, digital whiteboards).

Table 8. Computer-Supported Cooperative Work-Place-Time Matrix [b]

	Same Time (synchronous)	Different Times (asynchronous)
Same Place (collocated)	Synchronous Collocated	Asynchronous Collocated
Different Places (distributed)	Synchronous Distributed	Asynchronous Distributed

b.

Data from Johansen.[57]

Computers and other technologies are becoming more prevalent in face-to-face health encounters between clinicians and patients. In clinical settings, trust and rapport are developed in face-to-face encounters. Interactions during these encounters are crucial to the development and maintenance of trust between the individuals. One of the tenets of this relationship is the patient's perception of the clinician's empathy. Nonverbal interactional cues may be masked in technology-mediated clinical encounters that are synchronous and co-located. The results from this study show that eye contact is particularly important in communicating empathy; therefore technologies and systems should be designed to facilitate positive face-to-face encounters. These results are similar to those reported by Gorawara-Bhat and colleagues ;[33] an environment that contains no desk, no height difference and optimal interaction distance could lead more eye contact. Future research should translate nonverbal interaction needs, such as eye contact, into design guidelines for health information technologies used in face-to-face encounters. These guidelines should also be incorporated into training for clinicians who must use technologies to provide care.

In order to better understand how technology may affect the formation of empathy in clinical encounters, it is important to have an understanding of the relationship between nonverbal interactions and relationship outcomes. Two factors of interest are eye contact and social touch. Both may be inhibited by the introduction of new technologies or other system interventions into workplace designs. One study about the relationship between clinical touch and patient satisfaction noted that touch is a significant predictor of patient satisfaction among those receiving medical services within the HIV/AIDS population].[58]

Limitation of this Study

This study was exploratory in nature, and its purpose was to direct future research in nonverbal interactions and patient outcomes. Several limitations should be noted: patient perceptions of clinician empathy were based on self-report, although the measures were assessed for reliability and validity .[47][48] The study was largely observational, and use of video-recording may have influenced behavior on the part of both the clinicians and the patients. The video cameras used to collect data may have influenced clinician and patient behavior.[59] Anecdotally, the researchers did not observe any signs that the participants behaved differently because of the video camera, but different results may be obtained with different observational methods. The sample of clinicians and patients were from a single community and domain (primary care), and all patients were being seen for the same symptoms. Results may differ in other health systems or geographic locations, and with different patients displaying different symptoms. Additionally, the clinicians were all self-identified as white and the patient sample was also relatively ethnically homogenous. Future studies should explore these variables in more diverse settings. More than one factor can affect a specific nonverbal behavior .[60] As an example, Schmid Mast and colleagues[36] claimed that the physician gender significantly affects patient's satisfaction and expectation. However, there are many moderators such as age, gender, education level, and economic status. In this paper, the patient's socioeconomic status (SES) was mainly middle to high. There

was no gender-related analysis in this paper; further study would be conducted in the next stage of the study.

Future Research

In this study, three elements were evaluated: Nonverbal Behavior, Empathy, and Patient Assessment of Clinician. In prospective studies, a fourth element—verbal communication—could be added to the analysis. Though the focus of this study is on nonverbal behavior and patient-reported outcomes, there is a large body of research on verbal behavior. A key area for future research in patient clinician interaction is to develop a connection between verbal behavior, nonverbal behavior, empathy, and patients' perception of clinicians.

Here we considered patient satisfaction and patient perspective on a clinician's perceived empathy. Because trust is a core ingredient in helping relationships, and trust is the confident expectation that others can be relied upon to act with goodwill and to secure what is best for the person seeking help,[61] further research on the patient's trust toward the clinician is needed as well. Ickes and colleagues [62] pointed out that trust and empathy are closely related, and it is also documented that empathy depends heavily on nonverbal cues in face-to-face communication .[62][63] Therefore, patient trust could also lead to better outcomes in health encounters.

The results indicate that eye contact between clinician and patient plays a key role in the consultation. Two methods may increase clinician eye contact: first, training could be provided to teach eye contact enhancement during encounters. Secondly, health information technologies and work systems could be redesigned to increase clinicians' ease of use and decrease the obtrusiveness of the tools. With enhanced usability, clinicians might have less need to pay attention to a screen, allowing for more face-to-face interaction with the patient. More research is required to develop and understand how clinical space design relates to enhanced nonverbal interactions with health information technologies in primary care encounters.

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