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The impact of physician empathy on patient outcomes: A gender analysis

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Abstract

Background

Empathy in primary care settings has been linked to improved health outcomes. However, the operationalisation of empathy differs between studies, and no study concurrently compared affective, cognitive, and behavioural components of empathy regarding patient outcomes. Moreover, it is unclear how gender interacts with the studied dimensions.

Aim

To examine the relationship between several empathy dimensions and patient-reported satisfaction, consultation's quality and trust in physician, and to determine whether this relationship is moderated by physician's gender.

Design and setting

Analysis of 61 primary care physicians' empathy in relation to 244 patient experience questionnaires in French-speaking part of Switzerland.

Method

Sixty-one physicians were videotaped with two male and two female patients. Six different empathy measures were assessed: two self-reported measures, a facial recognition test, two external observational measures, and a Synchrony of Vocal Mean Fundamental Frequencies (SVMFF), measuring vocally coded arousal. After the consultation, patients indicated their satisfaction, trust, and quality of the consultation.

Results

Female physicians self-rated their empathic concern above their male counterparts, whereas male physicians were more synchronised to their patients. SVMFF was the only significant predictor of all patient outcomes. Verbal empathy statements were linked to higher satisfaction when the physician was a man.

Conclusion

Gender differences were observed more often in self-reported measures of empathy than in external measures, indicating a probable social desirability bias. SVMFF significantly predicted all patient outcomes and could be used as a cost-effective proxy of relational quality.

Keywords: general practice, empathy, empathy measures, gender, stereotypes, satisfaction

How this fits in

The operationalisation of empathy differs between studies and we do not know whether different empathy dimensions impact patient experience differently. This study examined the relationship between 6 empathy measures and patient satisfaction, trust, and quality of the consultation. As empathy is stereotypically viewed as a feminine quality, gender of physicians was taken into account. This study pointed out stereotype influence on the self-reported empathy, with male physicians self-reporting lower empathic concern, but no gender difference in most of the behaviorally based empathy measures, and a significant link between synchrony of mean fundamental frequencies and patient outcomes.

Introduction

Empathy in primary care settings has been linked to improved health outcomes, such as patient satisfaction, adherence to treatment and by trickle effect fewer malpractice complaints.¹ However, there is yet no consensus on the definition and operationalization of empathy, making cross-study comparisons challenging.²

A comprehensive definition of empathy has been proposed by Decety and Jackson: “Feeling what another person is feeling, knowing what another person is feeling, and having the intention to respond compassionately to another person’s distress”,³ which distinguishes an affective, cognitive, and acting component of empathy. When it comes to the operationalisation of empathy, instruments used to measure these components can be classified into three categories: self-reported questionnaires (level of agreement with various empathy-oriented statements describing oneself), tests (performance task in which there is a correct empathic answer), and observational ratings (behaviours coded by external evaluators). Many studies have reported on the beneficial impact of physicians’ empathy,^{4,5} nevertheless, no study has concurrently compared these different measures in regard to patient outcomes. Different outcomes are expected, because self-reported empathy, tests, and observed empathy do not measure precisely the same construct of empathy.⁶ Moreover, self-reported measures are more prone to biases (e.g. social desirability^{7 8 9}) than other measures.

Literature shows that empathy is highly influenced by gender. Stereotypically, women are considered as more prosocial than men,^{10,11} and female physicians self-assess their empathy higher than male physicians.¹² Though women are expected to show more empathy,¹³ it is unclear whether gender difference can be observed across different types of empathy measures. If this difference is primarily driven by gender stereotypes, it is likely that more gender differences will be observed in self-reported questionnaires than in tests or external observations of empathy.^{7,14} On the contrary, if empathy is indeed more enacted by female physicians as a result of natural predisposition and/or social construct,¹⁵ gender differences will be observed in tests and external observations of empathy as well. Finally, patients may evaluate the display of empathy differently when standing in front of a male or female physician. Indeed, patients evaluate positively female physicians behaving in line with expected gender roles (softer voice, less dominance), whereas a larger range of behaviour of their male counterparts is related to patient satisfaction.¹⁶

The present project strives to fill in the literature gap regarding the concurrent analysis of different empathy dimensions with a gender perspective. The specific aims of this study are to (1) investigate gender differences in

six different empathy measures, and (2) compare these empathy measures regarding their relation to patient outcomes, and (3) determine whether physician's gender impacts this relationship.

Methods

Study Design and Participants

The present study is a secondary analysis of data collected for a physician-patient communication study that received ethical approval from the regional ethic committees.²⁰ More than 400 general practitioners of the French-speaking part of Switzerland were contacted to participate in a study on patient-physician communication. In total, 61 physicians (43% female) participated in the study. This represents a convenience sample. After being enrolled in the study, they filled in online questionnaires and a test measuring their empathy and socio-demographic information.

Each participating physician was then videotaped with the 2 first female and 2 first male patients agreeing to participate (recruited in the waiting room during a usual day of consultation), ending with 244 videotaped consultations. Participating patients had to be over 18 years old, fluent in French and present no documented psychiatric disorder. At the end of the consultation, patients indicated sociodemographic characteristics, as well as their satisfaction with the consultation, quality of the consultation, and trust in the physician.

Measures

This study compared 6 different measures of empathy measured through self-reported questionnaires, an online test, and external observation (described in Table 1).

Self-reported questionnaires of empathy

Physicians' self-reported empathy was measured with two subscales of the Interpersonal Reactivity Index,¹⁹ known for its internal consistency.²⁰ In the present study, we used the empathic concern subscale, which measured affective empathy, and the perspective taking subscale, which measured cognitive empathy.

Empathy test

Physicians filled in a validated emotion recognition test (the Diagnostic Analysis of Nonverbal Accuracy; DANVA)²¹ online. It consisted of 24 pictures of faces displaying one of four emotions (happiness, sadness, anger, or fear). Each picture was presented for 2 seconds and the physician indicated which emotion was displayed. The final score was the number of emotions correctly recognized.

Observational empathy

Three external observational empathy assessments were included in the present study.

Verbal empathy statements (VES) were measured with the Roter Interaction Analysis System,²² a validated coding system specifically designed for medical interactions. Certified coders classified the physician's speech in 41 categories. In order to measure VES, we applied a cluster used in previous studies in the field.²³ The number of statements of "Empathy", "Shows concern or worry", "Reassures, encourages or shows optimism", and "Legitimize" (see Table 1 for more details) categories were aggregated and divided by the total number of intelligible statements.

Overall rating of physicians' empathy was coded using the Therapist Empathy Scale (TES), a 9-item scale measuring behavioural display of empathy that showed internal consistency in past research.²⁴

The Synchrony of Vocal Mean Fundamental Frequencies (SVMFF) has been proposed as a cost-effective alternative to the very time-consuming behavioural coding.²⁵ This measure is based on the assumption that two individuals tend to synchronize their behaviour in highly empathic interactions,^{26 27 2829} and thus are expected to synchronize their mean fundamental frequency (MFF), which relates to emotional arousal.³⁰ Patients' and physicians' MFF was automatically measured every 0.25 seconds using Praat software version 5.3.82.³¹ The correlation between patient and physician's MFF was then computed across minutes while controlling for physician's and patient's gender (see Gaume et al.¹⁸ and Baldwin et al.³² for model details); ending with SVMFF scores ranging from -1 = total dyssynchrony (e.g., patient displaying elevation of voice pitch while physician uses low-pitch) to 1 = total synchrony.

Patient outcomes

Patient outcomes were measured with three commonly used measures in healthcare studies: satisfaction, quality of consultation and trust. These measures have been shown to relate to positive clinical outcomes such as less work impediment,³³ better adherence to treatment adherence,^{34,35} or higher quality of life³⁶ and were thus used as indicators of medical outcomes. We did not measure clinical outcomes as such. Satisfaction with the consultation was measured with the reversed single item: "I am not completely satisfied with my consultation with this doctor". Quality of the consultation was assessed with the reversed single item: "Certain aspects of my consultation with this doctor could have been improved." Both items originate from a validated scale^{37,38} and have shown good reliability in previous research.³⁹⁻⁴¹ Finally, patients indicated their trust in the physician with the average (Cronbach's alpha = .73) of four items (e.g., "I completely trust my doctor's decisions about which treatments are best for me").

. All outcome items were rated on a scale from 1 (not at all agree) to 5 (completely agree). Because of important ceiling effect (between 47% and 84% of the patients giving the maximum score), we dichotomised our outcome measures in 2 categories as follows: best score (5/5) versus any other score (1-4/5).

Covariates

Four covariates were included: patient gender, frequency of consultations with this physician, years since first consultation with this physician, and physician clinical experience (aggregation of physician's age, years since graduation, years of practice, and years since start of private practice; Cronbach's alpha = .97).

Statistical Analysis

In order to investigate gender differences in the six empathy measures we ran separate independent sample t-tests comparing female and male physicians scores for each measure. Due to skewness (indices between -0.94 and 0.94), we also ran nonparametric tests, which showed similar results and are thus not presented in the result section.

In order to compare the different empathy measures regarding their relation to patient outcomes, and to determine whether physician's gender impacted this relationship, we ran 18 logistic regression models (6 empathy measures x 3 outcomes). Finally, these logistic regression models were replicated with an interaction term between

physician's gender and the empathy measure in order to test for gender effect on the relation between empathy and patient outcome. Each model controlled for the four covariates. Robust estimation was applied and the nested structure of our data (4 patients nested in each physician) was accounted for with standard errors adjusted for the clustering of the data. All analyses were performed using Stata 13.0.⁴²

Results

Male and female physicians did not significantly differ in terms of age and experience but they differed in the number of years since their beginning of private practice (in average 2.9 years later for women, adjusting for their age) and in their working hours with more women working part time (Table 2). When it comes to patients, men and women were similar in terms of age, education, severity of reason for consultation, and frequency of visits with this physician (Table 2). The characteristics of the patients participating to the present study presented slightly lower level education, but similar age and health status compared to the general practitioners' patients of other Swiss studies.⁴³⁻⁴⁵

T-tests analysing physician gender differences in empathy measures showed that most empathy measures (4/6) did not significantly differ between female and male physicians (Table 3). Nevertheless, female physicians self-rated their empathic concern significantly above male physicians, and male physicians were significantly more vocally synchronised with their patient compared to female physicians.

As shown in Table 4, the logistic regressions testing the relationship between the empathy measures and the patient outcomes showed that SVMFF was the only empathy measure related to patient outcomes. The logistic regression models with gender X empathy interaction term showed that physician's gender did not significantly impact the relation between empathy measures and patient outcomes, except for VES on patient satisfaction. In this model, we observed a significant interaction between VES and physician's gender ($\text{Chi}^2= 18.28, p < .05, \text{OR}=1.33, \text{SE}=0.18, p < .05$). This result indicates that VES was linked to lower patient satisfaction when the physician was a woman, but to higher satisfaction when the physician was a man.

Discussion

Summary

This study aimed to compare 6 different empathy measures in relation to patient outcomes and physician gender. Our study points out gender stereotype influence on self-reported empathy, with male physicians self-reporting lower empathic concern, but not differing from female physicians in most behaviorally based empathy measures. The divergent results between emotional concern and behavioural demonstration of empathy or emotion recognition tests could suggest that self-reported measures were influenced by gender stereotypes, female physicians aligning their self-reported empathic concern with the stereotypical prosocial characteristics expected for their gender.⁷ Nevertheless, it is also possible that the number of opportunities to demonstrate empathy during these general practice consultations were too few, impeding any difference between female and male general physicians.

Synchrony measured with SVMFF showed a significant gender difference, with male physicians showing higher synchrony than their female counterparts. However, unlike the other empathy measures, synchrony was computed while considering both patient's and physician's behaviour. It might be the case that it was actually the patients

who synchronised their vocal frequencies more when facing a male physician and not the other way around. This could indicate that patients reacted to the status of power usually attributed to men (especially male physicians)⁴⁶ by aligning their vocal frequency to them. More studies are needed to back up this hypothesis.

Counterintuitively, whereas numerous studies have underlined the beneficial impact of empathy on patients' outcomes,^{6,12,62-68} this study revealed very few significant relationships between the empathy measures and patient outcomes, synchrony of vocal mean fundamental frequencies (SVMFF) being the only measure positively related to all outcomes. The setting of this study in primary care, with patients consulting for varied reasons such as hypertension control or laboratory tests feedback, might not have been the ground for an extensive demonstration of empathy. Thus, empathic display might have not been expected nor acknowledged by the patients, explaining why empathy measures failed to predict outcomes. Moreover, synchrony may show different results compared to the other empathy measures, because it englobes a broader concept than strictly empathy and could be considered as a proxy of relationship quality.

A higher count of verbal empathy statements (VES) was related to lower likelihood of patient satisfaction within consultations led by female physicians. This indicates that male physicians might be better rewarded than women when expressing their empathy. On the other hand, it is more surprising to observe that female physicians' verbal empathy is related to less patient satisfaction. As other studies in the field suggest,⁵⁴ female physicians' verbal display of empathy might actually trigger more patients' empowerment and enable them to feel more confident and dare to express more negative feedback, but more studies are needed.

Strength and limitations

The main strength of this study was to compare six measures of empathy covering the affective, cognitive, and behavioural components of empathy with outcomes. We used a variety of empathy measures (self-reported assessments), emotion recognition test, as well as external coding and a novel cost-effective proxy measure of empathy. However, VES and SVMFF encompass broader aspects of patient-physician communication than strictly empathy. Anyhow, the patient outcomes measured in the present study showed a typical high ceiling effect, which lowered the variance that could be explained by our statistical models. Furthermore, the context of general practice might carry fewer or subtler opportunities for empathic display as compared to other settings such as psychiatry or oncology.⁵⁵⁻⁵⁸ Moreover, our sample of voluntary physicians, interested in medical communication, tend to have high interpersonal skills which may have lowered the probability to reveal more important gender differences. Thus, the results of the present study might not be generalizable to the whole general practitioner population.

Comparison with existing literature

Our results showed that female physicians self-reported higher emotional concern than their male counterparts, in line with existing literature regarding medical students^{12,59,60} and physicians.¹² Similar results were reported in non-medical settings in youth⁶¹ and adults.⁶²

Synchrony measured with SVMFF showed a significant gender difference, with male physicians showing higher synchrony than their female counterparts. Unfortunately, research on synchrony of voice

frequency in clinical settings are rare, and studies focusing on other types of synchrony (facial mimicry, position, gesture, or lexical field alignment) report gender-aggregated data,^{29,63} or use same-gender dyads⁶⁴⁻⁶⁶ impeding any conclusion regarding gender-dyad differences.

SVMFF significantly predicted all of our patient outcomes. This result corroborates precedent studies showing that synchrony “embodies the patients’ self-reported quality of the relationship”²⁷ and is positively related to better medical outcomes,⁶⁷ therapeutic alliance,⁶⁸ and interpersonal trust.⁶⁹

VES was related to higher satisfaction within male-conducted consultations only, in line with other studies reporting that male physicians seem to be better rewarded than women for their use of a patient-centred communication style,^{70,71} and that female physicians with better emotional recognition skills have more ambivalent patient reactions than their male counterparts.⁵⁴

Implications for Research and Practice

In the present study, self-reported empathy displayed more gender differences in comparison to other coded empathy. This result challenges the common notion that female physicians are more empathic than their male counterparts and questions the influence of gender stereotypes and gender expectations on empathy. Nevertheless, opportunities to demonstrate empathy may have been too rare in the present study’s setting, and more research should be conducted in fields where empathy is more central, such as in oncology, palliative care or psychiatry. SVMFF significantly predicted patient outcomes, and could be used as a cost-effective proxy of relational quality in future studies. As SVMFF showed a significant gender difference, more gender studies of synchrony should be conducted in clinical settings to understand gender-dyad dynamics of synchrony.

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Ethical approval

The data collection protocol was approved by the Human Research Ethics Committees of Vaud (protocol number: 35/2013) and Geneva (protocol number: 13-064).

Competing interests

The authors declare no conflict of interest.

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Table 1. Measures of physician's empathy: Items, scales, missing, and Cronbach's alpha.

Variables
Self-reported measures
Empathic concern
7 Items: e.g., "I am often quite touched by things that I see happen." Scale: 1 = "Does not describe me well", 2 = "Rarely describes me well", 3 = "Sometimes describes me well", 4 = "Most of the time describes me well", 5 = "Describes me very well" Score: Mean of the 7 items (after reversing specific reversed items) N=58 physicians; missing values: N=3 (4.9%), Cronbach's alpha = .70
Perspective Taking
7 Items: e.g., "Before criticizing somebody, I try to imagine how I would feel if I were in their place." Scale: 1 = "Does not describe me well", 2 = "Rarely describes me well", 3 = "Sometimes describes me well", 4 = "Most of the time describes me well", 5 = "Describes me very well" Score: Mean of the 7 items (after reversing specific reversed items) N=58 physicians; missing values: N=3 (4.9%), Cronbach's alpha = .77
Empathy online test
Diagnostic Analysis of Nonverbal Accuracy (DANVA)
Participants are asked to determine which emotion is displayed in 24 portraits (happiness, sadness, anger, or fear) Scale: 0 = "False", 1 = "Correct" Score: sum of the number of emotions correctly recognized (0 to 24) N=58 physicians; missing values: N=3 (4.9%), Cronbach's alpha = .52
External coding of empathy
Verbal statements of empathy (VES) with the Roter Interaction Analysis System
Aggregation of the statement frequencies of 4 categories (physician statements only): <i>empathy</i> (paraphrasing, interpreting, recognizing or naming other's emotional state), <i>shows concern or worry</i> (indicate that a condition/event is serious, worrisome, distressing, or deserving special attention), <i>reassurance</i> (indicate optimism, encouragement, relief of worry, or reassurance), and <i>legitimize</i> (indicate that the other's actions, emotions, or thoughts are understandable and normal) Scale: number of statements per category divided by the total number of statements Score: mean across the 4 categories N=243 sessions; missing values: N=1 (0.4%)
Therapist Empathy Scale (TES)
9 items assessing affective, cognitive and attitudinal aspects of the physician's empathy such as concern for the patient, warmth, or understanding of the patient's feeling. Scale: 1 = "no display of empathy", 7 = "extensive display of empathy" Score: mean across the nine items N=241 sessions; missing values: N=3 (1.2%)
Synchrony of Vocal Mean Fundamental Frequencies (SVMFF)
Degree of synchrony of mean fundamental frequency of patient's and physician's voices Estimates read as correlation coefficients [-1 to +1], positive estimates indicating higher synchrony. N=202 sessions; missing values: N=40 (16.4%).

Table 2. Descriptive statistics.

Physicians' Variables	Female physicians (N = 26)					Male physicians (N = 35)					T-test
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	t
Age	25	50.5	9.1	33	70	33	51.6	8.1	39	65	0.99
No of years since graduation	25	23.5	9.1	3	42	33	25.8	8.2	13	40	1.98*
No of years since beginning medical practice	25	23.4	8.4	10	41	33	24.6	8.1	13	40	1.17
No of years since beginning private practice	25	12.5	8.8	1	33	33	16.6	10.1	2	34	3.29***
Physician's clinical experience (in years)	25	27.5	8.4	14.8	46.5	33	29.7	8.4	17	44.5	1.98*
Working time (%)	25	72.8	17.8	48	100	33	95.2	10.2	60	100	12.11***
Patients' satisfaction with consultation ^a	104	4.7	0.8	1	5	140	4.8	0.7	1	5	0.30
Patients' evaluation of consultation quality ^b	104	4.2	1.1	1	5	140	4.2	1.2	1	5	0.21
Patient's trust in physician ^c	104	4.6	0.5	3.25	5	140	4.6	0.6	2.5	5	0.78
Patients' Variables	Female patients (N = 122)					Male patients (N = 122)					T-test
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	t
Age	122	57.3	18.5	18	97	122	57.7	17.5	19	91	0.18
Years since first consultation with this physician	122	9.4	9.3	0	43	121	9.3	9.7	0	44	0.07
Patients' satisfaction with consultation ^a	122	4.8	0.6	2	5	122	4.7	0.9	1	5	1.56
Patients' evaluation of consultation quality ^b	122	4.3	1.2	1	5	122	4.1	1.1	1	5	1.09
Patient's trust in physician ^c	122	4.6	0.6	2.5	5	122	4.6	0.5	3.25	5	0.27
Education	N	%				N	%				Chi-Square
Mandatory school	33	27.1				22	18.0				4.68
Vocational training	51	41.8				58	47.5				
Tertiary education	23	18.9				23	18.9				
Advanced studies	14	11.5				15	12.3				
Bachelor degree	1	0.8				3	2.5				
Master degree	-	-				1	0.8				
Doctorate	-	-									
Frequency of visits to this physician per year	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	1.37
Less than once a year	19	15.7				18	14.8				
Once or twice a year	30	24.8				35	28.7				
3 or 4 times a year	28	23.1				28	23.0				
5 or 6 times a year	11	9.1				14	11.5				
More than 6 times a year	33	27.3				27	22.1				
Severity of reason for consultation	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	9.83
Not severe at all	59	48.4				48	39.3				
Moderately severe	43	35.3				50	41.0				
Severe	18	14.8				15	12.3				
Very severe	1	0.8				8	6.6				
Extremely severe	1	0.8				1	0.8				

*p < .05, **p < .01, ***p < .001.

^aScale : 1= Very bad satisfaction, 2= Bad satisfaction, 3= Okay satisfaction, 4= Good satisfaction, 5= Excellent satisfaction.^bScale : 1= Very bad quality, 2= Bad quality, 3= Okay quality, 4= Good quality, 5= Excellent quality.^cScale : 1= Very bad trust, 2= Bad trust, 3= Okay trust, 4= Good trust, 5= Excellent trust.

Table 3. Independent sample t-tests for empathy measures between female and male physicians.

Variables	Female physicians			Male physicians			T-test			
	M	SD	[95% CI]	M	SD	[95% CI]	t	df	p-value	Cohen's d
Empathic Concern	4.27	0.37	[4.13-4.42]	3.93	0.52	[3.75-4.12]	2.80	56	.007**	.75
Perspective taking	3.78	0.53	[3.56-3.99]	3.72	0.63	[3.50-3.96]	0.30	56	.763	.08
DANVA^a	18.08	2.70	[16.99-19.17]	18.06	2.53	[17.15-18.97]	0.02	56	.983	.01
VES^b	0.69	0.48	[0.60-0.78]	0.66	0.50	[0.58-0.75]	0.44	241	.659	.06
TES^c	3.43	0.77	[3.28-3.58]	3.25	0.76	[3.12-3.38]	1.84	239	.067	.24
SVMFF^d	0.29	0.29	[0.23-0.36]	0.41	0.22	[0.37-0.45]	3.14	202	.002**	.45

^a Diagnostic Analysis of Nonverbal Accuracy. ^b Verbal empathy statements. ^c Therapist empathy scale. ^d Synchrony of Vocal Mean Fundamental Frequencies

*p < .05, **p < .01, ***p < .001

Table 4. Logistic regression analysis of empathy dimensions predicting satisfaction, quality, and trust outcomes

	Satisfaction			Quality			Trust		
	OR	SE	[95% CI]	OR	SE	[95% CI]	OR	SE	[95% CI]
Empathic concern	0.43	0.23	[0.15-1.25]	0.64	0.16	[0.39-1.06]	0.70	0.26	[0.34-1.47]
Perspective taking	1.10	0.34	[0.60-2.03]	0.72	0.22	[0.39-1.32]	0.62	0.16	[0.38-1.03]
DANVA^a	1.10	0.10	[0.92-1.30]	1.00	0.05	[0.90-1.12]	0.93	0.06	[0.82-1.05]
VES^b	0.96	0.06	[0.84-1.09]	1.03	0.05	[0.95-1.14]	1.00	0.05	[0.91-1.10]
TES^c	1.76	0.64	[0.86-3.57]	1.21	0.26	[0.79-1.84]	1.09	0.22	[0.74-1.61]
SVMFF^d	4.59*	3.01	[1.27-16.56]	11.69***	7.85	[3.14-43.56]	3.61*	2.07	[1.17-11.13]

Note. Each empathy measure was run in independent logistic regressions; ending with a total of six models for each outcome (i.e. 18 models). Every model included the following covariates: frequency of consultations with this physician, time since the first consultation with this physician, an aggregate of highly correlated indicators of physician experience (physician's age, number of years since graduation, number of years of practice, and year of the start of private practice) as well as the patient's sex.

^a *Diagnostic Analysis of Nonverbal Accuracy.* ^b *Verbal empathy statements.* ^c *Therapist empathy scale.* ^d *Synchrony of Vocal Mean Fundamental Frequencies*

*p < .05, **p < .01, ***p < .001