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# Lay Perspectives on Empathy in Patient-Physician Communication: An Online Experimental Study

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## ABSTRACT

Research indicates that patients consider empathy as a key factor contributing to the quality-of-care. However, ambiguities in the definition of this multidimensional construct complicate definite conclusions to-date. Addressing the challenges in the literature, and using a hypothetical physician-patient interaction which explored patient-perceived differences between expressions of affective empathy, cognitive empathy, compassion and no empathy, this study aimed to test whether lay participants' evaluations of the quality-of-care depend on the type of empathic physician behavior, and on the physician's gender. We conducted a randomized web-based experiment using a 4 (type of empathy) by 2 (physician gender) between-subjects design. Empathy was subdivided into three concepts: first, affective empathy (i.e. feeling with someone); second, cognitive empathy (i.e. understanding); and third, compassion (i.e. feeling for someone and offering support). Perceived quality-of-care was the primary outcome. Compared with non-empathic interactions, quality-of-care was rated higher when physicians reacted cognitively empathic or compassionate ( $d = 0.71$ ;  $0.43$  to  $1.00$  and  $d = 0.68$ ;  $0.38$  to  $0.98$ ). No significant difference was found between affective empathy and no empathy ( $d = 0.13$ ;  $-0.14$  to  $0.42$ ). The physician's gender was not related with quality-of-care. Aspects of participants' personality but not their age, gender or the number of physician visits were associated with quality-of-care. No interactions were observed. In showing that patients rated quality-of-care higher when physician reactions were described as cognitively empathic and compassionate, as compared with affectively empathic or non-empathic, our findings refine views about the kinds of empathy that are important in patient care with implications for clinical practice, education and communication trainings.

## Introduction

Empathy is considered a fundamental attribute of quality-of-care in medical encounters (Jeffrey, 2016; Peabody, 1927). In clinical practice empathic physician behavior reflects “the ability to understand the patient's situation, perspective and feelings and to be able to communicate that understanding to the patient” (Coulehan et al., 2001, p. 221). Therefore, focus on empathy in theory and practice has been set on the physicians' communication skills, such as their verbal and non-verbal expressions of displaying empathy (Beck et al., 2002), and accordingly, empathy is listed as an essential learning objective, for instance, by the American Association for Medical Colleges (Anderson et al., 1998). Supporting these motivations, a growing body of empirical research suggests empathy in patient-physician encounters benefits patients (Derksen et al., 2013; Neumann et al., 2009; Shanafelt et al., 2005). In contrast to a broad recognition of empathy as an important factor in the physician-patient relationship in clinical practice, in both theory and research, there is an ongoing debate about possible differentiations of the broad concept of empathy.

## Conceptual challenges in empathy theory and research

Existing literature demonstrates considerable latitude in how empathy is interpreted (Batson, 2009; Coulehan et al., 2001; Halpern, 2003; Mercer & Reynolds, 2002; Pedersen, 2009; Rogers, 1975; Wanzer et al., 2004). According to Schrooten and de Jong (2017) many models and approaches tend to obscure the multifaceted nature of the concept by consolidating instruments of empathy into one single construct.

Psychologists and neuroscientists understand empathy as a complex multi-faceted concept that encompasses a variety of distinctive competences, and processes (Barrett Lennard, 1981; Coke et al., 1978; Davis, 1983; Jeffrey, 2016; Mercer & Reynolds, 2002). Based on neuro-anatomical sub-processes, different aspects of empathy have been suggested (Decety & Jackson, 2006): (a) an emotional simulation process that mirrors the emotional elements of the other's bodily experience with brain activation centering in the limbic system and elsewhere; (b) a conceptual, perspective-taking process, localized in parts of prefrontal and temporal cortex; (c) an emotion-regulation process used to soothe the personal distress at the other's pain or

discomfort, making it possible to mobilize compassion and helping behavior for the other (probably based in parts of the orbitofrontal, prefrontal, and right parietal cortex).

In line with the described neuro-anatomically based sub-processes health communication researchers as well as psychologists and neuroscientists often differentiate between affective empathy versus cognitive empathy, grounding these distinctions in evolutionary and neuroanatomical evidence (Shamay-Tsoory et al., 2009; Smith, 2006). *Affective empathy* is said to encompass an individual's capacity to feel something of what others are feeling (Decety & Jackson, 2006; Mercer & Reynolds, 2002; Shamay-Tsoory et al., 2009) and may include affective reactions to the observed experiences of others (Mehrabian et al., 1988). *Cognitive empathy* is interpreted as reflecting the capacity to identify, interpret and understand the mental states of other people, involving perspective taking (Decety & Jackson, 2006; Mercer & Reynolds, 2002; Shamay-Tsoory et al., 2009). In addition, many researchers further differentiate compassion and empathy (Klimecki et al., 2013; Preckel et al., 2018; Singer & Klimecki, 2014). *Compassion* integrates an emotional regulation aspect and is considered a distinctive capacity that involves feeling for someone's adverse predicament or emotional state (Decety & Jackson, 2006; Perez-Bret et al., 2016). Compassion, can be "characterized by feelings of warmth, concern and care for the other, as well as a strong motivation to improve the other's wellbeing" without sharing the suffering of the other, as "feeling for and not feeling with the other" (Singer & Klimecki, 2014, p. 875). Differentiating the concept from affective empathy, psychologists propose compassion does not involve the sharing of someone's subjective emotional state but does engage processes related to agency that are characterized by pro-social feelings toward another person (Bloom, 2016; Decety, 2020). Importantly, compassion includes a motivation to help (Keltner & Goetz, 2007; Singer & Klimecki, 2014). It is important to note that some academic physicians and researchers label these terms slightly differently. For example, some define sympathy using the definition that we have offered for affective empathy (Aring, 1958; Thirioux et al., 2016).

### Our study

Building upon the results of previous research in empathy and health communication, our goal was to focus on patient-physician interactions by upholding distinctions between affective and cognitive empathy, and compassion. While a wealth of research conducted within the field of health communication (Derksen et al., 2013; Mohammed et al., 2016; Stewart, 2001; Wanzer et al., 2004), and by health psychologists (Howe et al., 2019) suggests patients prefer physicians who demonstrate warmth, and understanding, this research does not signal patient preferences based on more nuanced differentiations of empathy. In addition, to our knowledge, there is no study that has explored whether distinctive expressions of empathy by male and female physicians are perceived differently.

Therefore, advancing current research, we investigated three research questions: First, does participants' rating of quality-of-care differ depending on empathic versus non-empathic

physician reactions? Second, do participants' ratings of the quality-of-care differ if the physician shows affective or cognitively empathic or compassionate reactions when compared with non-empathic reactions? Third, do participants' preferences for certain empathic physician reactions interact with the physician's gender?

We hypothesized that patients would rate quality-of-care higher in empathic and lower in non-empathic interactions. In addition, we expected differences on quality-of-care ratings between the different types of empathy when compared with no empathy. We had no clear hypothesis regarding which of the empathy conditions would be superior to the others. Based on previous findings (Bylund & Makoul, 2002; Hojat et al., 2002; Howick et al., 2017; Singer et al., 2006), we expected that participants' judgments would differ depending on physician gender, but we found it difficult to predict the exact direction of interaction. We included patient gender, age, the number of physician visits within the last six months and patient personality in the analyses because we assumed these variables to be related with quality-of-care ratings.

### Methods

The study had a  $4 \times 2$  between-subjects design, with two independent variables: First, four types of physicians' empathy (i.e., affective empathy, cognitive empathy, compassion, and no empathy), and second the physician's gender (female vs male). The manipulation of both independent variables was operationalized by presenting one out of eight short descriptive vignettes of hypothetical patient-physician encounters. Participants were randomly assigned to one of these eight conditions, using an automated computerized simple randomization procedure (i.e., not stratified).

The study was conducted online via the survey platform Limesurvey on September 20 2019. Recruitment was stopped automatically after the recruitment goal of 500 participants was reached. Participants were informed the study was anonymous and no personally identifying information would be collected. Participants who consented proceeded to the online survey. Those who did not agree to participate after reading the study information were debriefed and thanked.

The study was approved by the ethical review board of the Faculty of Psychology at the University of Basel on August 9 2019. All data were anonymized, and stored on servers of the University of Basel.

### Participants

Participants were recruited using the crowdsourcing tool MTurk ([www.mturk.com](http://www.mturk.com)). By conducting the survey online, we intended to reach a broad convenience sample of US residents aged 18 years or older, who were able to speak English fluently, and who had seen a physician within the past six months. Participants were offered \$2.00 for participation in our 10–15 minutes survey (based on the U.S. federal

minimum wage of \$7.25 per hour in 2019). Sample size was calculated with G\*Power (Faul et al., 2009, Appendix 1).

### Manipulation of the physician's empathic response

Based on previous literature we developed four written descriptions of hypothetical encounters reflecting the four types of physician empathy (Appendix 2): *Affective empathy* was characterized by the physician showing a visible emotional reaction (i.e., signs of sadness in physician's face, physician's eyes becoming moist, soft and shaking voice). *Cognitive empathy* was characterized by the physician stating that he or she recognizes the patient's difficulties (i.e., implicitly through listening attentively, and explicitly through acknowledging the patient's challenges). *Compassion* was characterized by the physician's overtly supportive commitment and motivation to help the patient (i.e., signs of warmth and kindness in his or her face, comforting statements). The *no empathy* condition was characterized by the complete absence of any personally attuned reaction from the physician, and his or her strict adherence to a professional but neutral communication. This condition served as a reference group (see Appendix 2). In a pilot study 10 out of 15 contacted scholars from psychotherapy and intervention research with expertise in empathy research checked the validity of the vignettes used for the manipulation of empathy types.

### Manipulation of the physician's gender

In addition, as gender differences have been shown to be relevant in research on empathy in previous studies (e.g., Bylund & Makoul, 2002; Singer et al., 2006), we investigated whether the physician's gender had an additional effect on participants' evaluations of the quality-of-care, both as independent predictor and in interaction with the empathic behavior manipulation.

### Measurements

We assessed several characteristics of the participants, including age, gender, ethnicity, education, English language skills, country of residence, the number of visits to a physician in the last 6 months, and their health condition. In addition, participants filled out the 30-item Big Five Inventory (BFI-2S) to assess three personality aspects, namely "open-mindedness," "extraversion" and "negative emotionality" (Soto & John, 2017).

The primary dependent variable was the participants' quantitative evaluation of six aspects reflecting quality-of-care,

measured on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree; see Table 1). The six items covered the following aspects: (i.) feeling cared for, (ii.) appreciating the physician's response, (iii.) considering the physician's response as helpful, (iv.) professional, (v.) desirable, (vi.) expecting a similar physician response. The 6 items showed moderate to large inter-item correlations (Table 1), and the summary scale of all six items showed a Cronbach's  $\alpha = .84$ , indicating good internal consistency.

### Data preparation

We first excluded 162 participants who did not fulfill our inclusion criteria (Figure 1). None of the participants showed an inappropriate answering pattern. The exclusion of participants who did not fulfill the inclusion criteria did not lead to significantly different group sizes. Second, we checked for missing data, and found quality-of-care data from all participants to be complete. Third, because of a skewed distribution of the quality-of-care variable we used transformation (Box-Cox transformation, <https://doi.org/10.7275/qbpc-gk17>).

### Statistical analyses

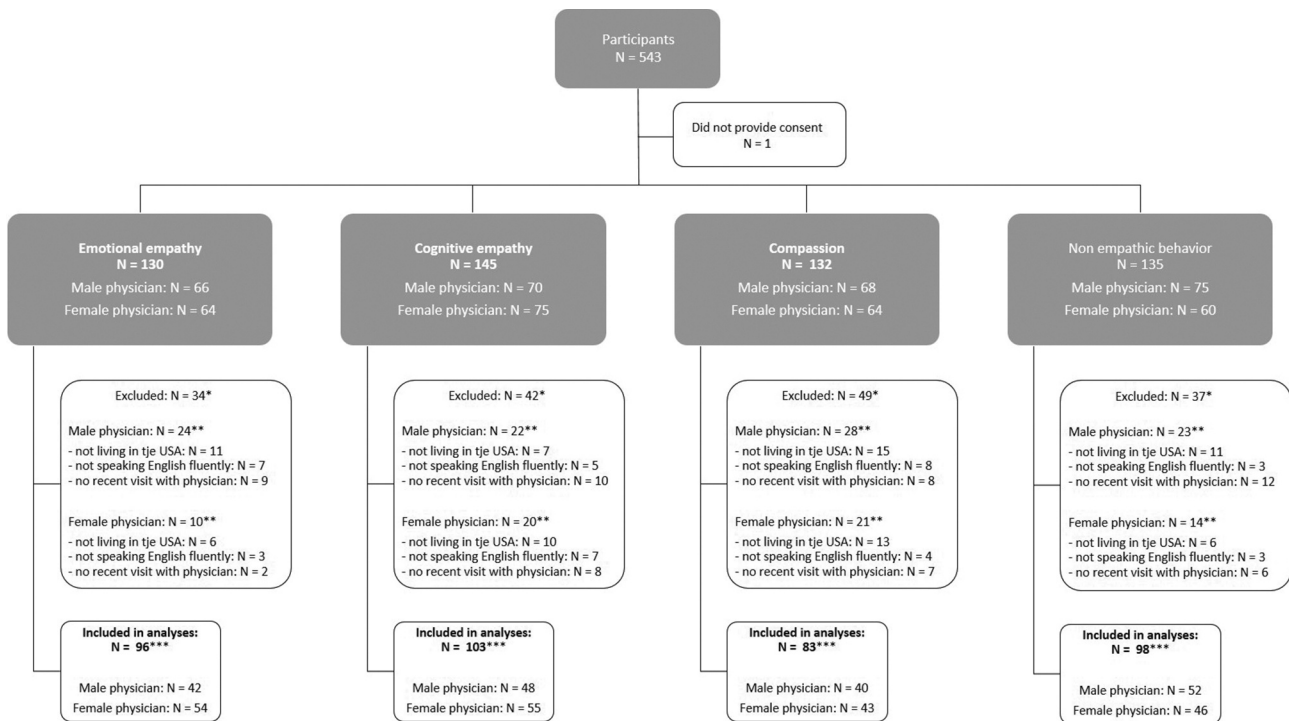
We first investigated the effects of a dichotomized empathy variable, distinguishing the three types of empathy (cognitive, affective, compassion) from non-empathic behavior, addressing our first research question. Second, we investigated potential differences using a four-level empathy variable (cognitive empathy, affective empathy, compassion, and no empathy), in order to address our second and third research question. We used analysis of variance for omnibus tests of effects of the level of empathy, physician's gender, and their interaction on perceived quality-of-care. Then, we used regression analysis to estimate effects for individual levels of these variables. Finally, we tested whether predefined patient variables (i.e., patient age and gender, the number of physician visits, or the participants' personality) acted as potential confounders using analysis of covariance (ANCOVA). All analyses were conducted using STATA. A two-sided  $p$  value  $< .05$  indicated statistical significance.

### Results

Table 2 shows relevant characteristics of the included study sample and Appendix 3 displays detailed characteristics of participants in the 8 experimental conditions.

**Table 1.** Inter-item correlations of the items assessing quality-of-care (dependent variable).

Item	1	2	3	4	5
1. The patient feels cared for by the doctor.	-				
2. The patient appreciates the doctor's response.	.64	-			
3. The doctor's response helps the patient.	.51	.54	-		
4. The doctor's response is professional.	.34	.44	.52	-	
5. The doctor's response is desirable.	.47	.54	.61	.58	-
6. If I were the patient in this story, I would expect my doctor to respond like the doctor in this story.	.25	.33	.39	.54	.47
Scale reliability coefficient (Cronbach's $\alpha$ ) = 0.84					



\*Because it was not possible to specify the inclusion criteria on MTurk in order to prevent participants not living in the USA, not speaking English fluently, and not having seen a physician in the past six months from participating in our study, 162 participants not meeting our pre-specified inclusion criteria had to be excluded after randomization had taken place.

\*\*Some participants fulfilled two exclusion criteria.

\*\*\*We did not identify any cases with inappropriate answering patterns (i.e., all answers rated with highest or lowest possible value, all answers with the scale mean, or inappropriate responses to the open-ended questions).

**Figure 1.** Allocation of participants to one of the eight groups according to type of empathic reaction and physician's gender.

**Table 2.** Summary of participant characteristics.

Number of participants included in the analyses	380
Gender	
Women	151 (39.74%)
Men	228 (60%)
No information	1 (0.26%)
Age	
M (SD)	36.49 (10.71)
Range	20, 72
Ethnic background	
White	249 (65.53%)
Black of African American	64 (16.84%)
Asian	19 (5%)
Hispanic	5 (1.31%)
American Indian	5 (1.31%)
Alaska Native	5 (1.31%)
Native Hawaiian	0 (0%)
Pacific Islander	0 (0%)
Unclear	4 (1.05%)

### Evaluation of the quality-of-care depending on the physician's empathic behavior and gender

In empathic physician communications perceived quality-of-care was higher than in non-empathic communications (Table 3). Further, we found a differential impact of the different types of empathic communication on quality-of-care: Cognitive empathy and compassion were associated with the highest quality-of-care ratings, with moderate effect sizes in contrast to no empathy (cognitive empathy:  $d = 0.71$ , 95% CI [0.43, 1.00], and compassion:  $d = 0.68$ , [0.38, 0.98]). In contrast, the effect size for affective empathy was small and non-significant compared with no empathy (affective empathy:  $d = 0.13$ , [-0.14, 0.42]). We

found no main effect for physician gender on quality-of-care ratings, and no interaction effect between type of empathy and physician gender on quality-of-care ratings.

We further tested the association of potential moderator variables with quality-of-care ratings: Participants' age, gender, and the number of visits with their physician were not correlated with quality-of-care ( $ps > .321$ ). However, participants' open-mindedness and extraversion were positively related with the participants' ratings of the quality-of-care ( $r = .25$  and  $r = .17$ ,  $ps < .001$ ), and participants' negative emotionality was negatively associated with the experienced quality-of-care ( $r = -.32$ ,  $p < .001$ ).

In a final model including type of empathy, physician's gender, and their interaction, as well as potential confounders (participant's age and gender, extraversion, negative emotionality, open-mindedness, and the number visits with their physician) and their interaction with type of empathy as predictors. Type of empathy remained a significant predictor of quality-of-care ( $F[3, 341] = 3.63$ ,  $p = .013$ ; see Appendix 4).

### Discussion

Empathic care is assumed to lie "at the heart" of good physician-patient communication (World Health Organization, 1993) and is described to be a core aspect of patient-centered communication (Stewart, 2001; Wanzer et al., 2004). We addressed previous concerns about conceptual vagueness in empathy research (Batson, 2009; Blystad & Hansen, 2022; Hall, Schwartz, & Duong, 2021; Hall, Schwartz, Duong, Niu et al., 2021;

**Table 3.** Mean quality-of-care ratings depending on the type of empathic physician communication and physician gender.

Model	<i>M (SD)</i>	<i>F</i>	<i>p</i>
2-leveled empathy		17.15	<.001
empathy	4.15 (0.67)		
no empathy	3.78 (0.83)		
4-leveled empathy		13.84	<.001
affective	3.89 (0.57)		
cognitive	4.29 (0.57)		
compassion	4.28 (0.60)		
no empathy	3.78 (0.83)		
Physician gender		0.86	.354
female	4.03 (0.74)		
male	4.08 (0.72)		
4-leveled empathy and physician gender		1.09	.352
affective empathy			
female	3.88 (0.75)		
male	3.9 (0.73f)		
cognitive empathy			
female	4.3 (0.58)		
male	4.29 (0.58)		
compassion			
female	4.16 (0.62)		
male	4.41 (0.56)		
no empathy			
female	3.78 (0.87)		
male	3.78 (0.79)		

Pedersen, 2009) by operationalizing sub-constructs of empathy. Using vignettes of hypothetical patient-physician interactions we showed that patients perceive quality-of-care to be highest in cognitively empathic and compassionate and lower in affectively empathic and non-empathic interactions, independent of the physician's gender. Our findings converge with recently published explorations (Decety, 2020; Hall, Schwartz, & Duong, 2021; Hall, Schwartz, Doung, Niu et al., 2021).

### Implications for research and practice

Our findings underline the relevance of distinguishing between different types of empathic physician behavior in practice and research. Especially with regards to possible burn-out in physicians due to empathic behavior our findings have relevant implications. Previously it has been shown, that training compassion may reflect a coping strategy which may contribute to strengthening resilience in physicians and reducing distress as compared with empathy trainings (Klimecki et al., 2013). In addition, a previous study (Thirioux et al., 2016) concluded that empathy was a protective factor of burnout as compared with sympathy (which was similarly defined as affective empathy in our study). Thus, taken together our results add to the suggestion that physicians should engage in compassionate rather than affective empathic interactions with their patients in order to avoid burn-out.

Unfortunately, previous studies comparing empathy and compassion did not distinguish between affective and cognitive empathy (Klimecki et al., 2013; Preckel et al., 2018; Singer & Klimecki, 2014). Our findings, thus, complement and extend previous findings in showing that from a patient perspective, understanding and support in physician communication is preferred over neutral and affective reactions by physicians. To the best of our knowledge, these differential findings have not been shown before.

Further research is warranted to explore whether our findings related to lay perceptions of sub-constructs of empathy and quality-of-care are upheld across different populations of patients, or whether results might be influenced by such factors as cultural background, clinical diagnoses or lived experience with illness. Research is also needed to explore how perceptions might be affected by nonclinical factors in the dyadic patient-clinician relationship, including patient and clinician race/ethnicity, relative socio-economic status, and personality traits.

### Strengths and limitations

Our study has several strengths. First, we used a set of vignettes as experimental between-subject manipulation, which were rated by experts in the field of psychotherapy or intervention research regarding their validity. This allowed for a high level of standardization in our study because the quality-of-care was evaluated with reference to a concrete physician-patient interaction. Second, blinded random allocation of participants to the experimental conditions allowed for a high internal validity of our study results. Third, we accounted for an additional factor, which could interact with the evaluation of the physician behavior, i.e., the physician's gender. Fourth, we controlled for the potentially confounding effects of several participant characteristics. Thus, our study was designed in a way that the risk of bias was minimized.

However, the study also has limitations. First, participants were not recruited using a stratified, random sample, and therefore may not be representative of the general population. We restricted our sample to U.S. residents in order to reduce potentially interfering effects with different healthcare systems in different countries. Relatedly it is unknown whether decision to participate was affected by personal traits. Therefore, it is unclear whether our findings generalize. Second, our dependent variable was self-constructed. Despite good internal consistency of the

measure, we did not validate the items against other measures with a similar scope. The differential associations with personality items can be regarded as confirming validity, however. Third, our vignettes were limited to one scenario; conceivably participants may have responded differently to empathy depending on the context. Fourth, we limited our analyses to the pre-defined moderator analyses, however, additional variables (e.g., social deprivation or ethnicity) or additional interactions (e.g., an interaction between patient and physician's gender) may have influenced the observed results. Fifth, we did not conduct a manipulation check with the participants. Instead, we chose to check the validity of the three empathy variations a priori in a pilot study. This approach has been suggested as a good alternative to a classical manipulation check (Hauser et al., 2018; Kidd, 1976). Sixth, our data were collected using MTurk, which has been criticized for potentially threatening the integrity of data (Dennis et al., 2020; Webb & Tangney, 2022). We carefully screened our data, including the inspection of answers to open-ended questions, and found no pattern of inappropriate answers over a number of responses to open questions. Finally, in vivo experiences with clinicians displaying distinctive dimensions of empathy in real world medical encounters may lead to different results when compared with our results based on a hypothetical medical interaction. We suggest that these limitations are considered when interpreting our findings and will be addressed in future research.

## Conclusion

Several medical educators promote the importance of empathy in patient care (Cooper & Tauber, 2005; Halpern, 2001; Jeffrey, 2016; Peabody, 1927). Our findings refine this assumption, in showing that specifically empathic reactions promoting compassion and perspective-taking, may be viewed as more desirable and considered more professional by patients than affectively empathic reactions.

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## Author contribution

HG: Conceptualization, Study Design, Methodology, Project Management, Funding Acquisition, Data Collection, Formal Analysis, Writing – original draft, Writing – review & editing.

TM: Formal Analysis, Writing – review & editing.

NK: Study Design, Methodology, Data Collection, Writing – review & editing.

CL: Methodology, Writing – review & editing

CB: Conceptualization, Study Design, Methodology, Writing – original draft, Writing – review & editing.

## Disclosure statement

No potential conflict of interest was reported by the author.

## Ethical approval

Ethical approval by the ethical review board of the Faculty of Psychology at the University of Basel (Nr. 013–19–2\_Amendment) on August 9<sup>th</sup>, 2019

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## Data availability and protocol

The data that support the findings as well as the pre-specified protocol of this study are available from the corresponding author upon reasonable request.

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## Appendix

### Appendix 1: Sample size calculation

To ensure a power of 0.80, assuming a small effect size ( $f=0.18$ ; corresponding to a Cohen's  $d=0.35$ ) and a significance level of  $\alpha=.05$ , 451 participants were needed for calculating ANCOVAs (fixed effects, main effects and interactions) with 8 study groups and 4 covariates (calculation done on June 27, 2019). Predicting we would have to exclude 10% of participants for not fulfilling our inclusion criteria, we aimed to recruit 500 participants.

### Appendix 2: Vignettes operationalizing the manipulation of the type of empathic reaction of the physician and of physician's gender

The vignettes were constructed in such a way to ensure a consistent structure of all vignettes with variations reflecting the manipulation of the two independent variables (i.e., physician's gender and empathy expression). Each vignette contained of a description of the patient's problem (constant across all 8 vignettes), the manipulation of the physician's reaction (in 8 different versions), and a closing remark (constant across all 8 vignettes). In a pilot study 10 experts who were blind to the study goals and to the definition of empathy types, independently rated the degree to which the four empathy vignettes reflected each of the four types of empathy on 5-point Likert scales (1 = not at all; 2 = somewhat; 3 = moderately; 4 = very well; 5 = excellent). Their feedback indicated a clear distinction between the content of the four vignettes, supporting the validity of our operationalization which we used as manipulation check. Based on the feedback of the 10 psychotherapy and intervention researchers, we slightly revised the wording of the vignettes in order to improve readability, clarity and structure.

#### 1: Affective empathy

"A patient visits the doctor, looking downcast, with hunched posture, and describing symptoms of very low mood. The patient tells the doctor that the last few months have been really difficult and becomes visibly upset, wiping away tears, as they describe personal and family problems. As the patient describes their problems, *the doctor shows signs of sadness in his/her face, and his/her eyes become moist. The doctor speaks to the patient with a soft and shaking voice.* The doctor then asks the patient questions relating to their symptoms. After some dialogue with the patient, the doctor makes a diagnosis, and he/she discusses a treatment plan with the patient."

#### 2: Cognitive empathy

"A patient visits the doctor, looking downcast, with hunched posture, and describing symptoms of very low mood. The patient tells the doctor that the last few months have been really difficult and becomes visibly upset, wiping away tears, as they describe personal and family problems. As the patient describes their problems, *the doctor listens attentively. He/she says that these experiences certainly sound challenging, and acknowledges that it is not easy to ask for help.* The doctor then asks the patient questions relating to their symptoms. After some dialogue with the patient, the doctor makes a diagnosis, and he/she discusses a treatment plan with the patient."

#### 3: Compassion

"A patient visits the doctor, looking downcast, with hunched posture, and describing symptoms of very low mood. The patient tells the doctor that the last few months have been really difficult and becomes visibly upset, wiping away tears, as they describe personal and family problems. As the patient describes their problems, *the doctor shows signs of warmth and kindness in his/her face. The doctor tells the patient that he/she is very sorry and will try to find a way to support the patient.* The doctor then asks the patient questions relating to their symptoms. After some dialogue with the patient, the doctor makes a diagnosis, and he/she discusses a treatment plan with the patient."

#### 4: No empathy

"A patient visits the doctor, looking downcast, with hunched posture, and describing symptoms of very low mood. The patient tells the doctor that the last few months have been really difficult and becomes visibly upset, wiping away tears, as they describe personal and family problems. As the patient describes their problems, *the doctor takes notes, and displays a neutral but engaged demeanor. He/she* asks the patient questions relating to their symptoms. After some dialogue with the patient, the doctor makes a diagnosis, and he/she discusses a treatment plan with the patient."

**Appendix 3: Detailed characteristics of study participants in the eight study groups (N = 380)**

	Affective empathy	Cognitive empathy	Compassion	Neutral condition/control
<b>Female doctor</b>				
Age: M (SD)	38.12 (11.59)	37.52 (11.35)	38.38 (12.29)	36.27 (9.85)
Gender				
Female	15 (35.71%)	18 (37.5%)	20 (50%)	24 (47.06%)
Male	27 (64.29%)	30 (62.5%)	20 (50%)	27 (52.94%)
Other	0	0	0	0
Ethnicity				
White	26 (61.90%)	35 (72.92%)	32 (80%)	28 (53.85%)
Black	8 (19.05%)	6 (12.5%)	2 (5%)	7 (13.46%)
Asian	5 (11.90%)	4 (8.33%)	3 (7.5%)	6 (11.54%)
Hispanic	3 (7.14%)	2 (4.17%)	1 (2.5%)	6 (11.54%)
Indian	0	1 (2.08%)	1 (2.5%)	1 (1.92%)
Other	0	0	1 (2.5%)	2 (3.85%)
Not assessed	0	0	0	2 (3.85%)
Education Level				
Less than H.S. diploma	0	0	1 (2.5%)	0
H.S. diploma	4 (9.52%)	3 (6.38%)	7 (17.5%)	5 (9.62%)
Some college	10 (23.81%)	10 (21.28%)	8 (20%)	16 (30.77%)
Bachelor's degree	24 (57.14%)	25 (53.19%)	19 (42.5%)	28 (53.85%)
Graduate degree	4 (9.52%)	9 (19.15%)	4 (10%)	3 (5.77%)
PhD	0	0	1 (2.5%)	0
Not assessed	0	0	0	0
Doctor's Visits				
1	13 (30.95%)	12 (25%)	19 (47.5%)	11 (21.15%)
2–5	23 (57.76%)	32 (66.67%)	20 (50%)	37 (71.15%)
6+	6 (14.3%)	4 (8.33%)	1 (2.5%)	4 (7.37%)
<b>Male doctor</b>				
Age				
M (SD)	35.57 (10.65)	35.6 (8.91)	34.44 (10.67)	36.55 (10.99)
Gender				
Female	25 (46.3%)	17 (30.9%)	14 (32.56%)	18 (39.13%)
Male	29 (57.7%)	38 (39.1%)	29 (67.44%)	28 (60.87%)
Other	0	0	0	0
Ethnicity				
White	35 (64.81%)	37 (67.27%)	28 (65.12%)	28 (60.87%)
Black	11 (20.37%)	8 (14.55%)	10 (23.26%)	12 (20.09%)
Asian	6 (11.11%)	4 (7.27%)	4 (9.30%)	3 (6.52%)
Hispanic	1 (1.85%)	3 (5.45%)	1 (2.33%)	2 (4.35%)
Indian	1 (1.85%)	0	0	1 (2.17%)
Other	0	1 (1.81%)	0	0
Not assessed	0	2 (2.3.64%)	0	0
Education Level				
Less than H.S. diploma	0	0	0	0
H.S. diploma	6 (11.11%)	6 (10.91%)	4 (9.30%)	3 (6.52%)
Some college	17 (31.48%)	18 (32.72%)	13 (30.23%)	14 (30.43%)
Bachelor's degree	22 (40.74%)	21 (38.18%)	20 (46.51%)	26 (56.52%)
Graduate degree	8 (14.81%)	6 (10.91%)	5 (11.63%)	3 (6.52%)
PhD	1 (1.85%)	3 (5.45%)	1 (2.33%)	0
Not assessed	0	1 (1.81%)	0	0
Doctor's Visits				
1	18 (33.33%)	18 (32.72%)	18 (41.86%)	23 (50%)
2–5	22 (59.26%)	29 (52.72%)	20 (46.51%)	15 (32.61%)
6+	4 (7.41%)	8 (14.55%)	5 (11.63%)	8 (17.39%)

**Appendix 4. Results from multivariable ANOVA model with participant rated quality-of-care as dependent variable, including the two independent variables, empathic behavior and physician gender, as well as all potential confounders as individual predictors and the interaction effects between empathy and all other variables**

Model and predictors	<i>F</i>	df	<i>p</i>
Multivariable ANOVA model	3.53	31	.00
<b>Type of empathy</b>	<b>3.63</b>	<b>3</b>	<b>.01</b>
Physician's gender	0.8	1	.37
Empathy*Physician's gender	0.59	3	.62
Participants' age	0.01	1	.90
Empathy*Age	1.14	3	.33
Participants' gender	0.22	1	.64
Empathy*Gender	1.53	3	.21
Physician visits	0.56	1	.46
Empathy*Visits	0.27	3	.85
<b>Open-mindedness</b>	<b>6.95</b>	<b>1</b>	<b>.01</b>
Empathy*Open-mindedness	0.43	3	.73
Extraversion	0.8	1	.37
Empathy*Extraversion	0.12	3	.95
<b>Negative emotionality</b>	<b>18.7</b>	<b>1</b>	<b>.00</b>
Empathy*Negative emotionality	0.79	3	.50

Note. ANOVA = analysis of variance; df = degrees of freedom; statistically significant results are printed in bold.