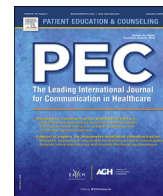




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“Very humble” vs. “Not humble”: What do ratings of fictitious physician profiles with humility descriptors reveal about potential patient preferences and behaviors?

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ABSTRACT

Objectives: The current study examined the impact of physician humility on future medical interactions and physician-related outcomes (e.g., patient patronage, loyalty) using a non-patient, community sample.

Methods: Participants ($N = 417$) were recruited online through Amazon Mechanical Turk (mTurk) and paid a nominal fee for their participation. They reviewed randomly assigned fictitious physician profiles that differed in humility (high, low), general effectiveness (high, low), physician gender (male, female), and specialty (family practice, orthopedic surgery). Then they reported their likelihood to trust, adhere to recommendations, and be satisfied with the physician. They also conveyed how likely they would select and recommend this physician to others, and how much out-of-pocket money they would be willing to spend to see the physician.

Results: Humble physicians were rated higher than their non-humble counterparts on all five outcomes. For physicians who were generally ineffective, the physicians low in humility scored lower on intended adherence, trust, and anticipated satisfaction than the physicians high in humility. Additionally, for physicians specializing in family practice, physicians low in humility scored lower on anticipated satisfaction and out-of-pocket expenditure than the physicians high in humility.

Conclusions: Findings from this study highlight how physician humility can affect the process of care even before it begins.

Practice Implications: The study emphasizes the need for deliberate pursuit of humility to improve outcomes for patients and physicians.

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Physician humility is related to desirable patient outcomes. For example, using neutral third-party raters who listened to pre-recorded medical interactions, researchers found that humble physicians demonstrated more effective communication and enabled better overall health than their non-humble counterparts [1]. Moreover, when patients were asked to recall their most recent visit with a physician, patients who rated their physician as being humble were more satisfied with their visit, reported trusting their physicians more, and also reported better overall health [2]. These findings held true even after accounting for objective factors such as physician status, wait time, and patient demographics.

Although prior research has identified important outcomes for physician humility, two factors restrict the impact of these findings. First, these findings all result from post-visit evaluations.

Therefore, there is no direct evidence to show how patients may use physician humility as a factor in their future health behaviors. For example, how does information about a physician's humility affect patients' anticipated interactions with that physician? Second, findings from physician humility have been focused exclusively on patient outcomes; the impact of humility for physicians in terms of patronage remains unclear (e.g., likelihood of being selected and recommended by patients; physician's financial value). The current study addresses these gaps in the literature by examining physician humility's effect on potential future medical interactions, and patients' likelihood to select and recommend certain physicians. Below, we define physician humility and briefly discuss how information about physician humility can affect these outcomes.

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1. Potential outcomes of physician humility for anticipated encounters

1.1. Physician humility

Key characteristics of humble physicians, based on humility research in personality and positive psychology, can be categorized into an intrapersonal and an interpersonal dimension. The intrapersonal component includes being open to new ideas and information and having an accurate view of one's own strengths and weaknesses. The interpersonal component includes having an other-focused orientation (i.e., seeing value in others and putting others before self; [3]). For example, humble physicians are open to discussing treatment plans with their patients and may see their patients as partners in the process of care. Physician humility may affect adherence intentions, trust, patient satisfaction, selection and recommendation, and out-of-pocket expenditure.

1.2. Adherence intentions

Patient adherence is the degree to which a patient follows medical advice. This may include complying with medication treatments or making behavior and lifestyle changes. Some examples include filling prescriptions, taking medication properly, and changing diet and exercise [4]. Patient nonadherence, on the other hand, may be harmful to both the physician and patient as it can affect the patient's health and well-being. Nonadherence can also be a threat to physicians' effectiveness and patients' financial spending [5]. Privy to information about a physician's humility, patients may judge physicians' recommendations as rigid and authoritarian or fluid and collaborative. For example, if patients believe their physicians to be humble, they may think that the physician will be open to patients' opinions on their health and potential treatments [6]. Therefore, even before the visit, information about physician humility may predict adherence intentions.

1.3. Trust

Trust entails the belief that a physician's words and actions are reliable and credible [7]. Patients who trust their physicians are more satisfied with their visit and show more adherence to the physician's instructions [8]. Knowledge about a physician's humility may lead patients to be more willing to trust the physician. Because humble physicians have an accurate understanding of their weaknesses and strengths, patients may be willing to be more trusting of physicians whom they believe to be humble. Patients trust their humble physicians not to make misguided recommendations for their health rooted in arrogance or inability [2].

1.4. Patient satisfaction

Patient satisfaction refers to care recipients' general evaluation of the health care process [9]. Patient satisfaction is related to patient adherence and persistence in pursuing care with the same provider [10]. Patient satisfaction is also related to physician communication styles and styles of care generally [11,12]. Patients may anticipate being more satisfied with a humble physician because they may expect a humble physician to involve them in the care process (e.g., value their beliefs and opinions as well).

1.5. Selection and recommendation

Patients' selection and recommendation of a physician is the central outcome that could result from online review websites

[13]. Selection and recommendation are important outcomes for physicians because they may lead to an increased number of patients seen in their facility. Considering that post-visit evaluations indicate that patients trust and are satisfied with the care provided by humble physicians [2], patients may use information about a physician's humility to decide whether they want to receive care from that physician. Patients will likely select and recommend physicians who are humble.

1.6. Out-of-pocket expenditure

We conceptualized out-of-pocket expenditure as the amount of money patients were willing to pay to see a physician even if they had to pay for the visit themselves. Given that in the United States insurers may limit which physician patients can select [14], out-of-pocket expenditure signifies that the patient is incurring some personal costs to see this physician, which suggests greater value in the patient's choice. Previous research suggests that patients are more satisfied and experience better health outcomes from humble physicians [1,2]. Therefore, we reasoned that patients would be willing to incur a greater financial cost to see a humble physician.

1.7. Potential moderators

When patients are making decisions about their future visit with a physician, physician humility may not be the only factor that patients consider. Therefore, we explored how information about physician humility would interact with other common physician characteristics that patients may consider. Below we discuss how physician gender, physician specialty, and general effectiveness may moderate the impact of physician humility.

1.8. Physician gender

Humility may benefit some physicians more than others depending on patients' expectations. Prior research demonstrates that patients will rate physicians differently based on the physician's gender. For example, female physicians tend to be more engaging and have more open communication with patients than male physicians [15]; as a result, patients are more satisfied with female physicians [16]. If female physicians generally spend more quality time with patients and are more engaged in patient care, it may appear to others that they show more humility because they put the time and effort into understanding patients' concerns.

1.9. Physician specialty

Just as patients have expectations based on physician gender, patients may hold different ideals about physician specialty. For example, although patients may prefer the lower prices that come with primary care physicians, they tend to report higher satisfaction from care provided by specialists [17]. Additionally, expectations of competency and skill may be different based on physician specialty. For instance, patients may expect surgeons to be more technically skilled, while expecting primary care physicians to be more skilled with interpersonal communication. These expectations may affect how patients use information about physician humility to evaluate physicians. For example, whereas patients might expect family physicians to display more humility, they may give a pass to surgeons for their lack of humility.

1.10. General effectiveness

We conceptualized general effectiveness as the average of all patient ratings for a physician. This effectiveness is represented as

a physician's overall rating score on online review websites [13]. When patients are making evaluations of potential physicians, the number of negative reviews directed at a physician affects patients' willingness to receive care from that physician [18]. Perhaps, information about a physician's humility will interact with overall effectiveness to affect patients' evaluation of the physician. For instance, patients may not judge an ineffective physician as harshly if they perceive that physician to be humble. On the other hand, it might be especially detrimental to physicians who do not have a high rating for effectiveness and are perceived as not humble.

1.11. Summary and hypotheses

Research indicates that physician humility is related to patient trust, satisfaction, health status [1] and effective communication [2]. These findings are based on post-visit reflections of medical encounters [2] or third-party ratings of audio-recorded interactions that have already occurred [1]. The strength of these findings is that they reflect real patient-provider encounters; however, they do not address causality. The current study addressed this gap by examining how physician humility may affect outcomes for patients and physicians prior to the medical visit through an experiment using fictitious physician profiles. We predicted that physician humility would affect the following five outcomes: 1) adherence intentions; 2) trust; 3) satisfaction; 4) likelihood to select and recommend; and 5) out-of-pocket expenditure.

Hypothesis 1. Main effects

Specifically, we predicted that there would be a main effect of humility; each of the five outcomes would be higher for physicians with high ratings of humility compared to physicians with low ratings of humility.

Hypothesis 2. Interactions

In addition, we expected that physician gender, competence, and specialty would moderate the relationship between physician humility and these five outcomes. However, there is a lack of established evidence from current literature to make specific predictions about these interactions. Therefore, we present these interactions in the form of exploratory analyses.

2. Method

2.1. Participants

Non-patient, community-member participants came from Amazon Mechanical Turk (mTurk), an online workforce where everyday people sign up to complete work posted by other people. MTurk participants tend to be more representative of the general population compared to traditional participant pools [19]. This diversity is especially important because this study involves evaluations of potential physicians; therefore, it is critical to recruit a community sample. In all, 502 people interacted with the study; 67 people previewed the study but did not go beyond the consent page and 18 participants only completed five questions before quitting the study. Because these participants ended the study prematurely, they did not provide information that would be helpful in determining whether there are systematic differences between participants who completed the study and those who did not. In total, 417 (83 %) participants provided enough data to be included in the analyses. Participants were paid \$.75 for their participation, which is representative of compensation for similar tasks on mTurk. The average age of participants was 40.57 ($SD = 11.50$). Fifty-three percent of participants self-identified as White/Caucasian, 5 % Black/African American, 4 % East Asian, 3 % Hispanic/Latino, 2 % multiracial, and 30 % did not provide a response.

2.2. Materials

We created fictitious physician profiles by taking a generic physician profile posted on Vitals.com, a popular website dedicated to helping patients "shop" for new physicians. Vitals.com claims that they are the largest online database of patient reviews for doctors and facilities [20]. Using a free photo editing software [21], we edited the profiles to reflect the manipulated physician characteristics. Physician gender was manipulated by varying the name on the profile (Dr. Edward Johnson vs. Dr. Emily Johnson). Physician specialty was manipulated by listing the physician as specializing in family medicine or orthopedic surgery. General effectiveness was manipulated by changing the average rating of the physicians. All physicians had nine reviews. The high effectiveness physician had an average rating of 4.9 stars out of 5, whereas the low effectiveness physician had an average of 2.3 out of 5 stars. Finally, humility of the physician was manipulated by a written review. In the low humility condition, the physician is described as "NOT humble in his (her) approach to patient care", whereas the high humility condition described the physician as "VERY humble in his (her) approach to patient care." The physician gender was matched with the physician name (Edward vs. Emily).

2.3. Measures

Participants indicated how likely they would select and recommend the physician (1 *not at all likely*, 7 *extremely likely*) using a three-item measure. Sample items include: "How likely are you to use this doctor for yourself?; How likely are you to recommend this doctor to a family member?" The measure demonstrated strong reliability, $\alpha = .98$, $M = 2.42$, $SD = 1.34$.

Participants indicated their intention to adhere to the physician using a three-item measure adapted from the Medical Outcomes Study [22]. Participants indicated their agreement or disagreement (1 *strongly disagree*, 7 *strongly agree*) with three items: "I would have a hard time doing what this doctor suggests. (r); I would follow this doctor's suggestions exactly; If this doctor recommended a treatment plan for me, I would do what was necessary to follow this doctor's plan." This measure also demonstrated strong reliability, $\alpha = .89$, $M = 4.89$, $SD = 1.36$.

Anticipated trust in the physician was measured using an 11-item scale [23]. Participants indicated their agreement or disagreement (1 *strongly disagree*, 7 *strongly agree*) with each statement. Sample items include: "I doubt that this doctor would really care about me as a person. (r); I would trust this doctor so much I would always try to follow his/her advice." The scale demonstrated acceptable reliability, $\alpha = .73$, $M = 4.33$, $SD = 0.86$.

Anticipated satisfaction was measured using a five-item scale [24]. Participants indicated their anticipated satisfaction by selecting the appropriate rating in the scale (0 *very dissatisfied*, 1 *dissatisfied*, 2 *neither satisfied nor dissatisfied*, 3 *satisfied*, 4 *very satisfied*). Sample items include: "How satisfied would you be with the care you would receive from this doctor?; How satisfied would you be with this doctor's office staff?" The measure demonstrated strong reliability, $\alpha = .96$, $M = 3.37$, $SD = 0.98$.

Additionally, participants were asked to imagine that they had to use their own money (pay out-of-pocket) to see this physician. Then they used a sliding scale from 0 to 100 to indicate how much money they would pay. They scale had the following anchors: 0 *none at all*, 100 *a great deal of money*. On average participants were willing to pay 37.64 units, $SD = 22.19$.

2.4. Procedures

All study procedures and materials were approved by the authors' Institutional Review Board. Data collection was completed

online. Participants clicked on an online link that connected them to the study hosted on Qualtrics, a survey management system. Following consent procedures, participants were randomly assigned one of 16 profiles to review. Participants were asked to imagine that they were looking for a new physician and to consider the candidate that would appear in an online profile. After viewing the profile, participants provided their ratings of the physician and demographic information. Then, participants were led to a debriefing page where they were informed about the purpose of the study, thanked for their participation, and were provided with contact information in case they had questions. On average, participants took 4.47 min (*SD* = 1.84) to complete the study.

2.5. Data analysis plan and preliminary analyses

Our study involved four dichotomous variables as independent variables and five continuous dependent variables. Because the dependent variables are related to each other (see Table 1), we used multivariate analysis of variance (MANOVA) to address the study’s hypotheses.

Our model consisted of humility (high, low), general effectiveness (high, low), physician gender (male, female), and specialty (family practice, orthopedic surgery) as independent variables. These variables were manipulated by varying different aspects of fictitious physician profiles. We entered likelihood to select and recommend the physician, adhere to the physician’s recommendations, trust in the physician, be satisfied with the physician’s care, and pay-out-of-pocket expenditure as dependent variables. Because patient gender has been found to play an important role in satisfaction with care, particularly with female patients [15], we included patient gender (male, female) as a covariate in the model. Additionally, because we included a measure of out-of-pocket expenditure, we also included patient socioeconomic status and race as covariates in the model because of their potential to influence the dependent variables [25]. Although these covariates did not explain any additional variance (all Pillai’s Trace values were less than 0.02, all *ps* were higher than .24), we included them in the model based on established evidence, therefore we did not remove them to create a new model. Although removing them might have resulted in a statistically stronger model, we wanted to avoid the atheoretical model-building approach of cherry-picking significant factors.

Prior to hypothesis testing, we examined the assumptions associated with MANOVA. The data met the assumption of independence because participants were randomly assigned to conditions. We used Mahalanobis’ distance scores to check for multivariate outliers. We deleted four cases where the Mahalanobis’ distance scores exceeded the critical χ^2 value of 18.47 (*df* = 4). Additionally, the scatterplot matrix between the dependent variables suggests that the linearity assumption is met. Moreover, bivariate correlations suggest that multicollinearity was not an issue because none of the correlations were greater than 0.90 (See Table 1). Shapiro-Wilk test statistics for all variables

Table 1
 Means, Standard Deviations (SDs), Cronbach’s α s, and Correlations for Dependent Variables.

	Means	SDs	α	1	2	3	4
1. Likelihood to Recommend	2.42	1.34	0.98				
2. Adherence Intentions	4.89	1.36	0.89	.59*			
3. Trust	4.33	0.86	0.73	.67*	.78*		
4. Anticipated Satisfaction	3.38	0.98	0.96	.73*	.77*	.86*	
5. Out-of-Pocket Expenditure ^{\$}	37.64	22.19	–	.60*	.56*	.62*	.64*

Notes: *N* = 417; \$ indicates a range in which 0 = none at all, 100 = a great deal of money;

* Correlations are significant with *p* < .001.

were higher than 0.87 and all *p* values were less than .001, suggesting a violation of the normality assumption. However, MANOVA is robust and outperforms the nonparametric alternative in terms of power and reducing type I error rate [26]. A Box’s M test suggested that the equality of covariance assumption was violated. However, this test is sensitive to large sample sizes and violations of normality. Because of these violations, for multivariate results, we reported Pillai’s trace because it is more robust than the other statistics to violations of model assumptions [27].

3. Results

Our study examined whether physician humility affects people’s perceptions of that physician using fictitious physician profiles. In conducting a MANOVA, we wanted to examine the effect of humility on the five outcomes. In addition, we wanted to see whether physician gender, specialty, and general effectiveness moderated humility’s effect. In statistical terms, we focused on the main effect of humility, and explored whether there were interactions between humility and these other factors.

3.1. Humility

The multivariate result was significant for humility, $F(5, 386) = 16.06, p < .001$, Pillai’s Trace = .17. Tests of between-subjects effects reveal that humility affected participants’ perceptions for all five outcomes. When presented with a physician who is high in humility compared to one who was low in humility, participants were more likely to recommend the physician, $F(1, 408) = 38.46, p < .001$, partial $\eta^2 = 0.09$; anticipate being more adherent, $F(1, 408) = 11.74, p = .001$, partial $\eta^2 = 0.03$; trust the physician, $F(1, 408) = 55.34, p < .001$, partial $\eta^2 = 0.13$; be satisfied with care provided by the physician, $F(1, 408) = 22.99, p < .001$, partial $\eta^2 = 0.29$; and spend more out-of-pocket money to receive care, $F(1, 408) = 10.61, p = .001$, partial $\eta^2 = 0.03$. See Table 2 for means and standard deviations of dependent variables by humility condition.

3.2. Humility X general effectiveness

The effects from physician humility were moderated by physicians’ general effectiveness as indicated by the significant multivariate result for the humility by general effectiveness interaction term, $F(5, 386) = 4.32, p = .001$, Pillai’s Trace = .05. General effectiveness moderated humility’s impact for adherence, $F(1, 408) = 4.21, p = .04$, partial $\eta^2 = 0.003$; trust, $F(1, 408) = 6.51, p = .01$, partial $\eta^2 = 0.19$; and satisfaction, $F(1, 408) = 5.58, p = .02$, partial $\eta^2 = 0.14$. However, general effectiveness did not moderate humility impact for likelihood to recommend, $F(1, 408) = 1.88, p = .16$, partial $\eta^2 = .005$; nor for out-of-pocket expenditure, $F(1, 408) = .29, p = .59$, partial $\eta^2 = .001$. See Fig. 1 for an illustration of the interactions.

Table 2
 Means and Standard Deviations of Dependent Variables by Humility Condition.

	Condition	<i>N</i>	Mean	<i>SD</i>
Likelihood to Recommend	Not humble	206	2.04	1.23
	Very humble	211	2.80	1.33
Adherence Intentions	Not humble	206	4.61	1.38
	Very humble	211	5.16	1.28
Trust	Not humble	206	4.01	0.85
	Very humble	211	4.64	0.75
Anticipated Satisfaction	Not humble	206	3.09	1.02
	Very humble	211	3.66	0.84
Out-of-Pocket Expenditure ^{\$}	Not humble	206	33.37	21.53
	Very humble	211	41.80	22.08

Note: \$ indicates a range in which 0 = none at all, 100 = a great deal of money;

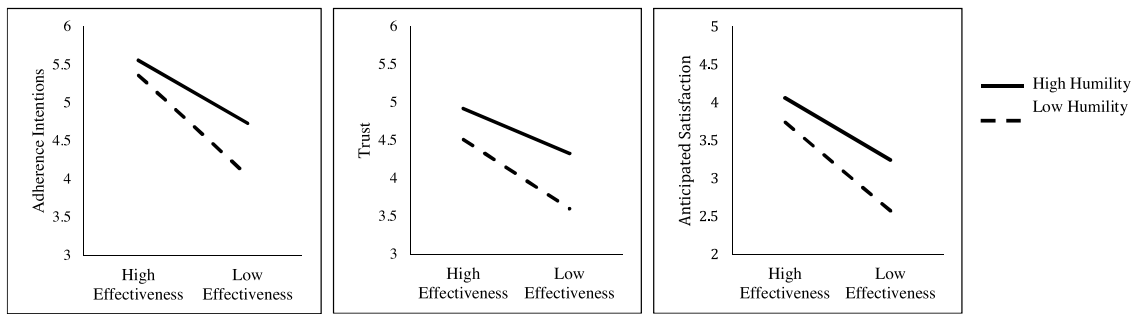


Fig. 1. Interaction between humility and general effectiveness for adherence intentions, trust, and anticipated satisfaction. For physicians who were generally ineffective, the physicians low in humility scored lower on intended adherence, trust, and anticipated satisfaction than the physicians high in humility. Humility did not significantly affect these outcomes when physicians had high ratings of general effectiveness.

The trend for all three significant interactions were the same: humility did not affect participants' perceptions when the physician is generally effective, but humility did affect participants' perceptions when the physician is generally ineffective. For generally ineffective physicians, adherence intention is lower when the physician is low in humility ($M = 4.04, SD = 1.42$) than when the physician is high in humility ($M = 4.73, SD = 1.34$). Similarly, trust is lower when the physician is low in humility ($M = 3.60, SD = .76$) than when the physician is high in humility ($M = 4.33, SD = .76$); anticipated satisfaction is lower when the physician is low in humility ($M = 2.57, SD = .93$) than when the physician is high in humility ($M = 3.24, SD = .80$).

3.3. Humility X specialty

The humility by physician specialty multivariate interaction term was not significant, $F(5, 386) = 1.23, p = .30$, Pillai's Trace = .02. However, tests of between-subjects effects focusing on univariate effects reveal that physician specialty moderated humility's effect on anticipated satisfaction, $F(1, 408) = 4.06, p = .04$, partial $\eta^2 = .01$; and intended out-of-pocket expenditure, $F(1, 408) = 4.38, p = .037$, partial $\eta^2 = .01$.

When it comes to anticipated satisfaction, humility did not significantly affect orthopedic surgery, but did affect family medicine. For family medicine, anticipated satisfaction is lower when the physician is low in humility ($M = 3.04, SD = 1.01$) than when the physician is high in humility ($M = 3.73, SD = .74$). Similarly, intended out-of-pocket expenditure is lower when the physician is low in humility ($M = 32.22, SD = 21.37$) than when the physician is high in humility ($M = 43.82, SD = 20.76$). See Fig. 2 for an illustration of the interactions. However, physician specialty did not moderate humility's effects on recommendation,

$F(1, 408) = .198, p = .16$, partial $\eta^2 = .005$; adherence intention, $F(1, 408) = 1.24, p = .27$, partial $\eta^2 = 0.003$; and trust, $F(1, 408) = 1.70, p = .19$, partial $\eta^2 = 0.004$.

3.4. Humility X physician gender and other potential interactions

Finally, there was no significant interaction between humility and physician gender, $F(5, 386) = .26, p = .94$, Pillai's Trace = .003. In addition, there were no significant three way interactions (e.g., humility x physician gender x specialty) and the four-way interaction (i.e., humility x physician gender x specialty x general effectiveness) was also not significant, all $F_s < 0.66, p_s > .65$, all Pillai's Trace values $< .009$.

3.5. Summary of results

We found that higher humility led to higher scores for all five outcomes. Additionally, we found that physicians' general effectiveness moderated the effects of physician humility. For physicians who were generally ineffective, the physicians low in humility scored lower on intended adherence, trust, and anticipated satisfaction than the physicians high in humility. Humility did not significantly affect these outcomes when physicians had high ratings of general effectiveness.

Additionally, we found that physician specialty moderated the effects of humility for anticipated satisfaction and out-of-pocket expenditure. For physicians specializing in family practice, physicians low in humility scored lower on both outcomes than the physicians high in humility. These differences were not found in physicians specializing in orthopedic surgery.

Finally, we found that the effects of humility were not affected by physician gender, patient socioeconomic status, gender, and race.

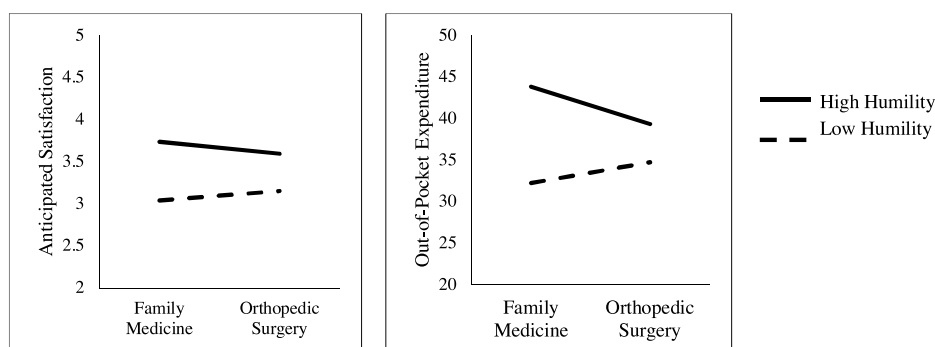


Fig. 2. Interaction between humility and physician specialty for anticipated satisfaction and out-of-pocket expenditure. For physicians specializing in family practice, the physicians low in humility scored lower on both outcomes than the physicians high in humility. These differences were not found in physicians specializing in orthopedic surgery.

4. Discussion

In the current study, we examined how physician humility may affect future medical interactions using fictitious physician profiles and a non-patient, community sample. We hypothesized that physician humility will affect people's adherence intentions, anticipated trust, and satisfaction. Moreover, we predicted that physician humility will also affect the likelihood that people select and recommend a physician and their out-of-pocket expenditure. Specifically, we predicted that all five outcomes will be higher for humble physicians compared to a non-humble one. Our results supported these predictions. We found that humble physicians performed better than their counterparts for all five outcomes.

We also predicted that physician gender, general effectiveness, and specialty would moderate humility's effect on the five outcomes. We found partial support for this hypothesis. General effectiveness moderated humility's effect for patient-centered outcomes (i.e., intended adherence, trust, and anticipated satisfaction) but not for physician-related outcomes (i.e., selection and recommendation, out-of-pocket expenditure). Additionally, we found that physician specialty moderated humility's effect when it came to anticipated satisfaction and out-of-pocket expenditure, but not for the other outcomes. Lastly, we found that physician gender did not moderate humility's effect for any of the outcomes.

Regarding the moderating role of general effectiveness, humility did not significantly affect people's perceptions for physicians with high ratings of general effectiveness; it only affected physicians with low ratings of general effectiveness. Additionally, the interaction only existed for patient outcomes (i.e., intended adherence, trust, and anticipated satisfaction) but not for physician-related outcomes (i.e., selection and recommendation, out-of-pocket expenditure). This may have occurred because humility may have been lost in the mix of multiple high quality indicators. If a physician is rated high in many different categories, humility may not stand out and therefore may not influence overall ratings of anticipated adherence intentions, trust, or satisfaction. On the other hand, if the physician is low in general effectiveness, humility may be a clear redeeming quality to which people can grasp. People may feel that physicians who are low in effectiveness but high in humility are serviceable because these physicians may understand their own weaknesses and limitations. This combination may be more comforting than ineffective doctors who may be arrogant and not willing to admit to shortcomings. Practically speaking, these findings may mean that physicians who are generally rated low on effectiveness can highlight their humility as a strategy to mitigate potentially negative outcomes related to those low effectiveness ratings. For example, physicians can emphasize their humility on their online profiles whenever possible.

Moreover, the fact that general effectiveness was significant only for patient outcomes and not physician-related outcomes suggests that if people had to go to an ineffective doctor, they would have a better experience with one who is humble. However, if they had a choice, they would not want to select and recommend nor spend much of their own money to see a non-humble physician, regardless of how effective that physician is.

Regarding physician specialty as a moderating factor, results indicated that humility was significant only for family practice and not for orthopedic surgery, when it came to satisfaction and expenditure. This finding may reflect people's differentiated expectations for their care based on physician specialty [28]. It could be that people expect family physicians to invest more in their interpersonal relationships; whereas, people might expect orthopedic surgeons' to focus on their technical skills. Therefore, people may value humility more for family physicians compared to orthopedic surgeons. This finding reflects the nature of care from

these two types of physicians. For family physicians, patients (and their family members) will likely have repeated interactions with these physicians [29]. However, patients are likely to experience one-time care from orthopedic surgeons. Due to the nature of these relationships, it is fitting that people would value humility for family practice, and not as much for orthopedic surgery.

Although we found that physician effectiveness and physician specialty moderated humility's effect, we found that physician gender had no effects on physician humility and patient outcomes. This null result may be a positive sign, indicating that humility is important for both male and female physicians. This effect is supported by research that demonstrated that physician humility predicted satisfaction, trust, and health status, even when controlling for physician and patient gender [2]. However, it may also be likely that the lack of gender differences resulted from a weak manipulation. Perhaps, manipulating the name of the physician and the gender pronoun in the written review were not enough to activate gender-based preferences. Unfortunately, we did not pretest the gender manipulation to examine the rate of accurate recall for the gender of the physician in the profile. Future researchers can address this limitation by examining participant recall of conditions prior to data collection. Additionally, we did not use pictures to manipulate gender. Future studies can attempt to manipulate gender by using different pictures in addition to the name on the profile. Of course, such studies should be careful not to conflate gender with other effects (e.g., attractiveness of the subjects).

4.1. Other limitations and future directions

Our study focused on physician humility; however, it may be just as important to study physician arrogance [30] because such trait may be more salient and perceptible. Nonetheless, we believe that there are benefits to studying each of the constructs. Whereas studying arrogance may lead to a catalog of behaviors for physicians to avoid, studying humility may lead to an index of behaviors for physicians to pursue and display. Additionally, because arrogance may be more salient and have more general interest, the examination of physician humility is necessary to shed light on this less intuitive concept. Nonetheless, it may be fruitful for future studies to address arrogance using similar experimental paradigms.

Likewise, our study examined humility using a one-word descriptor "humble", instead of following established approaches of using multiple phrases to describe a construct. For example, previous research has successfully used phrases such as "interrupts me" and "leaves me with unanswered questions" to examine humaneness as a construct [31]. Because we were explicitly interested in physician humility, we used the single word descriptor to succinctly target this construct. We avoided multiple descriptors because we did not want to inadvertently capture a related construct (e.g., modesty). However, future studies can address this limitation by examining physician humility as derived from its conceptual definition (e.g., places others before self; understands one's own strengths and weakness) or by constructing these phrases through qualitative studies that ask patients to list characteristics of humble physicians.

Moreover, our study employed an experimental approach to examining physician humility by manipulating various factors of a fictitious online review. Although this method allows us to make causal attributions about the outcomes, there are alternative and complementary approaches to studying physician humility that researchers should consider. For example, future researchers could adopt a qualitative approach of analyzing real online reviews of physicians. Similarly, researchers could examine how frequently humility (and/or arrogance) is mentioned in real online reviews.

This frequency may speak to how highly (or lowly) patients value humility compared to other qualities such as communication skills and technical competence. Additionally, researchers can examine how physicians and their administrators use these reviews. Established work describes how patients use online reviews [32], but little is known about how physicians and their administrators use this resource. Therefore, this another important direction for future research.

Relatedly, our study design of having participants rate fictitious physician profiles presented some limitations. One limitation is that we did not include a neutral control group (i.e., a profile where humility was not mentioned). We excluded this null group because we wanted to specifically compare humble and non-humble physicians. Moreover, because we already had a $2 \times 2 \times 2$ design, adding the neutral control condition would have added eight more cells to the design, which would have taken up additional resources. However, future studies can address this limitation by comparing high humility and low humility to a neutral condition where humility is not present. It will be interesting to examine whether the absence of humility (not low humility) differentially affects people's perceptions of physicians.

Another limitation in the current study could be that we drew our participant sample from Amazon's Mechanical Turk (Mturk). Participants who are paid to rate physician profiles in an online study may not be as invested as people who intend to select a physician for themselves. However, a case could be made that, if physician humility affected patient perceptions in this low-stakes scheme, physician humility will play an even bigger role when people select a physician for themselves. Future studies can address this discrepancy by studying patients who are actively looking to select a new physician on various websites where patients go to "shop" for new care providers.

Lastly, the fictitious profiles included only a single written review as a manipulation of physician humility. Online profiles of physicians typically feature several reviews, and oftentimes, there are mixed reviews. Research demonstrates that, in addition to the content of the review, the ordering of those reviews affect patient perceptions (i.e., better when positive reviews appear first [18]). Future research can examine not only the effect of physician humility, but also physician humility in combination with other reviews. For example, is physician humility weighted more when it appears first? Does physician humility stand out to patients when there are other reviews? Or, does humility give way to comments about other characteristics that the physician may have? Our current study leaves many opportunities for continued research.

4.2. Practice implications

Past studies based on post-visit evaluations and third-party ratings of recorded interactions demonstrated that physician humility is important to patients. Our study demonstrated that physician humility is also critical for future interactions. Humility may serve as a cue in the cycle of the self-fulfilling prophecy. Even before the visit, information about a physician's humility affects how people anticipate feeling in the interaction with that physician. If a physician is humble, people anticipate being more satisfied, feeling more trust, and intending to follow the physician's advice. These anticipatory feelings may influence the actual medical encounter, perhaps in a way that brings about their existence. Therefore, these outcomes suggest that physician humility is not only important because it affects the current interaction; physician humility is important because it may affect patients (and physicians) even before the medical interaction begins. In light of these findings, physicians should strive to express humility throughout their interactions with patients. They

can do so by adopting an other-focused orientation, by seeing value in their patients and putting others before self. Additionally, they can display humility by being open to new ideas and having an accurate view of their own strengths and weaknesses.

These features of humility complement established endorsements related to shared-decision making and physician communications training. For instance, the active pursuit of humility through the adoption of an other-focused orientation may lead physicians to meaningfully engage patients in health care decisions, which may result in care that is respectful and responsive to patients' values, needs, and preferences [6]. Moreover, when physicians demonstrate that they have an accurate view of their strengths and weaknesses and are open to new ideas, they may present themselves as ready and willing partners in their relationship with patients. Humility may serve both the physician and patients well in the establishment, development, and engagement phases of the physician-patient relationship [33]. Moreover, understanding one's own weaknesses with communication may lead physicians to pursue additional training, which can result in improved patient satisfaction, reduce physician burnout, and improve physician self-efficacy [34]. Ultimately, physician humility may serve as a complementary approach for physicians to best demonstrate their abilities and affect positive change for their patients.

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