



Center for Research in Medical Education and Health Care
Sidney Kimmel Medical College
at Thomas Jefferson University

Jefferson Scale of Empathy (JSE)

User Guide

Jefferson Scale of Empathy (JSE)

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“The secret of the care of the patient is in caring for the patient.”

(Francis W. Peabody, 1927/1984, p. 818)

INTRODUCTION

Empathy in Patient Care

Empathy is a major component of an optimal doctor–patient relationship. The cultivation of empathy is one of the learning objectives proposed by the Association of American Medical Colleges (AAMC, 2004) for medical schools. In addition, the American Board of Internal Medicine (ABIM, 1983) recommended that humanistic attitudes, including empathy, should be instilled and assessed among residents as an essential part of their postgraduate medical education. These recommendations by professional organizations indicate that it is important to study issues related to the assessment and professional development of in-training and in-practice health professionals.

What is Empathy?

Empathy is an ambiguous concept. Despite a lack of consensus about its definition, there are various descriptions or characterizations of the term in the literature (for a review see Hojat, 2016, pp. 3-16). Because of the conceptual ambiguity, empathy has been described as a notion that is difficult to define and hard to measure. Generally, some researchers have described empathy as a cognitive attribute, which means it predominantly involves understanding another person’s concerns. Others have described empathy as an affective or emotional attribute, which implies that it primarily involves feeling another person’s pain and suffering. Yet, there is a third group that views empathy as both affective and cognitive (for a review see Hojat, 2007; 2016).

A clear conceptualization of empathy is critically important because it can serve not only as a guideline for an operational definition of the term, but also can provide a framework for the development of a content-specific instrument for measuring empathy in the context of health professions education and patient care. Also, strategies to enhance empathy can be more appropriately developed based on a workable definition of the concept.

Definition of Empathy in Patient Care

To clarify the conceptual ambiguity associated with empathy, based on an extensive review of relevant literature, we defined empathy in the context of health professions education and patient care as:

" a predominantly *cognitive* (rather than an affective or emotional) attribute that involves *understanding* (rather than feeling) of the patient’s experiences, concerns, and perspectives, combined with a capacity to *communicate* this understanding, and an *intention to help* ." (Hojat, 2007, 2009; 2016; Hojat, Mangione, Nasca et al., 2001; Hojat, Vergare, Maxwell et al., 2009).

The key terms in this definition are italicized for two reasons: (1) to underscore their importance in the construct of empathy in the context of health professions education and patient care, and (2) to make a distinction between empathy (cognitively defined, also sometimes described as clinical empathy) and sympathy (analogous to emotional or affective empathy, sometimes described as vicarious empathy), which have often been mistakenly used interchangeably.

The interchangeable use of these two concepts may not cause a problem in the context of social psychology, but it is important to separate the two in the context of patient care. In social psychology, both empathy and sympathy can lead to a similar outcome (e.g., prosocial behavior), albeit for different behavioral motivations. For example, a prosocial behavior that is induced by empathic understanding is more likely to be elicited by altruistic motivation. A prosocial behavior that is prompted by sympathetic feelings, however, is more likely to be triggered by egoistic motivation to reduce personal distress or to generate good feelings (Hojat, 2007, 2016; Hojat, Vergare, Maxwell et al., 2009).

Empathy versus Sympathy

Sympathy, as opposed to empathy, is predominantly an affective or emotional attribute that involves intense feelings of a patient's pain and suffering. Empathy in contrast is predominantly a cognitive entity as defined above. Despite the differences in conceptualization, the two notions are not entirely independent. We found a moderate correlation of 0.49 between measures of the two concepts, which can be translated into approximately a 25% overlap between the two.

However, in the context of health professions education and patient care, we must make a distinction between the two constructs because, in this context, they lead to different behavior and patient outcomes. An empathic physician would be more concerned about understanding of the type and quality of patients' experiences, whereas a sympathetic physician would be more concerned about feeling the degree and intensity (quantity) of patients' experiences. Because of its cognitive nature, empathy in excess is always beneficial in patient-physician relationships. In contrast, because of its affective nature, an overabundance of sympathy can be detrimental in care giver-care receiver relationships, and can impede the neutrality that is necessary in clinical decision making, thus negatively influencing a care giver's performance. Cognitively defined empathy can always lead to personal growth, career satisfaction, and optimal clinical outcomes, whereas affectively defined sympathy, in excess, can lead to career burnout, compassion fatigue, exhaustion, and vicarious traumatization (Hojat, 2007; 2016; Hojat, Vergare, Maxwell et al., 2009).

Indeed, it can be assumed that the relationship between cognitive empathy and positive clinical outcomes is linear, meaning that the outcomes progressively become better as a function of an increase in empathy. In contrast, it can be speculated that the relationship between sympathy and clinical outcomes is like an inverted U shape (similar to that between anxiety and performance), meaning that sympathy to a limited extent can be beneficial, but excessive sympathy can be detrimental.

Another important implication for making a distinction between empathy and sympathy in health professions education and patient care is the fact that affect and emotion (the prominent ingredients of sympathy) are less amenable to change, whereas cognition and

understanding (the prominent ingredients of empathy) can be substantially enhanced by education. This implies that empathy can be taught, but sympathy is not easily amenable to change through education. The aforementioned differences between empathy and sympathy, and their other specific features described in Table 1 (see Appendix A) suggest that it is critically important to make a distinction between the two concepts in the context of health professions education and patient care because of their different consequences in educational and patient outcomes. For more detailed descriptions of specific features of empathy and sympathy see Hojat (2007, 2016), and Hojat, Vergare, Maxwell et al. (2009).

SECTION 1

Adapted from: Hojat, M. (2016). The Jefferson Scale of Empathy. In M. Hojat, *Empathy in Health Professions Education and Patient Care* (pp. 83-128), New York: Springer International.

Development and Psychometrics of the Jefferson Scales of Empathy (JSE)

Empathy has been described in the literature as the most frequently mentioned attribute of the humanistic physician (Linn et al., 1987), yet empirical research on the topic is insufficient because of the ambiguity of the term and the lack of psychometrically sound instruments to measure empathy in the context of health professions education and patient care. Some researchers believe that the instruments developed for the general population do not grasp the essence of the construct of empathy in the context of patient care and are not adequate for that purpose (Evans, Stanley, & Burrows, 1993).

To the best of my knowledge, prior to the development of the JSE, no psychometrically sound instrument was available to measure empathy among students and practitioners in health professions. None of the empathy measuring instruments developed for administration to the public was specific enough to capture the essence of empathy in the context of patient care. In more technical terms, none of the instruments had “face” and “content” validity in the context of health professions education and patient care.

More than a decade ago our research team at Sidney Kimmel Medical College at Thomas Jefferson University recognized the need for an instrument that could enable researchers to conduct empirical investigations to assess empathy in professional development of students and practitioners, to investigate the changes in empathy among them, to study group differences, and to examine correlates, antecedents, development, and outcomes of empathy in different stages of training as well as in different types of health professions disciplines and practices. In response to this need, we developed our empathy measuring instrument. Originally designed for medical students (Hojat et al., 2001) and entitled the Jefferson Scale of Physician Empathy (JSPE), it was subsequently modified to be applicable to not only medical students, but also to the broader populations of practicing physicians and other health professions students and practitioners (Hojat et al., 2002b). Thus, it was renamed as the Jefferson Scale of Empathy (JSE). A brief history of the JSE’s development and modifications is presented in the following sections.

Development of a Framework

Review of the Literature

To construct a test, one must embark on a journey to develop a framework for understanding the concept and its related elements that one intends to measure. The journey begins with a comprehensive review of the literature to explore conceptual frameworks, theoretical views, and empirical research on the topic and to identify behaviors that are relevant to the concept in question. Accordingly, in 1999, we began to search the Medline database for all studies published beginning in 1966 (the starting date in the Medline database) that would identify contexts and contents to guide us in drafting items for the preliminary version of the instrument. Using “empathy” as a keyword in our search, we found 3,541 published sources in English. Cross-searching with the terms “empathy” and “physician/physicians” resulted in 107 published entries. A review of these and other relevant references, most of which were cited in the original 107 entries, provided us with some ideas about what the contents of items in the preliminary version of the instrument should be to measure empathy among health professions students and practitioners.

Drafting Preliminary Items and Examination of Face Validity

The second step, subsequent to the review of the literature, was to draft preliminary items and examine the face validity of the drafted items. Face validity involves subjective judgments, usually by nonexperts, about the relevance of the contents of the items to the concept being measured. Our research team drafted 90 items for the preliminary version of the JSE that appeared to be relevant to empathy in patient care and, therefore, seemed to have face validity.

The items in the preliminary version covered broad areas, such as understanding subjective experiences of the patients and their families; interpersonal relationships with the patients; attention to verbal and nonverbal signals in physician–patient communications; humor; appreciation of art, poetry, and literature; narrative skills; absorption in stories, plays, and movies; cognitive and affective sensitivities; emotional closeness and affective distance between physician and patient; objectivity in clinical decision making; clinical neutrality; clinicians’ emotional expression and regulation of emotions; sentiments; imagination; tactfulness; perspective taking; role playing; and cues in verbal and nonverbal communications.

It is important to notice that during the process of examining the face validity of the items, a particular item may seem at first glance, to be irrelevant to the topic. Consequently, including such an item must be justified. A convincing argument should support the inclusion of every item, in case a question is raised concerning the item’s relevance to empathy. We used the rational scale method of theory-based item selection (Reiter-Palmon & Connelly, 2000) for that purpose. For example, we included items related to an interest in literature and the arts based on the theoretical view that studying literature and the arts can improve a person’s understanding of human pain and suffering (Herman, 2000; McLellan & Husdon Jones, 1996; Montgomery Hunter et al., 1995). Therefore, such an interest would be relevant to the capacity for empathy. Another example was inclusion of an item about humor based on the assumption that a clinician’s

sense of humor can reduce the stress perceived by the patient; thus contributing to an improved clinician–patient relationship (Yates, 2001). According to Martin (2007, p. xv) “humor is a ubiquitous human activity that occurs in all types of social interaction.” Humor generally can reduce the harmful impact of stressful experiences (Martin & Lefcourt, 1983). Additional theoretical support for this proposition is based on observations that humor can reduce the restraints in clinician-patient relationships by relieving tension and reducing inhibitions (Lief & Fox, 1963). Also, a sense of humor has been listed as an element of professionalism in medicine (Duff, 2002). According to Golden (2002), humor is a “magical force” that detaches patients from their pain and suffering through the healing power of laughter. A popular movie based on the true story of the life of doctor Patch Adams beautifully depicted the role of humor in medical care. Thus, we included an item about sense of humor in the instrument.

In addition, we made every effort to incorporate components that were consistent with our conceptualization and definition of empathy. For example, because “understanding” is a key component of our definition, the word appears in approximately one-third of the items in the final scale.

Examination of Content Validity

Examining the content validity of a new instrument is another important step in its development. Content validity involves the systematic examination of the instrument’s contents, usually by experts, to confirm the relevance and representativeness of the items in covering the domains of behavior the test intends to measure (Anastasi, 1976). We probed the instrument’s content validity to ensure that the instrument included a representative sample of the behaviors expected to fit within the concept of empathy, particularly in relation to patient-care situations.

To examine the content validity of the preliminary version of the JSE, we used a version of the Delphi technique (Cyphert & Gant, 1970), which is usually used to obtain systematic and independent judgments from a group of experts. We mailed the preliminary version of the instrument to 100 clinical and academic physicians. A cover letter described the purpose of our study as the development of an instrument to measure empathy among health professionals, such as physicians. The letter briefly described empathy as an “understanding” of patients’ experiences, emotions, pain and feelings as opposed to sympathy, which was described as “feeling” of patients’ pain, suffering, and emotions similar to the way patients’ experience them.

Respondents were asked to cross out any item they considered to be irrelevant to the measurement of empathy, as described in the brief definition. They were also asked to edit the remaining items for simplicity and clarity and to add new items they regarded as important to include in an instrument intended to measure empathy in the context of patient care. The 55 physicians who responded offered suggestions, made editorial improvements, and provided additional comments. They also made recommendations about revisions, additions, and deletions.

During this stage of the study, we excluded all items from the preliminary version that five or more physicians had crossed out. We also incorporated appropriate editorial suggestions the respondents had made. After several iterations and revisions to assure that

the items reflected distinct and relevant aspects of empathy in patient care situations, 45 of the original 90 items were retained (Hojat et al., 2001). It was this 45-item version of the instrument that was used in the preliminary psychometric analyses.

Preliminary Psychometric Analyses

For the purpose of a preliminary psychometric study, the 45-item instrument was administered to 223 third-year students at Jefferson (Sidney Kimmel Medical College) (193 completed the instrument, an 86% response rate). Also, a group of 41 residents in the internal medicine program at Thomas Jefferson University Hospital and its affiliated hospitals completed the instrument.

Likert-Type Scaling

A 7-point Likert-type scale (1 = Strongly disagree, 7 = Strongly agree) was used to respond to each item of the 45-item instrument. We chose a Likert-type scale rather than a simple, dichotomous (Agree/Disagree, Yes/No) response format because Likert-type scales (Likert, 1932) provide a wider range of item scores, which allows for more variation and thus more precise discriminatory power (Oppenheim, 1992). Furthermore, a Likert scale usually yields a distribution that resembles a normal distribution (Likert, 1932) and results in numeric scores that can be treated as an interval scale of measurement. The underlying assumptions for using more powerful parametric statistical techniques would not be violated by the presence of a distribution approaching a normal distribution and an interval scale of measurement. We also chose a 7-point Likert-type scale, rather than the more common 5-point scale, because the two additional points could reduce respondents' tendency to consistently use the extreme points of the scale (Polgar & Thomas, 1988; Reynolds, 2000).

Factor Analysis to Retain the Best Items

Factor analysis is a statistical method used to explore the underlying constructs associated with a set of items (an exploratory factor analysis). The set of items that are highly correlated with one another would emerge under one factor (or a hypothetical construct). In addition, factor analysis is used to reduce the length of an instrument by retaining the items that have relatively high factor loadings (e.g., greater than $|0.30|$) under the important and meaningful factors (Gorsuch, 1974). Factor analysis is also used to examine the empirical relationships among a set of variables that can be efficiently summarized by a theoretical formulation (a confirmatory factor analysis).

To screen for the best items to include in the next version and thus reduce the length of the preliminary instrument, we used exploratory factor analysis (EFA) with the data collected from 193 medical students for the 45-item instrument. We used principal component factor extraction (the most frequently used factor extraction method), followed by orthogonal varimax rotation. This type of mathematical rotation is frequently used to obtain a simpler factor structure and to produce independent (uncorrelated) factors.

The “Generic Version” of the Scale

On the basis of the results of the exploratory factor analysis, we retained 20 of the 45 items in the generic or original version of the instrument, the Jefferson Scale of Physician Empathy (JSPE), which was later renamed the Jefferson Scale of Empathy (JSE) subsequent to making some slight modifications in the content for administration of the instrument to medical as well as other health professions students, and all practicing health professionals. Those 20 items had the highest factor structure coefficients (greater than 0.40) on the first extracted factor (grand factor). The eigenvalue (latent root) of this grand factor was 10.64, which was much higher than the eigenvalue for the next factor, 3.45. Eigenvalues indicate the importance of extracted factors in terms of the proportion of variance accounted for. A relatively large eigenvalue for the first factor is indicative of the factor’s importance. A sudden drop in the magnitude of the eigenvalue and no significant decrease in the eigenvalues of subsequent factors is used to retain the substantial factors and disregard the trivial ones. This guideline is known as the “scree test” (Cattle, 1966). Because the sample size of 41 residents was insufficient (e.g., the ratio of the size of the sample of medical residents to the number of variables was less than 10; Baggaley, 1983), we did not perform a factor analysis for that sample. However, an examination of the patterns of inter-item correlations showed considerable similarities between samples of medical students and residents (Hojat et al., 2001).

The item with the highest factor structure coefficient on the grand factor was “Empathy is an important therapeutic factor in medical and surgical treatment.” This item was regarded as an “anchor” with which to evaluate the other items by examining the magnitude and direction of correlations between the anchor item and the other items. In the generic version of the scale, 17 items with positive factor structure coefficients and positive and statistically significant correlations with the “anchor” item were directly scored on the 7-point Likert-type scale (e.g., 1 = Strongly disagree; 7 = Strongly agree). The other three items, which had negative factor structure coefficients on the grand factor and also yielded negative correlations with the “anchor” item, were reverse scored (1 = Strongly agree, 7 = Strongly disagree). The descriptive statistics for the generic version of the two preliminary study samples of medical students and residents are reported in Table 2 (see Appendix A).

Construct Validity of the Generic Version

Construct validity refers to the extent to which a test measures the theoretical constructs of the attribute that it purports to measure (Anastasi, 1976). Factor analysis helps to determine whether the scale’s dimensions (underlying factors) are consistent with the theoretical constructs of the concept one intends to measure. Therefore, using factor analysis to examine construct validity can reveal the major dimensions that characterize the test scores (Anastasi, 1976).

To investigate the underlying structure of the generic version, data collected from the medical students were subjected to principal component factoring with orthogonal varimax rotation. Four factors emerged, each with an eigenvalue greater than 1. An eigenvalue equal to or greater than 1 known as the Kaiser criterion (Kaiser, 1960), is often used to retain the most important factors. The four extracted factors accounted for 56% of the total variance. Ten items had factor coefficients greater than 0.40 on the first factor

(eigenvalue = 7.56, accounting for 38% of the variance). We chose the magnitude of 0.40 as the minimum salient factor loading needed to assume a meaningful relationship between the item and the relevant factor (Gorsuch, 1974).

Assigning a title to a factor in factor analytic studies is a subjective judgment made according to the contents of the items with higher factor coefficients under the corresponding factor. Based on the contents of the 10 items with the highest factor coefficients, the first factor was called a construct of “the physician’s view of patient’s perspective” (perspective taking). Five items had a factor coefficient greater than 0.40 on the second factor, which accounted for 7% of the variance (eigenvalue = 1.30). Based on the contents of items with high factor coefficients, this factor was entitled “understanding patient’s experiences” (compassionate care). Two reverse-scored items had factor coefficients greater than 0.40 on the third factor (eigenvalue = 1.14, accounting for 6% of the variance), which was entitled “ignoring emotions in patient care.” (This is the opposite pole of standing in a patient’s shoes). Finally, two items had factor coefficients greater than 0.40 on the fourth factor (eigenvalue = 1.01, accounting for 5% of the variance), which was entitled “thinking like the patient.” According to Velicer and Fava (1998), a minimum number of three items per factor is required for a stable factor pattern. According to this criterion, the last two factors may not be as stable as the first two.

Also, a relatively considerable change in the magnitude of the pre-rotational eigenvalue after extracting the first factor suggests that the first factor is the most salient and reliable among all other extracted factors. The factor structure of the generic version of the JSE is consistent with the multifaceted concept of empathy reported in the literature (Spiro et al., 1993). Details regarding the factor analysis of the generic version of the JSE and a table of factor structure coefficients are reported elsewhere (Hojat et al., 2001).

Criterion-Related Validity of the Generic Version

Criterion-related validity involves an examination of the correlations between the test scores and selected criterion measures. One approach to criterion-related validation is to demonstrate significant correlations between scores on the scale and conceptually relevant variables (convergent validity) accompanied by nonsignificant correlations with conceptually irrelevant measures (discriminant validity). Convergent and discriminant validities are concepts derived from the method introduced by Campbell and Fiske (1959) which was initially used in their analysis of the multitrait-multimethod matrix of correlations to describe a pattern of higher relationships among conceptually more relevant variables (convergent validity) than among conceptually less relevant variables (discriminant validity) in different methods of assessment.

We included the criterion measures listed in Table 3 (Appendix A) in a questionnaire to examine the criterion-related validity of the generic version of the instrument. Criterion measures one to six were available for both samples of medical students and residents. The remaining 10 measures of personal attributes (items seven to sixteen in Table 3) were defined on the questionnaire and were answered on a 100-point scale. These criterion measures were available for the sample of students only. Respondents were asked to place a mark on the scale to identify the extent to which they perceived themselves as having each of those particular personal attributes. We also used scores of three scales

(Perspective Taking, Empathic Concern, and Fantasy of the Interpersonal Reactivity Index (IRI, Davis, 1983). We did not use the Personal Distress scale of the IRI for two reasons: We wanted to reduce the length of the questionnaire and increase the response rate, and we thought the Personal Distress scale was less germane to patient-care situations. The Pearson correlation coefficients between the generic version of the instrument and all 16 criterion measures (in Table 3) are reported in Table 4. The correlations with the scores of the three scales of the IRI were statistically significant but moderate in magnitude.

Although statistically significant, the correlations between the generic scale scores and conceptually relevant variables, such as compassion, warmth, dutifulness, faith-in-people, trust, tolerance, personal growth, and communication, were not large in magnitude—possibly the result of the low reliability of the single items used as criteria. However, the fact that all these conceptually relevant criteria yielded positive and statistically significant correlations is consistent with our expectations, thus providing support for the scale’s “convergent” validity. Conversely, a lack of significant relationships between scores on the scale and on personal attributes that seemed conceptually irrelevant to empathy (e.g., self-protection and clinical neutrality) supports the scale’s “discriminant” validity.

Sympathy overlapped with the scores of the scale to a limited degree, with correlations ranging from 0.27 to 0.33 (see Table 4). Self-reported empathy and compassion yielded the highest correlations with the JSPE scores, with correlations ranging from 0.31 to 0.56 (see Table 4). These correlations provide evidence supporting the criterion-related validity of the generic instrument (Details of these analyses are reported elsewhere; Hojat et al., 2001)

The moderate magnitude of the correlations with the criterion measures suggests that empathy, as measured by the original scale can be regarded as a distinct personal attribute with a statistically significant but practically limited overlap with compassion, concern, sympathy, perspective taking, imagination, warmth, dutifulness, tolerance, personal growth, trust, and communication.

Internal Consistency Reliability of the Generic Version

The reliability of an instrument is an indication of the precision in a single testing situation (internal consistency) or score stability in multiple testing situations (test-retest). We studied the internal consistency aspect of the reliability by calculating Cronbach’s alpha coefficient (Cronbach, 1951). The coefficient obtained was 0.89 for the sample of medical students and 0.87 for the sample of residents (Hojat, Mangione, Nasca et al., 2001). Reliability coefficients of this magnitude are desirable for educational and psychological instruments (Anastasi, 1976).

Revisions to Develop Three Versions of the Jefferson Scale of Empathy

The generic version of the scale was originally developed to measure medical students' orientations or attitudes toward empathic relationships in the context of patient care. However, there was a demand to use the scale for administration not only to medical students, but also to physicians and other health professionals involved in patient care, and all health professions students other than medical students. Thus, we decided to slightly modify the content of the generic scale so that three versions would be available:

1. **HP-Version:** for administration to physicians and other health professionals (see Appendix B1),
2. **S-Version:** for administration to medical students (see Appendix B2),
3. **HPS-Version:** for administration to students in all health professions other than medicine (see Appendix B3).

The HP-Version was to be geared more toward the clinician's empathic behavior in patient encounters; the S-Version and HPS-Version were to reflect students' orientation or attitudes toward empathy in patient care. The content in the three versions was very similar with only minor modifications to make the items appropriate for the target groups. For example, the item in the S-Version reading "It is difficult for a physician to view things from patients' perspectives," was modified as follows in the HP-Version: "It is difficult for me to view things from my patients' perspectives," and it was modified as follows in the HPS-Version "It is difficult for a health care provider to view things from patients' perspectives."

Revisions to Balance Positively and Negatively Worded Items

There were only three negatively worded items (reverse scored) in the generic version of the scale. Reversed scored items are used in personality tests to disrupt aberrant responses (Paulhus, 1991; Weijterd, Baumgartner & Schillewaet, 2013) and to reduce the confounding effects of those unusual responses. The following three mechanisms often lead to invalid responses: 1) the "acquiescence response style"—a tendency to agree or disagree constantly with the statements used as test items. (In the sociopolitical context, these people are "yeasayers" or "naysayers."); 2) "careless responding" refers to random or inattentive responses to the test items regardless of their content; 3) "confirmation bias," a tendency to express beliefs that are consistent with the way in which the question is stated (Davies, 2003). For example, when a question is about extraversion, respondents tend to think about situations in which they are extraverted, and when the question is about introversion, respondents tend to think about situations in which they are introverted (Weijters, et al., 2013).

In the modified version, a balance was maintained by making 10 items positively worded and the other 10 negatively worded. The positively worded items were directly scored according to their Likert weights (1=Strongly disagree, 7= Strongly agree), whereas the negatively worded items were reverse scored (1=Strongly agree, 7=Strongly disagree).

Revisions to Improve Clarity for an International Audience

Minor revisions also were made in the wording of a few items to improve their clarity for international audiences. For example, while researchers in Italy and Mexico were translating the instrument into Italian and Spanish, a question arose about the verbatim translation of the verb “touch” in the following item: “I do not allow myself to be touched by intense emotional relationships between my patients and their family members” (a negatively worded item). The symbolic meaning of “to be touched by” (to be affected or influenced by) was not apparent in the translated versions. Therefore, we revised this item by substituting “to be influenced” for “to be touched” to avoid confusion in translations in foreign languages.

Comparisons of the Generic (JSPE) and the Revised Versions (JSE)

To study the effects of our modifications and revisions on the JSE, we administered the generic version and the HP-Version to a group of 42 residents in internal medicine by using a cross-over design so that half the residents completed the HP-Version first and then the generic version, and the other half completed the two versions in the reverse order. The correlation between scores on the two versions was 0.85 ($p < 0.01$). We noticed an extremely slight nonsignificant trend toward improvement in the Cronbach’s alpha coefficient reliability estimate of the HP-Version (an increase from 0.81 to 0.85). No significant change occurred in the descriptive statistics of the two versions. For example, the mean score on the generic version was 120.9 (SD = 10.1), and it was 120.2 (SD = 10.7) for the HP-Version (Hojat et al., 2003). Recently collected data on medical students using the S-Version showed descriptive statistics that were similar to those reported in Table 2 on medical students who completed the generic version. Similar data on the HPS-Version of the JSE have also been reported in nursing students (Fields et al., 2011) and pharmacy students (Fjortoft et al., 2011).

We conducted studies to examine the psychometric characteristics of different versions of the JSE. For example, in the following study, we examined the psychometric properties of the HP-Version in a relatively large sample of practicing physicians. In the second study, we investigated the psychometric properties of the S-Version using a large sample of medical students.

Psychometrics of the JSE HP-Version

To study the psychometric and other aspects of the HP-Version, we mailed the JSE to 1,007 physicians in the Jefferson Health System, affiliated with Thomas Jefferson University Hospital and Jefferson (Sidney Kimmel) Medical College in the greater Philadelphia area (postage-paid return envelopes were provided). After two follow-up reminders, 704 physicians completed and returned the questionnaire, a response rate of 70% (Hojat et al., 2002c). A response rate of 70% is considerably higher than the typical rate of 52% reported for surveys mailed to physicians (Cummings et al., 2001). However, some researchers have suggested that a response rate of at least 75% should be achieved for surveys mailed to professionals to ensure the representativeness of the sample (Gough & Hall, 1977). A comparison of respondents and nonrespondents failed to show any significant differences between the two groups with regard to the distribution of their specialties, providing support for the representativeness of the study sample regarding their specialties (Hojat et al., 2002c).

To study the stability of scores on the HP-Version over time (test–retest reliability), 100 physicians who had completed the HP-Version were selected at random to receive a second copy of the scale plus a letter thanking them for their participation and requesting that they complete the second copy of the scale to help us establish the scale’s reliability. Seventy-one physicians responded, and their scores on the two tests were correlated. The exact time interval between completion of the two tests could not be determined accurately because we did not ask physicians to specify the date on which they completed the survey. However, by examining the postmarks, we were able to reach a rough estimate of approximately three to four months as the testing interval. The test–retest reliability was 0.65 ($p < 0.01$) (Hojat et al., 2002c).

Underlying Components (Factors) of the JSE HP-Version

We conducted an exploratory factor analysis to investigate the underlying components of the HP-Version. Three factors with eigenvalues greater than one emerged (4.2, 1.5, and 1.3) accounting for 21, 8, and 7% of the total variance, respectively (Hojat et al., 2002c). The factor coefficients, the magnitudes of eigenvalues, and the proportions of variance are reported in Table 5 (Appendix A). The 10 positively worded items had factor coefficients of at least 0.45 on Factor 1 (shown in bold). This factor can be regarded as the grand component of the scale, as the magnitude of its eigenvalue indicates. On the basis of the contents of items with high factor coefficients, the first factor can be titled “Perspective Taking,” a component of the JSE that has been described as the core cognitive ingredient of empathy (Davis, 1994; Spiro et al., 1993) and as the stepping stone in empathic engagement (Jackson et al., 2006). This major component is similar to the grand factor of “Physician’s View of the Patient’s Perspective.” that emerged in the generic version.

Factor 2 included eight of the negatively worded items with factor coefficients of at least 0.37. This factor can be regarded as a construct involving “Compassionate Care” according to the contents of the items (the positive pole of the contents of the items that were negatively worded but reverse scored). Conceptually, this construct is similar to the two factors that emerged in the generic version: “emotions in patient care” and “understanding patient’s experiences.” Finally, Factor 3 included two other negatively worded items with high factor coefficients (≥ 0.66) that can be called “Standing in the Patient’s Shoes” (the positive pole of the contents of the negatively worded but reverse scored items). This is a trivial component that is similar to the factor “Thinking Like the Patient,” which emerged in the generic version.

These findings suggest that the factor structure of the JSE is consistent with the notion of the multidimensionality of empathy (Davis, 1983, 1994; Kunyk & Olson, 2001). In addition, the stability and the similarity between the factor structure and components across different samples (medical students and physicians) and across different versions (generic and revised) provides further support for the JSE’s construct validity.

Item Characteristics and the Corrected Item-Total Score Correlations of the HP-Version

The means of item scores on the HP-Version ranged from a low of 4.8 to a high of 6.5 on the 7-point scale (Hojat et al., 2002c). This finding suggests that the physicians’ responses to the items tended to be skewed toward the upper tail of the scale although the distribution of their responses showed that the physicians actually used the full range of possible responses on all items. The standard deviations for the items ranged from 0.9 to 1.6 (Hojat et al., 2002c).

The corrected item–total score correlations were all positive and statistically significant ($p < .01$), ranging from 0.30 to 0.60 with a median correlation of 0.43. Two items with the highest item–total score correlations ($r = 0.60$) were “I try to imagine myself in my patients’ shoes when providing care to them” and “My understanding of how my patients and their families feel does not influence medical or surgical treatment.” Two items with the lowest item–total score correlations ($r = 0.30$) were “I do not enjoy reading nonmedical literature or the arts” (negatively worded, reverse-scored item) and “My understanding of how my patients and their families feel does not influence medical or surgical treatment.” (reverse scored) (Hojat et al., 2002c). The findings support the correct direction of scoring of the items and each item’s significant contribution to the total JSE score.

Descriptive Statistics and Reliability of the HP-Version

The descriptive statistics and the distribution of scores for the HP-Version are reported in Table 6 (Appendix A). The internal consistency aspect of reliability (Cronbach’s alpha coefficient) was 0.81 for the sample of physicians, and the test–retest reliability coefficient was 0.65 (Hojat et al., 2002c). The reliability coefficients indicate that the HP-Version is internally consistent and its scores are relatively stable over time (see Table 6).

Desirability of National Norms and Cutoff Scores

It would be desirable to develop norms based on representative national samples of physicians for comparative purposes or for evaluation of each individual physician's score (e.g., a female physician practicing family medicine) against the norm (e.g., percentile ranks) derived from a corresponding national sample (e.g., a national sample of female physicians in family medicine). Also, determining cutoff scores to identify those with marginal JSE scores could be helpful for assessment purposes. Obviously, the data reported in Table 6 cannot serve those purposes.

Psychometric Properties of the JSE S-Version

To examine the psychometrics and other measurement properties of the S-Version, we collected data from 2,637 students who matriculated at Jefferson (Sidney Kimmel) Medical College between 2002 and 2012 and completed the JSE (S-Version) at the beginning of medical school (orientation day, before they were exposed to formal medical education). There were 1,336 (51%) women and 1,301 (49%) men in this sample, which represented 94% of all matriculants during the 11-year study period ($n=2,802$). Frequency and percent distributions of the study sample by matriculation year and gender are reported in Table 7 (Appendix A). Although the proportion of women varied from 46% (in year 2002) to 57% (in year 2006), no significant difference was found in gender composition in different matriculation years ($\chi^2_{(10)}=9.8, p=0.45$) (for a more detailed report of this study, see Hojat & Gonnella, 2015).

Descriptive Statistics of the S-Version

Means, standard deviations, medians, score ranges, skewness and kurtosis indices for the entire sample and for matriculants of each year are presented in Table 8. As shown in the table, the JSE (S-Version) mean score for the entire sample was 114.3 ($SD=10.4$), which varied from a low of 113.2 ($SD=11.3$) for matriculants of 2009 to a high of 115.9 ($SD=9.8$) for matriculants of 2004. Analysis of variance was used to test the significance of differences in mean scores of matriculants in different years. No statistically significant difference was observed ($F_{(10,2626)}=1.2, p=0.29$), meaning that students during the 11 years of this study period had similar empathy scores at the beginning of medical school. These descriptive statistics are somewhat similar to most of those reported for medical students in the United States by other researchers (Hojat, 2016).

Skewness index is a measure of symmetry in score distribution. In a perfectly normal distribution the skewness is close to zero. As shown in Table 8 (Appendix A), the skewness index was negative for the entire sample (-0.56) and for each matriculating year (ranging from -0.92 for matriculants of 2008 to -0.24 for matriculants of 2002, with a median of -0.53). Negative skewness indicates that the peak of JSE score distributions tended to be to the right side of the distribution (bulk of data to the side of higher scores). However, the magnitudes of the skewness indices suggest that distributions were just moderately skewed (distributions with skewedness indices out of the -1 to +1 range are considered highly skewed).

Kurtosis is an index of the peak of score distribution. Higher values indicate a higher peak, and lower values a flatter peak. Normal distributions have a kurtosis index close to three (mesokurtic); those greater than three are high-peaked distributions (leptokurtic), and those with kurtosis less than three are flatter-peaked (platykurtic). The kurtosis for the entire sample was 0.93, ranging from a low of 0.04 (for matriculants of 2002) to 2.66 (for matriculants of 2008) with a median of 0.52 (Table 8). These findings indicate that the distributions of the JSE scores tend to be platykurtic (Hojat & Gonnella, 2015).

Internal Consistency Reliability of the S-Version

We calculated Cronbach's alpha coefficient for the entire sample which was 0.80, ranging from a low of 0.75 (for matriculants of 2006) to a high of 0.84 (for matriculants of 2008 and 2009) with a median of 0.80 (Table 8). These reliability coefficients are in the range of most JSE studies by other national and international researchers.

Score Distributions and Percentile Ranks of the S-Version

Frequency distributions of the JSE scores and percentile ranks for men, women, and the entire sample are presented in Table 9 (Appendix A). As shown in the table, the mean, median and standard deviation for the entire sample were 114.3, 115, and 10.4, respectively. Because we found significant gender difference on the JSE scores, we examined the score distributions for men and women separately (Hojat & Gonnella, 2015). I will discuss how the data reported in Table 9 can be used as "proxy" norm and for determining "tentative" cutoff scores.

Item Statistics of the S-Version

Respondents used the full range of possible answers (1-7) for each item. Item mean scores ranged from a low of 3.6 ($SD=1.4$) for this item: "Physicians should not allow themselves to be influenced by strong personal bonds between their patients and their family members" to a high of 6.5 ($SD=0.8$) for this item: "Patients feel better when their physicians understand their feelings."

The corrected item-total score correlations ranged from a low of 0.13 (for the aforementioned item with the lowest mean score) to a high of 0.61 (for this item: "Physicians' understanding of the emotional status of their patients, as well as that of their families, is one important component of the physician-patient relationship." The median item-total score correlation was 0.44. All correlations were positive and statistically significant ($p < 0.01$) which indicates that all items contributed positively and significantly to the total score of the JSE scale (for more detailed information see Hojat & LaNoue, 2014). Item-total score correlations are reported in Table 10.

To address the discrimination power of each item, we calculated an item discrimination effect size index. For that purpose, we divided the total sample into two groups of approximately top-third high scorers on the JSE (score > 119 , $n=835$) and bottom-third low scorers (JSE score < 111 , $n=857$). For each item, we calculated the mean score difference between the top-third and bottom-third JSE scoring groups, divided by the pooled standard deviation of the item to calculate the item discrimination effect size index, similar to the Cohen's d (item discrimination effect size index = $M_{\text{top-third}} - M_{\text{bottom-third}} / \text{pooled } SD$) (Hojat & LaNoue, 2014). The item discrimination effect size indices

ranged from a low of 0.50 for the aforementioned item which showed the lowest item-total score correlation, to a high of 1.4 for the above-mentioned item with the highest item-total score correlation. The median effect size was 1.2. (see Table 10). Cohen (1987) suggests that the effect size values around 0.30 or lower are considered negligible, around 0.50 are moderate, and around 0.70 and higher are large and practically important. According to these operational definitions, the item discrimination effect size indices were all substantial and practically (clinically) important (Hojat & Xu, 2004).

Underlying Components of the S-Version

For factor analytic studies we divided the sample into two groups: 1. Matriculants between 2002-2007 (n=1,380); data from this group were used for exploratory factor analysis (EFA). 2. Matriculants between 2008-2012 (n=1,232); data from this group were used for confirmatory factor analysis (CFA). We used principal component factor extraction with oblique rotation in our exploratory factor analysis to re-examine the underlying components of the JSE. For confirmatory factor analysis we used structural equation modeling (SEM) and root mean square error for approximation (RMSEA) (Arbuckle & Wothke, 1999) to confirm the latent variable structure of the scale.

In almost all of the factor analytic studies of the JSE, orthogonal (varimax) rotation was used to obtain independent factors. In the present study, we used oblique rotation (promax) to allow correlations among the extracted factors in order to examine if previously reported factor pattern in our study of physicians for the HP-Version (Hojat et al., 2002c) would remain unchanged. We also limited the number of retained factors to three to make the findings comparable to the previously reported factor analytic study with physicians (Hojat, et al., 2002c). Indeed, the scree test to determine the appropriate number of factors to retain before rotation showed that the plot of the eigenvalues leveled off after extraction of the third factor, supporting our decision to retain three factors for rotation. The Kaiser-Meyer-Olkin measure for sampling adequacy (MSA) was used prior to factor extraction which resulted in an overall index of .86, supporting the adequacy of data for factor analysis. Also, the Bartlett's test for sphericity showed that the intercorrelation matrix was factorable ($\chi^2_{(190)}=5332.5, p < 0.0001$).

The eigenvalues for the first, second, and third retained factors were 4.7, 1.6, and 1.4, respectively. The first factor, "Perspective Taking," included 10 items with relative high factor coefficients of at least 0.28, accounting for 23% of the total variance. A sample item (with the highest factor coefficient) is: "Patients value a physician's understanding of their feelings which is therapeutic in its own right." The Cronbach's alpha coefficient for items under this factor was 0.79. The second factor, "Compassionate Care," included seven items with relatively high factor coefficients (> 0.25), accounting for 8% of the total variance. A sample item is: "Patients' illnesses can be cured only by medical and surgical treatment; therefore, physicians' emotional ties with their patients do not have influence in medical or surgical treatment." This is a negatively worded item which is reverse scored. The Cronbach's alpha coefficient for items under this factor was 0.69. The third factor, "Standing in the Patient's Shoes" included only two items with factor coefficients greater than 0.67, accounting for 7% of the total variance. A sample item is: "Because people are different, it is difficult to see things from patients' perspectives" (reverse scored). The Cronbach's alpha coefficient for items under this factor was 0.68. One item

had a low factor coefficient (0.21) on Factor 2. However, this item showed a significant item discrimination effect size index and yielded a statistically significant (but low in magnitude) item-total score correlation. Summary results of the exploratory factor analysis are reported in Table 10. The general pattern of findings is similar to those in most other studies in the U.S. and abroad. For example, similarities in factor pattern are observed in studies reported for the physicians (Hojat, et al., 2002c) and nurses (Ward et al., 2009) in the United States and for samples of physicians in Italy (DiLillo et al., 2009); medical students in Iran (Shariat & Habibi, 2013); Korea (Roh et al., 2010); Japan (Kataoka et al., 2009); Mexico (Alcorta-Garza, et al., 2005); South Africa (Vallabh, 2011); mainland China (Wen et al., 2013); Taiwan (Hsiao et al., 2012); Brazil (Paro et al., 2012); Austria (Preusche & Wagner-Menghin, 2013); and England (Tavakol et al., 2011). The two factors of “Perspective Taking” and “Compassionate Care” emerged in almost all factor analytic studies of the JSE.

Confirming the Latent Variable Structure of the S-Version

In confirmatory factor analysis, all 20 items were modeled as functions of three underlying latent variables which emerged in the exploratory factor analysis and have been widely reported. Maximum likelihood (ML) estimation was used. The regression coefficient for one item-to-latent variable path for each latent variable was set to 1.0 to scale the latent variable. Additionally, the variance of one error term (that corresponding to item 6) was set to 0.0 to facilitate convergence of the ML estimation. Without this constraint, the model was inadmissible due to the negative error variance of item 3 (Kolenikov & Bollen, 2012).

As an exploratory analysis, we also evaluated a two-factor model; one which omitted the two items which comprise factor 3 – “walking in the patient’s shoes.” This was done because of the failure of the maximum likelihood CFA to converge without constraining one error variance, which can indicate a mis-specified model (Kolenikov & Bollen, 2012), and the other CFA studies of the scale which modeled only two factors (Tavakol et al., 2011; Williams et al., 2013). We compared the fit of this two-factor model to the fit of the three-factor model (Hojat & LaNoue, 2014).

Assessment of model fit was made through the use of several well-accepted metrics in structural equation modeling (*SEM*). First, the χ^2 test for the model was reviewed. In *SEM*, it is a measure of fit, rather than a test statistic, and desired values are small and non-significant. However, since χ^2 is sensitive to sample size, it is possible to obtain a large and significant value even when the fit of the model to the data is acceptable. To address this, a widely used “rule of thumb” was also evaluated – the ratio of the χ^2 to its degrees of freedom, which is suggested to reflect good fit at values < 4.0 (Joreskog, 1993).

We also evaluated the adjusted ‘goodness of fit’ index (AGFI) which indexes the proportion of the observed covariance matrix that is explained by the model-implied covariance matrix (Kline, 1998). The Tucker-Lewis Index (TLI) was used to compare the fitted model to a null model. Hu and Bentler (1998) recommend values > 0.95. Finally, the RMSEA (root mean square error for approximation) for the structural model was evaluated. Hu and Bentler (1998) showed that a cutoff of 0.06 for RMSEA indicates a good model fit.

For model comparisons, an additional fit and an incremental fit improvement metrics were used. The models were first compared to each other through the use of the χ^2 test for the significance of the difference in fit. The non-normed fit index (NNFI; also known as the TLI: Tucker-Lewis Index) was used to assess improvements in fit from model to model. The TLI normally results from SEM output as a comparison to a “null” model, but a version can be calculated for the improvement in fit between any two competing models. Hu and Bentler (1998) suggested that improvements in the TLI greater than 0.02 are of “substantive interest.” See Figure 1 (Appendix A) for the measurement model structure of 20 variables and three correlated factors.

The two-factor solution did not indicate a good fit (RMSEA=.07, AGFI = 0.88); however, the three-factor confirmatory factor analysis yielded a marginally good fit to the data; RMSA = 0.05 and AGFI greater than 0.90. Both the χ^2 difference test, and the TLI suggest that the three-factor model is a better fit than the two-factor model. Summary results for fit statistics are shown in Table 11 (Appendix A).

Results of CFA support the three-factor model of the JSE, and are in agreement with those reported in Iranian medical students (Shariat & Habibi, 2013) and British medical students (Tavakol et al., 2011). A satisfactory three-factor model fit was also achieved in Portuguese medical students after relaxing model restrictions (Magalhaes et al., 2011). The two-factor model (“perspective-taking” and “compassionate care”) in Australian paramedic students (Williams et al., 2013) partly resembles findings of the present study. Although we acknowledge that these findings overall (including the current study) are not definitive with regard to the structure of the scale, we do not agree with suggestions made by some that a few JSE items should be excluded for a better latent variable structure model (Williams, et al., 2013). First, deletion of items can cause an incompatibility problem in comparative research. Second, in most of the psychometric studies of the JSE (including the present study), significant item-total score correlations have been reported suggesting that each item contributes significantly to the total score of the JSE. In addition, we showed in this study that each item can discriminate substantially between high and low scorers of the JSE.

As noted above, this study did not conclusively support a three-factor latent variable scale structure for the JSE. Further exploratory studies may be desirable to re-examine this issue in different samples of health profession students and practitioners. In this sample, we noticed a ceiling effect, or relatively high mean scores (> 6.0) across 7 items, which may have contributed to the marginal model fit (Hojat & LaNoue, 2014).

Data in this large scale study supported the previously reported findings on the reliability (Cronbach’s alpha coefficient), underlying constructs, and confirmation of the latent variable structure of the JSE (S-Version). Similarities in factor pattern of the JSE in different samples and in different countries indicate that the underlying components of the scale are relatively stable, regardless of cultural variation. The three components of “Perspective Taking”, “Compassionate Care”, and “Standing in the Patient’s Shoes” which emerged in this and some other factor analytic studies of the JSE are consistent with the ingredients of empathy often reported in the literature. These underlying factors are also supportive of the pillars of empathic engagement in patient care, namely, seeing with the mind’s eye (e.g., Perspective Taking and Walking in the Patient’s Shoes) and

hearing with the third ear (e.g., Compassionate Care). Based on the findings from the CFA, we suggest to retain all 20 items in the instrument not only for the goodness of the fit of the three-factor model, but also because of significant item-total score correlations and substantial item discrimination effect size indices obtained for all items (Hojat & LaNoue, 2014).

The psychometric properties of an attribute, such as empathy in patient care, can be a function of several factors including sociocultural, educational, and environmental factors which necessitate a continued effort to examine psychometrics of the JSE in different sociocultural environments, populations, and in different translated versions of the scale to assure that the psychometric soundness of the JSE can be retained in a variety of settings. Such broad psychometric support would further add to the credibility of the JSE and raise confidence of its users wherever it is applied.

Proxy Norm Data for the S-Version

Data for a large sample of medical students ($n=2,637$) provided an opportunity for exploring the possibility of providing norm data and cutoff scores (Hojat & Gonnella, 2015). Because of the large sample from a large medical school-- which is similar to other large medical schools in the United States with regard to its four-year medical education curriculum, composition of student body, attrition rate, and career choices-- the statistics reported in Table 9 can serve as proxy norm data for matriculating students in other U.S. medical schools under the condition that descriptive statistics and score distributions of the JSE in those medical schools are not substantially different from data reported in Table 9. For example, a score of 120 on the JSE obtained by a male matriculant would place him in the 78th percentile, and the same score obtained by a female matriculant would place her in the top 65th percentile of the score distributions.

The score distributions and percentile ranks reported in Table 9 can be used as proxy norms for the purpose of comparing individual scores and determining the relative rank for male and female medical school matriculants (assuming that the score distributions and descriptive statistics of the medical school from which the JSE score is being compared are not substantially different from data reported in Table 9). For example, the JSE score of a first-year male matriculant to medical school "X" who falls between 131-135 would place him in the top 98-99 percentile, and a score of a first-year female matriculant from the same school who falls between 126-130 would place her in the 83-95 percentile (assuming there are similarities in descriptive statistics and score distribution of the JSE in medical school "X" with those reported in Table 9).

Tentative Cutoff Scores for the S-Version

For determining tentative cutoff scores for entering medical students to identify the high and low scorers on the JSE, we arbitrarily chose two points on the score distributions: One point was one and half standard deviation above the mean score (to identify the high scorers), and another was one and half standard deviation below the mean score (to identify the low scorers). These cutoff points were separately calculated for men and women. Thus, the cutoff scores for identifying low and high scorers in men were ≤ 96

and ≥ 127 , respectively; they were ≤ 102 and ≥ 129 , respectively in women. These cutoff scores include approximately 7% of top scorers and 7% of bottom scorers in both men's and women's score distributions (Hojat & Gonnella, 2015).

We compared performance measures among high, moderate, and low scorers using the above-mentioned cutoff scores. Results showed a consistent pattern of findings that the low scorers, as compared to the moderate and high scorers, received lower average ratings on clinical competence in six third-year medical school core clerkships (family medicine, internal medicine, obstetrics/gynecology, pediatrics, psychiatry, and surgery) and on the residency program directors' ratings for the factors of the "art" and the "science" of medicine (Hojat, Paskin, et al., 2007) given at the end of the first postgraduate training year. However, the results of analysis of variance indicated that the differences, while in the expected direction, were marginally significant for the ratings of clinical competence in the six third-year core clerkships ($F_{(2,2284)}=2.57, p < 0.07$) (Hojat & Gonnella, 2015).

The tentative cutoff scores suggested in this study are not definitive. We need not only more representative samples but also data on well-validated criterion measures to examine the predictive validity of the cutoff scores. We also need more data from representative samples of medical schools at the national level to develop national norm tables and determine cutoff scores for male and female medical school matriculants. Using a similar approach, national norm tables can also be developed for students in other health profession schools, as well as for male and female doctors in different specialties. These concepts set an agenda for future research.

Additional Indicators of Validity of the JSE

The "Contrasted Groups" Method

Other indicators that support the validity of the JSE are based on the notion that a measuring instrument is valid when it can demonstrate group differences or relationships in the expected direction. The expectations are based on previous research, theories, and behavioral tendencies described in the literature. This approach, in which different groups are compared to examine whether the differences in their scores are in the expected direction, is known as validation by the method of "contrasted groups" (Anastasi, 1976).

Expectation of Gender Difference on the JSE Scores in Favor of Women

In a majority of studies, women scored higher than men on measures of empathy. Some authors have suggested that women's behavioral style is generally more "empathizing" than men's style (Baron-Cohen, 2003). Thus, we expected to find a gender difference in favor of women on the JSE scores. Empirical confirmation of this expectation could be regarded as an indicator of the JSE's validity. Consistent with our expectation, in most studies in which the JSE was used, female health professions students and practicing health professionals obtained significantly higher JSE mean scores than their male counterparts. This pattern of gender difference in the JSE scores in favor of women has also been reported in national and international researchers (Hojat, 2016).

In our study of 11 entering classes (between 2002 and 2012) of Jefferson (Sidney Kimmel) Medical College, we reexamined gender differences on the JSE for each entering

class (Hojat & Gonnella, 2015). As reported previously there were 1,336 women (51%) and 1,301 (49%) men in this sample (Table 7). With one exception, women obtained substantially higher mean empathy scores than men in all of our comparisons for different matriculating classes and the differences were statistically significant ($p < .01$ by t-test). The exception was the matriculating class of 2008 in which women's higher JSE mean score ($M=114.8$, $SD=12.3$) was not significantly different from that of men ($M=112.2$, $SD=11.9$) at the conventional level of statistical significance ($t_{(235)}=1.6$, $p < .10$). This is consistent with the previous findings in which the JSE was used (Hojat et al. 2002a; 2001; Alcorta-Garza et al. 2005; Fjortoft, et al. 2011). The effect size estimates of gender differences varied for different matriculating classes, ranging from a low of 0.21 (for the matriculating class of 2008) to a high of 0.57 (for the matriculating class of 2009). For the entire sample, the effect size estimate was 0.40 (Hojat & Gonnella, 2015). Means and standard deviations of the JSE scores by matriculation year and gender are reported in Table 12 (Appendix A).

Several plausible explanations have been given for gender differences in empathy, including social learning, genetic predisposition, evolutionary underpinnings, and other factors (Hojat, 2016; Hojat et al., 2001, 2002a; 2002c).

Specialty Interest

Although empathy is the backbone of patient-clinician relationship in all specialties, there are some specialties that require a higher degree of empathic engagement because of the frequency of encounters, broader consultations, and the provision of continuous care. Based on this notion, some medical education researchers have classified specialties into two broad categories of "people-oriented" and "technology- or procedure-oriented" specialties (Lieu et al., 1989). The so called "people-oriented" specialties often require long-term patient-physician relationship with continuous care. The physician-patient relationship often begins as an office-based first encounter health or illness appraisal, preventive education or intervention, episodic and long-term comprehensive care of a wide variety of medical problems (e.g., family medicine, general internal medicine, pediatrics), plus obstetrics and gynecology, and psychiatry. The so called "technology- or procedure-oriented" specialties do not often require long-term continuous care. They primarily involve specialized diagnostic or technical computer-based procedures (e.g., primarily hospital based specialties such as anesthesiology, pathology, and radiology), and may include specialties that require performing highly skilled and specialized therapeutic techniques or procedures (e.g., surgery and surgical subspecialties), or providing episodic or long-term care of a limited number of medical problems that may include instrumentation and technical interventions with a mix of ambulatory and hospital based practice (e.g., medical subspecialties such as interventional cardiology, gastroenterology, plus other nonprimary care specialties).

Due to the nature of the patient-physician interpersonal relationship, we expected that those physicians-in-training and in-practice interested in "people-oriented" specialties would outscore those interested in "technology- or procedure-oriented" specialties. Out of 2,637 entering medical students in our sample, 75% ($n=1,979$) specified the specialty they planned to pursue after graduation from medical school (965 were interested in people-oriented, 590 in "technology- or procedure-oriented" and 424 in other specialties).

We compared the JSE scores of the three groups by using analysis of covariance to partial out the effect of gender (men=0, women=1). Summary results of statistical analysis are reported in Table 13 (Appendix A).

Consistent with our expectation, those who were interested in pursuing people-oriented specialties obtained a significantly higher JSE mean score ($M=115.35$) than their classmates who were interested in technology- or procedure-oriented ($M=112.34$) and other specialties ($M=114.51$) (adjusted $F_{(2,1973)}=16.25$, $p < 0.001$). It is important to notice that the differences observed in this sample of entering medical students who completed the JSE prior to their formal medical education cannot be attributed to their exposure to medical education experiences and training. Instead, the baseline differences can be attributed to a personality attribute developed prior to medical school that prompted some to express interest in different specialties, even though some of these students might have changed their specialty choice during medical school (Forouzan & Hojat, 1993). The findings regarding higher JSE scores in those interested in “people-oriented” compared to those interested in “technology-/procedure-oriented” specialties are in agreement with our previous research findings (Hojat et al., 2002c; 2005) and findings reported by others in the United States and abroad (Chen et al., 2012; 2007; Kataoka et al., 2009; Voinescu et al., 2009). These findings confirmed our expectation on specialty differences, which provide support for the validity of the JSE.

It might be argued that differences in JSE scores at the beginning of medical school could be due to prior undergraduate education. However, in his master’s thesis, Smolarz (2005) did not find a significant difference in the JSE scores among first-year medical students who majored in science and non-science disciplines as undergraduates. In other studies with nursing students (Fields et al., 2011; Ward et al., 2009) academic major prior to nursing school did not predict JSE scores in nursing school. Thus, it seems that undergraduate education has no significant link to empathy in health professions students.

Relationships with Conceptually Relevant Measures (Criterion-Related Validity)

Additional evidence in support of the validity of the JSE includes positive and significant correlations between scores of the JSE and measures of variables conceptually relevant to empathy, no correlation with measures irrelevant to empathy, and negative correlations with measures of attributes that are conceptually detrimental to empathic engagement. For example, in a study with medical students (Hojat, Zuckerman et al., 2005) we found that the scores on the JSE were significantly and positively correlated with “sociability” scores measured by the short form of the Zuckerman–Kuhlman Personality Questionnaire (ZKPQ) (Zuckerman, 2002).

Empirical evidence showed that a number of personality attributes that are conducive to relationship building, thus relevant to empathy, have been positively correlated with JSE scores including emotional intelligence (Arora et al., 2010; Austin et al., 2005; Kliszcz et al., 2006); attitudes toward teamwork and collaboration (Calabrese, Bianco et al., 2013; Van Winkle, Bjork et al., 2012; Ward et al., 2009); desirable professional behavior (Brazeau et al., 2010); therapists’ psychological growth (Brockhouse et al., 2011); agreeableness, conscientiousness, extraversion, and openness to experience (Costa et al.,

2014); orientation toward integrative patient care (Hojat, Bianco et al., 2015); positive social influence (Hojat, Michalec et al., 2015); peer nomination in clinical and humanistic excellence in medical school (Pohl et al., 2011); patient-centered care (Beattie et al., 2012); friendly and relaxed style of communication (Brown et al., 2011); and cooperativeness and self-directness (Hong et al., 2011).

In a sample of dental students at the University of Washington, School of Dentistry, Sherman and Cramer (2005) found positive and significant correlations between scores on the JSE and 18 of 26 measures of attitudes toward clinical competencies. The highest correlation was found between JSE scores and ratings of the following clinical competency: “application of the principles of behavioral sciences that pertain to patient-centered oral health care” ($r = 0.52$).

Furthermore, consistent with views on the effects of early interpersonal relationship experiences on the development of empathy, we observed that higher levels of self-reported satisfaction with the early maternal relationship (an indication of a secure mother-child attachment), and satisfactory peer relationships in school (an indication of social skills) were significantly associated with higher scores on the JSE (Hojat et al., 2005).

Conversely, scores of the JSE yielded negative correlations with personality attributes that are detrimental to positive interpersonal relationship such as measures of aggression-hostility (Hasan, et al., 2013); indicators of burnout such as depersonalization and emotional exhaustion (Hojat, Vergare et al., 2015; Lamothe et al., 2014); and harm and avoidance (Hong et al., 2011). In our own study (Hojat, Zuckerman et al., 2005), we obtained a significantly negative correlation between the scores on the JSE and the Aggression-Hostility scale of the ZKPQ (Zuckerman, 2002).

In his doctoral dissertation, Reisetter (2003) reported significant correlations between JSE factor scores and subscale scores of the Physician Belief Scale (PBS) (Ashworth et al., 1984; McLellan et al., 1999). For example, a negative correlation ($r = -0.30$) was found between the JSE “Standing in the Patient’s Shoes” factor scores of the JSE and the PBS “Burden” subscale (defined as the difficulties perceived by the clinician in addressing the client’s psychosocial problems). However, in this study, the correlation between the “Compassionate Care” factor scores of the JSE and the “Belief and Feeling” subscale of the PBS (defined as the clinician’s concern about his or her ability to address the client’s psychosocial problems) was significant and positive ($r = 0.50$).

Correlations between Scores on the JSE and the IRI

In a study involving 93 residents in internal medicine at Thomas Jefferson University Hospital (Hojat, Mangione, Kane et al., 2005a), we examined the relationships between total scores and factor scores (Perspective Taking, Compassionate Care, and Standing in the Patient’s Shoes) on the HP-Version and the IRI total and four scale scores (Perspective Taking, Empathic Concern, Fantasy, and Personal Distress). One study found that the Perspective Taking and Empathic Concern scales of the IRI were likely to measure empathy, whereas the Personal Distress and Fantasy subscales were likely to measure sympathy (Yarnold et al., 1996). We assumed that the IRI’s Perspective Taking and Empathic Concern scales were more relevant to the clinician–patient relationship

than were the Personal Distress and Fantasy scales. Therefore, we expected significant but moderate correlations between the JSE total and factor scores and scores on the IRI total and its Perspective Taking and Empathic Concern subscales. Conversely, we expected to obtain trivial correlations between scores on the JSE (and its factors) and scores on the IRI's Personal Distress and Fantasy subscales. A summary of the results is reported in Table 14 (Appendix A).

As expected, the correlations between scores on the IRI Personal Distress scale on the one hand and total and factor scores on the JSE on the other hand were all nonsignificant. Scores on the IRI Fantasy scale yielded modest correlations with scores on the JSE's Perspective Taking and Compassionate Care subscales ($r = 0.24, p < 0.05$, and $r = 0.37, p < 0.01$, respectively). The highest correlations were found between the scores on the IRI Empathic Concern scale and the JSE Compassionate Care and Perspective Taking factors ($r = 0.41, p < 0.01$, and $r = 0.40, p < 0.01$, respectively). The correlation between the scores on the perspective taking dimensions of both instruments was $r = 0.35$ ($p < 0.01$), and the correlation between the total scores on the two instruments was $r = 0.45$ ($p < 0.01$).

Therefore, our expectation was confirmed regarding significant correlations of moderate magnitude between total and factor scores on the JSE and scores on the Perspective Taking and Empathic Concern scales of the IRI. Furthermore, our prediction about the lack of relationship between the scores on the JSE and the scores on the IRI Personal Distress subscale was correct (Hojat, Mangione, Kane et al., 2005).

Scores on the JSE, Academic Performance, Clinical Competence

We expected to find a positive and significant relationship between medical students' scores on the S-Version of the JSE and global ratings of their clinical competence in core clinical clerkships. The reason for this expectation was that an ability to communicate with patients and understand their concerns is often considered when assessing global clinical competence. Our expectation was confirmed in a study with third-year medical students in which we found that students with higher scores on the S-Version obtained better ratings of clinical competence than did classmates with lower empathy scores (Hojat, Gonnella, Mangione et al., 2002).

The lack of convincing evidence precluded a hypothesis that performance on objective (multiple-choice) tests of academic knowledge should be associated with empathy scores. Therefore, we did not expect such an association and, indeed, did not find one (Hojat, Gonnella, Mangione et al., 2002). Our findings were consistent with those of other researchers (Disiker & Michielutte, 1981; Hornblow et al., 1977; Kupfer et al., 1978).

Scores on the JSE and Patient Outcomes

Because the ultimate purpose of medical and all other all health professions education is optimal patient outcome, the ultimate criterion measure for the validity of any measure of empathy in patient care should include tangible patient outcomes, independent of patients' subjective judgment.

To the best of our knowledge, there are only two published studies in which a significant association was observed between a validated measure of physician empathy (JSE) and tangible patient outcomes extracted from patients' electronic records, independent from patients' subjective judgment. In the first study (Hojat, Louis et al., 2011), electronic records of 891 adult patients with diabetes mellitus who were treated by one of 29 family physicians in the United States were examined, and the results of the most recent tests for hemoglobin A1c and low-density lipoprotein cholesterol (LDL-C) were extracted. Positive clinical outcomes were defined as good control of the disease reflected in A1c test results <7.0% and LDL-C <100. Findings showed that physicians' scores on the JSE could significantly predict clinical outcomes in the diabetic patients. Patients of physicians with high JSE scores were significantly more likely to have good control of their disease (56% of patients with A1C test results <7.0, and 59% with LDL-C < 100), compared to patients of physicians with low JSE scores (40% with A1c < 7.0, and 44% with LDL-C < 100). The association between physicians' scores on the JSE and patient outcomes (results of A1c and LDL-C) remained statistically significant after controlling for physicians' gender and age, as well as for patients' gender, age, and type of health insurance. Summary results are depicted in Figures 2 and 3 (Appendix A).

In the second study (Del Canale et al., 2012), electronic records of 20,961 adult patients with type 1 or type 2 diabetes mellitus who were treated by one of 242 primary care physicians (in Parma, Italy) were examined, and information on acute metabolic complications that required hospitalization (e.g., diabetic ketoacidosis, coma, and hyperosmolar) and demographic information were extracted. Physicians completed the JSE. Results showed statistically significant associations between physicians' scores on the JSE and rates of hospitalization due to acute metabolic complications in diabetic patients. Rates of disease complication in diabetic patients of physicians who scored high on the JSE (≥ 112), compared to other physicians with moderate scores (111-97) or low JSE scores (< 97) were 4.0, 7.1, and 6.5 per 1000, respectively. Summary results are presented in Figure 4 (Appendix A).

The association remained statistically significant after controlling for physicians' gender, age, type of practice (solo, group), geographical location of practice (plains, hills, mountains) and also patients' gender, age, and duration of time enrolled with the physician. Similarities in findings of the two aforementioned studies on significant association between physician empathy and patient outcomes are important for the generalization of the findings, given the cultural differences or variation in medical education and the health care systems in the U.S. and Italy.

Administration and Scoring

All three versions of the JSE can be administered either in individual or group testing. Half the items are directly scored according to their Likert weights (1 = Strongly disagree, 7 = Strongly agree) and the other half are reverse scored (1 = Strongly agree, 7 = Strongly disagree). Our scoring algorithm applies strict guidelines regarding missing responses, incomplete data and outliers. The scale is "untimed" and takes approximately five to ten minutes to complete. We do not recommend a strict time limit for completing the scale.

To assure integrity in scoring and statistical analyses, we have developed scoring instructions that we share with users and strongly encourage them to follow the instructions, and use the text of the items intact, as well as the 7-point Likert scale for meaningful comparisons of the findings. Also, scannable forms of the three versions of the JSE have been developed and have been used by researchers and processed at our center for scoring and other statistical analyses (information is posted at <http://www.jefferson.edu/university/skmc/research/research-medical-education/jefferson-scale-of-empathy.html>). Web-based administration of the scale is also available.

A Brief Scale to Measure Patient Perceptions of Physicians' Empathy

We also developed a brief scale to measure patients' perceptions of physicians' empathic orientation and behavior. Patients complete the Jefferson Scale of Patient Perceptions of Physician Empathy (JSPPPE) (Appendix C) to assess their physician's empathy.

The JSPPPE is a brief scale, containing five Likert-type items that patients can answer in a few minutes after an encounter with a physician or a health care professional. For example, a physician's concern regarding a patient and the patient's family is reflected in the following item: "This physician seems concerned about me and my family." The physician's perspective taking is reflected by the following item: "This physician can view things from my perspective (see things as I see them)." In a study conducted by Kane and colleagues with residents in an internal medicine program (Kane et al., 2007) and in another study by Glaser and colleagues with residents in a family medicine program (Glaser et al., 2007), scores on this scale correlated significantly with selected items from the Physicians' Humanistic Behaviors Questionnaire developed by Weaver and colleagues (1993) and also with selected items from a questionnaire measuring patients' appraisal of physicians' performance developed by Matthews and Feinstein (1989).

In the two aforementioned studies of the JSPPPE conducted at Thomas Jefferson University Hospital, data for 225 encounters between patients and resident physicians in the internal medicine residency program (Kane et al., 2005) and 90 encounters between patients and residents in the family medicine residency program (Glaser et al., 2007) were used. Item-total score correlations of the JSPPPE were statistically significant in both departments (median correlations were 0.78 for family medicine and 0.81 for internal medicine). The item and total scores on the JSPPPE in the Department of Internal Medicine study also yielded significant correlations with scores obtained from a rating form for patients developed by the American Board of Internal Medicine to assess physicians' communicative skills, humanistic qualities, and professionalism (Lipner et al., 2002). The median correlation between the two instruments was 0.64. The internal consistency reliabilities (coefficient alphas) of the patient perception scale were in the lower range (0.50s).

In a more recent study with 535 outpatients treated by family physicians (Hojat, Louis et al., 2010), we found that the JSPPPE is a uni-dimensional scale based on the results of exploratory factor analysis, a finding that was previously reported in another study (Kane et al., 2007). Corrected item-total score correlations of the JSPPPE ranged from 0.88 to 0.94. Cronbach's alpha coefficient ranged from 0.97 to 0.99 for the total sample, and for patients in different gender and age groups (Hojat, Louis et al., 2010). (see Table 15,

Appendix A). Scores on the JSPPPE were highly correlated with measures of physician-patient trusting relationships ($r > 0.73$). Also, significant correlations were noted between scores of the JSPPPE and a measure of patient overall satisfaction with the primary care physician (Hojat, Louis et al., 2010) was 0.93 (see Table 16, Appendix A).

In addition, we found that higher scores on the JSPPPE were predictive of patients' compliance with their physicians' recommendations (compliance rates $> 80\%$) for preventive care (e.g., colonoscopy for male and female patients, mammogram for female patients, and PSA for male patients) (Hojat, Louis et al., 2010).

The correlation coefficient between patients' ratings of their physicians on the patient perception scale and the residents' self-reported empathy (JSE scores) was 0.48 ($p < 0.05$) in the family medicine study, but it was only 0.24 (non-significant) in the internal medicine study. Further inspection of data for the Department of Internal Medicine showed that the majority of patients (78%) gave the highest possible scores to the residents, leading to a highly skewed JSPPPE score distribution with a restricted range of scores. This serious "ceiling effect" would not allow the correlation between residents' self-reported empathy and patients' perceptions of residents' empathy to be fully captured.

In a study of psychiatry residents in Iran who completed the JSE and their standardized patients who completed the JSPPPE (Esfahani et al., 2014), a moderate correlation between the JSE and JSPPPE was observed ($r=0.39$) which was not statistically significant, probably due to a small sample size according to the study's authors. It is interesting to note from the aforementioned findings that the associations between physicians' or medical students' self-reported empathy (JSE scores), and real or standardized patients' perceptions of clinicians' empathy (JSPPPE scores) were mostly moderate or negligible. However, correlations between patients' assessment of clinicians' empathy (JSPPPE scores) and patients' global assessments of clinicians' competence and empathy were found to be larger in magnitude (Grossemann et al., 2014). A possibility exists that patients' views regarding their clinicians' empathic behavior may differ from the clinicians' views of their own empathy. Grossemann and her colleagues raised a question about some physicians' ability to gauge or to communicate their empathic engagement with patients. Further research is needed to explore these and other possibilities.

The link between physicians' self-reported empathy and patients' perceptions of their physicians' empathy could also be strengthened by physicians' efforts to communicate their understanding to their patients (Free et al., 1985). Measuring patients' perceptions is important because research has shown that their perceptions of clinicians' empathy yield the highest correlations with clinical outcomes, followed by observers' ratings of clinicians' empathy and, finally, by clinicians' self-reported empathy (Bohart et al., 2002). Because other factors can contribute to patients' perceptions of clinicians' empathy, including the degree to which patients can cope with their illnesses (Mercer et al., 2001), more studies are needed to examine the complex reasons for patients' and clinicians' concordant and discordant views on empathic engagement in clinical encounters.

The associations between clinicians' self-reported empathy and patients' perception of clinician empathy may be confounded by gender and ethnicity. For example, in a few

recent studies, standardized patients assessed medical students' empathic engagement by completing the JSPPPE in Objective Structured Clinical Examination (OSCE) stations. Medical students completed the JSE. Findings showed statistically significant associations between scores of the JSPPPE (completed by standardized patients) and scores of medical students' self-reported empathy (measured by the JSE) (Berg et al., 2015; 2011a; 2011b). However, we noticed that students' gender and ethnicity (Berg et al., 2011b), and interaction of students' and standardized patients' gender and ethnicity could confound the relationships between self-reported JSE scores and standardized patients' assessments on the JSPPPE (Berg et al., 2015).

Broad National and International Attention

Over the years, we have been receiving increasing requests from researchers in the United States and abroad for copies of the JSE and for permission to use it. The JSE has enjoyed broad international attention and it has been described as “possibly the most researched and widely used instrument in medical education” (Colliver et al., 2010, p. 1813). As of this writing, we have received over 1,500 requests from the United States and 80 other countries (see Table 17) to grant permission to use the scale, and the JSE has already been translated into 53 languages (see Table 18). To ensure the accuracy of translations, we have always strongly recommended using the back-translation procedure (Brislin, 1970; Guillemin et al., 1993; Geisinger, 1994) to all those who asked us to grant permission to translate the JSE.

Interestingly, our findings have been replicated by many other researchers. The patterns of findings of most of the studies in the United States and other countries are similar to those we have reported in our own studies. The increasing national and international attention to the JSE is reflected in the 196 publications listed in Appendix D. An overall review of findings of the annotated studies provide strong evidence in support of psychometric soundness of the three versions of the JSE in different samples of the health profession students and practitioners, in a variety of health professions disciplines, and in different countries with different educational systems and cultural values. Consistencies in most of the major findings in those studies are amazing. For example, findings generally show that reliability coefficients of the JSE, reflected in the Cronbach's alpha coefficients, in almost all of those studies are in the 0.70s and 0.80s, a well-acceptable range for psychological tests. Also, in most exploratory factor analytic studies of the JSE, three factors of “Perspective Taking,” “Compassionate Care,” and “Standing in the Patient's Shoes” have emerged, sometimes in different order; and the three-factor model has been confirmed in a number of the confirmatory factor analytic studies (Hojat, 2016)

In the majority of studies, using the JSE, the mean scores of different versions of the JSE (when there is no remedial/education intervention) hover around 112 (standard deviations hover around 12); and in most of those studies, women outscored men in different versions of the JSE (see Hojat, 2016, pp. 275-331). In addition, in most of those studies with health profession students in the U.S., a decline of empathy has been observed during the course of medical and health professions education, particularly at a point in training when curriculum shifts toward the clinical phase that involves patient contact when empathy is most needed. Also, in most of the experimental programs which

were developed to enhance empathy, an increase in the JSE mean scores has been observed in the health professions students who were exposed to, or participated in the targeted educational programs. However, in none of the studies with follow up data, were the enhanced empathy scores sustained for a longer time without additional reinforcement (see Hojat, 2016, pp. 275-331).

Accumulated research by national and international researchers using the JSE and further expansion of the scope the studies in which the JSE has been used provide a unique opportunity for meta-analytic studies for graduate students' master's theses, or doctoral dissertations, and researchers interested in the topic of empathy in health professions education and in patient care. We hope that in the future, a large and valuable central data bank and a number of meta-analytic studies will be undertaken to summarize findings from different samples, professions, and countries on correlates of empathy in the context of health professions education and patient care, on effective approaches to enhance and sustain empathy among health professions students and practitioners, group differences, changes in empathy as students progress through professional training, etc.

Two Caveats

Attitudes, Orientation, Capacity, and Behavior

When we submitted manuscripts describing the results of our empathy studies to peer-reviewed journals, a few reviewers expressed concern about the link between physicians' scores on the JSE and their actual empathic behavior in patient care. If one assumes that the physicians' scores on the JSE indeed reflect their own attitude or orientation toward empathy in patient care, and not necessarily their empathic behavior, a convincing argument plus empirical data are needed to establish a link between attitudes and behavior.

Although social psychologists have long debated the link between attitude and behavior, the issue has not been completely settled yet (for a meta analytic review, see Wallace et al., 2005). When people have formed an attitude or an orientation toward a subject, they are no longer neutral about that subject. In other words, they are likely to take a stand or develop a behavioral tendency consistent with their attitude or orientation (Sherif et al., 1965). Attitude, orientation, and perception share common cognitive and neural elements that can activate relevant behavior (Prinz, 1997; Viviani, 2002). A concordance between an attitude and behavior is necessary to avoid an unpleasant psychological tension that resembles "cognitive dissonance" (Festinger, 1964), which occurs when a person is caught in a cognitive struggle between opposing motivational forces. Cognitive dissonance research has established that when individuals perform a behavior or make a choice that conflicts with a previously established attitude, the attitude tends to change in the direction that resolves the conflict with the behavior. This process appears to involve rationalization, whereby individuals strategically change their attitudes in order to avoid appearing inconsistent (Lieberman, 2007).

Attitudes often generate strong emotions (affective components) and form a cognitive orientation (cognitive components) leading to preferences that ultimately elicit actions (behavioral components) (Rosenberg & Hovland, 1960). Therefore, attitudes, orientations, beliefs, and intentions are all motivating forces that can elicit corresponding

behaviors (Fishbein & Ajzen, 1975). For example, acculturation studies have reported that attitudinal changes, even in relation to deeply rooted social institutions, such as marriage and the family, can lead to tangible behavioral changes, such as increased rates of marital discord and divorce (Hojat, Shapurian et al., 2000; 1999). An abundance of empirical studies have been published about hostile or hateful behaviors resulting from prejudicial attitudes toward members of the opposite sex and toward racial, ethnic, and religious groups. For corroborative proof of such behaviors, one only needs to consult a daily newspaper.

In a recent meta-analysis of 797 studies (Wallace et al., 2005), it was found that the mean of attitude–behavior correlations was 0.41, but the magnitude of the relationship varied, depending on social pressure and perceived difficulty. Considering that the average effect of only 0.21 was found in an analysis of more than 25,000 studies of eight million research participants in social psychology (Richard et al., 2003), the aforementioned attitude–behavior correlation ($r=0.41$) seems impressive. These findings suggest that forming an empathic attitude, possessing the capacity to understand others, or developing a tendency or an orientation toward empathic relationships do not necessarily ensure empathic behavior. What is certain, however, is that a higher degree of empathic attitude, tendency, orientation, or capacity will increase the likelihood that these qualities will be manifested as empathic behavior under certain conditions. All measures of empathy, including the JSE, are at best a proxy of empathic behavior. Validity evidence would indicate the extent to which these measures are predictive of actual empathic behavior, positive educational outcomes, and optimal clinical outcomes.

Transparency and Social Desirability Response Bias

Respondents can always manipulate their answers on self-report personality tests to produce a more socially desirable result. Edwards (1957), who was the first to systematically study the “social desirability phenomenon,” believed that respondents were likely to be unaware of the tendency to show themselves in the most socially acceptable light.

Because most items in the JSE are transparent and thus susceptible to social desirability response bias, they can be answered in a way that is recognized as more socially acceptable. Constructing socially neutral items that measure personal attributes, such as empathy, is difficult, and raises questions about not only the face and content validities of such items but the empirical validity of the test as well. For example, the relevance to empathy of nontransparent items, such as those about an interest in literature and the arts or a sense of humor (used in the JSE), is not necessarily apparent. Indeed, some peer reviewers who evaluated the manuscripts we submitted to professional journals questioned the reasons for including those items in the JSE. (The reasons for including those items were discussed earlier in this manual).

The degree to which socially desirable responses to items have a confounding effect on test scores could be a function of the test taker’s belief in testing outcomes. For example, when testing is used to screen applicants for employment or college admission, test takers may be more inclined to provide socially acceptable answers to test items that will increase their advantage.

In response to concerns about the possible effect of socially desirable responses in our empathy studies, we offer three explanations. First, the JSE has been administered in “nonpenalizing” situations where the purpose was described as research, not college admission or employment. Respondents were assured that their responses would be confidential and would be used only for research purposes approved by the Institutional Review Board’s Research Ethics Committee. This assurance, in itself, could reduce respondents’ tendency to give socially desirable responses.

Second, the pattern of relationships in our validity studies, particularly the convergent and discriminant validities (described previously), suggests that social desirability response bias, even if operative, did not substantially distort the expected relationships. For example, we observed that the magnitude of the correlation between the JSE scores and a more relevant concept, such as compassion, was twice the magnitude of the correlation between JSE scores and a less relevant concept, such as personal growth (see Table 4, Appendix A). Such a correlational pattern would be unlikely to emerge in the presence of the significant confounding effects of social desirability response bias.

Third, we conducted an empirical study to investigate the influence of faking “good impression” responses on the JSE (Hojat, Zuckerman et al., 2005). In that study, we administered the JSE and other personality tests, including the ZKPQ, to 422 first-year medical students who matriculated at Jefferson (Sidney Kimmel) Medical College. The ZKPQ includes an “Infrequency” scale that was developed to detect intentionally false responses by identifying respondents with an invalid pattern of responses (Zuckerman, 2002). A sample item is: “I never saw a person I didn’t like”. Scores on this scale can be regarded as indicators of social desirability response bias. Attempts to give socially desirable responses were determined by a cutoff score of three, which the test’s authors suggested would identify respondents whose patterns of responses were of questionable validity. An examination of the distribution of scores on this scale indicated that less than 5% of the respondents attempted to give false “good responses” or to respond carelessly without regard for the truth (Zuckerman, 2002). The hypothesis that social desirability would not distort the validity of the JSE scores in nonpenalizing testing situations was tested and confirmed.

We recently replicated that study by using a large sample ($n=2,637$) of first-year students who matriculated at Jefferson (Sidney Kimmel) Medical College between 2002 and 2012 and completed the JSE and the ZKPQ. In this recent study (unpublished), we found that approximately 6% of respondents ($n=169$) attempted to give “good impression” responses determined by their score of 3 or higher on the Infrequency scale of the ZKPQ, which is close to the 5% figure found in our previous study (Hojat, Zuckerman et al., 2005). We used two approaches to examine the possible effects of social desirability response bias on the outcomes of our research on the JSE. First, we conducted two different sets of statistical analyses. In one set, we included all students in the sample, and in another set we excluded those who according to their scores (≥ 3) on the Infrequency scale attempted to give socially desirable or “good impression” responses. Analyses of data regarding the relationship between scores on the JSE and on scores of the five scales of the ZKPQ clearly demonstrated that research outcomes remained virtually unchanged whether or not respondents who responded carelessly to the instrument were included or excluded in statistical analyses. This finding was expected because of the small proportion

of respondents in the sample who scored above the cutoff score of the Infrequency scale. These results also suggest that the magnitude of such descriptive statistics as the mean and median are unlikely to be inflated as a result of respondents' possible faking in nonthreatening testing conditions because of the small proportion of those who scored above the cutoff score.

Second, we used the analysis of covariance (ANCOVA) method to control the effect of giving false responses on the research outcomes by using the "Infrequency" score as a covariate (JSE scores as the dependent variable, gender and scores on the scale of the ZKPQ as the independent variables). Again, we noted no substantial change in the general pattern of results with or without control for social desirability. These findings generally suggest that social desirability response bias does not distort the validity of the JSE scores at least under nonthreatening testing conditions.

These findings were consistent with the results of an earlier study on the heritability of empathy by Matthews et al. (1981), who reported that their derived index of empathy was not affected by social desirability response bias or by scores on a "good impression" scale. Two other studies reported no significant correlations between empathy scores obtained on the Emotional Empathy Scale and social desirability response bias (Mehrabian & Epstein, 1972; Mehrabian & O'Reilly, 1980). Despite these findings, the confounding effects of giving false "good responses" and attempting to present a socially acceptable image in penalizing testing situations (e.g., by applicants for college admission or employment) need to be addressed in further studies.

In summary, general findings on the measurement properties of the JSE reported in this guide suggest that this specifically developed instrument can serve as an operational measure of empathy for students and practitioners of health professions. The evidence presented in support of the validity and reliability of the JSE can add to the confidence of those in search of a psychometrically sound instrument to study empathy in health professions education and practice.

Highlights of Some of Our Research Findings

- Women tend to score higher than men on the JSE (Hojat, Mangione, Nasca, Cohen et al., 2001; Hojat, Gonnella, Nasca, Mangione, Vergare et al., 2002a; Hojat, Gonnella, Mangione, Nasca, Veloski et al., 2002).
- Scores on the JSE are significantly correlated with global ratings of clinical competence in medical school, but not with grades on objective examinations of acquired knowledge (Hojat, Gonnella, Mangione, Nasca et al., 2002).
- Scores on the JSE in the third year of medical school are predictive of empathic behavior ratings given by postgraduate program directors approximately three years later (Hojat, Mangione, Nasca, Gonnella & Magee, 2005).
- Physicians in people-oriented specialties (e.g., general internal medicine, family medicine, general pediatrics, psychiatry) on average tend to obtain higher JSE scores than their counterparts in technology-oriented (procedure-oriented), and hospital-based specialties (e.g., anesthesiology, pathology, radiology, surgery) (Hojat, Gonnella, Nasca, Mangione, Vergare et al., 2002c; Hojat, Gonnella, Nasca, Mangione, Veloski et al., 2002a; Hojat, Mangione, Nasca et al., 2001).
- Medical students who, at the beginning of medical school, plan to pursue people-oriented specialties after completing medical school (e.g., general internal medicine, family medicine, general pediatrics, psychiatry) tend to score higher on the JSE than their classmates who plan to pursue technology-oriented (procedure-oriented) specialties (e.g., anesthesiology, pathology, radiology, surgery) (Hojat, Zuckerman, Gonnella et al., 2005).
- Scores on the JSE are significantly associated with personality attributes that are conducive to relationship building (e.g., sociability). (Hojat, Zuckerman, Gonnella et al., 2005).
- Scores on the JSE are inversely and significantly associated with personality attributes that are detrimental to interpersonal relationships (e.g., aggression-hostility) (Hojat, Zuckerman, Gonnella et al., 2005).
- Scores on the JSE are significantly associated with positive developmental factors such as a higher satisfaction with early relationship with the mother. (Hojat, Zuckerman, Gonnella et al., 2005).
- Scores on the JSE tend to decline in the third year of medical school when the curriculum is shifting toward patient care and empathy is most essential (Hojat, Vergare, Maxwell, Brainard et al., 2009; Hojat, Mangione, Nasca, Rattner et al., 2004).
- There is a downward trend in scores of the JSE as residents progress through residency training (Mangione, Kane, Caruso et al., 2002).
- There is a significant link between scores of the JSE and attitudes toward interprofessional collaboration and teamwork in nursing students (measured by the Jefferson Scale of Physician-Nurse Collaboration) (Ward et al., 2009). Similar result was found in osteopathic medical students (Calabrese, Bianco, Mann, Massello & Hojat, 2013).

- There is a moderate correlation between physicians' self-reported empathy (measured by the JSE) and patients' report of their physician empathy (measured by the Jefferson Scale of Patient Perceptions of Physician Empathy) (Glaser, Markham, Adler et al., 2006).
- Scores on the JSE enhanced in medical and pharmacy students as a result of their participation in a workshop on aging game designed to improve their understanding of the elderly people's problems. The empathy enhancement did not sustain for a long time (Van Winkle, Fjortoft & Hojat, 2012)
- Scores on the JSE improved in medical students by participation in a workshop in which short video clips of patient-clinician encounters selected from commercial movies were shown and students discussed their views of the clinical encounters. Improvement was sustained by additional reinforcements (Hojat, Axelrod, Spandorfer & Mangione, 2013).
- Psychostimulant drugs abuse in medical students was not associated with the JSE scores, however, scores on the Aggression-Hostility scale of the Zuckerman Kuhlman Personality Questionnaire were predictive of psychostimulant drug abuse (Bucher, Vu, & Hojat, 2013).
- JSE mean score was significantly higher in medical students who were nominated by their classmates on six areas of clinical and humanistic excellence than the rest of the class (Pohl, Hojat, Arnold, 2011).
- Medical students who were identified by their classmates as having high positive influences on the professional and personal development of their classmates obtained a significantly higher JSE mean score than the rest of the classmates (Hojat, Mechalec, Veloski, & Tykocinski, 2015).
- Scores on the JSE were significantly and positively associated with scores on measures of Personal Accomplishment of the Maslach Burnout Inventory. However, JSE scores were inversely associated with scores on the Depersonalization scale of the burnout inventory (Hojat, Vergare Isenberg, Cohen, & Spandorfer, 2015).
- Statistically significant correlations were found between scores of the JSE, attitudes toward interprofessional collaboration, and orientation toward integrative patient care in osteopathic medical students. (Hojat, Bianco, Mann, Massello, & Calabrese, 2015).

An Outline for Research Agenda

There are many important issues that are desirable to be empirically addressed in studying empathy in the context of health professions education and patient care. We are planning to tackle some of the following issues (in no particular order) and hope that other researchers also address them:

- Relationships between care givers' scores on the JSE and tangible clinical outcomes (e.g., improvements in diagnostic medical tests, morbidity, comorbidity, mortality, etc.).
- Associations between care givers' scores on the JSE and patients' perceptions of care givers' empathy.
- Relationships between care givers' scores on the JSE and patients' compliance and satisfaction with care.
- Research in exploring the neurological underpinnings of empathy, as opposed to sympathy, by using brain imaging technology (e.g., fMRI).
- Research on approaches to maximize empathy and regulate sympathy in patient care.
- Study of the associations between JSE scores and the quality of early attachment relationships (e.g., mother-child attachment) and adult relationships with significant others.
- Research on the association between JSE scores and personal experiences and life events.
- Exploring cultural and cross-cultural factors that contribute to the variation in the JSE scores, and cross-cultural study of empathy in health professions education and practice.
- Short- and long-term outcome assessments of strategies and remedial programs to enhance empathy in health professions education and practice.
- Study of the relationships between scores of the JSE and career choices, including between-discipline choices (e.g., medicine, nursing, dentistry, pharmacy, social work, clinical psychology, etc.) as well as within-discipline choices (e.g., specialties and subspecialties within each discipline).
- Study of the relationships between scores of the JSE and orientation toward teamwork and interprofessional collaboration in different health professions,

lifelong learning, attitudes toward patient-centered care, integrative medicine, and holistic care.

- Changes in empathy during health professions education in different disciplines, different cultures, different systems of medical and health professions education.
- Research on the relationships between scores of the JSE and measurable or observable empathic behaviors.
- Meta analytic research on findings from national and international studies in health professions education and patient care in which the JSE has been used.
- Research on the associations between scores of the JSE and personal qualities that are conducive to relationship building.
- Research on inverse link between scores on the JSE and personal qualities which are detrimental to meaningful interpersonal relationships.
- Research on consideration of using scores of the JSE in admissions decision making.
- Examining approaches and factors that contribute to enhancing empathy among health professionals in-training and in-practice.
- Developing national and international norm tables and cutoff scores for different genders, professions, and specialties.
- Research on the contribution of patients' perspective and peer assessments in empathy outcomes in patient care.

SECTION 2

Administering and Ordering the JSE

The JSE can be administered either in individual or group testing. It takes 5-10 minutes to complete, although we do not recommend a time limit for completing the scale. Since the empathy score is compiled from all responses, it is important that each participant answer every item to ensure accurate scores. Respondents indicate the extent of their agreement or disagreement for each of the 20 items using a 7-point Likert scale. The JSE may be administered online or by using scannable paper forms.

There are a number of options when ordering the scale. All three versions-- the HP-version for administration to physicians and other practicing health care professionals; the S-version for administration to medical students; and the HPS-version for administration to other health professions students-- are available for administration from our website and scoring is included with this option. We also have computer scannable forms of the scale for paper administration. Scoring services and additional statistical analyses are available if the scale is administered on our official forms or from our official Thomas Jefferson University website. Some clients find it more convenient to administer the JSE from their own website or to administer the scale on paper combined with other instruments and score it themselves. Clients choosing these self-scoring options must agree in writing to certain conditions that safeguard the integrity, accuracy, and validity of their scoring process and to protect the JSE copyright held exclusively by Thomas Jefferson University.

More information about the forms and services, a *Frequently Asked Questions* (FAQ) file and an order form can be found at our website: www.jefferson.edu/jmc/crmebc/jse.html.

Administering the JSE on the Web

Setting up a web administration

There are four steps to administer the scale on the TJU Website:

1. You may order this option most efficiently by contacting our staff directly at empathy@jefferson.edu. Once the order is processed, an account and survey code are created and you are emailed a hyperlink to access the JSE.
2. You contact each of your participants, give them the web address and tell them what "Respondent ID" you want them to use. It is imperative that the ID code is unique, as it is used to identify individual participants in reporting empathy scores and to match individuals in pretest-posttest analyses, and repeated measure research designs.
3. Participants use the link to go to the website, log in with their "Respondent ID" and complete the scale.
4. When you contact us to confirm your end date, the survey is closed, your data is processed and a report and your raw data file are emailed to you.

Closing a web administration

As the administration approaches your end date, a list of Respondent ID codes of those who have completed the survey will be provided, upon request. This gives you the option to send reminder emails to those who did not complete the survey.

Although we ask for an end date when the survey is created, we realize this is approximate. The survey will not be closed until an email is sent to empathy@jefferson.edu with that request confirming the exact closing date. The data are then processed and the report is emailed to the client along with a file containing the raw data.

ALLOW 2 WEEKS FOR PROCESSING.

If you have chosen to administer the JSE on your own secure website, you are welcome to use the above steps as a guideline. Your annual license allows you to post the JSE for up to 12 months. After that time it must be removed from the website or the annual license renewed. You may want to make use of the two “Optional Fields” to identify additional variables for analysis.

Administering the JSE on Paper


Completing the Scannable Forms


If you are returning the JSE forms for scoring or scoring the scale yourself, data verification and validation is essential for accurate reporting. These guidelines will help to ensure accurate data collection:

- Use black or blue ballpoint pen to complete the form. This prevents "bleed-through" and smearing that may interfere with accurate data collection. Using pencil may cause errors in reading hand-printed fields on scanner processed forms.
- Do not bend, fold, staple or make stray marks on the forms.
- No multiple marks. Select only one best answer for each item. To change a selected response, mark it out and clearly indicate your intended response.
- All items must be answered to complete the survey.

Please return all forms together in the same package. If your order includes a pretest and posttest, be sure you have marked Optional Field #1 on each form with a “1” if it is a pretest and with a “2” if it is a posttest.

The JSE is a two-sided form. Fields on page 1 collect demographic data that may be used for comparative analyses. Age, gender, and specialty information are included on the HP-version, shown below. Other versions of the JSE have slightly different demographic items. Two optional fields are included on all paper forms to facilitate the collection of additional data for research purposes and other comparative analyses. These are discussed in detail in the next section.





Jefferson Scale of Empathy

Physician/Health Professions (HP - version)

Use a ball-point pen.
Mark one response for each of the items below.

For *ID Code* and *Optional* fields, write numerals completely inside the boxes, one numeral to a box.

Name (optional) _____ ID Code

--	--	--	--	--	--	--	--	--	--

Date ____/____/____

Age:
 <21 21-30 31-40 41-50 51-60 61-70 >70

Gender:
 Male Female

Physician primary specialty: [Please choose only one]

<input type="checkbox"/> Anesthesiology	<input type="checkbox"/> Dermatology	<input type="checkbox"/> Emergency Medicine
<input type="checkbox"/> Family Med./General Prac.	<input type="checkbox"/> Internal Med./Med. specialties	<input type="checkbox"/> Neurology
<input type="checkbox"/> Neurosurgery	<input type="checkbox"/> Obstetrics/Gynecology	<input type="checkbox"/> Ophthalmology
<input type="checkbox"/> Otolaryngology	<input checked="" type="checkbox"/> Orthopaedic Surgery	<input type="checkbox"/> Pathology
<input type="checkbox"/> Pediatrics	<input checked="" type="checkbox"/> Physical Med./Rehabilitation	<input type="checkbox"/> Plastic Surgery
<input type="checkbox"/> Preventive Medicine	<input checked="" type="checkbox"/> Psychiatry	<input type="checkbox"/> Public Health
<input type="checkbox"/> Radiology	<input type="checkbox"/> Surgery/Surgical specialties	<input type="checkbox"/> Urology
<input type="checkbox"/> Other _____		

Other health professions primary specialty: [Please choose only one]

<input type="checkbox"/> Community Healthcare Worker	<input type="checkbox"/> Dentistry	<input type="checkbox"/> Midwifery
<input type="checkbox"/> Nursing	<input type="checkbox"/> Nurse Practitioner	<input type="checkbox"/> Nutrition/Dietician
<input type="checkbox"/> Occupational Therapy	<input type="checkbox"/> Pharmacy	<input type="checkbox"/> Physician Assistant
<input type="checkbox"/> Physical Therapy/Physiotherapy	<input type="checkbox"/> Podiatry	<input type="checkbox"/> Psychology/Counseling
<input type="checkbox"/> Public Health Worker	<input type="checkbox"/> Speech Therapy/Audiology	<input type="checkbox"/> Social Worker
<input type="checkbox"/> Other _____		


Optional field #1..


--	--	--	--

Optional field #2..



--	--	--	--

Please continue on the back --- Do not write below this line



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Using the Handprint Fields on Paper Forms

“Handprint” fields refer to the boxes provided for participants to write their ID code and enter optional data (Optional Fields #1 and #2). These are read by the scanner and become part of the data file. The *Name* and *Date* fields are provided for your use only. Information entered in these fields is not scanned, does not become part of any record, and will not appear on any report.

Data in the ID Code and Optional fields #1 and #2 become part of the data file and are used to identify participants in reports. These alphanumeric fields may be used to collect additional demographic data or other information you wish to keep confidential. Score reports identify individuals by the barcode on the bottom of the form and the ID code entered by the respondent. The ID code must be unique for each individual. Scores will be reported by this alphanumeric ID code. This assures the confidentiality of your participants. If you plan multiple administrations to follow the same group of participants over multiple time periods, participants should login with the exact same Respondent ID for each administration. Participants’ scores for subsequent administrations of the scale are linked using this code.

When completing handprint fields, please write numerals or CAPITAL letters completely inside the boxes without touching the sides of the box, one numeral or letter to a box as shown below:

1	2	3	4	5	6	7	8	9	0
---	---	---	---	---	---	---	---	---	---

ABCDEFGHIJKLMNOPQRSTUVWXYZ

If the ID code has less than nine characters, leave leading unused boxes empty.

Optional Fields for Research Purposes and Pretest-Posttest Comparisons

The unique *ID Code* field must be completed if you plan pretest and posttest analyses, or repeated measure research designs.

If you plan pretest-posttest comparison studies, or repeated research designs; the ID Code is essential. It must be unique and identical on both pretest and posttest forms; therefore, it is best to assign an ID code the respondent can easily remember or recreate. We recommend using Optional field #1 to differentiate the pretest from the posttest:

Optional field #1

Pretest:

		1
--	--	---

Posttest:


		2
--	--	---

Other Purposes for Optional Fields

The codes used to complete the two optional fields on paper forms become part of the raw data file returned to a client with the standard report. In addition to pretests and posttests, these two alpha-numeric fields might identify year of residency, practice setting (rural vs. urban), geographical regions, a group assignment, participation in a class/intervention, or any other data you want to include in your dataset.

If you take advantage of our scoring services to analyze your additional data fields, please discuss the coding with our staff prior to administering the scale. You will need to provide a mapping table of the codes used and their descriptions to insure an accurate, timely analysis.

The 20-item empathy scale is on the back of the form (page 2, HP-Version shown below) with simple instructions for completing the scale.



Jefferson Scale of Empathy

Physician/Health Professions (HP - version)

Instructions: Using a ball-point pen, please indicate the extent of your agreement or disagreement with *each* of the following statements by marking the appropriate circle to the right of each statement.

Please use the following 7-point scale (*a higher number on the scale indicates more agreement*):
Mark one and only one response for each statement.

1 2 3 4 5 6 7
Strongly Disagree *Strongly Agree*

	1	2	3	4	5	6	7
1. My understanding of how my patients and their families feel does not influence medical or surgical treatment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. My patients feel better when I understand their feelings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. It is difficult for me to view things from my patients' perspectives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I consider understanding my patients' body language as important as verbal communication in caregiver-patient relationships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I have a good sense of humor that I think contributes to a better clinical outcome.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Because people are different, it is difficult for me to see things from my patients' perspectives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I try not to pay attention to my patients' emotions in history taking or in asking about their physical health.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Attentiveness to my patients' personal experiences does not influence treatment outcomes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I try to imagine myself in my patients' shoes when providing care to them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. My patients value my understanding of their feelings which is therapeutic in its own right.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Patients' illnesses can be cured only by medical or surgical treatment; therefore, emotional ties to my patients do not have a significant influence on medical or surgical outcomes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Asking patients about what is happening in their personal lives is not helpful in understanding their physical complaints.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I try to understand what is going on in my patients' minds by paying attention to their non-verbal cues and body language.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I believe that emotion has no place in the treatment of medical illness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Empathy is a therapeutic skill without which success in treatment is limited.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. An important component of the relationship with my patients is my understanding of their emotional status, as well as that of their families.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I try to think like my patients in order to render better care.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. I do not allow myself to be influenced by strong personal bonds between my patients and their family members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. I do not enjoy reading non-medical literature or the arts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I believe that empathy is an important therapeutic factor in medical or surgical treatment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Returning the Forms for Processing

When you receive your forms, they will be packaged to avoid damage in transit. Completed forms should be returned in a like manner to:

Center for Research in Medical Education and Health Care
1015 Walnut St., Suite 319
Philadelphia, Pennsylvania 19107-5085, U.S.A.
Attn.: Shira Carroll
Phone: 215-955-9458 Fax: 215-923-6939

The original forms will be returned to you when the analysis is emailed.
ALLOW 2 WEEKS FOR PROCESSING, PLUS SHIPPING TIME.

Scoring the JSE

Calculating Scores

The empathy score for an individual is calculated from the responses to the 20 items. Half of the items are reverse scored (e.g., Strongly Agree=1,...Strongly Disagree=7). Other items are directly scored based on their Likert weights (e.g., Strongly Agree=7,... Strongly Disagree=1). Detailed instructions are provided in a separate document to clients who opt to self-score the JSE.

Data verification and Validation

The data verification and validation process addresses anomalies in the data such as unanswered items or multiple responses on paper forms prior to scoring. **Our scoring algorithm applies strict guidelines regarding missing items, incomplete data and outliers.** After the data is scored, scores considered to be outliers are investigated, their individual response patterns are examine and, if a determination cannot be made as to whether they should be included or rejected from the analysis, the final report is created with two sections, one including and one excluding the records in question.

Self-Scoring Translations or Modified Scales

If you translate or modify the JSE, we strongly recommend that you examine the psychometric properties (validity & reliability) in your samples. You must make sure that after these modifications, the items still have "face validity" for your sample. We strongly recommend that you examine some indicators of psychometric support for the revised version of the scale; e.g., Cronbach's alpha reliability coefficient, an indicator of reliability; corrected item-total score correlations that will indicate that each item contributes positively and significantly to the total score; test-retest reliability, etc.

These correlations must be all positive and statistically significant; otherwise, either the scoring was not done correctly or the translation was not accurate.

Additional Analyses

When scoring is performed by our office, with your statistical analysis report you will receive the raw data from your JSE forms and individual empathy scores for each participant in electronic form to enable further investigation; however, advanced analyses are also available through our office. A number of factors determine the costs of providing additional analyses, so please contact us if you are interested to discuss options and pricing.

Reporting and Interpretation

Standard Reports

The standard scoring report includes:

1. An empathy score for each respondent.
2. Descriptive statistics of scores including mean, standard deviation, range, mode and quartiles for the entire sample.
3. A histogram showing distribution of empathy scores for the entire sample.
4. Matrix of raw data and individual scores in electronic form.
5. Where applicable, the pretest-posttest analysis includes the results of a paired t -test to determine if there was a significant change in empathy scores.

The Empathy Score – What does it Mean?

The empathy score can range from 20 to 140. Higher values indicate a higher degree of empathy.

Norm tables and cut off scores are typically calculated using data collected from representative samples at the national level. We are hopeful that in the future we will be able to develop national norm tables and determine cut off scores to identify high and low scorers. At the present time, we recommend that the score distribution for your sample be examined. You may find the section on proxy-norm data and tentative cut-off scores described in Section 1 helpful if your research participants are comparable to those in the cited study (Hojat, M., & Gonnella, J. S. (2015) in that section.

Appendix A

Tables and Figures

Table 1: Specific Features of Empathy and Sympathy

<i>Feature</i>	<i>Empathy</i>	<i>Sympathy</i>
Contribution of learning	More significant	Less significant
Contribution of cognition	More significant	Less significant
Contribution of affects	Less significant	More significant
Contribution of innate or genetic factors	Less innate	More innate
Objectivity vs. subjectivity	More objective	More subjective
Likelihood of accuracy in judgment	More accurate	Less accurate
Behavioral roots	Advanced	Primitive
Required efforts	More effortful	More effortless
Relation to care giver's performance	Linear	Inverted U Shape
Reaction time	Nonspontaneous (intentional)	Spontaneous
Patient's emotions	Appreciated without joining	Perceived by joining
Process	Controlled	Automatic
Feeling felt	The kind and quality of the patient's experiences	The degree and quantity of the feelings
Brain processing areas	Predominantly neocortex	Predominantly limbic system
Psychological regulatory process	Appraisal	Arousal
Psycho-physiological state	Energy conserving	Energy consuming
Behavioral motivation	More likely altruistic	More likely egoistic
State of mind	Intellectual	Emotional
Effect on caregiver	Personal growth, career satisfaction	Exhaustion, fatigue, burnout
Typical expression to patient	I understand your suffering	I feel your pain
<i>Key mental processing mechanism</i>	<i>Cognitive/Intellectual/Understanding</i>	<i>Affective/Emotional/Feeling</i>

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Table 2: Descriptive Statistics of the Generic Version of the JSE

	Residents (<i>n</i> =41)	Medical Students (<i>n</i> =193)
Mean	118	118
Standard Deviation	12	11
Median (50 th percentile)	119	117
Mode	119	112
25 th Percentile	110	111
75 th Percentile	126	126
Possible range ¹	20-140	20-140
Actual range ²	88-140	87-139
Alpha reliability estimate	0.87	0.89

¹The minimum and maximum possible scores.

²The lowest and highest scores obtained by the samples.

©2001 *Educational and Psychological Measurement*. Reproduced with permission (Hojat, Mangione, Nasca et al., 2001).

Table 3: Criterion measures used for the validity study

1. *Empathic concern*. A scale of the Interpersonal Reactivity Index (IRI) (Davis, 1983).
2. *Perspective taking*. A scale of the IRI.
3. *Fantasy scale*. A scale of the IRI.
4. *Warmth*. A facet of personality (eight items) from the revised version of the NEO Personality Inventory (NEO PI-R©), a widely used instrument measuring the big five personality factors and their facets (Costa & McCrea, 1992). The inventory has been used in the United States with samples of both physicians and members of the general population. Physicians scored higher than the general population on Warmth (Hojat et al., 1999a). Also, positive female role models in medicine scored higher than the general population on this facet of personality (Magee & Hojat, 1998).
5. *Dutifulness*. A facet of personality from the NEO PI-R © (eight items). Both male and female positive role models in medicine scored higher than the general population on this facet (Magee & Hojat, 1998).
6. *Faith-in-people scale*. This scale was developed by Rosenberg (1957, 1965) and contains five items measuring one's degree of confidence in the trustworthiness of people (Robinson, 1978). A typical item is "Most people are inclined to help others."
7. *Global empathy*. Defined as "Standing in the patient's shoes in the experience of the illness."
8. *Global sympathy*. Defined as "Developing feelings for the patient's sufferings."
9. *Global compassion*. Defined as "Sympathy for the patient combined with the intention of doing good and a desire to help."
10. *Trust*. Defined as "Belief that patients report their illness experience honestly."
11. *Tolerance*. Defined as "The ability to evaluate a patient who shows offensive and self-destructive behavior without becoming judgmental or losing interest in helping."
12. *Personal growth (through interaction with the patient)*. Defined as "Learning and gaining reward through emotionally intense (either positive or negative) interactions with patients."
13. *Communication (of the understanding)*. Defined as "The capacity to reflect patients' emotions by providing some statements which validate the patient's feelings."
14. *Self-protection*. Defined as "Protecting one's self from being over-whelmed by patients' emotions and/or suffering."
15. *Humor*. Defined as "Ability to laugh with the patients about human foibles and absurdities related to their illness and treatment, as well as to appropriate jokes and lighter topics unrelated to illness."
16. *Clinical neutrality*. Defined as "Controlling expressions of emotional reactions to patients, whether their reactions are positive or negative."

Table 4: Correlations of scores of the generic version of the JSE with criterion measures

Criterion measures	Residents ($n = 41$)	Medical students ($n = 193$)
<u>IRI scales</u> ¹		
Empathic concern		0.41**
Perspective taking		0.29**
Fantasy		0.24**
<u>Self-report (7-point scale)</u> ²		
Compassion	0.56**	0.48**
Sympathy	0.27***	0.33**
<u>NEO PI-R personality facets</u> ²		
Warmth ³	NA	0.33**
Dutifulness ³	NA	0.24**
Faith-in-people (misanthropy) ⁴	NA	0.12***
<u>Self-report (100-point scale)</u> ⁵		
Empathy	NA	0.45**
Compassion	NA	0.31**
Trust	NA	0.27**
Sympathy	NA	0.26**
Tolerance	NA	0.25**
Personal growth	NA	0.15*
Communication	NA	0.13***
Self protection	NA	0.11
Humor	NA	0.05
Clinical neutrality	NA	-0.05

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.10$.

¹ Scales from the Interpersonal Reactivity Index (Davis, 1983).

² Single items.

³ Personality facets from the NEO PI-R (Costa & McCrea, 1992).

⁴ Faith-in-People Scale (Rosenberg, 1957, 1965).

⁵ Self-reported personal attributes on a 100-point scale.

NA: Data were not available.

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Table 5: Rotated Factor Loadings of the HP-Version of the JSE¹

<i>Items</i>	Factor		
	1	2	3
1. An important component of the relationship with my patients is my understanding of the emotional status of the patients and their families.	.70	.21	-.08
2. I try to understand what is going on in my patients' minds by paying attention to their non-verbal cues and body language.	.62	.06	.23
3. I believe that empathy is an important therapeutic factor in medical treatment.	.60	.28	-.25
4. Empathy is a therapeutic skill without which my success as a physician would be limited.	.58	.22	-.16
5. My understanding of my patients' feelings gives them a sense of validation that is therapeutic in its own right.	.58	.32	.03
6. My patients feel better when I understand their feelings.	.50	-.02	.16
7. I consider understanding my patients' body language as important as verbal communication in physician-patient relationships.	.48	-.18	.30
8. I try to imagine myself in my patients' shoes when providing care to them.	.46	.29	.28
9. I have a good sense of humor, which I think contributes to a better clinical outcome.	.45	-.02	.14
10. I try to think like my patients in order to render better care.	.46	.20	.25
11. Patients' illnesses can be cured only by medical treatment; therefore, affectional ties to my patients cannot have a significant place in this endeavor.	.17	.60	-.01
12. Attentiveness to my patients' personal experiences is irrelevant to treatment effectiveness.	.07	.59	.07
13. I try not to pay attention to my patients' emotions in interviewing and history taking.	.02	.54	.02
14. I believe that emotion has no place in the treatment of medical illness.	.22	.50	-.03
15. I do not allow myself to be touched by intense emotional relationships between my patients and their family members.	.13	.44	.26
16. My understanding of how my patients and their families feel is an irrelevant factor in medical treatment.	-.03	.43	.14
17. I do not enjoy reading non-medical literature and the arts.	.05	.37	.13
18. I consider asking patients about what is happening in their lives as an unimportant factor in understanding their physical complaints.	.10	.37	-.12
19. It is difficult for me to view things from my patients' perspectives.	.10	.05	.74
20. Because people are different, it is almost impossible for me to see things from my patients' perspectives.	.17	.20	.66
Eigenvalues	4.2	1.5	1.3
% Variance	21	8	7

¹ Items are listed based on the order of the magnitude of the factor structure coefficients within each factor. Values greater than .35 are in boldface. Responses were based on a 7-point Likert-type scale.

Table 6: Score Distributions, Percentiles, and Descriptive Statistics for the HP-Version of the JSE (*n*=704 Physicians)

Score Interval	Freq.	Cumulative Frequency	Cumulative %
≤ 75	3	3	<1
76-80	3	6	1
81-85	2	8	1
86-90	3	11	2
91-95	13	24	3
96-100	21	45	6
101-105	31	76	11
106-110	57	133	19
111-115	97	230	33
116-120	111	341	48
121-125	114	455	65
126-130	126	581	83
131-135	85	666	95
136-140	38	704	100
Mean	120		
Standard Deviation	11.9		
25 th percentile	113		
50 th percentile (median)	121		
75 th percentile	128		
Possible range	20-140		
Actual range	50-140		
Alpha reliability estimate	0.81		
Test-retest reliability ¹	0.65		

¹ Test-retest reliability is calculated for 71 physicians within an approximately 3-4 month interval between tests.

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Table 7: Frequency and Percent Distribution of the Study Sample (2,637 Medical Students) by Matriculation Year and Gender

Matriculation Year	Men <i>n (%)</i>	Women <i>n (%)</i>	Total <i>n (%)</i>
2002	120 (54%)	101 (46%)	221 (100%)
2003	105 (48%)	113 (52%)	218 (100%)
2004	103 (46%)	121 (54%)	224 (100%)
2005	126 (51%)	121 (49%)	247 (100%)
2006	107 (43%)	140 (57%)	247 (100%)
2007	132 (53%)	116 (47%)	248 (100%)
2008	120 (51%)	117 (49%)	237 (100%)
2009	111 (46%)	128 (54%)	239 (100%)
2010	124 (49%)	128 (51%)	252 (100%)
2011	125 (50%)	127 (50%)	252 (100%)
2012	128 (51%)	124 (49%)	252 (100%)
Total	1,301 (49%)	1,336 (51%)	2,637 (100%)

$\chi^2_{(10)} = 9.8, p = 0.45$ (Nonsignificant).

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Table 8: Means, Standard Deviations, Range, Skewness and Kurtosis Indices, and Reliability Coefficients (Cronbach's alpha Coefficient) of the JSE by Matriculating Classes and Summary Results of Statistical Analysis

Matriculating Class	<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>Median</i>	<i>Range</i>	<i>Skewness</i>	<i>Kurtosis</i>	<i>Cronbach α</i>
2002	221	114.1	9.9	114	81-137	-.24	.04	.80
2003	218	113.9	10.0	115	75-140	-.44	.52	.79
2004	224	115.9	9.8	117	82-140	-.35	.12	.78
2005	247	114.5	9.7	116	82-133	-.66	.46	.78
2006	247	114.8	9.4	115	86-135	-.46	.19	.75
2007	248	114.6	10.6	114	71-136	-.47	.74	.81
2008	237	113.5	12.1	114	52-140	-.92	2.66	.84
2009	239	113.2	11.3	113	73-140	-.28	.05	.84
2010	252	113.8	10.7	114	70-140	-.62	.88	.81
2011	252	114.1	10.1	116	76-140	-.57	.79	.79
2012	252	114.8	10.6	116	79-140	-.65	.90	.81
Total	2,637	114.3	10.4	115	52-140	-.56	.92	.80

$F_{(10,2626)} = 1.2, p=0.29$ (Nonsignificant).

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Table 9: Frequency and Percent Distributions and Descriptive Statistics of Scores on the Jefferson Scale of Empathy (S-Version) by Gender

Score Interval	Men (<i>n</i> =1,301)			Women (<i>n</i> =1,336)			Total (<i>n</i> =2,637)		
	Freq.	Cumulative Freq.	Percentile Ranks	Freq.	Cumulative Freq.	Cumulative %	Freq.	Cumulative Freq.	Percentile Ranks
≤ 80	11	11	1%	5	5	< 1%	16	16	< 1%
81 - 85	8	19	1%	2	7	< 1%	10	26	1%
86 - 90	22	41	2 - 3%	1	8	1%	23	49	2%
91 - 95	48	89	4 - 7%	21	29	2%	69	118	3 - 4%
96 - 100	87	176	8 - 13%	56	85	3 - 6%	143	261	5 - 10%
101 - 105	136	312	14 - 24%	89	174	7 - 13%	225	486	11 - 18%
106 - 110	214	526	25 - 40%	165	339	14 - 25%	379	865	19 - 33%
111 - 115	252	778	41 - 60%	258	597	26 - 45%	510	1,375	34 - 52%
116 - 120	232	1,010	61 - 78%	279	876	46 - 65%	511	1,886	53 - 71%
121 - 125	159	1,169	79 - 90%	221	1,097	66 - 82%	380	2,266	72 - 86%
126 - 130	91	1,260	91 - 97%	171	1,268	83 - 95%	262	2,528	87 - 96%
131 - 135	34	1,294	98 - 99%	56	1,324	96 - 99%	90	2,618	97 - 99%
> 135	7	1,301	100%	12	1,336	100%	19	2,637	100%

Descriptive Statistics			
Mean ¹	112.3	116.2	114.3
Median	113	117	115
Standard Deviation	10.8	9.7	10.4
Possible Range	20 - 140	20 - 140	20 - 140
Actual Range	70 - 140	52 - 140	52 - 140

¹ $t_{(2,635)} = 9.9, p < .0001$ for testing the null hypotheses that JSE mean scores for men and women are not different.

Table 10: Rotated Factor Pattern for the Jefferson Scale of Empathy¹, Item-Total Score Correlations, and Effect Size Estimates of Item Discrimination Indices (*n*=1,380)

Items ²	Factors			Item-total score Correlation ³	Discrimination Index Effect Size ⁴
	Factor 1	Factor 2	Factor 3		
• Patients value a physician’s understanding of their feelings which is therapeutic in its own right.(10)	.66	.02	.01	.55	1.3
• Physicians should try to stand in their patients’ shoes when providing care to them.(9)	.64	-.05	.02	.50	1.2
• Physicians should try to think like their patients in order to render better care.(17)	.61	-.16	.00	.37	1.0
• Physicians’ understanding of the emotional status of their patients, as well as that of their families is one important component of the physician-patient relationship.(16)	.46	.29	.00	.61	1.4
• I believe that empathy is an important therapeutic factor in medical treatment.(20)	.44	.26	-.02	.59	1.3
• Patients feel better when their physicians understand their feelings.(2)	.44	.00	.03	.41	.89
• Physicians should try to understand what is going on in their patients’ minds by paying attention to their non-verbal cues and body language.(13)	.40	.17	.04	.49	1.2
• Empathy is a therapeutic skill without which the physician’s success is limited.(15)	.36	.20	-.04	.44	1.2
• Understanding body language is as important as verbal communication in physician-patient relationships.(4)	.30	.09	.08	.35	.88
• A physician’s sense of humor contributes to a better clinical outcome.(5)	.29	.03	.00	.26	.79
• Patients’ illnesses can be cured only by medical or surgical treatment; therefore, physicians’ emotional ties with their patients do not have a significant influence in medical or surgical treatment.(11)	.03	.59	.01	.52	1.2
• I believe that emotion has no place in the treatment of medical illness.(14)	.23	.54	.04	.46	1.0
• Attentiveness to patients’ personal experiences does not influence treatment outcomes.(8)	.01	.52	.05	.48	1.1

(Continued)

(Continued)

• Asking patients about what is happening in their personal lives is not helpful in understanding their physical complaints.(12)	.03	.49	.00	.44	1.0
• Attention to patients' emotions is not important in history taking.(7)	.01	.48	.09	.43	1.0
• I do not enjoy reading non-medical literature or the arts.(19)	.00	.25	.00	.20	.62
• Physicians should not allow themselves to be influenced by strong personal bonds between their patients and their family members.(18)	-.02	.21	.01	.13	.50
• Because people are different, it is difficult to see things from patients' perspectives.(6)	-.05	.06	.75	.15	.59
• It is difficult for a physician to view things from patients' perspectives.(3)	.06	-.06	.68	.14	.57

¹ Principal component factor extraction with oblique rotation was used for approximately half of the sample ($n=1380$). Confirmatory factor analysis was performed for the other half of the sample to examine the 3-factor model.

² Items are listed by the order of magnitude of factor loadings within each extracted factor. Factor loadings equal to or greater than .25 are in bold. Numbers in parentheses represent the sequence of the items in the actual scale. Items were scored using a 7-point Likert-type scale. Half of the items are reverse scored.

³ These are partial correlations between score of each item and total JSE score by excluding the corresponding item score from the total score ($p < .001$ for all of the reported correlations).

⁴ Discrimination indices were calculated based on data for the entire sample ($n=2612$). For calculation of the effect size estimates of discrimination indices, the item mean score for JSE high scorers (top33%) was subtracted from the item mean score for JSE low scorers (bottom 33%), divided by the pooled standard deviation of the corresponding item.

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Table 11: Summary Results of Confirmatory Factor Analysis Fit Statistics ($n=1,232$)

Model	Parameter Estimate	χ^2	df	χ^2/df	AGFI	TLI	RMSEA	AIC
Fitted 3-Factor Model	42	887.87	168	5.28	.93	.89	.05	971.87
Fitted 2-Factor Model	36	984.51	135	7.29	.88	.843	.071	
Difference		205.65	33*			.47 ¹		
Null Model (1 Factor Model)	20	6469.32	190	34.05	.39	.00	.16	7468.25

* $p < .05$.

¹ Calculated as recommended in Hu & Bentler,⁵⁴ this value represents a significant improvement in fit over the two-factor model.

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Table 12: Gender Differences on the JSE Scores by Matriculating Classes

Matriculating Class	Men		Women		<i>t</i>	<i>Effect Size</i> ¹
	<i>n</i>	<i>M(SD)</i>	<i>n</i>	<i>M(SD)</i>		
2002	120	112.3 (10.1)	101	116.3 (9.3)	3.1**	.41
2003	105	111.5 (10.8)	113	116.1 (8.6)	3.4**	.46
2004	103	113.7 (9.6)	121	117.7 (9.6)	3.1**	.43
2005	126	112.1 (10.2)	121	117.0 (8.6)	4.1**	.52
2006	107	112.8 (9.2)	140	116.3 (9.3)	3.0**	.37
2007	132	112.8 (11.7)	116	116.6 (8.6)	2.7**	.40
2008	120	112.2 (11.9)	117	114.8 (12.3)	1.6 ²	.21
2009	111	109.8 (11.5)	128	116.1 (10.3)	4.5**	.57
2010	124	111.7 (10.8)	128	115.8 (10.4)	3.1**	.38
2011	125	112.6 (11.0)	127	115.6 (9.0)	2.4*	.30
2012	128	113.4 (10.9)	124	116.4 (10.2)	2.3*	.28
Total	1,301	112.3 (10.8)	1,336	116.2 (9.7)	9.9*	.40

** $p < .01$, * $p < .05$,

¹ Cohen's effect size estimate

² $p = .10$.

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Table 13: Means and Standard Deviations of the JSE by Specialty and Summary Results of Analysis of Covariance

Specialty	<i>n</i>	<i>M (SD)</i>	<i>F-ratio</i>	<i>P</i>
People-Oriented ¹	965	115.35 (9.9)	Adjusted $F_{(2,1975)}=5.79$	< 0.001
Technology-Oriented ²	590	112.34 (11.02)	Unadjusted $F_{(2,1973)}=16.25$	< 0.01
Other ³	424	114.51 (10.20)		

¹ People-oriented specialties included family medicine, general internal medicine, general pediatrics, obstetrics and gynecology, and psychiatry.

² Technology-oriented specialties included anesthesiology, pathology, radiology, surgery and surgical specialties.

³ Other specialties included medical subspecialties, dermatology, emergency medicine, etc.

Effect of gender was controlled by entering gender as a covariate in statistical analysis. Post hoc mean comparisons showed that Technology-Oriented < People-Oriented, and Technology-Oriented < Other specialties.

Table 14: Correlations between scores on the JSE and the IRI ($n= 93$ first-year internal medicine residents)

IRI subscales	JSPE factors			
	Perspective taking	Compassionate care	Standing in patient's shoes	Total score
Perspective taking	0.35**	0.31**	0.17	0.40**
Empathic concern	0.40**	0.41**	0.16	0.48**
Fantasy	0.24*	0.37**	0.12	0.35**
Personal distress	0.01	0.02	0.13	0.02
Total score	0.34**	0.40**	0.22*	0.45**

* $p < 0.05$. ** $p < 0.01$.

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Table 15: Factor coefficients of the Jefferson Scale of Patient Perceptions of Physician Empathy, item-total score correlations, and correlations of each item with scores of patient satisfaction and recommendation ($n=535$)

Items	Factor Coefficients ¹	Item-Total Score ²	Patient Satisfaction ³	Recommendation ⁴
1. My doctor understands my emotions, feelings and concerns	0.93	0.94	0.87	0.80
2. My doctor is an understanding doctor	0.92	0.93	0.95	0.89
3. My doctor seems concerned about me and my family	0.92	0.93	0.87	0.82
4. My doctor asks about what is happening in my daily life	0.88	0.91	0.80	0.73
5. My doctor can view things from my perspective (see things as I see them)	0.84	0.88	0.79	0.74

¹ Items are reported by descending order of factor coefficients.

² Correlation between scores of the item and the rest of the scale.

³ Correlation between scores of the item and scores on the Jefferson Scale of Patient Satisfaction

⁴ Correlation between scores of the item and responses to this anchor item: “I would recommend my doctor to my family and friends.”

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Table 16: Concurrent validity coefficients of the Jefferson Scale of Patient Perceptions of Physician Empathy and criterion measures of patient-physician interpersonal trust by patients' gender and age

Criterion Measures	Gender ¹		Age		Total (n= 535)
	Men (n = 174)	Women (n = 355)	< 56 (n = 266) [¶]	≥ 56 (n = 269)	
Patient overall satisfaction with physician ²	0.94	0.93	0.96	0.90	0.93
I would recommend my doctor to my family and friends	0.88	0.86	0.91	0.80	0.87
My doctor listens carefully to me	0.88	0.91	0.96	0.84	0.91
My doctor spends sufficient time with me	0.79	0.80	0.85	0.75	0.80
My doctor really cares about me as a person	0.93	0.85	0.89	0.87	0.88
I would like my doctor to be present in any medical emergency situation	0.73	0.78	0.80	0.73	0.77
I am satisfied that my doctor has been taking care of me	0.86	0.86	0.90	0.83	0.87

¹ Six patients did not specify their gender.

² Scores on the Jefferson Scale of Patient Overall Satisfaction with Primary Care physician (Hojat, Louis, Maxwell, Markham et al., 2011).

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Table 17: Interest in the Jefferson Scale of Empathy Worldwide

Africa:	Algeria	Europe:	Albania	Middle East:	Iran
	Ghana		Austria		Iraq
	Malawi		Belgium		Israel
	Nigeria		Bulgaria		Jordan
	Rwanda		Croatia		Kuwait
	South Africa		Czech Republic		Lebanon
	Tunisia		Cyprus		Pakistan
			Denmark		Qatar
Asia:	Bangladesh		England		Saudi Arabia
	Brunei		Finland		Turkey
	China		France		United Arab Emirates
	India		Germany	North/Central	
	Indonesia		Greece	America:	Canada
	Japan		Hungary		Costa Rica
	Malaysia		Ireland		Guatemala
	Nepal		Italy		Mexico
	Philippines		Latvia		St. Maarten
	Russia		Lithuania		Trinidad & Tobago
	Singapore		Norway		United States
	South Korea		Poland		
	Sri Lanka		Portugal	Oceania:	Australia
	Taiwan		Romania		New Zealand
	Thailand		Scotland		
	Uzbekistan		Serbia	South America:	Argentina
			Slovenia		Brazil
			Spain		Chile
			Sweden		Columbia
			Switzerland		Ecuador
			The Netherlands		Peru
			United Kingdom		Uruguay
					Venezuela

HP=Health Professions/Physician Version
S=Student Version

HPS=Health Professions Student Version
*=PDF available

Table 18. The Jefferson Scale of Empathy has been translated into these languages/dialects

Arabic	HP*	Lithuanian	HP*, HPS
Bengali	S*	Malay	HPS
Bulgarian	HP*	Nepali	S
Catalan	S*	Norwegian	HP* & S
Chinese	(Simplified), HP*	Persian (Farsi)	HP* & S*
Chinese	(Mainland), HP & S*	Polish	HP* & S*
	(Taiwan), HP*, S* & HPS*	Portuguese	(Portugal), HP* & S*
Croatian	S*		(Brazil), HP & S*
Czech	HP* & S*	Romanian	HP* & S*
Danish	HP*	Russian	HP*
Dutch	(Flemish, Belgium), S*		(Uzbekistan) HP
	(Dutch, Netherlands), HP & S	Serbian	HP*, S* & HPS*
Filipino	HP*	Sinhalese	(Sri Lanka) S*
Finnish	HP*, S* & HPS*	Slovenian	S*
French	(Belgium), HP*	Spanish	S
	(Canada), HP*		(Argentina) HP*
	(France), HP*		(Chile), HP* & S*
	(Switzerland) S*		(Mexico), HP* & S*
German	HP* & S*		(Peru), S*
Greek	HP*		(Spain), S*
Hebrew	HP, S*	Swedish	HP
Hindi	HP*	Tagalog (Philippines)	HP*
Hungarian	HP* & S*	Tamil (Sri Lanka)	S*
Indonesian	HP* & S*	Thai	HP* & S*
Italian	HP*, S* & HPS*	Turkish	HP*, S* & HPS
Japanese	HP*, S* and HPS*	Urdu (Pakistan)	HP & S
Korean	HP* & S*		

HP=Health Professions/Physician Version

S=Student Version

HPS=Health Professions Student Version

* PDF available.

Figure 1: Three-Factor Model (Latent Variable Structure) of the Jefferson Scale of Empathy ($n=1,232$)

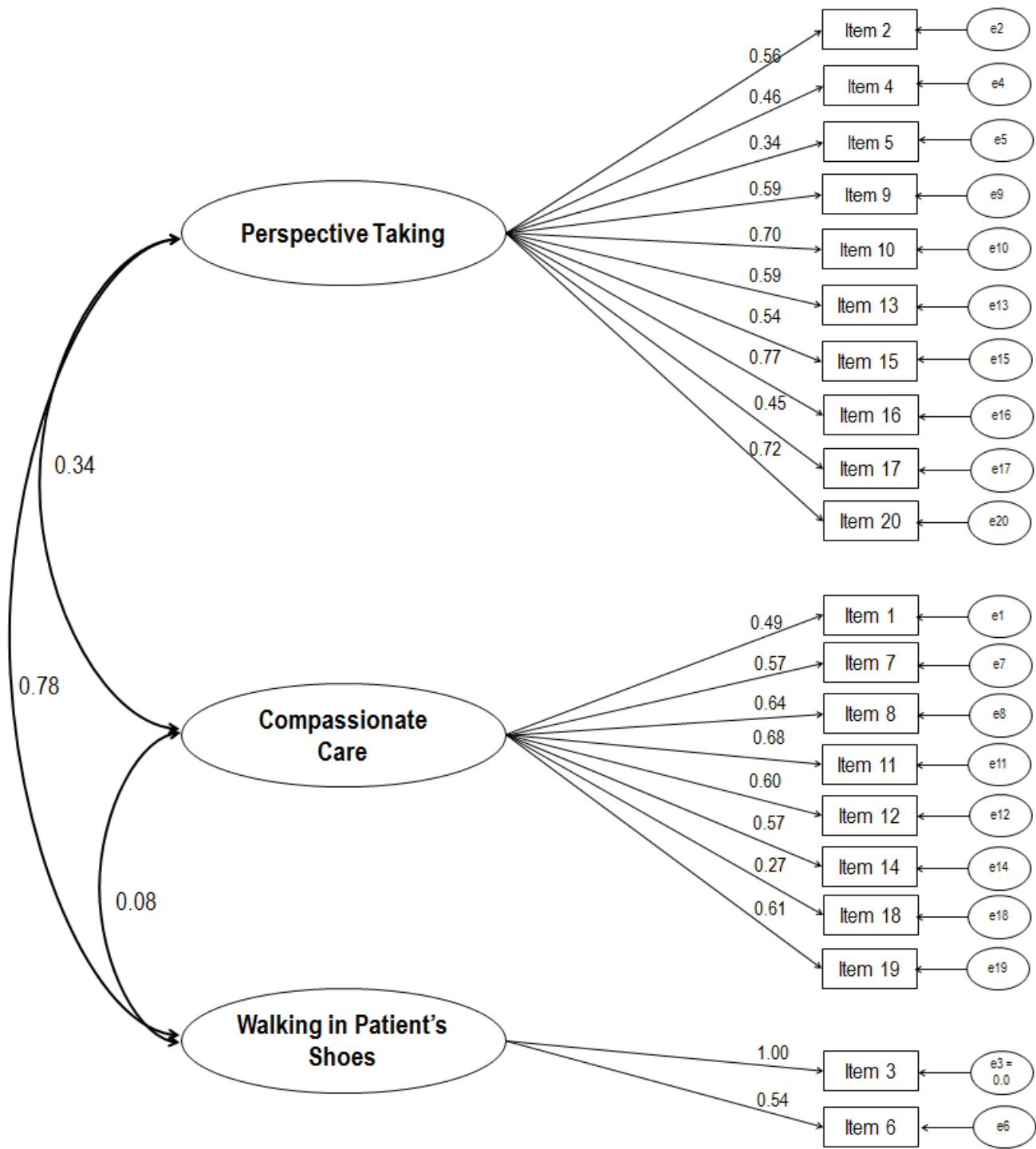


Figure 2: Association between physician ($n=29$) empathy and Hemoglobin A1c test results for diabetic patients ($n=891$)

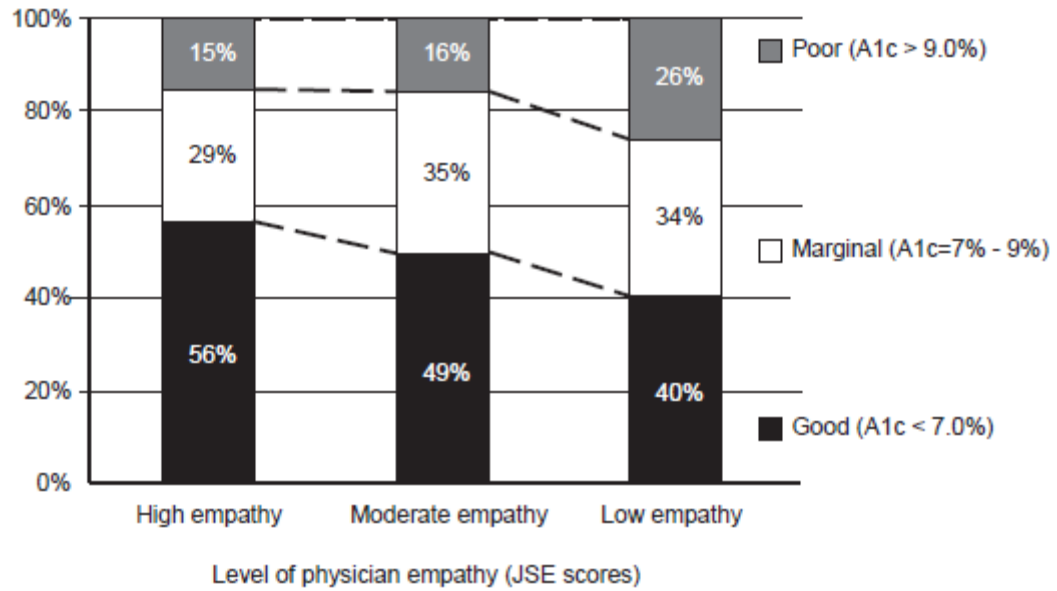


Figure 3: Association between physician ($n=29$) empathy scores and low-density lipoprotein cholesterol (LDL-C) test results for diabetic patients ($n=891$)

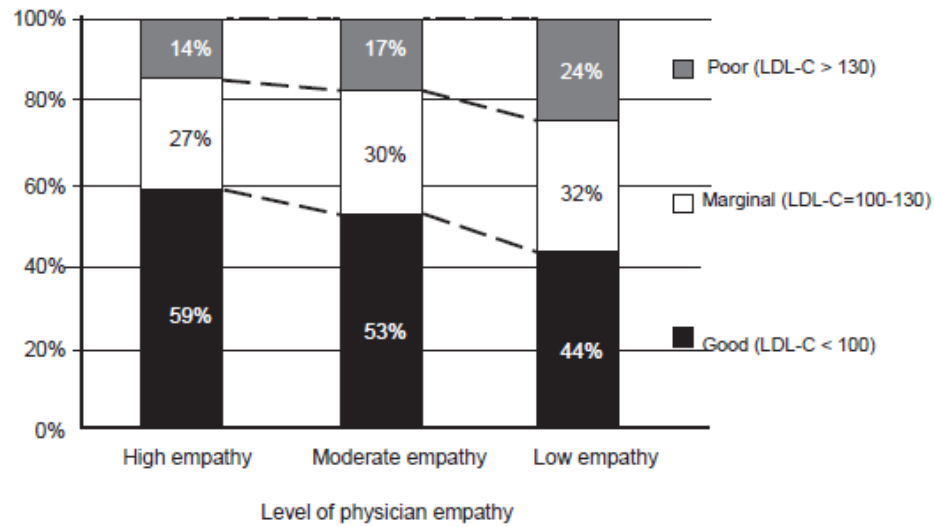
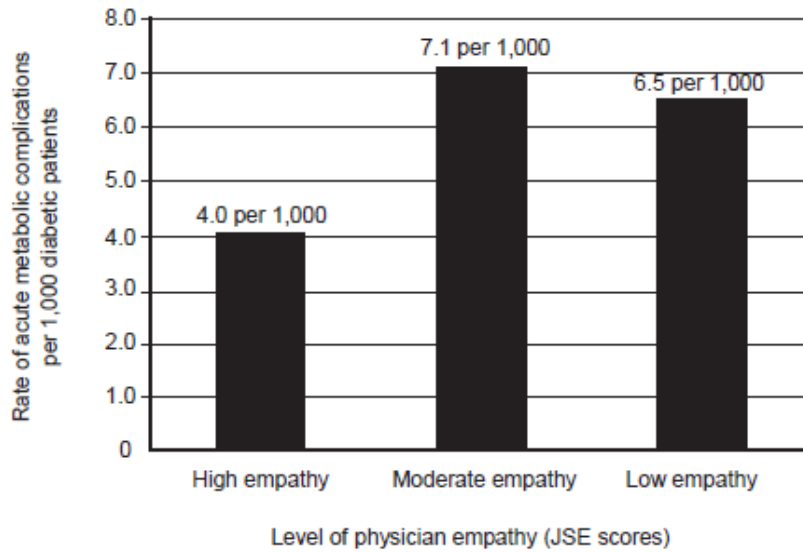



Figure 4: Association between physician empathy ($n=242$) and acute metabolic complications in their diabetic patients ($n=20,961$) in Parma, Italy



Appendix B

Three Versions of the JSE

Appendix B1: HP-Version (for administration to physicians and other health professionals)



Jefferson Scale of Empathy
Physician/Health Professions (HP - version)

Use a ball-point pen.
Mark one response for each of the items below.

For ID Code and Optional fields, write numerals completely inside the boxes, one numeral to a box.

Name (optional) _____ ID Code

--	--	--	--	--	--	--	--	--	--

Date ____/____/____

Age
 <21 21-30 31-40 41-50 51-60 61-70 >70

Gender:
 Male Female

Physician primary specialty: [Please choose only one]

<input type="checkbox"/> Anesthesiology	<input type="checkbox"/> Dermatology	<input type="checkbox"/> Emergency Medicine
<input type="checkbox"/> Family Med./General Prac.	<input type="checkbox"/> Internal Medicine specialties	<input type="checkbox"/> Neurology
<input type="checkbox"/> Neurosurgery	<input type="checkbox"/> Obstetrics/Gynecology	<input type="checkbox"/> Ophthalmology
<input type="checkbox"/> Otolaryngology	<input type="checkbox"/> Orthopedic Surgery	<input type="checkbox"/> Pathology
<input type="checkbox"/> Pediatrics	<input type="checkbox"/> Physical Med./Rehabilitation	<input type="checkbox"/> Plastic Surgery
<input type="checkbox"/> Preventive Medicine	<input type="checkbox"/> Psychiatry	<input type="checkbox"/> Public Health
<input type="checkbox"/> Radiology	<input type="checkbox"/> Surgery/Surgical specialties	<input type="checkbox"/> Urology
<input type="checkbox"/> Other _____		

Other health professions primary specialty: [Please choose only one]

<input type="checkbox"/> Community Healthcare Worker	<input type="checkbox"/> Dentistry	<input type="checkbox"/> Nutritionist
<input type="checkbox"/> Nursing	<input type="checkbox"/> Nurse Practitioner	<input type="checkbox"/> Nutrition/Dietician
<input type="checkbox"/> Occupational Therapy	<input type="checkbox"/> Pharmacy	<input type="checkbox"/> Physician Assistant
<input type="checkbox"/> Physical Therapy/Physiotherapy	<input type="checkbox"/> Podiatry	<input type="checkbox"/> Psychology/Counseling
<input type="checkbox"/> Public Health Worker	<input type="checkbox"/> Speech Therapy/Audiology	<input type="checkbox"/> Social Worker
<input type="checkbox"/> Other _____		


Optional field #1:

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Optional field #2:

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Please continue on the back --- Do not write below this line



SELF-SCORE

OE0

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160106 (rev. 4.0)

Jefferson Scale of Empathy

Physician/Health Professions (HP - version)


Instructions: Using a ball-point pen, please indicate the extent of your agreement or disagreement with each of the following statements by marking the appropriate circle to the right of each statement.

Please use the following 7-point scale (a higher number on the scale indicates more agreement):
Mark one and only one response for each statement.

1-----2-----3-----4-----5-----6-----7
Strongly Disagree Strongly Agree

- | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. My understanding of how my patients and their families feel does not influence medical or surgical treatment. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. My patients feel better when I understand their feelings. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. It is difficult for me to view things from my patients' perspectives. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. I consider understanding my patients' body language as important as verbal communication in caregiver-patient relationships. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. I have a good sense of humor that I think contributes to a better clinical outcome. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. Because people are different, it is difficult for me to see things from my patients' perspectives. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. I try not to pay attention to my patients' emotions in history taking or in asking about their physical health. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. Attentiveness to my patients' personal experiences does not influence treatment outcomes. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. I try to imagine myself in my patients' shoes when providing care to them. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. My patients value my understanding of their feelings which is therapeutic in its own right. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. Patients' illnesses can be cured only by medical or surgical treatment; therefore, emotional ties to my patients do not have a significant influence on medical or surgical outcomes. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. Asking patients about what is happening in their personal lives is not helpful in understanding their physical complaints. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. I try to understand what is going on in my patients' minds by paying attention to their non-verbal cues and body language. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. I believe that emotion has no place in the treatment of medical illness. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. Empathy is a therapeutic skill without which success in treatment is limited. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. An important component of the relationship with my patients is my understanding of their emotional status, as well as that of their families. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. I try to think like my patients in order to render better care. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. I do not allow myself to be influenced by strong personal bonds between my patients and their family members. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19. I do not enjoy reading non-medical literature or the arts. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. I believe that empathy is an important therapeutic factor in medical or surgical treatment. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Appendix B2: S-Version (for administration to medical students).



Jefferson
HEALTH IS ALL WE DO

Jefferson Scale of Empathy
Medical Student version (S - version)

Use a **ball-point pen**. Mark one response for each item below.
 For **ID Code**, write numerals completely inside the boxes, one numeral to a box.
 Leave **Optional** fields blank unless otherwise instructed.

Name _____ ID Code.....

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Date ____/____/____

Age:
 < 22 22-24 25-27 28-30 31-33 34-36 > 36

Gender:
 Male Female

Year of Medical School:
 1st year 2nd year 3rd year 4th year > 4th year

Which specialty do you plan to pursue? [Please choose only one]

<input type="checkbox"/> Anesthesiology	<input type="checkbox"/> Dermatology	<input type="checkbox"/> Emergency Medicine
<input type="checkbox"/> Family Med./General Prac.	<input type="checkbox"/> Internal Med. (see below)	<input type="checkbox"/> Neurology
<input type="checkbox"/> Neurosurgery	<input type="checkbox"/> Obstetrics/Gynecology	<input type="checkbox"/> Ophthalmology
<input type="checkbox"/> Otolaryngology	<input checked="" type="checkbox"/> Orthopaedic Surgery	<input type="checkbox"/> Pathology
<input type="checkbox"/> Pediatrics	<input checked="" type="checkbox"/> Physical Med./Rehabilitation	<input type="checkbox"/> Plastic Surgery
<input type="checkbox"/> Preventive Medicine	<input checked="" type="checkbox"/> Psychiatry	<input type="checkbox"/> Public Health
<input type="checkbox"/> Radiology	<input checked="" type="checkbox"/> Surgery (see below)	<input type="checkbox"/> Urology
<input type="checkbox"/> Other _____	<input type="checkbox"/> Undecided	

Medical Sub-specialty: [Please choose one if your primary specialty interest is Internal Medicine]

<input type="checkbox"/> Cardiology	<input type="checkbox"/> Critical Care/Pulmonary	<input type="checkbox"/> Endocrinology
<input type="checkbox"/> General Internal Medicine	<input type="checkbox"/> Gastroenterology	<input type="checkbox"/> Hematology/Oncology
<input type="checkbox"/> Infectious Disease	<input type="checkbox"/> Nephrology	<input type="checkbox"/> Rheumatology
<input type="checkbox"/> Other _____	<input type="checkbox"/> Undecided	

Surgical Sub-specialty: [Please choose one if your primary specialty interest is Surgery]

<input type="checkbox"/> Cardiothoracic	<input type="checkbox"/> Colorectal	<input checked="" type="checkbox"/> General Surgery
<input type="checkbox"/> Transplant	<input type="checkbox"/> Trauma/Critical Care	<input checked="" type="checkbox"/> Vascular
<input type="checkbox"/> Other _____	<input type="checkbox"/> Undecided	


Optional field #1.....

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Optional field #2.....


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Please continue on the back --- Do not write below this line



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Appendix B3: HPS Version (for administration to health professions students other than medical students)



Jefferson Scale of Empathy
Health Professions Student version (HPS - version)

Use a ball-point pen. Mark one response for each item below.
For *ID Code*, write numerals completely inside the boxes, one numeral to a box.

Name (optional) _____ ID Code

--	--	--	--	--	--	--	--	--	--

Date ____/____/____

Age:

<input type="checkbox"/> < 19	<input type="checkbox"/> 19 - 21	<input type="checkbox"/> 22 - 24	<input type="checkbox"/> 25 - 27	<input type="checkbox"/> 28 - 30	<input type="checkbox"/> 31 - 33	<input type="checkbox"/> 34 - 36
<input type="checkbox"/> 37 - 39	<input type="checkbox"/> 40 - 42	<input checked="" type="checkbox"/> 42 - 45	<input type="checkbox"/> 46 - 48	<input type="checkbox"/> 49 - 51	<input type="checkbox"/> > 51	

Gender:

Male Female

What is your degree program?

<input type="checkbox"/> Bioscience/Medical technology	<input checked="" type="checkbox"/> Counseling/Psychology	<input type="checkbox"/> Dentistry
<input type="checkbox"/> Diagnostic Imaging	<input type="checkbox"/> Nursing	<input type="checkbox"/> Nurse Practitioner
<input type="checkbox"/> Occupational Therapy	<input type="checkbox"/> Ophthalmology/Optometry	<input type="checkbox"/> Pharmacy
<input type="checkbox"/> Physical Therapy	<input type="checkbox"/> Physician Assistant	<input type="checkbox"/> Public Health
<input type="checkbox"/> Other _____		

Year in this program:

1st year 2nd year 3rd year 4th year 5th year

Please leave *Optional* fields blank unless otherwise instructed.


Optional field #1

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Optional field #2

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PLEASE CONTINUE



S E L F - S C O R E

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Appendix C

The Jefferson Scale of Patient Perceptions of Physician Empathy (JSPPPE)



Jefferson Scale of Patient Perceptions of Physician Empathy

Instructions: We would like to know the extent of your agreement or disagreement with *each* of the following statements *about your physician named below*. Please use the following 7-point scale and write your rating number from 1 to 7 on the space before each statement (1 means that you Strongly Disagree, and 7 means you Strongly Agree with the statement, a higher number indicates more agreement).

1-----2-----3-----4-----5-----6-----7
Strongly Disagree *Strongly Agree*

Dr. (Name of the physician here) _____

1. Can view things from my perspective (see things as I see them).
2. Asks about what is happening in my daily life.
3. Seems concerned about me and my family.
4. Understands my emotions, feelings and concerns.
5. Is an understanding doctor.

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Appendix D

**Selected Publications by National and International Researchers in which the
JSE was used (as of March 2016)**

(For an annotated bibliography of these publications, see Hojat, 2016, pp.275-331)

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