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# Psychometrics of the scale of attitudes toward physician-pharmacist collaboration: a study with medical students.

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# Psychometrics of the scale of attitudes toward physician–pharmacist collaboration: A study with medical students

**Mohammadreza Hojat, John Spandorfer, Gerald A. Isenberg, Michael J. Vergare, Reza Fassihi & Joseph S. Gonnella**

## **Abstract**

**Background:** Despite the emphasis placed on interdisciplinary education and interprofessional collaboration between physicians and pharmacologists, no psychometrically sound instrument is available to measure attitudes toward collaborative relationships.

**Aim:** This study was designed to examine psychometrics of an instrument for measuring attitudes toward physician–pharmacist collaborative relationships for administration to students in medical and pharmacy schools and to physicians and pharmacists. **Methods:** The Scale of Attitudes Toward Physician-Pharmacist Collaboration was completed by 210 students at Jefferson Medical College. Factor analysis and correlational methods were used to examine psychometrics of the instrument.

**Results:** Consistent with the conceptual framework of interprofessional collaboration, three underlying constructs, namely “responsibility and accountability;” “shared authority;” and “interdisciplinary education” emerged from the factor analysis of the instrument providing support for its construct validity. The reliability coefficient alpha for the instrument was 0.90. The instrument’s criterion-related validity coefficient with scores of a validated instrument (Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration) was 0.70.

**Conclusions:** Findings provide support for the validity and reliability of the instrument for medical students. The instrument has the potential to be used for the evaluation of interdisciplinary education in medical and pharmacy schools, and for the evaluation of patient outcomes resulting from collaborative physician-pharmacist relationships.

## **Introduction**

Historically, interprofessional collaboration in patient care in the United States can be traced back to World War II when medical, surgical, and nursing teams worked together to treat injured soldiers (Baldwin 2007). Teamwork and collaboration among health care providers is regarded as one important ingredient of professionalism (Veloski & Hojat 2006) which can lead to the improvement of patient safety and optimal patient outcomes

(Fagin 1992; Poulton & West 1993; Clemmer et al. 1998; Papa 1998; Kiel & McCord 2005; Carter et al. 2008; Nkansah et al. 2008). Collaborative relationships between physicians and pharmacists can be reflected in conferring patients' drug therapy, coordinating to improve patients' self-care skills, providing information about drug interactions (McDonough & Doucette 2001; Brock & Doucette 2004), reducing medication errors (Sweeney 2002) and cost-effective use of medication (Davies et al. 1994).

In the past, the role of the pharmacist has been primarily focused on the dispensation of medication, often prescribed by physicians (Sweeney 2002). However, in recent years this focus has shifted and broadened. Increasingly, interdisciplinary education in medical and pharmacy schools, and interprofessional collaboration between pharmacists and physicians, have been encouraged (Zillich et al. 2006) to allow all parties to effectively use their specialized training and expertise in optimizing patient care and improving therapeutic outcomes. The rapid advancement in medical and pharmaceutical sciences, complex interactions among drugs, the cost of drug-related morbidity, increased possibility of medical errors, and skyrocketing costs of health care necessitate a collaborative relationship between pharmacists and physicians.

Schellens et al. (2008) suggest that: "In view of its increasing complexity, rational and tailored drug therapy cannot be implemented in its full width when the discipline is applied only by physician" (p.146).

Collaboration between physicians and pharmacists is a relatively new concept. Coluccio and Maguire (1983) described professional collaboration in terms of "joint communication and decision-making process ... with the goal of meeting the patient's wellness and illness needs as best as possible, while respecting the unique qualities and abilities of both professionals" (p. 63). In the context of physician-nurse teamwork, Baggs and Schmitt (1988) suggest that collaborative relationship requires "cooperatively working together, sharing responsibilities for solving problems and making decisions to formulate and carry out plans for patient care" (p. 145). The key concepts in these and most other descriptions of interprofessional collaboration are "shared responsibilities," "communication," "accountability," "shared decisions" and "education."

## Measurement

Despite the importance of a collaborative relationship between physicians and pharmacists, no psychometrically sound instrument has been developed to specifically measure orientation or attitudes toward collaborative relationships. In particular, no validated instrument is available that can be administered to physicians and pharmacists, as well as to students in medical and pharmacy schools. Although some instruments exist for measuring collaborative relationships between physicians and pharmacists, none can be applied to both practitioners and students of pharmacy and medicine for comparative research. For example, the Physician/Pharmacist Collaboration Index (PPCI) was originally developed to assess physicians' perspectives about collaborative relationships with pharmacists (Zillich et al. 2005). The scale contains 14 items, and a typical item is: "This pharmacist is

credible.” There is another version of this instrument that was adapted to assess pharmacists’ perspectives about collaboration with physicians (Zillich et al. 2006). The corresponding item in that instrument reads as: “This physician is credible.”

There was a need for a psychometrically sound instrument to quantify attitudes toward physician-pharmacist collaborative relationships, which can be used for outcome assessment of interdisciplinary educational programs and for the evaluation of clinical outcomes resulting from interprofessional collaboration. In response to this need, the Scale of Attitudes Toward Physician-Pharmacist Collaboration (SATP<sup>2</sup>C) was developed (Hojat & Gonnella 2011). We designed this study to examine the validity and reliability of the SATP<sup>2</sup>C in medical students.

## Methods

### Participants

Study participants were 210 third-year students at Jefferson Medical College who completed the survey. We chose third year students, because formal clinical curriculum and patient care activities that require teamwork and interprofessional collaboration start in the third year of in medical school.

### Instruments

Two instruments were included in the survey.

1. The Scale of Attitudes Toward Physician-Pharmacist Collaboration (SATP<sup>2</sup>C), described previously was used (Hojat & Gonnella 2011). This scale includes 16 items, each answered on a 4-point Likert scale (1 ¼ Strongly Disagree, 4 ¼ Strongly Agree). A higher score indicates a more positive orientation toward collaborative relationships between physicians and pharmacists. The step-by-step development of the scale, a pilot study of its face and content validities, and preliminary psychometrics with samples of physicians and pharmacists have previously been reported (Hojat & Gonnella 2011). The scale can be administered to students in medical and pharmacy schools and to physicians and pharmacists. Psychometric support for the scale in pharmacy students has been reported (Van Winkle et al. 2011). However, psychometrics of the scale in medical students, practicing physicians and pharmacists have not yet been investigated. We attempted in this study to provide evidence in support of validity and reliability of the SATP<sup>2</sup>C in medical students.

2. The Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration. This scale was developed to measure attitudes toward physician-nurse collaboration (Hojat & Herman 1985; Hojat et al. 1997, 1999). The scale includes 15 items answered on a 4-point Likert scale (1 ¼ strongly disagree, 4 ¼ strongly agree). Evidence in support of the psychometrics of this scale has been reported among American (Hojat et al. 1997, 1999; Ward et al. 2008), Mexican (Hojat et al. 2001), Italian, and Israeli samples (Hojat et al. 2003). In a review article, this

scale was listed among the recommended instruments for measuring physician–nurse collaborative relationships (Daugherty & Larson 2005). A higher score reflects a more positive attitude toward physician–nurse collaborative relationships. Because of the content similarity and conceptual relevance to interprofessional collaboration (Hojat & Gonnella 2011), we expected a significant correlation between scores of this scale and the SATP<sup>2</sup>C.

### Procedures

Subsequent to the Thomas Jefferson University’s IRB approval, we distributed the survey to third-year medical students at the completion of the third-year clinical rotations in March 2011 during a session on medical professionalism. Students were told that the purpose was to study interprofessional teamwork. They were asked not to identify themselves by name; however, they were given an option to use their “campus key” for correlating their responses with other information maintained in the Jefferson Longitudinal Study (Gonnella et al. 2011). Students were asked to specify their gender.

### Statistical analyses

Correlational methods were used to examine the construct validity of the SATP<sup>2</sup>C (principal component factor extraction at item level, followed by varimax rotation), criterion-related validity (Pearson correlation coefficient between scores of the two aforementioned scales), internal consistency reliability (Cronbach’s coefficient alpha), and t-test (for gender comparison).

### Results

Of the total class (n = 263), 210 students completed the survey (80% response rate).

### Underlying construct

Factor analysis was used to explore the underlying construct of the scale. Kaiser’s measure of sampling adequacy prior to factor extraction resulted in an overall index of 0.91, which confirmed the adequacy of data for factor analysis. Bartlett’s test for sphericity indicated that the intercorrelation matrix was factorable ( $\chi^2(120)=1337.9, p \leq 0.001$ ). Three factors emerged, each with an eigenvalue greater than one, accounting for a total of 57% of the variance. Summary results of factor analysis are presented in Table 1.

As shown in the table, the first factor (eigenvalue = 6.5, accounting for 41% of the variance) can be considered as a construct involving “responsibility and accountability” based on the content of nine items with substantial factor coefficients ( $>0.52$ ) on this factor. The second factor (eigenvalue = 1.4, accounting for 9% of the variance) is a construct involving “shared authority.” Five items had substantial factor coefficients ( $>0.55$ ) on this factor. Finally, the third factor (eigenvalue = 1.1, accounting for 7% of the variance) can be entitled a construct involving “interdisciplinary education” based on the content of three items with substantial factor coefficients (Table 1). One item (item 14 in the table:

“Physicians and pharmacists should be educated to establish collaborative relationship”) is bi-factorial involving both “shared authority” and “interdisciplinary education” constructs.

#### Descriptive statistics

Descriptive statistics for the Scale of Attitudes Toward Physician-Pharmacist Collaboration are reported in Table 2. An examination of the score distribution revealed a bell-shape with a mean of 53.8, median of 54, standard deviation of 6.3, 25th percentile of 48, 75th percentile of 59, and a range of 32–64 (minimum possible score is 16, and maximum possible score is 64).

The corrected item-total correlations were all positive and statistically significant ( $p \leq 0.01$ ), ranging from a low of 0.43 (for item 12 in Table 2) to a high of 0.76 (for item 2 in Table 2), with a median correlation of 0.62.

#### Reliability coefficients

The internal consistency reliability of the scale calculated by the Cronbach’s coefficient alpha was 0.90, which is very satisfactory for psychological testing, indicating that the scale is highly internally consistent. The magnitudes of the reliability coefficients for factors 1, 2, and 3, were 0.82, 0.78, and 0.68, respectively.

#### Validity coefficients

The mean and standard deviation of the Jefferson Scale of Attitudes Toward Physician–Nurse Collaboration for the sample of this study were 47.1 and 6.6, respectively. Cronbach’s coefficient alpha for this scale was 0.86 in this sample.

The scores of the SATP<sup>2</sup>C and the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration were highly correlated ( $r = .70$ ,  $p < 0.01$ ), which provides support for the criterion related validity of the SATP<sup>2</sup>C. Criterion validity is the degree to which scores of an instrument are correlated with those of another conceptually relevant and validated instrument (Anastasi 1988). The disattenuated validity coefficient was 0.79. The validity coefficients for the factors of “responsibility and accountability,” “shared authority,” and “interdisciplinary education” were 0.65, 0.62, 0.49, respectively.

#### Gender comparison

Of the total sample who completed the survey, 100 women and 99 men specified their gender. This gender ratio is similar to that in the entire class. No statistically significant difference was observed between men ( $M = 54.1$ ,  $SD = 6.6$ ) and women ( $M = 53.9$ ,  $SD = 5.8$ ) on their SATP<sup>2</sup>C scores ( $t(197) = 0.22$ ,  $P = 0.89$ ).

#### Discussion

Findings of this study provide evidence in support of the validity and reliability of a newly developed Scale of Attitudes Toward Pharmacist-Physician Collaboration. The positive and statistically significant item-total score correlations suggest that each item contributes to a significant degree to the total score of the scale. The construct validity of the scale was supported by the factor analytic findings, suggesting that the underlying construct of the scale is consistent with the key ingredients of interprofessional collaboration (Fagin 1992; Poulton & West 1993; Nkansah et al. 2008). The major underlying factor of “responsibility and accountability” is the backbone of teamwork among health professionals. The constructs of “shared authority” and “interdisciplinary education” are also important in caring for the patient, and in training of health professionals. (Fagin 1992; Poulton & West 1993; Clemmer et al. 1998; Papa et al. 1998; McCord 2005; Nkansah et al. 2008).

The criterion-related validity of the scale was supported by the positive and significant correlations of the scores of the entire scale and its factors with the scores of a conceptually relevant measure of attitudes toward physician–nurse collaboration. We expected substantial validity coefficients because of the conceptual similarities on measuring orientation toward interdisciplinary education and inter professional collaboration between the two scales taken by the same group of students. The internal consistency aspect of the scale’s reliability was supported by coefficients alpha for the entire scale and its extracted factors. Limitations of this study include the single institution research, a lack of heterogeneity of the sample, convenience sampling, and administration of the test in a medical professionalism session that could have influenced participants’ orientation toward collaborative relationship. Despite these limitations, the findings are encouraging in support of the psychometrics of the scale. A recent study supported the validity and reliability the SATP2C among pharmacy students (Van Winkle et al. 2011). Additional research is needed to confirm the psychometrics of the scale among practicing physicians and pharmacists. The scale has the potential to be used in the assessments of interdisciplinary educational programs, in studying clinical outcomes of teamwork, in examining group differences in orientation toward collaboration, and in cross-cultural research on physician-pharmacist collaboration.

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## References

- Anastasi A. 1988. Psychological testing. 6th ed. New York: Macmillan.
- Baldwin D. 2007. Some historical notes on interdisciplinary and interprofessional education and practice in the USA. *J Interprof Care* 21:23–37.
- Braggs JG, Schmitt MH. 1988. Collaboration between nurses and physicians about care decisions. *Image: J Nurs Scholarsh* 20:145–149.
- Brock KA, Doucette WR. 2004. Collaborative working relationships between pharmacists and physicians: An exploratory study. *J Amer Pharm Assoc* 4:358–365.
- Carter BL, Bergus GR, Dawson JD, Farris KB, Doucette WR, Chrischilles EA, Hartz AJ. 2008. A cluster randomized trial to evaluate physician/ pharmacist collaboration to improve blood pressure control. *J Clin Hypertens* 10:260–271.
- Clemmer TP, Spuhler VJ, Berwick DM, Nolan TW. 1998. Cooperation: The foundation of improvement *Ann Int Med* 128:1004-1009.
- Coluccio M, Maguire P. 1983. Collaborative practice: Becoming a reality through primary nursing. *Nurs Admin Quart* 7:59–63.
- Daugherty MB, Larson E. 2005. A review of instruments measuring nurse- physician collaboration. *J Nurs Admin* 35:244–253.
- Davies JG, Horne R, Bennett J, Stott R. 1994. Doctors, pharmacists and the prescribing process. *Br J Hosp Med* 52:167–170.
- Fagin CM. 1992. Collaboration between nurses and physicians: No longer a choice. *Acad Med* 67:295–303.
- Gonnella JS, Hojat M, Veloski J. 2011. AM last page: The Jefferson longitudinal study of medical education. *Acad Med* 86:404.
- Hojat M, Fields SK, Rattner SL, Griffiths M, Cohen MJM, Plumb J. 1997. Attitudes toward

- physician-nurse alliance: Comparisons of medical and nursing students. *Acad Med* 72:1–3.
- Hojat M, Fields SK, Veloski JJ, Griffiths M, Cohen MJM, Plumb J. 1999. Psychometric properties of an attitude scale measuring physician–nurse collaboration. *Eval Health Prof* 22:208–220.
- Hojat M, Gonnella JS. 2011. An instrument for measuring pharmacist and physician attitudes toward collaboration: Preliminary psychometric data. *J Interprof Care* 25:66–72.
- Hojat M, Gonnella JS, Nasca TJ, Fields SK, Cicchetti A, Lo Scalzo A, Taroni F, Amicosante AMV, Macinati M, Tangucci M, et al. 2003. Comparisons of American, Israeli, Italian and Mexican physicians and nurses on the total and factor scores of the Jefferson scale of attitudes toward physician–nurse collaborative relationships. *Intl J Nurs Stud* 40:427–435.
- Hojat M, Herman MW. 1985. Developing an instrument to measure attitudes toward nurses: Preliminary psychometric findings. *Psychol Rep* 56:571–579.
- Hojat M, Nasca TJ, Cohen MJM, Griffiths M, Rattner SL, Ibarra D, Alcorta- Gonzalez A, Torres-Ruiz A, Ibarra G, Garcia A. 2001. Attitudes toward physician–nurse collaboration: A cross-cultural study of male and female physicians and nurses in the United States and Mexico. *Nurs Res* 50:1–6.
- Kiel PJ, McCord AD. 2005. Pharmacist impact on clinical outcomes in a diabetes disease management program via collaborative practice. *Ann Pharmacother* 39:1828–1832.
- McDonough RP, Doucette WR. 2001. Developing collaborative working relationships between pharmacists and physicians. *J Amer Pharm Assoc* 41:682–692.
- Nkansah NT, Brewer JM, Connors R, Shermock KM. 2008. Clinical outcomes of patients with diabetes mellitus receiving medication management by pharmacists in an urban private physician practice. *Amer J Health-Syst Pharm* 65:145–149.
- Papa PA, Rector C, Stone C. 1998. Interdisciplinary collaborative training for school-based health professionals. *J Sch Health* 68:415–419.
- Poulton BC, West MA. 1993. Effective multidisciplinary teamwork in primary health care. *J Adv Nurs* 18:918–925.
- Schellens JHM, Grouls R, Guchelaar HJ, Touw DJ, Rongen GA, de Boer A, van Bortel LK. 2008. The Dutch model for clinical pharmacology: Collaboration between physician- and pharmacist-clinical pharmacologist. *Br J Clin Pharmacol* 66:146–147.
- Sweeney MA. 2002. Physician–pharmacist collaboration: A millennial paradigm to reduce medication errors. *JAOA* 102:678–681.
- Van Winkle LJ, Fjortoft N, Hojat M. 2011. Validation of an instrument to measure pharmacy and medical students attitudes toward physician–pharmacist collaboration. *Amer J Pharm Educ* 75(9):Article 178, 1–6.
- Veloski J, Hojat M. 2006. Measuring specific elements of professionalism: empathy, teamwork, and lifelong learning. In: Stern TD, editor. *Measuring medical professionalism*. Oxford: Oxford University Press. pp 117–145.
- Ward J, Schaal M, Sullivan J, Bowen M, Erdmann JB, Hojat M. 2008. The Jefferson scale of attitudes toward physician–nurse collaboration: A study with undergraduate nursing students. *J Interprof Care* 22:375–384.
- Zillich AJ, Doucette WR, Carter BL, Kreiter CD. 2005. Development and initial validation of an

instrument to measure physicianpharmacist collaboration from the physician perspective.  
Value Health 8:59–66.

Zillich AJ, Milchak JL, Carter BL, Doucette WR. 2006. Utility of a questionnaire to measure physician–pharmacist collaborative relationships. J Amer Pharm Assoc 46:453–458.