RESEARCH

Validation of an Empathy Scale in Pharmacy and Nursing Students

Mary E. Kiersma, PharmD, PhD,^{a*} Aleda M. H. Chen, PharmD, PhD,^{b*} Karen S. Yehle, PhD, MS,^{c,d,e} and Kimberly S. Plake, PhD^{d,e,f}

^aManchester University College of Pharmacy, Fort Wayne, Indiana

^bCedarville University School of Pharmacy, Cedarville, Ohio

^cCollege of Health and Human Sciences, Purdue University, West Lafayette, Indiana

^dCenter on Aging and the Life Course, Purdue University, West Lafayette, Indiana

^eRegenstrief Center for Healthcare Engineering, Purdue University, West Lafayette, Indiana

^fCollege of Pharmacy, Purdue University, West Lafayette, Indiana

Submitted August 29, 2012; accepted November 26, 2012; published June 12, 2013.

Objective. To validate an empathy scale to measure empathy in pharmacy and nursing students.

Methods. A 15-item instrument comprised of the cognitive and affective empathy domains, was created. Each item was rated using a 7-point Likert scale, ranging from strongly disagree to strongly agree. Concurrent validity was demonstrated with the Jefferson Scale of Empathy – Health Professional Students (JSE-HPS).

Results. Reliability analysis of data from 216 students (pharmacy, N=158; nursing, N=58) showed that scores on the empathy scale were positively associated with JSE-HPS scores ($p<0.001$). Factor analysis confirmed that 14 of the 15 items were significantly associated with their respective domain, but the overall instrument had limited goodness of fit.

Conclusions. Results of this study demonstrate the reliability and validity of a new scale for evaluating student empathy. Further testing of the scale at other universities is needed to establish validity.

Keywords: empathy, psychometrics, pharmacy students, nursing students

INTRODUCTION

By 2030, nearly 22% of the United States population will be aged 65 years or older,¹ increasing from 12.9% in 2009.² These older adults have more chronic diseases than did previous generations.³ Healthcare professionals need to be well prepared to address the needs of the growing population of older adults.⁴ However, students and new practitioners may have difficulties understanding and empathizing with older adults, as they may not have experienced aging-related challenges, such as disability and disease.

Empathy can be defined as the ability to understand and view the world from other people's perspectives and to connect with their experiences or feelings.⁵ Two decades ago, healthcare professionals had negative views of aging and were not empathetic toward older adults.⁶⁻⁸

Corresponding Author: Mary E. Kiersma, Manchester University, 10627 Diebold Road, Fort Wayne, IN 46845. Tel: 260-470-2668. Fax: 260-270-4418. E-mail: mekiersma@manchester.edu.

*Portions of this project were completed while Mary Kiersma and Aleda Chen were graduate research assistants at Purdue University College of Pharmacy, West Lafayette, Indiana

Healthcare professionals demonstrated more empathy regarding older adults' abilities, the aging process, and older adults in general, perhaps because of the incorporation of geriatric-specific education into the health professions curricula.⁹⁻¹⁷ However, empathy declined among health professions students by the end of the first year in their program.¹⁸

In pharmacy education, the Accreditation Council for Pharmacy Education (ACPE) revised standards and the American Association of Colleges of Pharmacy (AACP) outcomes recognize the importance of displaying empathy during all healthcare interactions.^{19,20} The ability to demonstrate empathy should be considered during the admission process for the doctor of pharmacy (PharmD) degree program, included as a learning outcome, and taught in the communication courses.¹⁹⁻²² In baccalaureate nursing education, the American Association of Colleges of Nursing (AACN) also emphasizes the importance of empathy and caring as part of the professional role and of all healthcare interactions.²³ Therefore, integrating activities within the curriculum, such as interprofessional experiences, experiential education, geriatric electives, and simulation games that improve health professions

students' empathy toward different patient populations is needed to promote patient-centered care.^{4,7,9,13,16,24-31}

For several years, the College of Pharmacy and the School of Nursing at Purdue University incorporated educational activities to address ACPE and AACN standards.^{19,23} A need existed to assess whether these activities resulted in changes in student empathy toward a specific patient group or population. After performing a thorough literature review, only 1 reliable and valid instrument to measure empathy among pharmacy and nursing students was identified: the Jefferson Scale of Empathy – Health Professional Students (JSE-HPS).³²⁻³⁶ The JSE-HPS, which measures empathetic qualities and tendencies, was modified from the Jefferson Scale of Empathy to include health professions students. The original Jefferson Scale of Empathy was created using a modified Delphi method.³² After performing a literature review on the term “empathy,” a panel of physicians was used to develop a pilot scale. Final psychometric testing was completed in a group of medical residents and medical students.³²

While the JSE-HPS addresses relevant aspects of empathy as perceived by healthcare professionals and has been successfully used in both pharmacy and nursing students, it was not based in theory. Researchers felt that a theoretical background for a scale would better explain changes in students' empathy, and there was considerable interest in examining empathy as conceptualized from a theoretical background. Furthermore, the cost associated with using the scale routinely for assessment was a barrier. The purpose of this project was to develop and validate a new, alternative instrument to measure the cognitive and affective constructs of empathy for eventual use in routinely assessing changes in student empathy throughout the curriculum.

METHODS

Researchers from the College of Pharmacy and the School of Nursing collaborated to develop the Kiersma-Chen Empathy Scale (KCES). The literature was reviewed to gain an understanding of the conceptualization of empathy, with emphasis on its theoretical background. After the initial literature review, the authors used the conceptualization of cognitive and affective empathy by Davis⁵ as the theoretical foundation for developing the scale. In 1994, Davis⁵ conceptualized empathy as having 2 distinct domains: cognitive and affective. In the cognitive domain, individuals have the ability to understand and view the world from other people's perspective. In the affective domain, individuals are able to connect to the experiences or feelings of others.⁵

Multiple items were created for each of the domains based on the constructs identified in an extensive review

of the literature on cognitive and affective empathy. Each item developed was examined using accreditation standards for pharmacy and nursing programs to ensure that the instrument could assist in the evaluation of student empathy for both programs. After peer review by researchers in pharmacy and nursing, 9 items pertaining to the cognitive domain and 6 items pertaining to the affective domain remained. Four of the 15 items that were worded negatively were reverse-coded when scored. For each of the items, participants rated their level of agreement or disagreement using a 7-point Likert scale, ranging from 1=strongly disagree to 7=strongly agree. Higher scores on the KCES indicated greater student empathy, and scores could range from 15 to 105.

The JSE-HPS was selected to establish concurrent validity, as it has been found to be a valid and reliable measure of empathy among medical students^{32,35,36} and more recently, among pharmacy and nursing students.^{33,34} The JSE-HPS contains 20 items (7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree) with 10 negatively worded items, which were reverse-coded when scored. Higher scores on the JSE-HPS indicated greater student empathy, and scores could range from 20 to 140.

Institutional review board approval (exempt status) was obtained prior to data collection. The *Geriatric Medication Game*, an aging simulation game specifically addressing the challenges of older adults that was developed by the St. Louis College of Pharmacy, was chosen to test the KCES.^{14,37} In the game, students “become” older adults and experience physical, psychological, and financial problems while navigating the healthcare system and performing challenges. A modified version of the game, described previously,³⁸ was incorporated into the pharmacy curriculum as part of a pharmacy practice skills laboratory to address the ACPE standard regarding professional attitudes and values during healthcare interactions as well as student empathy toward older adults.¹⁹ In order to address similar standards within the nursing curriculum, nursing students who were enrolled in a sophomore-level clinical course focusing on the care of older adults also participated in the game as part of the course activities.

Students completed the JSE-HPS and KCES prior to beginning the skills laboratory to determine their baseline empathy toward older adults and again after participating in the game to measure changes in empathy as a result of the game. An anonymous identifier was used to match the baseline and post-game tests. Additional demographic information, including gender, age, and the degree program in which the student was enrolled, was obtained.

Statistical analyses were performed using SPSS, v. 19.0 (IBM, Armonk, NY) for Windows, with an *a priori*

level of significance $\alpha=0.05$. Frequencies were calculated for demographic items. Reliability of the KCES and JSE-HPS was measured using the Cronbach alpha for pharmacy students, nursing students, and the combination of pharmacy and nursing students. A coefficient alpha of 0.8 or greater was considered indicative of good reliability.³⁹ Because the JSE-HPS was previously validated for use among health professions students,^{32,35,36} correlation coefficients were used to determine concurrent validity between the JSE-HPS and KCES.

Because the KCES was constructed on a theoretical framework suggested by Davis,⁵ confirmatory factor analysis (CFA) was performed to test the model, underscoring the relationship between the items and their corresponding factor (ie, cognitive or affective empathy). Analyses were performed in SAS v. 9.3 (SAS, Inc., Cary, NC) using the PROC CALIS procedure on the baseline test data. Model fit was assessed using the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMSR) fit statistics. A RMSEA value of ≤ 0.08 and SRMSR value of ≤ 0.10 indicate a reasonable model fit, with a RMSEA value of ≤ 0.06 and SRMSR value of ≤ 0.05 being indicative of a good fit.⁴⁰

RESULTS

Two hundred and sixteen students (pharmacy N=158 and nursing N=58) completed the baseline and post-game tests. The majority of students were between the ages of 19 and 21 and female (Table 1). Reliability analysis provided a Cronbach α of 0.851 and 0.869 for the KCES baseline and post-game test scores, respectively, and 0.821 and 0.889 for the JSE-HPS baseline and post-game test scores (Table 2). The average reliability for the KCES was 0.860 and 0.855 for the JSE-HPS. Individual analyses for pharmacy and nursing students test scores were similar, with the exception of the KCES baseline test scores for nursing being lower ($\alpha=0.689$) than those for pharmacy ($\alpha=0.851$).

The baseline and post-game test scores for the KCES also were positively correlated with those for the JSE-HPS ($r=0.594$, $p<0.001$; $r=0.770$, $p<0.001$) (Table 3).

Table 1. Demographics of Pharmacy Students Who Participated in an Assessment of Empathy Before and After Playing the *Geriatric Medication Game*^a

Item	No. (%)
Degree	
Pharmacy	158 (73.1)
Nursing	58 (26.9)
Age	
19-21	159 (73.6)
22-24	35 (16.2)
25-27	11 (5.1)
28-48	7 (3.4)
Gender	
Male	52 (24.1)
Female	146 (67.6)

^a The *Geriatric Medication Game* is an aging simulation game that specifically addresses the challenges of older adults.¹⁴

The baseline and post-game test scores for the KCES had stronger correlations with those for the JSE-HPS in pharmacy students than in nursing students. The KCES was found to correlate significantly with the JSE-HPS, providing evidence for concurrent validity. Correlations between the KCES and the JSE-HPS for the baseline and post-game test scores were between 0.59 and 0.77, respectively, which can be characterized as medium to strong correlations.⁴¹ Accordingly, the concurrent validity of KCES appeared to be good to very good.

Two hundred nine complete responses were used for the CFA model. The RMSEA and the SRMSR did not meet the criteria for acceptable fit (RMSEA=0.151, SRMSR=0.101). Of the 15 items, only 1 item (question 4, which was reverse-coded) did not have a significant relationship with its specified factor (ie, cognitive or affective). The cognitive and affective factors significantly covaried with one another (standardized coefficient=0.983 $p<0.001$).

DISCUSSION

Healthcare professionals need to be well prepared to address the needs of a diverse patient population. Both

Table 2. Reliability of the Kiersma-Chen Empathy Scale (KCES) and the Jefferson Scale of Empathy – Health Profession Student Version (JSE-HPS)

Group	KCES Baseline Test		KCES Post-game ^a Test		JSE-HPS Baseline Test		JSE-HPS Post-game ^a Test	
	N	α	N	A	N	α	N	α
Pharmacy students	153	0.851	150	0.880	152	0.819	136	0.801
Nursing students	55	0.689	58	0.805	55	0.792	52	0.897
Pharmacy students and nursing students	209	0.851	210	0.869	207	0.821	190	0.889

^a The *Geriatric Medication Game* is an aging simulation game that specifically addresses the challenges of older adults.¹⁴

Table 3. Scale Correlations between the Kiersma-Chen Empathy Scale (KCES) and the Jefferson Scale of Empathy – Health Profession Student Version (JSE-HPS)^a

Students	JSE-HPS Baseline Test		JSE-HPS Post-game ^b Test	
	R ^c	P	R ^c	P
Pharmacy + Nursing				
KCES baseline test	0.594	<0.001	0.669	<0.001
KCES post-game ^b test	0.609	<0.001	0.770	<0.001
Pharmacy				
KCES baseline test	0.610	<0.001	0.670	<0.001
KCES post-game ^b test	0.610	<0.001	0.776	<0.001
Nursing				
KCES baseline test	0.289	0.037	0.421	0.002
KCES post-game ^b test	0.499	<0.001	0.684	<0.001

^a Higher scores on both the JSE-HPS and the KCES indicate more empathy.

^b The *Geriatric Medication Game* is an aging simulation game that specifically addresses the challenges of older adults.¹⁴

^c Spearman's Rho

pharmacy and nursing education support the development of empathy in students with respect to their interactions with patients. Appendix D of the ACPE revised standards for pharmacy education acknowledges that empathy should be demonstrated in all practice experiences as part of professionalism.¹⁹ According to ACPE Guideline 17.3, empathy is considered a desirable quality to support the student's potential to become a self-directed lifelong learner and an effective professional. Additionally, an AACP policy statement recently was approved for supporting the development of measureable behavioral competencies that include professional attitudes and values.⁴² The KCES was developed to measure changes in empathy among students after they participated in an aging-related game.

The KCES was found to be a reliable measure of empathy for pharmacy and nursing students. The Cronbach alpha for the baseline and post-game tests of the KCES were greater than 0.8 for the combined analysis of pharmacy and nursing students as well as the analysis of pharmacy students, which is indicative of good reliability.³⁹ Furthermore, the Cronbach's alpha for the nursing students was greater than 0.8 for the post-game but not the baseline test. Reliability and concurrent validity were lower in nursing students than in pharmacy students. Given that only 58 nursing students participated, variability in experience with older adults may have contributed to differences. Future work should assess the reliability and concurrent validity of this scale in a larger sample of nursing students.

As anticipated, JSE-HPS reliability was similar to that found in previous research. In 2011, Fjortoft and colleagues³³ found the Cronbach's alpha of the JSE-HPS to be 0.84 in pharmacy students, and Fields and colleagues⁴³ found $\alpha = 0.78$ in nursing students. Therefore, the JSE-HPS is a reliable measure of empathy in pharmacy and nursing students.^{33,43} There could be differences in students between universities that may make the JSE-HPS less reliable in some groups, but this study confirmed the reliability of the JSE-HPS in both pharmacy and nursing students.

The KCES and the JSE-HPS were moderately and positively associated in both the baseline and post-Game assessments. While there is no exact definition for weak, moderate, and strong correlations, the closer the number is to 1 or -1, the stronger the correlation.⁴¹ Because of inconsistency in the literature and given that the correlation is greater than 0.5 but not as high as 0.8 or 0.9, the KCES and the JSE-HPS were considered moderately correlated. The number of items (KCES=15 items, JSE-HPS=20 items) or the manner in which the scales were constructed could have contributed to the strength of the correlation. For example, JSE-HPS, which was originally constructed using a modified Delphi method before psychometric evaluation, measured multiple aspects of empathetic qualities and tendencies.³² The KCES, which was based on the definition by Davis in 1994, included 2 specific constructs of empathy.⁵ Future work should examine and determine the concurrent validity of the KCES to other measures of empathy, such as the Empathy Construct Rating Scale,⁴⁴ the Interpersonal Reactivity Index,⁵ and the Layton Empathy Test.⁴⁵

CFA indicated that the model did not have a good fit with the data. While the SRMSR indicated an acceptable fit, other criteria did not meet the standards. Fourteen of the 15 items had a significant relationship with their respective factor. Additionally, the cognitive and affective scales of empathy significantly covaried. This finding may explain why the model and data did not have a better fit. Cognitive and affective empathy represent 2 aspects of empathy and are similar by definition, as cognitive empathy encompasses understanding another's perspective while the affective empathy relates to an individual's connection to the feelings or experience of another.⁵ While the scale was created to measure the domains of cognitive and affective empathy, it may be difficult to determine a difference between the 2 aspects.

Even though the KCES was found to be reliable and to have good internal consistency, the scale has been administered at only 1 institution in pharmacy and nursing students and, therefore, may not be reliable or valid for measuring empathy among health professions students at other institutions. Because of the small sample of nursing

students (N=58), validation of the scale in a larger group of nursing students is needed. Future work should validate the KCES on a larger scale to determine its reliability and validity, particularly at other institutions and with students in other health professions, such as medicine, dentistry, and dietetics.

Since the KCES was used as a pre- and post-measure of empathy with an aging simulation game, it may reliably measure empathy only toward older adults. The items on the KCES did not specify a particular patient group, such as older adults. Instead, the term “someone else” was used to allow for future work validating the use of the KCES with different curricular activities designed to improve empathy toward other patient groups. However, given that the directions on the KCES specified that students were to rate their level of agreement with the assessment items as related to older adults, the KCES may be a reliable measure of empathy only toward older adults.

CONCLUSION

With few other validated measures of empathy available, the KCES may be a useful instrument for pharmacy and nursing faculty members in assessing whether curricular or experiential activities incorporated within the curriculum meet ACPE and AACN standards regarding professional attitudes and values. Because accreditation standards for pharmacy colleges and schools encourage the development of professional attitudes and values, it is important for pharmacy educators to demonstrate how we are meeting these standards on a routine basis. The KCES is a viable option for measuring changes in students' empathy, has no fee for use, was shown to be reliable in both pharmacy and nursing students, and demonstrated concurrent validity with the JSE-HPS. While additional testing of the KCES is necessary to determine the true reliability and validity of the scale, particularly at other institutions or with regard to other activities, this study has provided initial evidence that the KCES may be an effective alternative for measuring pharmacy and nursing students' empathy toward older adults.

ACKNOWLEDGMENTS

Support for this project was provided by the Purdue University Learning Outcomes Assessment Grant and the Purdue University College of Pharmacy. Support for Aleda Chen while a graduate student was provided by the National Institute on Aging (T32AG025671), the Purdue University Center on Aging and the Life Course, and the American Foundation for Pharmaceutical Excellence. We thank Stephanie Cailor, prepharmacy student at Cedarville University, for her assistance in preparing this manuscript.

REFERENCES

1. US Census Bureau. Projections of the population by selected age groups and sex for the United States: 2015 to 2060. 2012. <http://www.census.gov/population/projections/data/national/2012/summarytables.html>. Accessed May 7, 2013.
2. US Census Bureau. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2012. 2012. <http://www.census.gov/popest/data/state/totals/2012/>. Accessed May 7, 2013.
3. Pearson WS, Bhat-Schelbert K, Probst JC. Multiple chronic conditions and the aging of America: a challenge for primary care physicians. *J Prim Care Community Health*. 2012;3(1):51-56.
4. Odegard PS, Breslow RM, Koronkowski MJ, Williams BR, Hudgins GA. Geriatric pharmacy education: a strategic plan for the future. *Am J Pharm Educ*. 2007;71(3):Article 47.
5. Davis MH. *Empathy: A Social Psychological Approach*. Madison, WI: Brown and Benchmark; 1994.
6. Marte AL. How does it feel to be old? Simulation game provides “into aging” experience. *J Contin Educ Nurs*. 1988;19(4):166-168.
7. Bonstelle SJ, Govoni AL. Into aging: exploring aging through games. *Rehabil Nurs*. 1984;9(2):23-27.
8. Slevin ODA. Ageist attitudes among young adults: Implications for a caring profession. *J Adv Nurs*. 1991;16(10):1197-1205.
9. Damron-Rodriguez J, Kramer BJ, Gallagher-Thompson D. Effect of geriatric clinical rotations on health professions trainees' attitudes about older adults. *Gerontol Geriatr Educ*. 1998;19(2):67-79.
10. Courtney M, Tong S, Walsh A. Acute-care nurses' attitudes towards older patients: a literature review. *Int J Nurs Pract*. 2000; 6(2):62-69.
11. Lookinland S, Anson K. Perpetuation of ageist attitudes among present and future health care personnel: Implications for elder care. *J Adv Nurs*. 1995;21(1):47-56.
12. Douglass C, Henry BW, Kostiwa IM. An aging game simulation activity for allied health students. *Educ Gerontol*. 2008;34(2):124-135.
13. Estus EL, Hume AL, Owens NJ. An active-learning course model to teach pharmacotherapy in geriatrics. *Am J Pharm Educ*. 2010;74(3):Article 38.
14. Evans SL, Lombardo M, Belgeri MT, Fontane PE. The Geriatric Medication Game in pharmacy education. *Am J Pharm Educ*. 2005;69(3):Article 46.
15. Kennedy DH, Fanning KD, Thornton PL. The Age Game: an interactive tool to supplement course material in a geriatrics elective. *Am J Pharm Educ*. 2004;68(5):Article 115.
16. Sauer BL. Student-directed learning in a community geriatrics advanced pharmacy practice experience. *Am J Pharm Educ*. 2006; 70(3):Article 54.
17. Stewart JJ, Giles L, Paterson JE, Butler SJ. Knowledge and attitudes towards older people: New Zealand students entering health professional degrees. *Phys Occup Ther Geriatr*. 2005;23(4):25-36.
18. Nunes P, Williams S, Sa B, Stevenson K. A study of empathy decline in students from five health disciplines during their first year of training. *Intl J Med Educ*. 2011;2:12-17.
19. Accreditation Council for Pharmacy Education. Accreditation standards and guidelines for the professional program in pharmacy leading to the doctor of pharmacy degree. Guidelines Version 2.0. 2011. http://www.acpe-accredit.org/pdf/S2007Guidelines2.0_ChangesIdentifiedInRed.pdf. Accessed January 29, 2012.
20. American Association of Colleges of Pharmacy, Center for the Advancement of Pharmaceutical Education. Educational outcomes. 2004. <http://aap.org/resources/education/Documents/CAPE2004.pdf>. Accessed January 27, 2021.

21. Indritz MES, Hadsall RS. An active learning approach to teaching service at one college of pharmacy. *Am J Pharm Educ.* 1999;63(Summer):126-131.
22. Kritikos V, Sainsbury EJ, Bosnic-Anticevich SZ, Watt HMG. Pharmacy students' perceptions of their profession relative to other health care professions. *Int J Pharm Pract.* 2003;11(2):121-129.
23. American Association of Colleges of Nursing. The essentials of baccalaureate education for professional nursing practice. 2008. <http://www.aacn.nche.edu/education-resources/BaccEssentials08.pdf>. Accessed June 12, 2012.
24. Furze J, Lohman H, Mu K. Impact of an interprofessional community-based educational experience on students' perceptions of other health professions and older adults. *J Allied Health.* 2008; 37(2):71-77.
25. Schmall V, Grabinski CJ, Bowman S. Use of games as a learner-centered strategy in gerontology, geriatrics, and aging-related courses. *Gerontol Geriatr Educ.* 2008;29(3):225-233.
26. Lonie JM, Alemam R, Dhing C, Mihm D. Assessing pharmacy student self-reported empathic tendencies. *Am J Pharm Educ.* 2005;69(2):Article 29.
27. McMillan LR. *Empathy and Empathic Communication: Nursing Student Perceptions of Program Effectiveness, Academic Experiences, and Competence.* Auburn: Educational Psychology, Auburn University; 2007.
28. Chen JT, LaLopa J, Dang DK. Impact of patient empathy modeling on pharmacy students caring for the underserved. *Am J Pharm Educ.* 2008;72(2):Article 40.
29. Lovell M. Caring for the elderly: changing perceptions and attitudes. *J Vasc Nurs.* 2006;24(1):22-26.
30. Beck CT. Nursing students' experiences caring for cognitively impaired elderly people. *J Adv Nurs.* 1996;23(5):992-998.
31. Henry BW, Ozier AD, Johnson A. Empathetic responses and attitudes about older adults: how experience with the Aging Game measures up. *Educ Gerontol.* 2011;37(10):924-941.
32. Hojat M, Mangione S, Nasca TJ, et al. The Jefferson Scale of Physician Empathy: development and preliminary psychometric data. *Educ Psychol Meas.* 2001;61(2):349-365.
33. Fjortoft N, Van Winkle LJ, Hojat M. Measuring empathy in pharmacy students. *Am J Pharm Educ.* 2011;75(6):Article 109.
34. Ward J, Schaal M, Sullivan J, Bowen ME, Erdmann JB, Hojat M. Reliability and validity of the Jefferson Scale of Empathy in undergraduate nursing students. *J Nurs Meas.* 2009;17 (1):73-88.
35. Hojat M, Gonnella JS, Nasca TJ, Mangione S, Vergare M, Magee M. Physician empathy: definition, components, measurement, and relationship to gender and specialty. *Am J Psychiatry.* 2002;159(9): 1563-1569.
36. Hojat M, Gonnella JS, Mangione S, et al. Empathy in medical students as related to academic performance, clinical competence and gender. *Med Educ.* 2002;36(6):522-527.
37. Oliver CH, Hurd PD, Beavers M, Gibbs E, Goeckner B, Miller K. Experiential learning about the elderly: the Geriatric Medication Game. *Am J Pharm Educ.* 1995;59(2):155-158.
38. Chen AMH, Plake KS, Yehle KS, Kiersma ME. Impact of the Geriatric Medication Game on pharmacy students' attitudes toward older adults. *Am J Pharm Educ.* 2011;75(8):Article 158.
39. Cortina JM. What is coefficient alpha? *J Appl Psychol.* 1993; 78(1):98-104.
40. Kline RB. Principles and practice of structural equation modeling. The Guilford Press; 2011.
41. Serfling RJ. References. *Approximation Theorems of Mathematical Statistics.* John Wiley & Sons, Inc.; 2008:353-363.
42. American Association of Colleges of Pharmacy. Final report of the 2011-2012 Bylaws and Policy Development Committee. <http://www.aacp.org/governance/HOD/Documents/FINAL2012BPDC.pdf>. Accessed July 24, 2012.
43. Fields SK, Mahan P, Tillman P, Harris J, Maxwell K, Hojat M. Measuring empathy in healthcare profession students using the Jefferson Scale of Physician Empathy: health provider – student version. *J Interprof Care.* 2011;25(4):287-293.
44. LaMonica E. Construct validity of an empathy instrument. *Res Nurs Health.* 1981;4(4):389-400.
45. Layton JM, Wykle MH. A validity study of four empathy instruments. *Res Nurs Health.* 1990;13(5):319-325.