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Further Confirmation of the Psychometric Properties of Responses to the Psychological Medicine Inventory –Student Version

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A B S T R A C T

Context: The Psychological Medicine Inventory (PMI) was first developed to measure physicians' reported interest level, confidence and perceived ability to address the psychological aspects of patient care. A student version of this scale has since been proposed (PMI-S).

Objective: To further examine the psychometric properties of responses to this student version and to confirm a 2-factor response structure.

Methods: A total of 213 first-year medical students at Ben-Gurion University of the Negev participated in this study. They completed the PMI-S (translated into Hebrew) and a socio-demographic questionnaire. The viability of the 2-factor structure of PMI-S responses was assessed using confirmatory factor analysis (CFA).

Findings: Consistent with the original English language version, CFA supported a 2-factor solution (i.e., psychological abilities and psychological sensitivity). All goodness-of-fit indices were found to be within ideal parameters.



Discussion and conclusions: Results of this study suggest that the PMI-S can be used to assess psychosocial competence and abilities of medical students and to evaluate the effectiveness of psycho-educational programs aimed at improving their psychosocial abilities.

Keywords: Confirmatory factor analysis, medical education, students, Psychological Medicine Inventory

Context

The increasing emphasis in medical education on patient-centered or relationship-centered healthcare delivery¹ has necessitated the development and validation of psychometrically valid instruments to assess medical students' aptitude for empathy and effective interpersonal communication. The Psychological Medicine Inventory (PMI) was first developed to assess resident physicians' interest level, confidence and ability to address the psychological aspects of patient care². Originally validated with residents enrolled in a family medicine graduate program, this self-reported instrument consists of nine items with responses provided along a 9-point Likert-type scale. The PMI consists of two dimensions: psychological abilities and psychological sensitivity. The former measures core clinical abilities (i.e., psychological interviewing, diagnosis, consultation use, treatment decisions and therapeutic ability and confidence) whereas the latter measures sensitivity to patients' reactions, awareness of the physician-patient relationship and attention to one's own feelings. Responses to the PMI demonstrated satisfactory inter-item correlations and convergent validity vis-à-vis residents' self-ratings and independent preceptors' ratings of these attributes².

The PMI has been used in various studies examining the effectiveness of psychosocial training programs for healthcare professionals (e.g., resident and staff development). Turner and Malm³, for example, compared pre- and post-PMI responses from family medicine residents who completed the Balint rural training program compared to controls.

Bachner and colleagues⁴ have since proposed a student version of the PMI with deletion of one item specific to consultation with allied health professionals not germane at this career stage. The original 9-point response key was also revised to a more conventional 7-point Likert-type format. Exploratory factor analysis yielded a 2-factor structure identical to that of the original PMI (psychological abilities and sensitivity). Bachner and colleagues⁴ reported satisfactory internal consistency of the entire scale ($\alpha=0.82$) and both factors ($\alpha=0.84$; $\alpha=0.69$, respectively). Furthermore, validity was supported by fairly high and significant correlations found between both factors (psychological abilities and psychological sensitivity) and students' ratings of their communication competence ($r=0.57$, $r=0.45$; respectively).

While encouraging, these preliminary results are tempered by the small sample size ($n=68$). As noted by these authors, responses to this student version of the PMI requires further validation research, ideally with larger samples sufficient for confirmatory factor analysis to ascertain the viability of the proposed 2-factor structure⁴. The current study was undertaken to meet this objective.

Methods

Participants and procedures: Two hundred and thirteen first-year medical students enrolled at Ben-Gurion University of the Negev provided responses for this study. This total represents three consecutive years (2006-2008). Questionnaires were administered at the beginning of a one-day medical communication workshop held during orientation week prior to the beginning of the academic



year. The students were informed that questions were administered to evaluate the effectiveness of the workshop, that responses were sought for research purposes only, and that participation was voluntary. The questionnaire was distributed in a standard manner in all three years by the same researchers. Over the three years, the combined response rate was 92%. Ethical approval of the study was granted by the Soroka University Medical Center Ethics Committee.

Psychological Medical Inventory - Student (PMI-S): Consistent with the original scale, the student version of the PMI measures interest level, confidence and perceived clinical ability to address psychological aspects of patient care. The PMI-S measures psychological abilities (five items) and psychological sensitivity (three items). Responses are provided along a 7-point Likert-type scale ranging from *not at all* (1) to *to a great extent* (7). The scale was translated into Hebrew and has been previously administered to medical students (e.g., Bachner et al.⁴). Participants in the current study also provided socio-demographic information.

Results

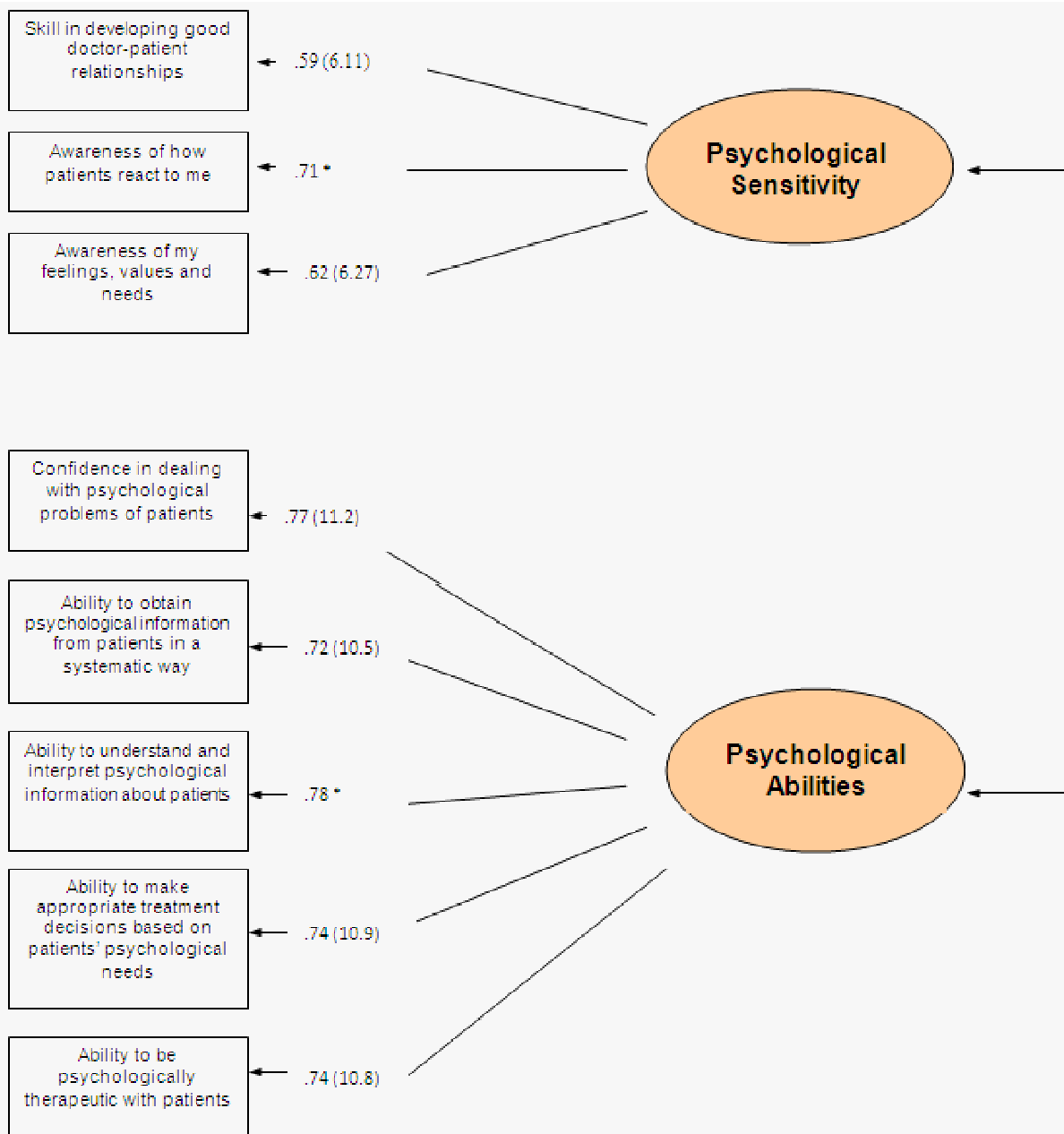
Respondents were 22.4 years of age on average (sd=2.96, mode=23) ranging from 17 to 30 years; the majority were female (112 or 53.1%) and the large majority were single (205 or 96.2%).

Confirmatory factor analysis: For this study, the previously proposed, 2-factor model of PMI responses was assessed with confirmatory factor analyses (CFA) using AMOS 16. A first finding of note is that each item loads significantly upon its a priori factor (i.e., all item *t values* > |1.96|) with no items loading across factors (i.e., no complex items). Of further note is the magnitude of standardized item coefficients, the smallest being .59, each well above a minimum value of .30⁵. In addition, a coefficient of $r = 0.54$ between *Psychological Sensitivity* and *Psychological Abilities* suggests that these factors tap related but not redundant constructs (Figure 1)

After correction for correlation between 1 of 36 error term pairs, goodness-of-fit indices for this CFA model are within ideal parameters, $\chi^2(df 18) = 38.33, p < .01$. In accord with the threshold values proposed by Hu and Bentler⁶, the Adjusted Goodness-of-Fit Index is greater than .90 (i.e., AGFI = .92) and the Comparative Fit Index is greater than .95 (i.e., CFI = .97). Also of note, the Standardized Root Mean Residual for this model is less than .05 (i.e., SRMR = .0487). These goodness-of-fit indices should be interpreted somewhat cautiously, however, as statistical power for this model is less than ideal.

Discussion and conclusions

Results of this confirmatory factor analytic study provide further support for the 2-factor model of responses. These findings are in accord with our previously reported exploratory factor analyses⁴ and those of Ireton and Sherman². Perceived psychological abilities and psychological sensitivity factors appear applicable to this student version similar to the original English language format developed for use with physicians. Consistency between language formats (Hebrew/English), time (initial development and now) and career stage (physicians/students) suggests the existence of common abilities that transcend languages, age and professional development. This implies that the scale would have similar meanings in other languages. Overall, we contend that the PMI-S can be used to evaluate educational programs or courses aimed at improving the psychosocial abilities and competence of medical students.



Cells contain the items representing the two factors of the PMI-S.

Note. Parameters expressed as maximum likelihood estimates (standardized solution). Asterisks (*) denote parameters initially fixed to 1.0 for scaling and statistical identification, thus, significance levels cannot be computed for these four items. Parenthetical numbers indicate significance levels for parameter estimates (statistically significant t values > | 1.96 |).

Figure 1: Confirmatory Factor Analytic Model for the Psychological Medicine Inventory - Student (PMI-S) (n = 213)



However, various limitations of the study need to be acknowledged. Although the sample size exceeded the minimum required for conducting confirmatory factor analysis⁷, statistical power for the CFA model was less than ideal. In addition, participants were recruited from one medical school. Future research should be undertaken in other language formats to replicate these findings with larger samples sizes derived from multiple medical programs.

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