EVALUATING THE CONSTRUCT VALIDITY OF WORK COMMITMENT MEASURES

A Confirmatory Factor Model

CAROLINE A. GAITHER
University of Michigan

A detailed description of the use of confirmatory factor analysis when evaluating the construct validity of work commitment measures is provided. Using a random sample of 841 licensed pharmacists, evidence for the convergent and discriminant validity of the measures of career commitment, organizational commitment, career withdrawal intention, and job withdrawal intention was obtained. The factor loadings, error variances, and fit indices all indicated an adequate fit. The psychometric properties of each scale indicated that the scale items had high reliabilities. The results of these analyses indicate that confirmatory factor analysis provides an alternative to exploratory analyses when determining the construct validity of work commitment concept measures. Continued use of these scales is recommended in other professional groups so that these results may be replicated.

AUTHOR'S NOTE: Funding for this project was provided by the Department of Pharmacy Practice, Purdue University, and the Walgreen Company. The author would like to thank Richard P. Bagozzi for helpful comments on earlier drafts of this manuscript. Requests for reprints should be sent to Caroline A. Gaither, Ph.D., College of Pharmacy, University of Michigan, 428 Church Street, Ann Arbor, MI 48109-1065.

EVALUATION & THE HEALTH PROFESSIONS, Vol. 16 No. 4, December 1993 417-433

The work commitment of professionals has received much attention in recent years (Lachman & Aranya, 1986a, 1986b; Morrow & Goetz, 1988; Morrow & Wirth, 1989; Reilly & Orsak, 1991; Steffy & Jones, 1988). But many of the items that make up the scales used to measure work commitment concepts have been found to overlap with one another (Morrow, 1983). Using a modified version of the organizational commitment questionnaire (OCQ); (Porter, Steers, Mowday, & Boulian, 1974) in which the word *profession* was substituted for the word *organization*, Morrow and Wirth (1989) found that the measures in this scale did not overlap with other measures of work commitment. But these researchers also concluded that further refinement was necessary in the measurement of this concept. Further refinement of the measurement of professional commitment may be found in the career commitment concept forwarded by Blau (1985). Through the use of principal components factor analysis, Blau (1985, 1988, 1989) found career commitment to be distinct from other forms of work commitment, such as job involvement and organizational commitment.

The distinctiveness of work commitment measures falls under the rubric of construct validity. Construct validity can be defined as the extent to which an operationalization measures the concept it is supposed to measure (Cook & Campbell, 1979). Central to the notion of construct validity is convergent and discriminant validity. Convergent validity is the degree to which the information obtained from multiple measures of a construct indicates the same or a similar meaning of the construct (Campbell & Fiske, 1959). Discriminant validity is the degree to which measures of different concepts are distinct (Campbell & Fiske, 1959).

The construct validity of measures has typically been shown by examining a matrix of correlations using Campbell and Fiske's (1959) multitrait, multimethod matrix (MTMM). Two important limitations exist when using this method. First, specific guidelines are not available for evaluation of the matrices; because only rules of thumb are given, it is difficult to ascertain what is an adequate matrix (Bagozzi, Yi, & Phillips, 1991). Second, measurement error is not taken into account using the MTMM.

How big a problem is measurement error? In an investigation of 70 construct validation studies, Cote and Buckley (1987) found that 64% of the variation in attitude measures could be accounted for by measurement error. Measurement error is of two types: random and systematic. Random error is error which is due to chance and is inherent in all measures to some degree. Systematic error is nonrandom error that causes bias in a systematic fashion and is directly related to the validity of a measurement instrument. Random error is inversely related to the degree of reliability of a measurement instrument. Reliability is the accuracy or precision of a measuring instrument (Lord & Novick, 1968). One must be able to obtain reliable measures if one is to perform and interpret valid tests of a theory.

In regards to work commitment measures—the exception being the OCQ—little effort has been directed toward the development and psychometric evaluation of these measures (Randall & Cote, 1991). Much of the information available on the reliability and validity of these measures has involved the use of exploratory factor analysis and the MTMM. Jöreskog (1978) indicated that these methods can be useful in the early stages of measurement development, but as more knowledge is gained about the nature of social and psychological measurements, exploratory factor analysis may not be as useful. Relationships that have been suggested by exploratory procedures should subsequently be confirmed or disproved by obtaining new data and subjecting it to more rigorous statistical techniques, such as structural equation models (Jöreskog & Sörbom, 1989).

STRUCTURAL EQUATION MODELS AND CONFIRMATORY FACTOR ANALYSIS

Structural equation models consist of two parts: the measurement model and the structural model. A maximum likelihood estimation method estimates the model parameters based on the sample variance-covariance or correlation matrix (Jöreskog & Sörbom, 1989). The measurement model, also called confirmatory factor analysis (CFA), examines the linear relationships between the observed variables

(indicators) and unobserved (latent) variables and the relations among unobserved variables. The structural model examines the causal relationships among the latent variables. The unobserved variables or latent variables are not directly measured but inferred from the observed variables. The observed variables are the items used on a scale to measure the construct. Latent variables are similar to the factors that are obtained from exploratory factor analysis. The major difference is that the interpretation of latent variables is more precise. The precision stemming from CFA comes about because specific hypotheses are required and empirical analyses yield parameters confirming or disconfirming the hypotheses. With CFA the researcher must specify the number of factors, the number of observed variables, the variances and covariances among the factors, the relationships among the observed variables and latent factors, and the variances and covariances among the errors. In exploratory factor analysis, most of these aspects of model specification are left to interpretation after the fact and can be ambiguous and misleading.

One of the most widely used approaches to CFA is the use of LISREL (Jöreskog & Sörbom, 1989). It provides a more rigorous method of evaluating construct validity than the MTMM (Anderson & Gerbing, 1988; Bagozzi, 1980; Fornell & Larcker, 1981). The factor loadings, chi-square goodness-of-fit (X^2, *df*), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI) and the root mean square residual (RMR) obtained from LISREL analyses provide an indication of the degree of convergent validity of measures. The correlations among the latent variables, which have been corrected for measurement error, can be used to determine discriminant validity.

THEORETICAL RATIONALE

The relationship between career and organizational commitment has been characterized in several ways. Researchers have argued that professionals cannot be simultaneously committed to both the profession and the organization (Gouldner, 1957; Thornton, 1970). Other researchers have argued that organizations which facilitate profes-

sional goals can enhance the congruence of these two commitments (Bartol, 1979; Lachman & Aranya, 1986a).

Organizational commitment and career commitment have been found to affect other forms of work commitment, such as intention to leave the organization (job withdrawal intention) (Bartol, 1979; Blau, 1989; Price & Mueller, 1986). It follows that intention to leave a professional career (career withdrawal intention) should also be affected by career and organizational commitment. Correlational analyses of these relationships indicated that career commitment was more highly correlated with career withdrawal intention than with job withdrawal intention (Blau, 1985, 1988). In a similar fashion, organizational commitment was more highly correlated with job withdrawal intention than with career withdrawal intention (Blau, 1985, 1988). Further investigation of the causal relationships among these variables found a strong direct effect of career commitment on career withdrawal intention and a strong direct effect of organizational commitment on job withdrawal intention (Gaither & Mason, 1992).

Many of the above studies have used exploratory analyses to determine the reliability and validity of the measures used to operationalize the constructs. Although this is useful, researchers should also consider submitting their measures to more rigorous techniques such as CFA. This method is not without its drawbacks in the sense that the mathematics involved are quite complex. Discussions of the mathematics involved can be found in several reviews (Anderson & Gerbing, 1988; Bagozzi, 1980). An explanation of how to use CFA, which draws together tests of reliability and validity from a variety of research areas, should help increase its use when evaluating the construct validity and psychometric properties of measures used in organizational research.

Therefore, the purpose of this article is to illustrate the use of CFA when evaluating the construct validity of several work commitment measures. Figure 1 depicts the confirmatory factor model used in this analysis. The circles represent the latent variables; the boxes, indicators. Each indicator is designated by an x and the error variance associated with each indicator is represented by an e. The arrows extending from the latent variables to the indicators represent the

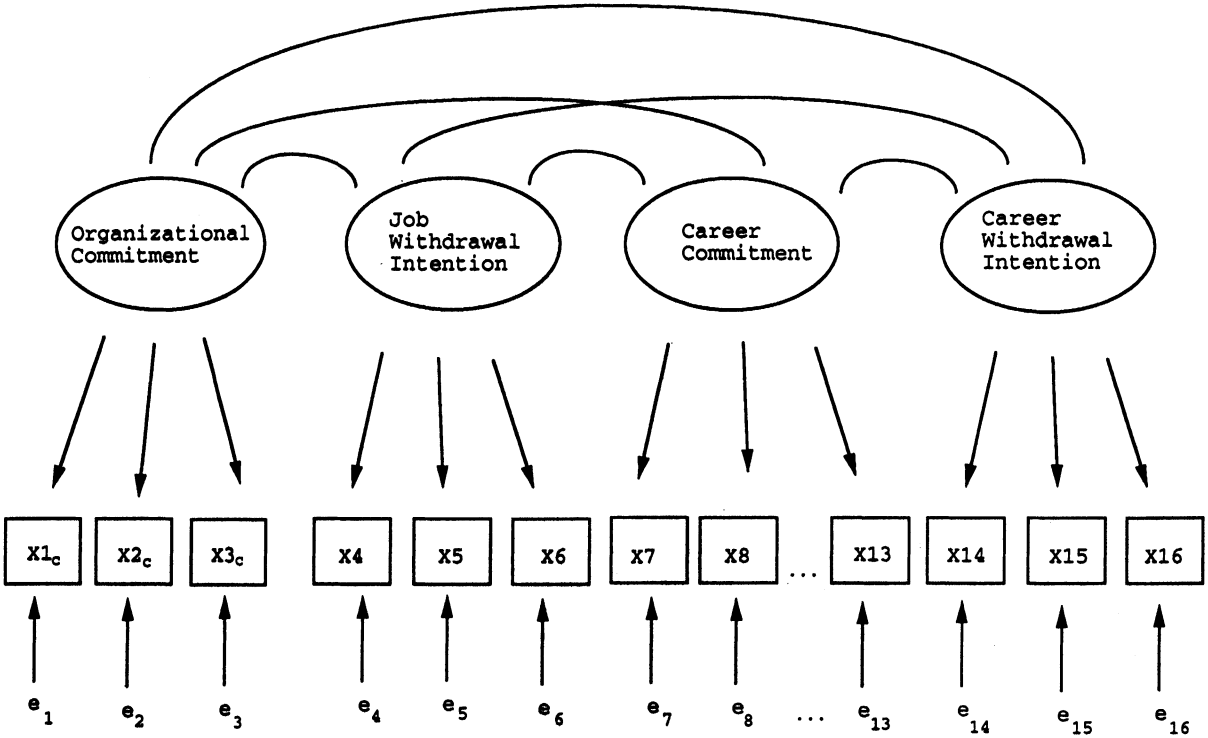

Figure 1: Confirmatory Factor Model

factor loadings. The correlations among the latent variables are represented by the curved lines.

METHODS

SUBJECTS AND PROCEDURES

The subjects for these analyses were taken from a study conducted on the career commitment, career withdrawal intention, organizational commitment, and job withdrawal intention of a nationwide random sample of individuals who held a license to practice pharmacy in the United States (James, 1991). An eight-page mail questionnaire that contained measures for the above constructs and other demographic questions was sent to 2,400 pharmacists. Fifteen hundred pharmacists returned the survey. Because the respondents worked in a variety of settings, it was decided to examine only those respondents who indicated full-time employment in either retail or hospital pharmacies (the most common employment sites). This provided for greater homogeneity in the data when examining construct validity. The above group comprised 940 pharmacists; 74% of the respondents were male, and 81% were married. Respondents had a mean age of 43.0 years (±11.2), had practiced pharmacy a mean of 18.1 years (±11.0), and had been with their current employer a mean of 9.9 years (±8.8).

MEASURES

Career commitment. Career commitment was defined as one's attitude toward one's profession or vocation and was measured using the seven-item scale developed by Blau (1988). Responses to each item were recorded on a 5-point *strongly agree* to *strongly disagree* scale and were used as indicators of career commitment. This scale has been used with a wide range of occupational groups such as nurses, insurance salesmen, and bank tellers, with coefficient alphas ranging from .83 to .87 (Blau, 1988, 1989; Reilly & Orsak, 1991).

Career withdrawal intention. Career withdrawal intention was defined as thinking about leaving the profession, staying in the pro-

fession for some time, and actually searching for a new profession (Blau, 1985). A modified version of the scale developed by Blau (1985) was used as three indicators of career withdrawal intention. These items were randomly placed among the career commitment items and therefore had the same response format.

Organizational commitment. Organizational commitment was defined as the willingness to exert considerable effort on behalf of the organization, a strong belief in and an acceptance of the organization's goals, and the desire to maintain membership in the organization (Porter et al., 1974). The organizational commitment questionnaire (OCQ) developed by Porter et al. (1974) was used to examine organizational commitment. The 15-item OCQ has a 7-point Likert-type response format (1 = *strongly disagree* to 7 = *strongly agree*). The OCQ has been found to be distinct from other forms of work commitment (Morrow & McElroy, 1986), with coefficient alphas ranging from .82 to .90 (Porter et al., 1974). For this analysis, three 5-item indicators were formed to represent organizational commitment.

Job withdrawal intention. Job withdrawal intention was defined as thinking about leaving the current job, searching for another job, and the likelihood of actually leaving the current job (Mobley, Horner, & Hollingsworth, 1978). A three-item scale was developed based on studies done by Blau (1985) and Mobley et al. (1978), and these three items were used as indicators of job withdrawal intention. A response format of 7 = *very unlikely* to 1 = *very likely* was used for this scale.

DATA ANALYSIS

Using a listwise deletion of missing variables, 841 cases were included in the final analyses. The intercorrelation matrix indicated that all of the measures were significantly related to one another at $p < .01$, and the relationships were in the appropriate direction (see Table 1). This matrix was used as input data for the LISREL7 computer program (Jöreskog & Sörbom, 1989). Factor loadings, error variances, indicator reliabilities, factor intercorrelations, standard errors, X^2, RMR, GFI, and AGFI were obtained from the program output. The composite reliabilities, percent of variance extracted, and overall

TABLE 1

Intercorrelation Matrix Among Items

	X1c	*X2c*	*X3c*	*X4*	*X5*	*X6*	*X7*	*X8*	*X9*	*X10*	*X11*	*X12*	*X13*	*X14*	*X15*	*X16*
X1c	1															
X2c	.82	1														
X3c	.80	.86	1													
X4	–.52	–.56	–.60	1												
X5	–.51	–.57	–.63	.79	1											
X6	–.44	–.49	–.54	.78	.79	1										
X7	.24	.30	.34	–.25	–.30	–.24	1									
X8	.23	.26	.29	–.18	–.22	–.18	.64	1								
X9	.24	.25	.28	–.17	–.19	–.15	.46	.44	1							
X10	.28	.31	.34	–.24	–.25	–.20	.65	.66	.64	1						
X11	.26	.30	.33	–.22	–.26	–.22	.62	.66	.46	.64	1					
X12	.20	.26	.27	–.15	–.21	–.18	.65	.72	.43	.64	.74	1				
X13	.32	.33	.35	–.25	–.25	–.22	.62	.69	.53	.70	.64	.68	1			
X14	–.24	–.30	–.34	.32	.35	.32	–.55	–.46	–.41	–.55	–.51	–.45	–.49	1		
X15	–.24	–.29	–.33	.30	.35	.31	–.55	–.49	–.40	–.55	–.54	–.48	–.52	.76	1	
X16	–.21	–.27	–.30	.27	.29	.28	–.47	–.43	–.42	–.52	–.46	–.42	–.46	.61	.60	1

NOTE: X1c = Put in great deal of effort, Talk up organization (org.), Feel little loyalty, Accept any type of job assignment, Values similar to org.; X2c = Proud to be member, Could work for different org., Org. inspires best job performance, Take very little to leave org., Glad I chose this org.; X3c = Not much gained by staying, Difficult to agree with org. policies, Really care about fate of org., Best org. to work for, Definite mistake working for this org.; X4 = Think about leaving current employer; X5 = Will search for another employer within next year; X6 = Will actually leave current employer; X7 = Go into different profession (prof.) if paid same; X8 = Want career in pharmacy again; X9 = Had all the money I needed, would still work in prof.; X10 = Like prof. too well to give up; X11 = Disappointed I ever entered prof.; X12 = Do over, would not work in pharmacy; X13 = Ideal prof. for life's work; X14 = Thinking about leaving pharmacy; X15 = Intend to look for different prof.; X16 = Intend to stay in pharmacy for some time.

indices of fit for the model were calculated. A significance level of .05 was used in all analyses.

RESULTS

Bagozzi and Yi (1988) stated that negative error variances, factor correlations greater than one, and extremely large parameter estimates indicate model misspecification. None of the above were found for this model. The convergent validity of the model was then examined.

The factor loadings can be used to determine the degree of convergent validity among the measures. Weak evidence for convergent validity results when the factor loadings on a measure are statistically significant (Bagozzi & Yi, 1991). A significant factor loading is at least twice its standard error. Stronger evidence is provided when each of the factor loadings is at least .50 (Bagozzi & Yi, 1991). As shown in Table 2, each of the factor loadings was statistically significant and was found to be greater than .50. In addition, all of the error variances were found to be statistically significant. The presence of nonsignificant error variances suggests model specification problems, because a small amount of residual variance may be expected with social science data (Maxwell, 1977).

In assessing the psychometric properties of the measures, the indicator and composite reliabilities and the variance extracted were calculated (Table 2). The indicator reliability is found by squaring each of the factor loadings. The lowest indicator reliability was found for X9 (.376). The composite reliability assesses the internal consistency of a scale and is similar to Cronbach's alpha. For standardized parameter estimates, it is calculated by dividing the squared sum of the factor loadings by the squared sum of the factor loadings plus the sum of the error variances (Werts, Linn, & Jöreskog, 1974). For example, the composite reliability for career commitment was calculated as follows: $5.50^2/(5.50^2 + 2.65) = .92$. Values of $\geq .60$ are considered adequate (Bagozzi & Yi, 1988). The composite reliabilities for the latent variables ranged from .86 to .94. Fornell and Larcker (1981) defined the variance extracted as the amount of variance represented by the construct in relation to the amount due to random error; values

TABLE 2
Factor Loadings, Error Variances, Reliabilities and Percentage of Variance Extracted From the Latent Variables

	Latent Variable	*Factor Loadings*[a]	*Error Variances*[a]	*Indicator/ Composite Reliabilities*	*Variance Extracted*
Organizational commitment				.935	.827
	$X1_c$	.868 (.028)	.247 (.015)	.753	
	$X2_c$	.929 (.027)	.137 (.012)	.863	
	$X3_c$	.930 (.027)	.136 (.012)	.865	
Job withdrawal intention				.917	.786
	X4	.885 (.028)	.217 (.016)	.783	
	X5	.903 (.027)	.184 (.015)	.815	
	X6	.871 (.028)	.241 (.016)	.759	
Career commitment				.920	.622
	X7	.781 (.029)	.391 (.022)	.610	
	X8	.816 (.029)	.333 (.019)	.666	
	X9	.613 (.032)	.624 (.032)	.376	
	X10	.829 (.029)	.313 (.018)	.687	
	X11	.809 (.029)	.346 (.020)	.655	
	X12	.826 (.029)	.317 (.018)	.682	
	X13	.824 (.029)	.321 (.019)	.679	
Career withdrawal intention				.857	.669
	X14	.864 (.029)	.253 (.020)	.747	
	X15	.869 (.029)	.244 (.020)	.756	
	X16	.710 (.031)	.497 (.028)	.504	

NOTE: $X1_c$ = Put in great deal of effort, Talk up organization (org.), Feel little loyalty, Accept any type of job assignment, Values similar to org.; $X2_c$ = Proud to be member, Could work for different org., Org. inspires best job performance, Take very little to leave org., Glad I chose this org.; $X3_c$ = Not much gained by staying, Difficult to agree with org. policies, Really care about fate of org., Best org. to work for, Definite mistake working for this org.; X4 = Think about leaving current employer; X5 = Will search for another employer within next year; X6 = Will actually leave current employer; X7 = Go into different profession (prof.) if paid same; X8 = Want career in pharmacy again; X9 = Had all the money I needed, would still work in prof.; X10 = Like prof. too well to give up; X11 = Disappointed I ever entered prof.; X12 = Do over, would not work in pharmacy; X13 = Ideal prof. for life's work; X14 = Thinking about leaving pharmacy; X15 = Intend to look for different prof.; X16 = Intend to stay in pharmacy for some time.
a. Standard errors are in parentheses.

≥ .50 are considered adequate. It is calculated by dividing the sum of each squared factor loading by the sum of each squared factor loading plus the sum of the error variances. The value for career commitment

was calculated as follows: 4.36/(4.36 + 2.65) = .62. The variance extracted by the latent variables ranged from .62 to .83.

DISCRIMINANT VALIDITY

Discriminant validity is determined by examining the factor correlation matrix. It can be demonstrated when each correlation is less than 1.0 by an amount greater than twice its respective standard error (Bagozzi & Warshaw, 1990). As shown in Table 3, this was demonstrated for each correlation. Therefore, discriminant validity was achieved among these measures.

The chi-square (X^2) statistic, the stand-alone indices (GFI and AGFI), and the RMR can be used to test the fit of the overall model. The chi-square statistic tests the null hypothesis, which states that the proposed model fits the data and that there is no significant difference between the observed sample covariance or correlation matrix and the implied matrix reproduced by the hypothesized model. Failure to reject the proposed model ($p > .05$) suggests that the data fit the model. The GFI and AGFI are measures of the relative amount of variance jointly accounted for by the model and are thought to be relatively independent of sample size; a value closer to one indicates a good fit (Marsh, Balla, & McDonald, 1988). The RMR indicates the average of the residual variances and covariances and can be used to compare the fits of different models to the same data. As the RMR approaches zero, the better the fit. As shown in Table 3, the GFI was .936 and the AGFI was .911 for the CFA model. The RMR for the CFA model was .035.

Taken together, the above results indicate a relatively good fit for the CFA model, with the exception of the highly significant chi-square. Chi-square, however, is sensitive to large sample sizes. As the sample size increases, it is easier to detect trivial discrepancies between the observed covariance or correlation matrix and the implied matrix (Bagozzi & Yi, 1988). This in turn leads to the rejection of a true model.

Another index that is commonly used to determine the fit of the overall model is the X^2 divided by *df* ratio (Jöreskog, 1969). Values between 2 and 3 have been recommended, but these values are misleading because this ratio is also affected by sample size (Marsh

TABLE 3
Factor Intercorrelation Matrix and Overall Fit Indices

	1	*2*	*3*	*4*
1. Organizational commitment	1			
2. Job withdrawal intention	−.68	1		
	(.02)			
3. Career commitment	.40	−.31	1	
	(.03)	(.03)		
4. Career withdrawal intention	−.38	.43	−.74	
	(.03)	(.03)	(.02)	1

Model	X^2	df	*GFI*	*AGFI*	*RMR*	*NCNFI*	*TLI*	*NCTLI*
CFA	423.52[a]	98	.936	.911	.035	.968	.961	.972
Null	10368.64[a]	120	.241	.139	.431	.000	.000	.000

NOTE: Standard errors are in parentheses. GFI = Goodness-of-fit index; AGFI = Adjusted goodness-of-fit index; RMR = Root mean square residual; NCNFI = Noncentralized normed fit index; TLI = Tucker-Lewis index; NCTLI = Noncentralized TLI.
a. $p < .0001$.

et al., 1988). The larger the sample size, the greater likelihood of obtaining a large value. The X^2/df ratio for the CFA model was 4.32.

One way to overcome the sample size problem is by calculating the incremental fit indices that are derived from the comparison of chi-square values of the model of interest and the null model (Bentler & Bonett, 1980; Mulaik et al., 1989). The null model estimates the error variances, with all the other parameters constrained to 0 or 1. The null model is the worst possible model as indicated by its large chi-square and provides a baseline in which other models can be compared (Table 3). Over 30 incremental fit indices have been developed to test the adequacy of nested models, but many have been found to be affected by sample size (Marsh et al., 1988; McDonald & Marsh, 1990; Mulaik et al., 1989).

The noncentralized normed fit index (NCNFI), also called the normed comparative index (Bentler, 1990) or the relative noncentrality index (McDonald & Marsh, 1990), was developed to remove any bias due to sample size by subtracting out the degrees of freedom. Another index that has been recommended for use is the Tucker-Lewis

index (TLI) (Tucker & Lewis, 1973). This index may be unstable in small samples; therefore, one may use the noncentralized Tucker-Lewis index (NCTLI), which has been found to be stable in finite samples (McDonald & Marsh, 1990). A value less than .90 for any of these indices indicates that the model can be improved substantially with modifications.

Based on the above indices, the CFA model seems to fit the data quite well (Table 3). Each of the incremental fit indices was above .90. The large sample size may well have had an effect on the chi-square value and was the cause for the rejection of the CFA model.

DISCUSSION

The purpose of this article was to illustrate the use of confirmatory analysis when evaluating the construct validity of several work commitment measures (organizational commitment, career commitment, career withdrawal intention, and job withdrawal intention). The factor loadings and error variances were all statistically significant, and the small standard errors provided evidence for convergent validity. The factor intercorrelations provided evidence for the distinctiveness of the latent variables. When similar methods are used to measure a construct (i.e., self-reported response), common method variance may inflate the correlations among the measures and make discriminant validity harder to achieve (Bagozzi, 1993). If evidence is found for the discriminant validity of these measures using the factor correlations (as it was in this case), a stronger test is provided than the traditional analysis of the correlation matrix and when using maximally dissimilar methods. The composite reliabilities and variance extracted were within recommended values. Even though the chi-square statistic was highly significant, the stand-alone and incremental fit indices indicated that the model fit the data quite well. The significant chi-square may have been due to the large sample size.

Even though evidence is provided for the construct validity of the measures, improvements should still be considered for the individual items that compose the scales. One item each in the career commitment scale and the career withdrawal intention scale had higher error

variances and lower factor loadings than the other items in the respective scales. It could be that these items may not be tapping the commitment or withdrawal intention of pharmacists. These items may have a different meaning to pharmacists than to other professionals. These analyses should be performed in other professional groups to determine the generalizability of the findings reported here.

Another recommendation is also in order. The findings of these analyses are limited in the sense that only one method was used to measure these constructs. There was no way to determine the influence of method effects. A stronger test of the construct validity of measures can be conducted when several different methods are used to obtain information about the constructs (Schmitt & Stults, 1986; Widaman, 1985). It is recommended that whenever possible, several methods should be used when measuring work commitment concepts.

Even given the above limitations, the findings suggest continued use of these scales in the measurement of the work commitment and withdrawal intentions of professionals. CFA is a useful method for determining the construct validity of these measures and provides an alternative to use of MTMM and factor analysis. It should be noted that these methods are only a guide, and good theory is the most important element of construct validity. Without it, these methods are just powerful statistical tools that will not provide a substantive interpretation of the data to which they were applied.

REFERENCES

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411-423.

Bagozzi, R. P. (1980). *Causal models in marketing*. New York: Wiley.

Bagozzi, R. P. (1993). Assessing construct validity in personality research: Applications to measures of self-esteem. *Journal of Research in Personality, 27*, 49-87.

Bagozzi, R. P., & Warshaw, P. R. (1990). Trying to consume. *Journal of Consumer Research, 17*, 1-14.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science, 16*, 74-94.

Bagozzi, R. P., & Yi, Y. (1991). Multitrait-multimethod matrices in consumer research. *Journal of Consumer Research, 17*, 426-439.

Bagozzi, R. P., Yi, Y., & Phillips, L. W. (1991). Assessing construct validity in organizational research. *Administrative Science Quarterly, 36*, 421-458.

Bartol, K. M. (1979). Professionalism as a predictor of organizational commitment, role stress and turnover: A multidimensional approach. *Academy of Management Journal, 22*, 815-821.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*, 238-246.

Bentler, P., & Bonett, D. G. (1980). Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588-606.

Blau, G. J. (1985). The measurement and prediction of career commitment. *Journal of Occupational Psychology, 58*, 277-288.

Blau, G. J. (1988). Further exploring the meaning and measurement of career commitment. *Journal of Vocational Behavior, 32*, 284-297.

Blau, G. J. (1989). Testing the generalizability of a career commitment measure and its impact on employee turnover. *Journal of Vocational Behavior, 35*, 88-103.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*, 81-105.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Chicago: Rand McNally.

Cote, J. A., & Buckley, M. R. (1987). Estimating trait, method and error variance: Generalizing across 70 construct validation studies. *Journal of Marketing Research, 24*, 315-318.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with observable variables and measurement error. *Journal of Marketing Research, 18*, 39-50.

Gaither, C. A., & Mason, H. L. (1992). A model of pharmacists' career commitment, organizational commitment and career and job withdrawal intentions. *Journal of Social & Administrative Pharmacy, 9*, 75-86.

Gouldner, A. V. (1957). Cosmopolitans and locals: Toward an analysis of latent social roles—I. *Administrative Science Quarterly, 2*, 281-306.

James, C. A. (1991). Career commitment among pharmacists: Its effect on career withdrawal intention, organizational commitment and job withdrawal intention. *Dissertation Abstracts International, 51*, 4799B.

Jöreskog, K. G. (1969). A general approach to confirmatory maximum likelihood factor analysis. *Psychometrika, 34*, 183-202.

Jöreskog, K. G. (1978). Structural analysis of covariance and correlation matrices. *Psychometrika, 43*, 443-477.

Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications* (2nd ed.). Chicago: SPSS.

Lachman, R., & Aranya, N. (1986a). Evaluation of alternative models of commitments and job attitudes of professionals. *Journal of Occupational Behavior, 7*, 227-243.

Lachman, R., & Aranya, N. (1986b). Job attitudes and turnover intentions among professionals in different work settings. *Organization Studies, 7*, 279-293.

Lord, F. M., & Novick, M. R. (1968). *Statistical theories of mental test scores*. Reading, MA: Addison-Wesley.

Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin, 103*, 391-410.

Maxwell, A. E. (1977). *Multivariate analysis in behavioral research*. London: Chapman & Hall.

McDonald, R. P., & Marsh, H. W. (1990). Choosing a multivariate model: Non-centrality and goodness-of-fit. *Psychological Bulletin, 107*, 247-255.

Mobley, W., Horner, S., & Hollingsworth, A. (1978). An evaluation of precursors of hospital employee turnover. *Journal of Applied Psychology, 63*, 408-414.

Morrow, P. C. (1983). Concept redundancy in organizational research: The case of work commitment. *Academy of Management Review, 8*, 486-500.

Morrow, P. C., & Goetz, J. F. (1988). Professionalism as a form of work commitment. *Journal of Vocational Behavior, 32*, 92-111.

Morrow, P. C., & McElroy, J. C. (1986). On assessing measures of work commitment. *Journal of Occupational Behaviour, 7*, 139-145.

Morrow, P. C., & Wirth, R. E. (1989). Work commitment among salaried professionals. *Journal of Vocational Behavior, 34*, 40-56.

Mulaik, S. A., James, L. R., Van Alstine, J., Bennett, N., Lind, S., & Stilwell, C. D. (1989). Evaluation of goodness-of-fit indices for structural equation models. *Psychological Bulletin, 105*, 430-445.

Porter, L. W., Steers, R. M., Mowday, R. T., & Boulian, P. V. (1974). Organizational commitment, job satisfaction and turnover among psychiatric technicians. *Journal of Applied Psychology, 59*, 603-609.

Price, J. L., & Mueller, C. W. (1986). *Absenteeism and turnover of hospital employees*. Greenwich, CT: JAI.

Randall, D. M., & Cote, J. A. (1991). Interrelationships of work commitment constructs. *Work and Occupations, 18*, 194-211.

Reilly, N. P., & Orsak, C. L. (1991). A career stage analysis of career and organizational commitment in nursing. *Journal of Vocational Behavior, 39*, 311-330.

Schmitt, N., & Stults, D. M. (1986). Methodology review: Analysis of multitrait-multimethod matrices. *Applied Psychological Measurement, 10*, 1-22.

Steffy, B. D., & Jones, J. W. (1988). The impact of family and career planning variables on the organizational, career and community commitment of professional women. *Journal of Vocational Behavior, 32*, 196-212.

Thornton, R. (1970). Organizational involvement and commitment to the organization and the profession. *Administrative Science Quarterly, 15*, 417-426.

Tucker, L. R., & Lewis, C. (1973). The reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*, 1-10.

Werts, C. E., Linn, R. L., & Jöreskog, K. G. (1974). Interclass reliability estimates: Testing structural assumptions. *Educational and Psychological Measurement, 34*, 25-33.

Widaman, K. F. (1985). Hierarchically nested covariance structure models for multitrait-multimethod data. *Applied Psychological Measurement, 9*, 1-26.