Leagues of Organizational Justice: Factorial Invariance Across Gender and College Union Status

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Justice is an important issue undergirding much of human relations and organizational justice and is an important antecedent to organizational change and work outcomes. Although substantive analyses have investigated differences across gender and union status concerning organizational justice constructs, scholars have failed to understand the potential measurement error associated with these measures and constructs, and as such assume that differences between groups represent true group differences and not differential psychometric functioning. The current study examined the factorial invariance of a second-order factor structure for organizational justice among chiropractic faculty predominately working within chiropractic colleges in the United States using an online survey. The study achieved a 50% response rate, yielding a robust sample. Study results indicated a good fitted configural model for gender, with strong measurement invariance across men and women. Concerning college union status (i.e., union versus non-union status), an adequate to good configural model fit resulted, with strong measurement invariance between unionized and non-unionized college employees. These results indicate that the data are psychometrically sound for between group comparisons by gender and union status.

Organizational justice is an important variable within the work environment affecting human relations (Fisher, 2012) and work outcomes. Organizational justice has positively related to outcome satisfaction, rule compliance, and leader evaluation, as well as collective esteem, group commitment, and helping behaviors (Colquitt, 2001). Furthermore, the first-order justice factors interactional, procedural, and distributive justices positively related with normative organizational commitment (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002) and the conflict management style and conflict avoidance of students (Rahim, Magner, & Shapiro, 2000).

Evidence for the validity and reliability of the organizational justice latent constructs exists for both undergraduate higher education (Colquitt, 2001; Rahim et al., 2000) and business (Ambrose & Schminke, 2003; Aryee et al., 2002). Cross-validation of the second-order latent construct for organizational justice also occurred within educational institutions offering a doctor of chiropractic degree program (Weinert, 2013).

Colquitt (2001) posited a four-factor, first-order solution for organizational justice (procedural, interpersonal, informational, and distributive justice), with corresponding alpha reliabilities: 0.930, 0.920, 0.900, and 0.930, respectively. Another study posited a second-order factor structure for organizational justice (Weinert, 2013), with three first-order factors and reliabilities: procedural (0.915), interpersonal (0.934), and distributive (0.949), indicating a second-order factor reliability of 0.962[1].

Measurement Invariance Testing

Generally, measurement is the systematic assignment of values or numbers to represent the characteristics of an event, object, or person, or a series of events, objects, or persons (Vandenberg & Lance, 2000). More specifically, and within a measurement invariance (MI) framework, measurement involves the examination of latent constructs (e.g., text anxiety, motivation, etc.) that are often comprised of observable indicators (e.g., test or survey items; Dimitrov, 2010a). Although an observable indicator is a variable that is directly observed through the collection of test or survey data, a latent variable represents an unseen continuum (Dimitrov, 2010a; Dimitrov, 2012) of a grouping of observed variables.

Measurement invariance testing, then, is a process for assessing the equivalence of measures on latent variables across groups. In other words, invariance testing answers the question: do the measurements represent the same thing across groups (Dimitrov, 2010b)? For instance, is the latent construct motivation, which is indicated by several observed items, measured in a similar manner for both men and women (i.e., invariant), or do the indicators perform differently across groups (i.e., is a lack of invariance evident)? More specifically, measurement invariance addresses whether or not measurements between differing groups, or under differing conditions, present similar or different psychometric properties (Meade et al., 2008). Simply, invariance testing is an examination of the extent to which score properties and interpretations are generalizable across population groups, settings, and tasks (Messick, 1995).

Sparse research exists concerning the invariance of organizational justice. One study investigated the invariance of organizational justice across cultures different from the United States (Fisher et al., 2011). Despite an unfortunate replication of a typographical error in Cheung and Rensvold's (2002) article, expressing the criterion for invariance as ΔCFI of less than .01 (the threshold should be less than -.01, see Dimitrov, 2010 for more information), their interpretation of strong measurement invariance across 13 non-U.S. cultures appears appropriate and sound.

Purpose & Educational Significance

The purpose of this study was to examine the measurement invariance of a second-order factor structure for organizational justice to increase the practical utility of this type of data within organizational settings. As such, the current study is an extension of a prior study (Weinert, 2013) that utilized data from a cross-validation study for organizational justice.

Others have proposed the latent construct organizational justice as an important aspect of both business and educational environments. Although cross validation evidence for the construct has been established, and the construct has been used in substantive examinations (i.e., mean differences across groups) within various research studies, studies of measurement invariance for this construct are absent from the literature.

In today's fast paced business and educational marketplaces, where employers demand that employees increase productivity with shrinking resources, researchers and scholars study concepts like organizational justice to better understand how organizational dynamics impact employee productivity. Because the perceptions of and outcomes associated with organizational justice might differ between both men and women and union and non-union employees, a growing number of studies use demographic variables such as these as predictors or grouping variables to understand existing differences and effects (for instance, see Hatam, Mozhgan, & Kovasi, 2013; Mellor, Barnes-Farrell, & Stanton, 1999; Ramamoorthy & Flood, 2004; Simpson & Kaminski, 2007). Thus, when researchers find significant differences or effects, and measurement invariance is unknown, they may wrongly assume that the differences or effects are true population differences or effects instead of representative of differential psychometric functioning of the data. Assumptions like these are problematic because they can lead to increased Type I errors (i.e., accepting that a significant difference or predictor exists when, in fact, it doesn't). In this way, understanding measurement invariance for factor structures is similar to examining assumptions of homoscedasticity in t-tests, ANOVA, or regression.

Methodology

Procedures & Participants

Chiropractic faculty members, including dual workload assignments (i.e., administrators who also teach), were included within the following examination. Administration of the survey occurred online between December 2012 and January 2013 and was sent to 1003 chiropractic faculty within all U.S. chiropractic institutions and a Canadian chiropractic college. The authors received faculty lists from each institution and sent unique emails to each participant to control for non-duplicated response. This also allowed targeted reminder emails for those who did not respond. Participants could have received up to four reminder email messages.

Instrument

The instrument for the current study was developed utilizing established instruments for resistance to change (Oreg, 2003), perceptions of justice (Colquitt, 2001), trust, (Nyhan & Marlowe, 1997) and climate for innovation (Scott & Bruce, 1994). Prior research evidences construct validity for resistance to change, perception of justice, trust, and climate for innovation data (Colquitt).

Data & Demographics

The 500 responses (50% response rate) to the survey were split into two, approximately equal, random samples for EFA exploration and CFA cross-validation in the event that initial cross-validation failed to disconfirm the structure (see Weinert, 2013, for more information). In the 2013 study, the current authors found support for the use of these constructs (i.e., they failed to disconfirm the constructs in cross-validation) within a chiropractic faculty sample (Weinert). Figure 1 presents the cross-validated, second-order factor structure.
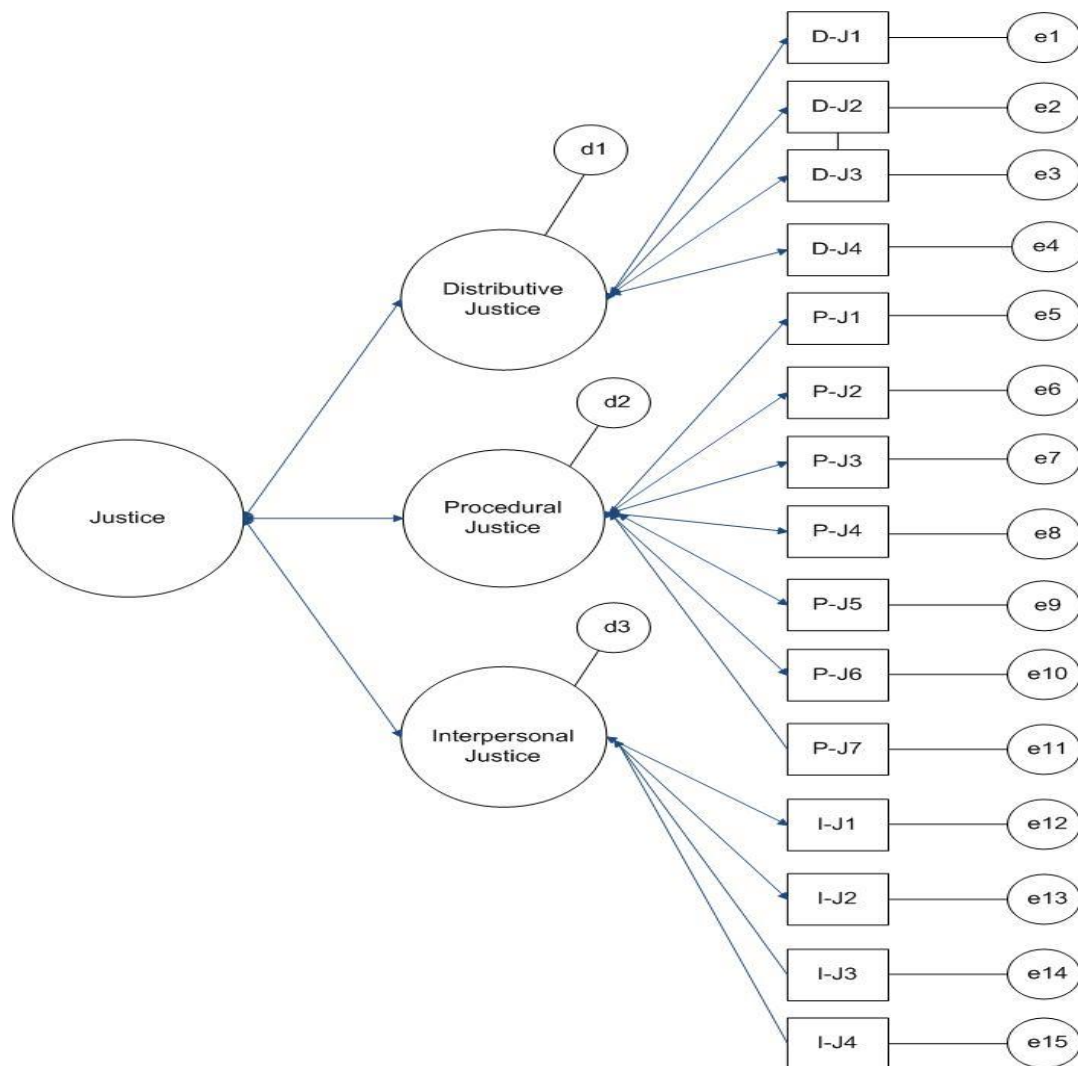
Figure 1. Second-order factor structure for justice.

The current study utilized the second random sample (n = 236). The majority of participants were above the age of 50. Males represented more than 60% of the respondents. Over 90% of the respondents were white and had doctoral-level education. A minority, 23% of respondents, belonged to a union.

Variables

The variables of interest in the current study related to organizational justice. Procedural, interpersonal and distributive justices were measured using the Dimensionality of Organizational Justice developed by Colquitt (2001). The measures for procedural justice consisted of seven questions: (1) Have you been able to express your views and feelings during those procedures? (2) Have you had influence over the (outcome) arrived at by those procedures? (3) Have those procedures been applied consistently? (4) Have those procedures been free of bias? (5) Have those procedures been based on accurate information? (6) Have you been able to appeal the (outcome) arrived at by those procedures? (7) Have those procedures upheld ethical and moral standards?

The measures for distributive (outcome) justice consisted of four questions: (1) Does your (outcome) reflect the effort you have put into your work? (2) Is your (outcome) appropriate for the work you have completed? (3) Does your (outcome) reflect what you have contributed to the organization? (4) Is your (outcome) justified, given your performance?

Finally, the measures for interpersonal justice (interaction) consisted of four questions: (1) Have the members of your administration treated you in a polite manner? (2) Have the members of your administration treated you with dignity? (3) Have the members of your administration treated you with respect? (4) Have the members of your administration refrained from improper remarks or comments?

Measurement occurred using a five-point response scale: very small extent, small extent, moderate extent, large extent, and very large extent. Respondents self-selected their membership concerning gender and union status.

Multivariate Normality, Multicollinearity, and Heteroscedasticity

Data assessment for normality occurred in a stepwise process to assess the prerequisite assumption of multivariate normality (Burdenski, 2000). This process assures a normal distribution of the data. A review of Q-Q plots and corresponding Shapiro-Wilk tests for all variables indicated the data were not univariate normally distributed. Univariate normality is a necessary condition for multivariate normality. As such, the data did not meet the assumption of multivariate normality.

Data were also tested for multicollinearity by iteratively regressing all observed variables against all other observed variables (Schroeder, 1990) within the justice framework and inspecting the variance inflation factors (VIF) for values over 10.0. None of the VIF values exceeded 10, and as such, the data did not violate the assumption of multicollinearity.

Heteroscedasticity (i.e., violations of the assumption of bivariate homogeneity of variance) could result in biased estimates that could lead to Type I error, leading the researcher to reject the null hypothesis, having detected an effect that is not actually present (i.e., accepting a false positive). Examination of heteroscedasticity for the current study occurred by comparing item residuals within MPLUS using the MLM and MLR estimators. Because the MLR estimator utilizes a "sandwich" estimator that protects against heteroscedasticity (see White, 1980 for more information), differences in residual variances across estimators would indicate the presence of heteroscedasticity. A comparison of residual variances estimated using MLM vs. MLR indicated no differences in residual variances for the justice data, thus providing evidence that the data in the current study were homoscedastic.

Data Analysis

Invariance testing within the current study conformed to that illustrated in Dimitrov (2012). Table 1 displays the invariance testing sequence and analytical comparisons. Given the non-multivariate normality of the data and because the number of categorical response categories exceeded four, robust maximum likelihood (MLM) estimation was used to estimate the models (as per the recommendations of Rhemtulla, Brosseau-Liard, & Savalei, 2012) and the Yuan-Bentler χ^2_{YB} statistic (Yuan & Bentler, 2000) computed. Model invariance was assessed using the Scaled Chi Square difference test $\Delta\chi^2_{YB}$ and the change in Comparative Fit Index (ΔCFI) model fit statistics, wherein "a negative ΔCFI lower than -.01" and/or significant $\Delta\chi^2$ "indicated a lack of model invariance" (Dimitrov, 2010b, p. 127; see also Cheung & Rensvold, 2002). In the event of model misspecification, a modification index of 10 or greater assisted in re-specifying the model.

Because the aim of this study is to increase the practical utility of this type of data within various organizational situations, the authors adhered to Dimitrov's (2012) suggestion that model modifications should involve fewer than 20% of the parameters. The authors considered several goodness-of-fit (GFI) cut point criteria to measure model fit. The first criteria used for fit of the obtained models were CFI $\geq$ .95, TLI $\geq$ .95, RMSEA $\leq$ .06, and $\leq$ .08 SRMR, which would indicate that a model has good fit (Hu & Bentler, 1999). The authors also considered GFI cut points that would indicate

Table 1. Framework for Second-Order Invariance Testing

Invariance Tested	Model	Description
Configural	--	Structural models for each group under study
Measurement Invariance	M0	without invariance
	M1	invariance first-order factor loadings
	M2	M1 + invariant second-order factor loadings
	M3	M2+ invariant item intercepts
	M4	M3 + invariant first-order factor intercepts
	M5	M4 + first-order factor disturbances
	M6	M5 + invariant item residual variances

Note. Taken from Dimitrov (2012).

Table 2. Configural Model Goodness of Fit Statistics for Organizational Justice by Gender and Union Status

									90% CI For RMSEA	
Group		χ^2_{YB}	df	p	CFI	TLI	SRMR	RMSEA	LL	UL
Gender	Men	131.863	87	0.0014	0.950	0.940	0.068	0.079	0.500	0.105
	Women	122.638	87	0.0071	0.963	0.955	0.067	0.082	0.044	0.114
Status	Union	125.989	87	0.0040	0.899	0.878	0.088	0.112	0.065	0.153
	Non-Union	168.954	87	0.0001	0.945	0.934	0.059	0.093	0.072	0.114

Note. χ^2_{YB} = Yuan-Bentler scaled χ2 statistic

reasonable model fit; CFI ≥ .90, TLI ≥ .90, RMSEA ≤ .08 (Marsh, Hau & Wen, 2004). Finally considered was an expanded view of the CFI: ≤ .85 is an inadequate fitted model, .85 to .89 is a mediocre fitted model, .90 to .95 is an adequate fitted model, .95 to .99 is a close fitted model and a CFI equal to 1.00 was an exact fitted model (Dimitrov, 2012). Data analysis occurred using Mplus 7 software.

Results

Gender Invariance

The goodness-of-fit statistics for the configural model in Table 2 indicated a reasonable to good fit of the organizational justice model for both men and women. Under gender, Model 0 (i.e., M0) in Table 3 provides another assessment of configural invariance, which indicates a good fit of the model across gender. Although the GFIs are relatively similar across groups (especially RMSEA and SRMR), examination of CFI and TLI suggests that the model may fit slightly better for women compared to men.

Concerning the invariance testing across gender, as indicated in Table 3, the organizational justice model exhibited invariant first-order factor loadings (M1) and second-order factor loadings (M2), invariant item intercepts (M3), invariant first-order factor intercepts (M4), and first-order factor disturbances (M5).

The model, however, lacked invariance of residual variances (M6), as freeing 33% (i.e., more than 20%, Dimitrov, 2010b) of the residual variances continued to indicate a significant chi square difference. Although viewed as an overly restrictive test, this indicates differential precision and reliability between men and women with regard to measurement for the structure. Table 4 reports the reliability[2] for men and women for each item and each justice construct. Although the reliability for most items and constructs was higher for women, the reliability for the second-order justice factor was higher for men. All reliabilities met the commonly accepted threshold (≥ .70) for this type of data. Overall, these results indicate that the organizational justice structure exhibited strong measurement invariance for gender.

Union Status Invariance

The goodness of fit statistics for the configural model in Table 2 indicated a mediocre to adequately fitted organizational justice model for both union and non-union members. Under union status, model 0 (i.e., M0) in Table 3 provides another assessment of configural invariance, which indicates good fit of the model across union status. The model appears to fit better for non-union personnel with CFI and TLI indicating reasonable or adequate fit, SRMR indicating good fit. For both union and non-union personnel, RMSEA indicated poor model fit.

Similar to the tests with gender, and as indicated in Table 3, the organizational justice model exhibited invariant first-order factor loadings (M1) and second-order factor loadings (M2), invariant item intercepts (M3), invariant first-order factor intercepts (M4), and first-order factor disturbances (M5).

However, the model showed a lack of invariance with regard to residual variances, as it was necessary to free more than 20% (33%) of the residual variances to achieve a nonsignificant SBS chi square difference. This indicates differential precision and reliability between union and non-union status with regard to measurement for the structure. Table 5 reports the reliability[2] for union and non-union status for each item and each justice construct. Although the reliability for most items and constructs was higher for non-union status, the reliability for the second-order justice factor was higher for union status. All reliabilities met the commonly accepted threshold (≥ .70) for this type of data. Overall, these results indicate that the organizational justice structure exhibited strong measurement invariance for union status.

Table 3. Invariance Statistics and Goodness of Fit for Organizational Justice by Gender and Union Status

Model	χ^2_{YB} [a]	df	Scaling Correction	Comparison	$\Delta\chi^2_{YB}$	Δdf	CFI	ΔCFI	RMSEA
Gender									
M0	255.743	174	1.1391	--	--	--	0.956	--	0.081
M1	269.354	186	1.1309	M1-M0	13.138	12	0.955	-0.001	0.079
M2	269.991	188	1.1307	M2-M1	0.599	2	0.956	0.001	0.078
M3	282.612	202	1.1121	M3-M2	10.453	14	0.956	0.000	0.074
M4	283.589	203	1.1121	M4-M3	0.977	1	0.956	0.000	0.074
M5	287.596	206	1.1194	M5-M4	4.063	3	0.956	0.000	0.074
M6	309.221	221	1.1644	M6-M5	21.388*	15	0.952	-0.004	0.075
M6P	301.418	216	1.1649	M6P-M5	13.884*	10	0.954	-0.002	0.074
Union Status									
M0	298.41	174	1.1198	--	--	--	0.936	--	0.099
M1	313.96	186	1.1175	M1-M0	15.395	12	0.934	-0.002	0.097
M2	316.899	188	1.1181	M2-M1	2.960	2	0.933	-0.001	0.097
M3	331.803	202	1.1109	M3-M2	14.075	14	0.933	0.000	0.094
M4	333.705	203	1.1094	M4-M3	2.000	1	0.933	0.000	0.094
M5	337.114	206	1.1058	M5-M4	2.979	3	0.932	-0.001	0.094
M6	369.068	221	1.1302	M6-M5	30.260**	15	0.924	-0.008	0.096
M6P	347.728	216	1.1112	M6P-M5	11.137	10	0.932	0.000	0.092

Note. *p< .05, ** p< .001, [a] All values significant at p < .001, Note: χ^2_{YB} = Yuan-Bentler scaled χ2 statistic, $\Delta\chi^2_{YB}$ = computed using scaling correction factor.

Discussion

Although support for strong measurement invariance for cultural invariance with non-US cultures exists for the justice structure (Fisher et al., 2011), sparse evidence exists for the measurement invariance across gender and union status. Because both gender and union status can influence how individuals perceive organizational justice, this study represents an important step in relatively uncharted waters.

The current study supports strong measurement invariance for the second-order justice factor structure for both gender and union status. These findings have potentially important implications for current and future research. First, a finding of strong measurement invariance indicates that comparisons of factor means across these groups (gender and union status) are permissible, and that the items measuring these constructs exhibit a lack of bias between members of these groups. In other words, the observed variables, and resulting factor structure, displayed small degrees of differential psychometric functioning between men and women or union and non-union status. This indicates that the instrument items are measuring, essentially, the same things across each group.

Invariance tests for both gender and union status indicated differential precision and reliability for both gender and union status. However, several seminal studies consider testing for uniqueness invariance as an "overly restrictive" data assessment (Dimitrov, 2010b, p. 128; see also Bentler, 2004; Byrne, 1988). Because of this, we deem the justice structure to be psychometrically sound for group comparisons across both gender and union status.

Study Limitations

This study consists of a convenience survey of all United States chiropractic colleges offering a doctor of chiropractic program, and a Canadian chiropractic college. Although utilizing a convenience sample increases the coverage within a study's target population, doing so can increase sampling error, which can decrease the precision of the measurements taken, and may result in data that do not completely represent the intended population. Although convenience sampling in this study may have had an unintended impact on the second-order justice factor structure within the current study, the data and factor structure for the current study show evidence of external validity support (see Weinert, 2013 for more information).

Table 4. Standardized Factor Loadings, Robust Standard Errors, Item Reliability, and Construct Reliability by Gender

	Factor Loadings				Reliability	
	Men		Women		Men	Women
	λ	SE	λ	SE		
Distributive Justice	0.622	0.087	0.569	0.121	0.95	0.99
Does your (outcome) reflect the effort you have put into your work?	0.747	0.059	0.890	0.019	0.56	0.79
Is your (outcome) appropriate for the work you have completed?	0.931	0.018	0.931	0.015	0.87	0.87
Does your (outcome) reflect what you have contributed to the organization?	0.945	0.017	0.996	0.004	0.89	0.99
Is your (outcome) justified, given your performance?	0.871	0.035	0.933	0.019	0.76	0.87
Procedural Justice	0.858	0.115	0.653	0.131	0.93	0.95
Have you been able to express your views and feelings during those procedures?	0.743	0.047	0.690	0.071	0.55	0.48
Have you had influence over the (outcome) arrived at by those procedures?	0.767	0.046	0.758	0.047	0.59	0.57
Have those procedures been applied consistently?	0.865	0.033	0.912	0.026	0.75	0.83
Have those procedures been free of bias?	0.866	0.027	0.902	0.026	0.75	0.81
Have those procedures been based on accurate information?	0.825	0.037	0.907	0.028	0.68	0.82
Have you been able to appeal the (outcome) arrived at by those procedures?	0.740	0.050	0.743	0.050	0.55	0.55
Have those procedures upheld ethical and moral standards?	0.747	0.051	0.673	0.062	0.56	0.45
Interpersonal Justice	0.653	0.074	0.803	0.128	0.96	0.97
Have the members of your administration treated you in a polite manner?	0.924	0.020	0.910	0.028	0.85	0.83
Have the members of your administration treated you with dignity?	0.958	0.013	0.981	0.012	0.92	0.96
Have the members of your administration treated you with respect?	0.947	0.017	0.926	0.030	0.90	0.86
Have the members of your administration refrained from improper remarks or comments?	0.808	0.041	0.738	0.101	0.65	0.54
JUSTICE					0.81	0.75

Note. λ = factor loading, SE = Standard Error. Item reliability calculated $\lambda^2/(\lambda^2 + \delta)$; construct reliability as $H = \left[1 + \sum_i^M \left(\lambda_i^2 \Big/ \left(1 - \lambda_i^2 \right) \right) \right]^{-1}$.

The results of this study may not be generalizable to other institutions of higher education, other types of first professional programs, or international chiropractic colleges. Although this study seeks to understand the validity of data for justice sub-scales, it does not seek to provide evidence of validity for data from other sub-scales or other parts of the survey instrument.

Future Research
Although the current study examined the measurement invariance of data for the justice factor structure across gender and union status, future studies may want to focus on examining invariance of the structure between faculty and administrative employees, as these groups often have different perspectives of the institution and organizational justice. Additionally, many studies have investigated justice with

Table 5. Standardized Factor Loadings, Robust Standard Errors, Item Reliability, and Construct Reliability by Union Status

| | Factor Loadings | | | | Reliability | |
| | Union | | Non-Union | | Union | Non-Union |
	λ	SE	λ	SE	r	r
Distributive Justice	0.515	0.203	0.611	0.086	0.97	0.96
Does your (outcome) reflect the effort you have put into your work?	0.590	0.085	0.887	0.02	0.42	0.79
Is your (outcome) appropriate for the work you have completed?	0.965	0.018	0.938	0.014	0.95	0.88
Does your (outcome) reflect what you have contributed to the organization?	0.968	0.014	0.948	0.011	0.94	0.90
Is your (outcome) justified, given your performance?	0.953	0.020	0.871	0.025	0.91	0.76
Procedural Justice	0.425	0.227	0.865	0.08	0.91	0.95
Have you been able to express your views and feelings during those procedures?	0.803	0.053	0.706	0.046	0.63	0.50
Have you had influence over the (outcome) arrived at by those procedures?	0.704	0.093	0.782	0.031	0.51	0.61
Have those procedures been applied consistently?	0.856	0.046	0.900	0.021	0.72	0.81
Have those procedures been free of bias?	0.836	0.052	0.890	0.022	0.69	0.79
Have those procedures been based on accurate information?	0.739	0.061	0.889	0.023	0.54	0.79
Have you been able to appeal the (outcome) arrived at by those procedures?	0.532	0.091	0.768	0.037	0.23	0.59
Have those procedures upheld ethical and moral standards?	0.393	0.109	0.775	0.037	0.20	0.60
Interpersonal Justice	0.969	0.308	0.670	0.086	0.92	0.98
Have the members of your administration treated you in a polite manner?	0.847	0.071	0.926	0.018	0.75	0.86
Have the members of your administration treated you with dignity?	0.921	0.026	0.979	0.008	0.87	0.96
Have the members of your administration treated you with respect?	0.860	0.054	0.947	0.018	0.73	0.90
Have the members of your administration refrained from improper remarks or comments?	0.573	0.162	0.842	0.026	0.28	0.71
JUSTICE					0.94	0.81

Note. λ = factor loading, SE = standard Error. Item reliability calculated $\lambda^2 / (\lambda^2 + \delta)$; construct reliability as $H = \left[1 + \sum_{i}^{M} \left(\lambda_i^2 \middle/ \left(1 - \lambda_i^2 \right) \right) \right]^{-1}$.

both college students and college employees. Examining the invariance of the structure between these groups may also be important given their differing perspectives. Finally, many studies involving organizational justice involve factor structures related to resistance to change, organizational trust, and climate for innovation. Understanding the measurement invariance of these structures between key constituent groups is paramount to understanding equivalency of measurement, or a lack thereof, for those groups.

Conclusion

Organizational justice is an important consideration in both organizational change and work outcomes, and underlies many aspects of human work-life relationships. The purpose of the current study was to examine the measurement invariance of an organizational justice factor structure. Results indicated support for strong measurement invariance of the structure between gender and union status, which signals that it is appropriate to make group comparisons with the data. Findings from the current study extend the existing validity evidence for data from the justice sub-scales.

When researchers and scholars examine organizational justice factors through the lenses of gender and union status, often they do so without knowing how differential psychometric functioning of the data influences their results. Although not a panacea for all psychometric ills, results from the current study augments existing validity evidence supporting the sound psychometric properties of data collected with the Dimensionality of Organizational Justice instrument, within U.S. based healthcare higher educational institutions for gender and unionized populations. To further support and extend the validity of these findings, future research should seek a better understanding of measurement invariance within other institutions of higher education in a variety of contexts and populations--in the U.S. and abroad, between students and employees, and between faculty members and administrators.

Endnotes

1. Second-order reliability derived from the following formula cited in Dimitrov, 2012:

$$1 - \left[\frac{(1-\alpha_1)Var(X_1)+(1-\alpha_2)Var(X_2)+(1-\alpha_3)Var(X_3)}{Var(X)} \right]$$

2. Item reliability was defined as: $\lambda^2 / (\lambda^2 + \delta)$, where λ is the standardized factor loading and δ is the standardized residual variance (Raykov, Dimitrov, & Asparouhov, 2010); construct reliability was defined as: $H = \left[1 + \sum_i^M \left(\lambda_i^2 \middle/ \left(1 - \lambda_i^2 \right) \right) \right]^{-1}$; where λ_i is the standardized loading for the ith of M indicator variables on a single latent construct (see Hancock & Mueller, 2001).

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