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Analysis of the Psychometric Properties of Colquitt's Organizational Justice Scale in Mining Workers

Análisis de las propiedades psicométricas de la Escala de Justicia Organizacional de Colquitt en trabajadores mineros

Análise das propriedades psicométricas da Escala de Justiça Organizacional de Colquitt em trabalhadores da indústria de mineração.

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Abstract:

This study analyzed the factor structure of Colquitt's Organizational Justice Scale using a non-experimental, cross-sectional, descriptive design with 300 workers from a Chilean mining company. The analysis included both the original four-factor model and a second-order general factor model, revealing that the latter presented a slightly better fit. Despite a generally high internal consistency, inadequate reliability was observed for the interpersonal justice subscale. Criterion validity was explored by establishing a connection between organizational justice and job satisfaction, which explained 24.4% of the variance in the latter. The results of this research significantly advance the understanding of the construct and predictive validity of the scale in a Chilean sample.

Keywords: Organizational Justice, Job Satisfaction, Confirmatory Factor Analysis, Mining Workers.

Resumen:

Este estudio analizó la estructura factorial de la Escala de Justicia Organizacional de Colquitt mediante un diseño descriptivo transversal no experimental con 300 trabajadores de una empresa minera chilena. El análisis incluyó tanto el modelo original de cuatro factores como un modelo factorial general de segundo orden, revelando que el último presentaba un ajuste ligeramente mejor. A pesar de una consistencia interna general alta, se observó una confiabilidad inadecuada para la subescala de justicia interpersonal. La validez de criterio se exploró estableciendo una conexión entre la justicia organizacional y la satisfacción laboral, explicando el 24,4% de la varianza de esta última. Los resultados de esta investigación avanzan significativamente en la comprensión del constructo y la validez predictiva de la escala en una muestra chilena.

Palabras clave: Justicia Organizacional, Satisfacción laboral, Análisis factorial Confirmatorio, Trabajadores Mineros.

Resumo:

Este estudo analisou a estrutura fatorial da Escala de Justiça Organizacional de Colquitt por meio de um desenho descritivo transversal não experimental com 300 trabalhadores de uma mineradora chilena. A análise incluiu tanto o modelo original de quatro fatores

quanto um modelo geral de fatores de segunda ordem, revelando que este último apresentou um ajuste ligeiramente melhor. Apesar da alta consistência interna geral, observou-se confiabilidade inadequada para a subescala de justiça interpessoal. A validade de critério foi explorada estabelecendo uma conexão entre justiça organizacional e satisfação no trabalho, explicando 24,4% da variância desta última. Os resultados desta pesquisa avançam significativamente na compreensão do construto e na validade preditiva da escala em uma amostra chilena.

Palavras-chave: Justiça Organizacional, Satisfação no Trabalho, Análise Fatorial Confirmatória, Trabalhadores da Mineração.

1. Introduction

In an increasingly competitive organizational environment, changes are observed, leading to full restructuring, personnel downsizing, and the use of technological advances to cope with the dynamism of an uncertain corporate climate. Those changes are associated with employees' expectations to have the same opportunities as their peers in various areas, such as professional development, procedures, compensation, or recognition, which guide a major organizational justice implementation (Bilal, Muqadas y Khalid, 2015). The importance of this construct, according to Mladinic and Isla (2002), lies in the emergence of theories that attempt to apply justice concepts to better understand organizations. In practice, several researchers have proposed organizational justice as one of the requirements for effective management (for example, Choudhry, Philip y Kumar, 2012; Pan, Chen, Hao y Bi, 2018).

Thus, organizational justice is expected to predict workers' satisfaction and their commitment to the organization, because organizational justice influences how the employees feel about their work and their workplace, and if they trust their supervisors, which in turn affects their intentions to leave (Choi, 2011).

2. Theoretical Framework and State of the Art

2.1. Definition and dimensions of organizational justice

Different definitions of organizational justice have been proposed. For Greenberg and Scott (1996), as cited in Patlán-Pérez, Martínez-Torres y Hernández-Hernández (2012), organizational justice consists of the workers' perceptions of their organization's fairness; Mladinic and Isla (2002) define it as the workers' subjective evaluations of outcomes; while for Niehoff and Moorman (1993) organizational justice is the workers' trust perceptions of the processes to decide about outcomes allocation. The present study will be based on the definition of Mladinic and Isla (2002) because it provides a more complete and updated perspective of the concept.

Currently, the theory of organizational justice has been evolving to understand its impact on organizations. Mladinic and Isla (2002) describe several types of justice dimensions, and each one of them has a different impact on the organizational processes, such as distributing resources and reinforcing or punishing behaviors, among others. For example, distributive justice would be mainly related to equity, where employees compare their contributions and what they obtain back. Procedural justice refers to procedures associated with the organization's decision-making, and it is based on the ways used to achieve a goal. Finally, interactional justice focuses on the context and quality of treatment between employees and authority figures when the latter communicate their decisions. Previous studies considering only these three dimensions have reported adequate reliability for those dimensions with α values greater than .720 in Mexican (Patlán-Pérez, Flores-Herrera, Martínez-Torres y Hernández-Hernández, 2015), Turkish (Akbolat, Isik, Yilmaz y Akca, 2015; Tan, 2014), Jordanian (Al-Zu'bi, 2010), and U.S. American (Niehoff y Moorman, 1993) samples.

On one hand, Niehoff and Moorman (1993) developed a scale composed of twenty items, including three dimensions: distributive justice (items 1-5), formal procedures (items 6-11), and interactional justice (items 12-20). In its original format, it achieved good reliability

(α values between .740 and .920) and fit with the three-factor structure (CFI = .920, and all item loadings were above .500). Those good indexes were replicated in Mexican (.730 < α < .940, CFI = .970, SRMR = .050, GFI = .960, AGFI = .950, RMSEA = .068, and all item loadings were above .600; Patlán-Pérez, Flores-Herrera, Martínez-Torres y Hernández-Hernández, 2015), Jordan (.790 < α < .820; Al-Zu'bi, 2010) and two Turkish ((.800 < α < .910, GFI = .911, AGFI = .867, NFI = .909, IFI = .951, TLI = .940, CFI = .950, RMSEA = .061, all factor loadings > .600, except one item on the distributive factor; (Akbolat, Isik, Yilmaz y Akca, 2015) and (.900 < α < .960, (CFI = .960, NFI = .930, GFI = .880, AGFI = .914, RMSEA = .070, SRMR = .034, all items loadings were above .700; Tan, 2014)) samples.

2.2. Colquitt's (2001) four-factor model

Based on the three-factor model proposed by Niehoff and Moorman (1993), recent studies have identified two specific types of interactional justice: interpersonal justice and informational justice. Including both types, Colquitt (2001) developed a four-dimensional model (procedural, distributive, interpersonal, and informational justice), which has been followed by several authors (e.g., Loli-Pineda, Llacho-Inca, Pulido-Cavero, Cerón-Valencia y Vergara-Villarino, 2022; Fischer, Ferreira, Jiang, Cheng, Achoui, Wong, Baris, Mendoza, van Meurs, Achmadi, Hassan, Zeytinoglu, Dalyan, Harb, Darwish y Assmar, 2011; Obalade y Mtembu, 2023). The interpersonal justice dimension refers to the respect and courtesy with which authorities treat workers, while the informational justice dimension focuses on the explanations provided to employees about a procedure (Mladinic y Isla, 2002).

Using interpersonal and informational justice dimensions, instead of one interactional justice component, is appropriate as it allows for finding more specific predictive paths between different types of justice and employee behaviors (Greenberg, 1993, as cited in Colquitt, 2001). On the one hand, informational justice has been related to the behavior of good communication (Greenberg, 1993, as cited in Streicher, Jonas, Maier, Frey, Woschée y Waßmer, 2008) and social exchanges with supervisors and the organization

(Roch y Shanock, 2006). On the other hand, interpersonal justice has been associated with friendly behavior (Greenberg, 1993, as cited in Streicher, Jonas, Maier, Frey, Woschée y Waßmer, 2008) and social exchanges with a supervisor but not the organization (Roch y Shanock, 2006). Thus, using four dimensions of organizational justice gives a better understanding of the factors that affect the perception of justice (Kernan y Hanges, 2002).

Colquitt (2001) developed the organizational justice scale and evaluated its fit in two studies. He found a better fit for the four-structure model in a university ($.780 < \alpha < .920$, IFI = .920; CFI = .920; RMSEA = .055; all item loading factors were above .500, except one item in procedural and informational justice factors) and employees in the automobile industry ($.900 < \alpha < .930$, IFI = .940; CFI = .940; RMSEA = .057; all the item loading factors were over .600) than the three-factor, bi-factor, and unifactor structures.

2.3. Theoretical foundations of the Colquitt Scale

A meta-analysis of justice concepts conducted by Colquitt (2001) was relevant to his scale development as detailed below. Two items of the procedural justice factor, which determines the essential nature of the procedures, were based on Thibaut and Walker (1978): an item about process control (item 1 of Colquitt´s scale), which refers to a person's ability to express his/her opinions and arguments during a procedure; and an item about decision control (item 2), which alludes to an individual's ability to influence the outcomes obtained through the process.

Colquitt (2001), following Leventhal (1980), assessed procedural justice by comparing what a person experienced with various generalizable rules. Thus, if someone believed that these rules most often satisfied his/her needs, the procedure would be considered fair. Colquitt used five (items 3-7) of the six criteria proposed by Leventhal to create the procedural justice subscale. Those five criteria are: consistency (e.g., the process is applied consistently concerning individuals), bias suppression (e.g., the people making decisions in an organization are impartial), information accuracy (e.g., the procedures are

always based only on accurate information), *correctability* (e.g., correctable, the required procedures are available in case of someone having bad outcomes) and *ethicality* (e.g., ethical, the personal standards of ethics and morals are respected during a procedure).

The distributive justice factor of Colquitt´s scale is based on the concept of *equity rule* proposed by Leventhal (1976). This concept states that employees should expect appropriate rewards and resources for their contributions to the organization, and this expectancy may affect their performance. Thus, four items (8-11) refer to an expected outcome depending on the type of organization, for example, Colquitt (2001, p. 389) indicates a “pay or promotions in a field study, a reward in a laboratory study, a grade in a university setting”, and so forth.

We mentioned that Colquitt proposes to separate the interactional justice factor into two (interpersonal and informational justice). Colquitt based both factors on four criteria (respect, propriety, truthfulness, and justification) established by Bies and Moag (1986), as cited in Colquitt (2001). The concepts of respect (e.g., not being rude to others, items 12-14) and propriety (e.g., avoiding prejudicial or inappropriate comments, item 15) were included in the interpersonal justice factor. Truthfulness (e.g., item 16: the authorities are sincere) and justification (e.g., items 17-20, the authorities provide the basis for their decisions) were used to form the informational justice factor.

2.4. Empirical evidence for the four-factor model

The four-factor structure and good reliability of Colquitt´s scale have been found in diverse samples such as university students (Colquitt, 2001) and several companies, for example, branch services, healthcare, manufacturing industry, insurance industry, and education (Andersson-StrÅberg, Sverke y Hellgren, 2007; Baka, 2018; Díaz-Gracia, Barbaranelli y Moreno-Jiménez, 2014; Enoksen, 2015; Hansen, Byrne y Kiersch, 2013; Shibaoka, Takada, Watanabe, Kojima, Kakinuma, Tanaka y Kawakami, 2010; Spagnoli, Farnese, D'Olimpio, Millefiorini, y Kovalchuk, 2017; Streicher, Jonas, Maier, Frey, Woschée y Waßmer, 2008).

Moreover, each dimension of Colquitt's model has been related to a positive result. Specifically, procedural justice is a good predictor of: job satisfaction in college professors (Patlán-Pérez, Martínez-Torres y Hernández-Hernández, 2012) and office employees (Mossholder, Bennet y Martin, 1998); management trust in pharmaceutical corporation workers (Kernan y Hanges, 2002); organizational commitment in engineers (Sweeney y McFarlin, 1993); and normative commitment in field and laboratory studies (Cohen-Charash y Spector, 2001).

The distributive justice factor predicted job satisfaction in medical college employees (Bakhshi, Kumar y Rani, 2009) and pay satisfaction in engineers (Sweeney y McFarlin, 1993). Likewise, both interpersonal justice and informational justice are good predictors of organizational citizenship behavior (OCB), withdrawal, and negative reactions in field and laboratory studies (Colquitt, Conlon, Wesson, Porter y Ng, 2001). While interpersonal justice has shown significant effects on job satisfaction, affective commitment, and normative commitment (Roch y Zlatoper, 2001, as cited in Mladinic y Isla, 2002), informational justice has been associated with trust in employees from different industries (retail, law, and hospitality; Colquitt y Rodell, 2011).

There is also evidence of the four-factor structure of Colquitt's scale in Latin American countries such as Puerto Rico ($.880 < \alpha < .940$, IFI = .950; NFI = .940; CFI = .950; RMSEA = .070; AIC = 1432.840; Rodríguez-Montalbán, Martínez-Lugo y Sánchez-Cardona, 2015), Ecuador ($.930 < \alpha < .980$, NFI = .990; CFI = .990; RMSEA = .065; Duque-Oliva, Ortega-Santos y Grueso, 2018) and Argentina ($.830 < \alpha < .880$, TLI = .910; CFI = .940; RMSEA = .030; AIC = 401.640; Omar, Salessi, Vaamonde y Urteaga, 2018). In those studies, the four-factor structure showed a better fit than three-factor, bifactor, or unifactor models, reliability was good, and factor loadings were higher than .500. The exception was the study conducted in Ecuador. They found items with factor loadings < .500; therefore, they eliminated items 1 and 5 from procedural justice, item 4 from interpersonal justice, and item 1 from informational justice. For more details about the above-mentioned studies, see the supplementary material.

2.5. Evidence in Chile

We found three studies conducted in Chile using Colquitt´s scale. One of them tested four-factor (KMO = .511) and three-factor (KMO = .511) models, finding a better fit for the latter, with reliability α values ranging from .804 to .849 (Villa-Retamal, 2015). However, this study must be taken cautiously because it had some important limitations: a small sample (N = 31) of judicial branch workers, and a low-reliability index for the informational subscale (α < .530). Another study (Rodríguez-Díaz, Carvajal-Araneda y Montenegro-de la Barrera, 2018) used a sample of public university workers and supported a four-factor structure, showing adequate reliability (α between .910 and .960) and factor loadings (> .570). Finally, a third study (Espinoza y Muñoz, 2018) reported good reliability (α values between .700 and .810) in a sample of public employees. Nevertheless, the last two studies also used a questionable sample size, considering the requirements for confirmatory factor analysis (N < 180).

The present article aimed to enrich the previous results in the Chilean context, contributing to the literature by analyzing the factor structure of Colquitt's scale in Chile, using a new sample (workers in the mining industry). This sample is relevant for Chilean economic development because it represents between 14% and 20% of the country's GDP, being one of the most important economic activities (Cardemil, 2023). Furthermore, this study will examine a second-factor general model and predictive validity, which have not been explored previously in Chile.

Based on these theoretical and empirical gaps, the following hypotheses are proposed:

- H1: A four-factor structure of Colquitt's scale will demonstrate an adequate fit to the data from the sample.
- H2: A second-order general factor model will show adequate fit.

3. Method

3.1. Study design

The study was instrumental (Ato, López-García y Benavente, 2013) with a non-experimental, cross-sectional, and descriptive research design.

3.2. Participants

The sampling was intentional, non-probabilistic. The eligibility criteria were to be 18 years of age or older and to be an employee of a mining company. The sample was composed of 300 workers (286 men) who work in a mining services company located in the north of Chile. The respondents' ages were as follows: 26 (8.7%) were under 26 years of age, 96 (32%) were between 26 and 35 years of age, 94 (31.3%) were between 36 and 45 years of age, 49 (16.3%) were between 46 and 55 years of age, and 35 (11.7%) were older than 55 years.

3.3. Instruments

The Chilean adaptation (Villa-Retamal, 2015) of Colquitt's (2001) Organizational Justice Questionnaire was used. This scale consists of 20 items and assesses a person's perception of fairness within an organization. It was answered in a Likert response format, with five choice options: 1 (Never), 2 (Very rarely), 3 (Sometimes), 4 (Almost always), and 5 (Always). Examples of items are "Did the explanations related to the procedures seem reasonable to you?" and "Have you been treated with dignity?". Job satisfaction was measured with a subscale from the UNIPSICO questionnaire (Gil-Monte, 2014). This Likert subscale consists of 6 items and measures the subjective perception of people's work experiences by asking them how satisfied they are with different aspects of their work. It was answered: 0 (Very unsatisfied), 1 (Unsatisfied), 2 (Indifferent), 3 (Satisfied), and 4 (Very satisfied). Examples of items are "The salary you receive" and "The promotional opportunities you have". Studies show adequate levels of reliability, with

alpha estimates that fluctuate between .790 and .810 (Lavarello-Salinas, Kramm-Vergara, Gil-LaOrden y Gil-Monte, 2023).

3.4. Procedures and ethical aspects

To carry out the data collection, first, authorization was requested by the company's administrators. Subsequently, information was collected in the workplaces of the participants, who had to answer the questionnaire through a digital platform (Google Forms). This questionnaire guaranteed anonymity, confidentiality of the data and the voluntary nature of participation, in accordance with the ethical principles of the Declaration of Helsinki and current Chilean regulations on research with human beings.

3.5. Data analysis

Multivariate normality was evaluated with Mardia analysis. Confirmation of the instrument's structure was tested through confirmatory factor analysis (CFA). Confirmatory factor analysis (CFA) is a multivariate statistical technique that serves to check whether empirical data conform to a structure of factors (latent constructs) previously defined by theory (Alavi, Visentin, Thapa, Hunt, Watson y Cleary, 2020). We compared the four-factor model with the general factor model. The goodness-of-fit estimation of those models was performed using the robust maximum likelihood method (MLR). The indices considered in the CFA were chi^2, the Tucker-Lewis Index (TLI), and the Comparative Goodness of Fit Index (CFI). Values above .900 in CFI and TLI are good indicators of adjustments (Hu y Bentler, 1999). In addition, the root of the approximation mean square error (RMSEA) and standardized mean square error (SRMR) were analyzed, with values below .08 considered acceptable (Schreiber, 2017). The indicators AIC and BIC were also used. We considered that two models differ if |ΔCFI|, |ΔRMSEA|, and |ΔSRMR| > .010 (Kong, 2017), and |ΔACI| > 10 (Mohsin, Mourad, Faure, Szawarc y Bringer, 2013). The criterion validity of the instrument was evaluated by conducting a structural model, using the same cut-off for the indicators mentioned above. Reliability was considered acceptable for values of McDonald's omega (ω) higher than .700

(Nunnally, 1978), while convergent validity required an Average Variance Extracted (AVE) value greater than .500 on each factor (Cheung, Cooper-Thomas, Lau y Wang, 2024). Different programmes were used because the analyses were performed by different members of the research team. Descriptive analyses were performed using SPSS 22 software. Confirmatory factor analyses were performed with R version 4.3.0 (R Core Team, 2023). Reliability estimation using McDonald's omega statistic (ω) was calculated using JASP 0.17 software (JASP Team, 2023).

4. Results

The descriptive statistics are detailed in **Table N°1**. The Skewness and Kurtosis indicated that the variables do not follow a normal distribution. Additionally, multivariate normality was evaluated by a Mardia analysis for multivariate skewness and kurtosis. Skewness = 75.278 (X2 = 3763.925, gl = 1540, $p < .001$) and kurtosis = 557.313 ($z = 34.248$; $p < .001$), which indicated a non-normal multivariate data distribution.

Table N° 1. Descriptive statistics.

Items	*M*	*SD*	Skewness	Kurtosis
PJ1	2.487	1.175	-.347	-.686
PJ2	2.330	1.259	-.309	-.829
PJ3	3.107	.933	-.835	.026
PJ4	2.970	.904	-.541	-.273
PJ5	3.177	.872	-.777	-.261
PJ6	2.107	1.251	-.162	-.896
PJ7	3.070	.963	-.841	.144
DJ1	2.643	1.278	-.506	-.900
DJ2	2.587	1.281	-.478	-.911
DJ3	2.640	1.225	-.514	-.718
DJ4	2.609	1.288	-.549	-.850
INTJ1	3.413	.760	-1.222	1.035
INTJ2	3.490	.738	-1.371	1.290
INTJ3	3.537	.690	-1.359	1.157
INTJ4	2.850	1.238	-.841	-.348
INFJ1	3.467	.777	-1.372	1.391
INFJ2	3.410	.874	-1.536	1.874
INFJ3	3.200	.907	-.947	.269
INFJ4	3.263	.922	-1.243	1.183
INFJ5	3.240	.992	-1.426	1.756

Note: PJ = procedural justice. DJ = distributive justice. INTJ = interpersonal justice. INFJ = informational justice.

Source: own elaboration.

The reliability (McDonald's ω) of the subscales was acceptable (ω > .700, see **Table N°2**), except for the interpersonal justice factor.

Table N°2. Reliability of the organizational scale dimensions.

Estimate	McDonald's ω	Alpha
Procedural Justice	.832	.841
Distributive Justice	.934	.933
Interpersonal Justice	.667	.632
Interpersonal Justice (without item 15)	.877	.876
Informational Justice	.911	.907

Source: own elaboration.

The reliability of this last dimension was increased (ω = .877) by eliminating item INT4 (item 15 of the total scale) because it reported a smaller correlation (r < .200) with the rest of the items (see **Table N°3**).

Table N°3. Correlations among items of interpersonal justice.

Item	Correlation of the element with the rest
INTJ1	.584
INTJ2	.652
INTJ3	.563
INTJ4	.118

Note: The statistics of the Omega element eliminated with CFA failed.

Source: own elaboration.

Organizational Justice Scale fit was calculated for the four-factor models (with and without considering item 15) and a general second-order factor (see **Table N°4**).

Table N°4. Fit index for the Organizational Justice Scale (MLR estimator).

	χ2(df)	χ2/DF	CFI	TLI	RMSEA	RMSEA IC 90%		SRMR	AIC	BIC
						Low.	Upp.			
Original (four factors)	361.740 (164)	2.206	.938	.928	.070	.060	.080	.053	13392.32	13562.69
Four factors without item 15	328.497 (146)	2.250	.941	.930	.072	.062	.082	.054	12413.79	12576.76
General factor	330.469 (148)	2.233	.941	.931	.072	.061	.082	.055	12412.52	12568.08
Note: All the χ2 values were significant (p < .001).										

Source: own elaboration.

The factor loadings of the four-factor and second-order factor models are presented in **Table N°5** and **Table N°6**, respectively.

Table N°5. Factor loadings of the four-factor model.

Item	Factor 1	Factor 2	Factor 3	Factor 4
1	.586			
2	.584			
3	.655			
4	.777			
5	.773			
6	.477			
7	.757			
8		.884		
9		.920		
10		.911		
11		.815		
12			.889	
13			.799	
14			.809	
15			**.123**	
16				.726
17				.774
18				.871
19				.865
20				.834

Note: All the factor loadings were significant (p < .001).

Source: own elaboration.

Table N°6. Factor loadings of the general factor model.

Factors	Organizational Justice
Procedural Justice	.903
Distributive Justice	.730
Interpersonal Justice (without item 15)	.763
Informational Justice	.843

Note: All the factor loadings were significant (p < .001).

Source: own elaboration.

The four-factor model showed adequate factor loadings (> .500), except for item 6 (PJ6) and item 15 (INTJ4). We decided to keep item 6 as it did not affect the reliability of its subscale, unlike item 15. **Figure N°1** shows the coefficients of the second-order model. In the four-factor model without item 15, similar fit indices (CFI, TLI, RMSEA, and SRMR) were obtained. We found that Item 15 from the interpersonal justice subscale would not have been adequately adapted by Villa-Retamal (2015). While the original item refers to the boss or supervisor´s actions (“Has (he/she) refrained from improper remarks or comments”), the adapted version focuses on workers' perception of their own actions (“Do you refrain from making inappropriate remarks or comments?”). For this reason, we eliminated item 15 from the final scale version.

The general factor structure did not differ from the four-factor models because |ΔCFI|, |ΔRMSEA|, and |ΔSRMR| < .010 and |ΔACI| < 10.

Considering the above, to evaluate the predominance of the general factor and determine if the scale can be treated as essentially one-dimensional, a Schmid-Leiman transformation was used, which is an analytical method that allows re-expressing a higher-order factorial model as an orthogonalized two-factor model (**Table N°7**).

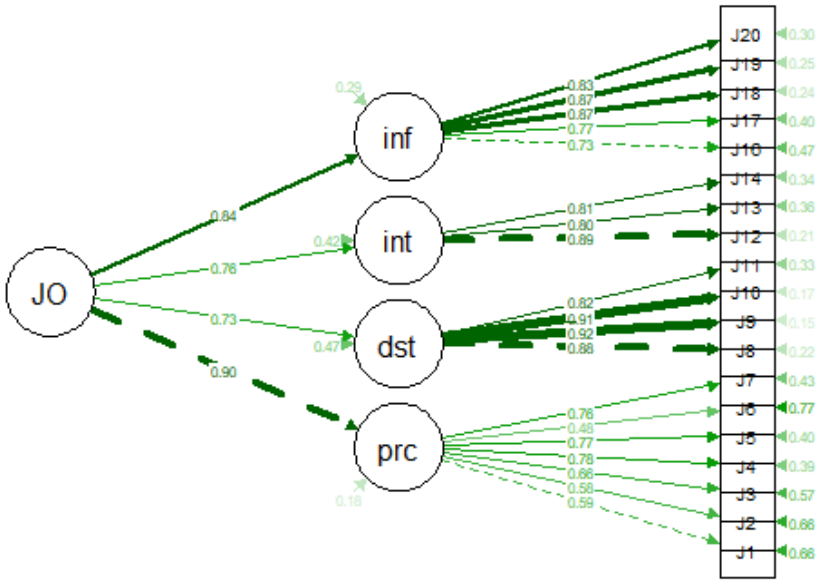
Table N°7 shows a predominance of the general factor over the specific factors, especially in the procedural and informational justice dimensions. This predominance is not observed in the case of the dimensions of distributive and interpersonal justice, where these factors would retain their psychometric identity.

Table N°7. Schmid-Leiman transformation matrix.

Dimension / Item	Primary Load (a_{ij})	Load Factor General (L_{ig})	Load Specific Factor (L_{is})	Explained Variance (h^2)
Procedural Justice				
(h_j=0.903)				
PJ1 (Voice)	0.586	0.529	0.252	0.343
PJ2 (Influence)	0.584	0.527	0.251	0.341
PJ3 (Consistency)	0.655	0.591	0.281	0.429
PJ4 (Lack of Bias)	0.777	0.702	0.334	0.604
PJ5 (Accuracy)	0.773	0.698	0.332	0.597
PJ6 (Appeal)	0.477	0.431	0.205	0.228
PJ7 (Ethics)	0.757	0.684	0.325	0.573
Distributive Justice				
(h_j=0.730)				
DJ1 (Effort)	0.884	0.645	0.604	0.781
DJ2 (Contributions)	0.920	0.672	0.629	0.846
DJ3 (Performance)	0.911	0.665	0.622	0.830
DJ4 (Justification)	0.815	0.595	0.557	0.664
Interpersonal Justice				
(h_j=0.763)				
INTJ1 (Dignity)	0.889	0.678	0.575	0.790
INTJ2 (Respect)	0.799	0.610	0.516	0.638
INTJ3 (Sincerity)	0.809	0.617	0.523	0.654
Informational Justice				
(h_j=0.843)				
INFJ1 (Explanation)	0.726	0.612	0.391	0.527
INFJ2 (Reasonableness)	0.774	0.652	0.416	0.599
INFJ3 (Details)	0.871	0.734	0.469	0.759
INFJ4 (Opportunity)	0.865	0.729	0.465	0.748
INFJ5 (Veracity)	0.834	0.703	0.449	0.696

Source: own elaboration.

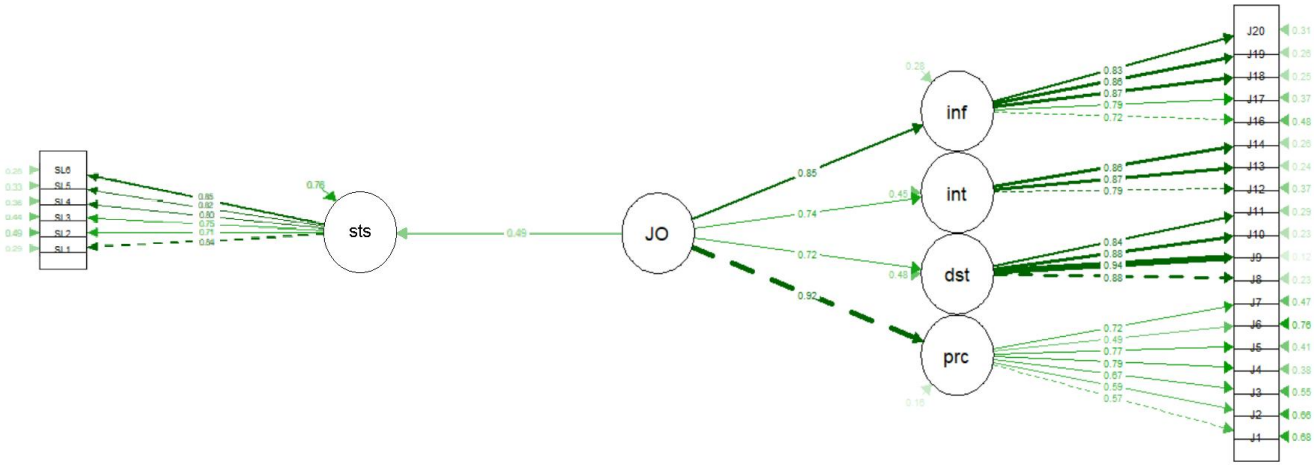
Figure N°1. Second Order Model.



Source: Own elaboration.

We estimated criterion validity of the Organizational Justice Scale using a structural model in which organizational justice was the predictor of job satisfaction (see **Figure N°2**). Organizational justice was associated positively with job satisfaction (β =.490; p = < .010), explaining 24.4% of the dependent variable variance. The structural model showed an acceptable fit. The chi-square value was significant (χ^2 = 494.085, gl = 270, p < .010). The χ^2/gl coefficient < 3 (1.830), CFI and TLI > .900 (.946 and .940 respectively), and SRMR and RMSEA were .054 and .058, respectively.

Figure N°2. Structural model of the Organizational Justice Scale as a predictor of job satisfaction.



Source: Own elaboration.

Regarding convergent validity, **Table N°8** shows the AVE values for each of the factors. In this regard, positive results are observed in most of the factors except for factor 1, which obtained an AVE of less than 0.5. The procedural factor obtained an AVE of 0.405, which, after the S-L transformation, is evidence that most of its variance is captured by the general factor of organizational justice.

Table N°8. Average Variance Extracted.

Factor	VME (AVE)
Factor 1	0.405
Factor 2	0.781
Factor 3	0.707
Factor 4	0.675

Source: own elaboration.

5. Discussion

The present study aimed to analyze the factor structure of the Colquitt scale in Chile, which is composed of four factors: distributive justice, procedural justice, interpersonal justice, and informational justice. The results showed a good fit for the three models examined, the general and the two four-factor models (one of them without item 15). The examined models did not differ from each other. In these three models, the internal consistency indices were high, except for item 15 in the original four-factor model, while the factor loadings were above .500, except for item 15 (INFJ) and item 6 (PJ).

Although we did not find fit differences in the three models tested, we endorse the general factor model without item 15 (see above the problems with this item translation) because it is consistent with the structure and theoretical framework of the original scale (Colquitt, 2001), and is coherent with the validation studies conducted in different Latin-American countries (Rodríguez-Montalbán, Martínez-Lugo y Sánchez-Cardona, 2015; Duque-Oliva, Ortega-Santos y Grueso, 2018; Omar, Salessi, Vaamonde y Urteaga, 2018). But, in addition, this support is empirically based on an additional procedure that was carried out through a Schmid-Leiman transformation of the factorial loads of the hierarchical model, evidencing the preponderance of the general factor over the specific ones, especially in the procedural and informational justice factors.

The confirmation of the four-factor contributing to a general factor structure in this sample reinforces the evolution of the construct described in the literature. The differentiation existing among interpersonal and informational justices suggests that Chilean mining workers cognitively distinguish between the quality of treatment received and communication regarding organizational procedures. This finding indicates that a single interactional dimension (composed of interpersonal and informational factors) is insufficient to capture the complexity of social exchanges in a workplace.

The criterion validity analysis indicated that organizational justice explains around a quarter of worker satisfaction variance, which is similar to the literature (Choi, 2011; Hao,

Hao y Wang, 2016; Mossholder, Bennet y Martin, 1998). This predictive power is relevant, showing that psychological perception of fairness (about outcomes and interactions) remains a fundamental driver of worker satisfaction. Furthermore, those results contribute to supporting the general four-factor structure for the organizational justice scale in Chile, which is consistent with the international (Patlán-Pérez, Martínez-Torres y Hernández-Hernández, 2012; Mossholder, Bennet y Martin, 1998; Bakhshi, Kumar y Rani, 2009) and national research (e.g., Rodríguez-Díaz, Carvajal-Araneda y Montenegro-de la Barrera, 2018).

This study extended previous studies to a less explored context, Chilean miner workers. Similarly, it was possible to test the convergent validity of the dimensions of the instrument. Although the procedural justice dimension was slightly lower than the recommended AVE value (0.5), it was evident that this would not be a problem, given the strong contribution that this factor has to the general factor.

This is one of the most relevant industries for the national GDP (Cardemil, 2023). The mining environment is characterized by high operational risks and strict safety regulations. In such a context, the dimensions of procedural and informational justice become critical. This could mean miners are sensitive to whether safety and operational procedures are applied consistently and authority figures provide candid explanations for decisions made. Validating this scale specifically in the mining sector extends its contribution by providing a necessary tool for assessing the sense of fairness, which can be highly relevant if the aim is to maintain trust and compliance with protocols in different workplaces. Future research can explore new, relevant economic areas at the national level, such as agriculture and manufactured goods. Those studies would help to establish if the relationship between organizational justice and job satisfaction depends on industrial activity.

This study has limitations associated with sampling and sample. The sampling method was non-probabilistic, and the sample was predominantly composed of men (94.6%). Therefore, our results cannot be extrapolated directly to the rest of the population. Despite

this limitation, this study contributed to establishing the organizational justice scale construct and predictive validity in a Chilean sample of miner workers, a less explored context.

Future research should consider the use of external criteria based on objective measures (e.g., actual turnover, number of medical leaves or reprimands), to contrast with the subjective perception of justice obtained through self-reports.

Another limitation that future studies should consider is the cultural adaptation of the questionnaire, considering the idiosyncratic aspects of a masculinized environment, with codes specific to this area. It is possible that in these environments, certain social practices may not be considered unjust, which need to be weighed against measures that account for this specific social reality.

A practical implication of the study is that these types of measures could help generate evidence that helps management prioritize comprehensive management of organizational justice. It is not only necessary to improve wages (distributive justice) to have an impact if the general perception of the company is already damaged by the treatment of supervisors. In this sense, it is necessary to consider all its components. For example, training supervisors in communication skills (informational justice) could help a lot to promote the perception of justice, but also as a direct strategy for accident prevention.

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