

# Spanish-Language Adaptation of Morgeson and Humphrey's Work Design Questionnaire (WDQ)

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**Abstract.** Since work organizations became the subject of scientific research, how to operationalize and measure dimensions of work design has been an issue, mainly due to concerns about internal consistency and factor structure. In response, Morgeson and Humphrey (2006) built the Work Design Questionnaire –WDQ–, an instrument that identifies and measures these dimensions in different work and organizational contexts. This paper presents the instrument's adaptation into Spanish using reliability and validity analysis and drawing on a sample of 1035 Spanish workers who hold various jobs in an array of occupational categories. The total instrument's internal consistency was Cronbach's alpha of .92 and the various scales' reliability ranged from .70 to .96, except for three dimensions. There was initially a difference in the comparative fit of the two versions' factor structures, but the model with 21 work characteristics (motivational –task and knowledge–, social, and work context) showed the highest goodness of fit of the various models tested, confirming previous results from the U.S. version as well as adaptations into other languages and contexts. CFA results indicated goodness of fit of factor configurations corresponding to each of the four major categories of work characteristics, with CFI and TLI around .90, as well as SRMR and RMSEA below .08. Thus it brings to the table a reliable, valid measure of work design with clear potential applications in research as well as professional practice, applications that could improve working conditions, boost productivity, and generate more personal and professional development opportunities for workers.

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Work design is a hotly debated area of indisputable importance in the study of Organizational Sciences. To thoroughly comprehend this concept, it must be considered in relation to that of *work organization*. Strictly speaking, organizing work has to do with understanding and breaking down the process of production or service providing to enable effective job performance and coordinate the final integration of different subprocesses (Fernández Ríos & Sánchez, 1997). And *work design*, which is becoming more and more inclusive, concerns the way in which work tasks are configured within the broader system of work, acknowledging the close connection between work activities, and the organizational context in which they take place.

Work design was at first closely connected to how jobs are configured, which was justified by reasons such as productivity, workforce qualifications, and

organizational efficiency. It later came to be associated primarily with motivational aspects (Hackman & Oldham, 1980), and the current, more wholistic view is that it incorporates processes and results into explanations of how work is structured, organized, experienced, and represented (Grant, Fried, & Juillerat, 2010; Morgeson & Humphrey, 2008). Furthermore, there is a clear, growing tendency to consider context a relevant factor in design decisions and, at the same time, depart from classic, static job descriptions and instead embrace more dynamic features, like those associated with the concept of *role* (Ilgen & Hollenbeck, 1991).

Morgeson and Humphrey's (2008) conceptualization is fully aligned with those trends. Integrating the design of jobs as well as teams, they formulated the most complete definition of work design to date:

The study, creation, and modification of the composition, content, structure, and environment within which jobs and roles are enacted. As such, it concerns who is doing the work, what is done at work, the interrelationship of different work elements, and the interplay of job and role enactment with the broader task, social, physical, and organizational context. (p. 47).

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This definition meets the current objectives and purposes of work design research, incorporates elements of earlier theoretical models, does not contradict any, and opens new horizons that were in dire need of theoretical development and research.

Work design is becoming increasingly relevant, which is why this study's reason for being – its objective – is to adapt Morgeson and Humphrey's (2006) Work Design Questionnaire (WDQ)<sup>1,2</sup> into the Spanish language, thereby providing researchers and practitioners with a reliable, valid tool properly adapted into Spanish with which they can investigate, measure, and change the reality of work.

Several empirical studies have emphasized work design's impact on a wide range of individual, group, and organizational outcomes (Fried & Ferris, 1987; Humphrey, Nahrgang, & Morgeson, 2007); that is, without a doubt, why it has played a crucial role in bridging the theory and practice of organizational science. In addition, it represents an important synthesis of multiple disciplines (Morgeson & Campion, 2003), and its study is crucial to the effective implementation of new forms of work organization (Fernández Ríos, San Martín, & De Miguel, 2008; Smith, 1997).

Morgeson and Campion (2003) maintained that despite its enormous impact on organizational success and individual well-being, research interest in work design has gradually waned since the '80s, as reflected by the dearth of articles about it in the most prominent journals. This reached its most critical point when after twenty years of investigation, researchers presumed to have a "clear picture" of the psychological and behavioral effects of work design (Humphrey et al., 2007).

Despite contributions from the *empowerment* movement of the '80s, and the *lean production* literature of the '90s, it came to be accepted that theory and practice in this field of research was relatively mature (Parker, Wall, & Cordery, 2001). That perpetuated the dominant paradigm of the time, the *job characteristics model* (Hackman & Oldham, 1980), and disincentived further

developments on the subject, especially in terms of theory. Proof of that lays in the fact that this model and the other dominant perspective, the *sociotechnical systems model* (Trist, 1981), have barely changed in the last four or five decades despite abundant criticism for their lack of theoretical substantiation and applicability to the content and context of real-life work situations (Roberts & Glick, 1981). These shortcomings were even greater in terms of instrument development; that was apparent in mounting distrust of the available tools and resulting abandonment of the field by researchers as well as practitioners.

Today the scientific community is seeing a resurgence of interest in this subject, as reflected in the formation of comprehensive theoretical frameworks that go beyond the motivational features of work, actively incorporating social and contextual design elements and thus incentivising empirical research. This trend is apparent in select papers by Morgeson and Humphrey (2006), Humphrey et al. (2007), and Grant et al. (2010), among others.

This resurgence is a reaction not just to the research stagnation described above, but also a warranted response to changes in the nature of work at contemporary organizations in the globalized context. It is characterized by questioning the underlying assumptions of previous paradigms, and a joint effort to spur new theory production. It constitutes a new paradigm, one of integration, redesign, and reinvention. Specific examples of efforts to integrate different ideas include Parker et al. (2001), Morgeson and Campion (2003), Humphrey et al. (2007), and Grant et al. (2010), and examples of more ground-breaking, emerging contributions – reinventions – include Wrzesniewski and Dutton (2001) and Clegg and Spencer (2007), among others.

Various formulations have been configured along those lines, and a new theory seems to be distilling that, in short, proposes that work design is a constructive process (Rico & Fernández Ríos, 2002; Wrzesniewski & Dutton, 2001) that should include certain antecedents (environmental features, available technology, company culture, etc.) and certain outcomes that do not solely result from the work design in place. Instead, the relationship is influenced by individual, group, and organizational contingencies, and by intermediary mechanisms. In short, work design is an essential component, but ultimately it is one component among many, and whatever work design is put in place, its results will be conditioned, if not determined, by elements beyond the work itself that, being part of context, cannot be ignored when designing work at an organization.

This theoretical perspective is exceptional not only for the contributions it holds, in and of itself, or for its

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<sup>2</sup>The instrument that was this study's subject was originally published in English: Morgeson, F. P. & Humphrey, S. E. (2006). The Work Design Questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work. *Journal of Applied Psychology*, 91, 1321–1339. It was translated and reproduced with written authorization from the editor and author. Neither the APA nor the author is responsible for the accuracy of the translation.

great potential for future contribution, but also because a) it neither excludes nor directly contradicts previous theories. Rather, it partially fuses them and moves them forward as a whole; and b) it clarifies the basic elements that were pondered and explored previously (Fernández Ríos, 1996; Fernández Ríos, Rico, & San Martín, 2004; Fernández Ríos & Sánchez, 1997; Fernández Ríos et al., 2008; Rico & Fernández Ríos, 2002) but never clearly presented as a set.

Formulating organizational theory, branching into design, and rooting work design in that theory do not happen “just because,” or for aesthetic reasons. They happen because they have individual, group, organization, and extraorganization-level consequences. Those consequences are intentional, worked for, and desired. In other words, work design involves actions that clearly, intentionally try to change organizations; it is a series of explicit efforts to improve the organization, boost productivity, and reap positive results for individuals, their families, society, and the non-social environment. These outcomes are numerous and varied, often affecting systems beyond the confines of the formal organization.

Fortunately, around the turn of the century, several authors in different parts of the world had similar concerns about work design; they included F. P. Morgeson and S. E. Humphrey in the United States, S. K. Parker and J. Cordery in Australia, and T. D. Wall in England. In the Spanish-speaking world, studies by M. Fernández Ríos and R. San Martín were noteworthy. But a qualitative leap was needed – a broader vision of work analysis – to overcome the conceptual and metric limitations of the main instruments in use, like the Job Diagnostic Survey – JDS – (Hackman & Oldham, 1980) and the Multimethod Job Design Questionnaire – MJDQ – (Campion & Thayer, 1985).

A new way to conceptualize and measure work design was needed, without the limitations of 20<sup>th</sup> century research advancements (for an in-depth analysis of said limitations, see Morgeson & Humphrey, 2006, and Humphrey et al., 2007). And that needed to be addressed on the level of theory, methodology, and measurement. And if Parker et al. (2001) shone a light on theory, Morgeson and Humphrey (2006) did so on measurement. It was the Work Design Questionnaire (WDQ).

#### *The Work Design Questionnaire (WDQ)*

The WDQ is a comprehensive, integrative measurement instrument that according to its authors, is needed for three reasons: a) to date, the available measures were either highly specific, like those of tasks in very concrete jobs, or quite general, like those of work characteristics. A measure was needed to bridge

the gap between tasks and characteristics; b) when designing or redesigning jobs, practitioners were only able to act with a quite limited range of work characteristics (autonomy, variety, etc.). By taking more characteristics into account, many more changes would be possible; and c) theoretical debate needed to resume. Along those lines, after the last 35 years of meager contributions to theory, we need to progress toward greater integration across disciplines and fusion of perspectives.

The WDQ focuses on work (rather than job), considering not only the person’s job, but relations between workers and the larger environment like Parker et al. (2001) suggested. To develop the WDQ, the work design literature was reviewed to identify key work characteristics and measures used previously. An item pool was developed to encompass all the work characteristics identified in the specialized literature to date and produce a more complete set of the scales considered previously.

#### *Interest in adapting the WDQ into Spanish*

Spanish-language adaptation of a tool like the WDQ is of tremendous research interest for two fundamental reasons: a) because it is a new, powerful measurement instrument that in a way synthesizes all the available knowledge, operationalizes it, and makes it available for use by researchers and practitioners; and b) because this instrument is consistent with new notions of work design. It certainly does not cover everything in what have come to be called “expanded models or perspectives” but it does cover virtually the full spectrum of variables related to work characteristics.

The benefits of the WDQ have stirred the attention of numerous research teams around the world. It has been adapted into German (Stegmann et al., 2010), Chinese (Chiou, Chou, & Lin, 2010), and Polish (Hauk, 2014) in addition to versions not yet published in Italian, Portuguese, and French, among other languages, and preliminary versions in languages including Arabic, Hebrew, Japanese, and Korean (Morgeson, 2011). Given the interest it attracts, we decided to create a Spanish adaptation (in Spain), something unprecedented in this context so far, with the conviction that in Spanish-speaking countries too, this aspect of the reality of work can and should be developed, and that the WDQ is an indispensable tool.

#### *Bases for and development of the WDQ*

The WDQ rests on a three-factor, integrated typology proposed by Morgeson and Campion (2003) that has abundant theoretical and empirical evidence to support it. Those authors posited that the field of work

design could be broken down and analyzed in terms of three major components:

*-Job complexity:* This dimension encompasses the motivational work features studied most extensively (e.g., autonomy, variety, significance), and others such as cognitive demands and specialization. When these features are more prevalent or increase, one's work tends to be more complex, which is more demanding of the worker.

*-Social environment:* This dimension includes features of the relational or social context in which work is done, including for instance interdependence, social support, and feedback from others. This dimension has gradually demonstrated its relation to important outcomes of work design.

*-Physical demands:* This dimension encompasses the features of the physical environment in which work is done, including aspects like physical activity, work conditions, ergonomic design, and the use of technology. Its importance is inescapable anytime work activity takes place under such conditions.

With that definition in mind, which synthesized the bulk of work design research and made sense of it, Morgeson and Humphrey (2006) adapted their main ideas and proposed that work design is comprised of three categories of work characteristics corresponding to the original three-component structure presented above.

The first category, *motivational characteristics*, have been the most extensively studied in the literature and reflect the overall complexity of work. Those are divided into task characteristics and knowledge characteristics. *Task characteristics* relate to how work is done, and to the range and nature of the tasks associated with a specific job. Meanwhile, *knowledge characteristics* address the kinds of demands placed on the individual – knowledge, skills, individual abilities – as a function of what he or she does on the job.

The second category, *social characteristics*, reflects the fact that work is done within a broader social and relational setting. Historically, these have not been studied as much, less than motivational features for example, but that trend has slowly shifted as its important role in various outcomes of work design is revealed. And the third category, *physical or contextual characteristics*, corresponds to the physical and material context in which work is done. With the exception of the MJDQ (Campion & Thayer, 1985), the physical context of work has mostly been neglected in the scientific research on work design (Morgeson & Humphrey, 2006). Thus, the work characteristics in the WDQ are organized into these three larger categories – motivational, social, and physical/contextual.

The creation and development of the WDQ took place through a series of steps briefly summarized in this section. First, work characteristics were identified; an extensive literature review identified 107 characteristics that had been debated and/or measured. Then, through various processes involving the definition of different characteristics, comparative analysis, sorting into categories, etc., 18 categories of work characteristics were established. Those were then grouped into the three higher-order categories described above: motivational, social, and physical/contextual. And the first was halved into two subcategories: task and knowledge work characteristics. Hence four larger factors will be discussed: task motivational characteristics, knowledge motivational characteristics, social work characteristics, and physical or contextual work characteristics. Those categories encompass 18 features: 5 task motivational, 5 knowledge motivational, 4 social, and 4 contextual. On that foundation, one model of 19 characteristics (interdependence was subdivided, adding a social dimension) and another with 20 (this one has 7 task motivational characteristics because it separates autonomy in three) have been discussed. Finally, there is a model of 21 characteristics that subdivides autonomy as well as interdependence: 12 motivational, 5 social, and 4 physical. The above appears in Figure 1 and will be required in the Method section to analyze the instrument's factor structure.

After identifying different categories, subcategories, and specific variables or characteristics, Morgeson and Humphrey explored whether or not specific items already existed in the scientific literature for each of the constructs or variables to measure. They utilized pre-existing items, modified some, and created some new, always striving for consistency with the definitions compiled in Figure 1. Ergo, the WDQ is a mix of previously existing items (17%), adapted items (33%), and new items (50%). They utilized a relatively simple response scale to avoid extraneous construct variance (5-point scale from 1 *-strongly disagree-* to 5 *-strongly agree-*). Furthermore, the authors suggest that all items are phrased in positive terms so as to avoid the factor structure issues reported about other, earlier work design measures (e.g., Idaszak & Drasgow, 1987). The only exceptions to that rule were items on the job complexity and ergonomics scales, which were easier to comprehend when phrased negatively.

To achieve adequate internal consistency while maintaining reasonable scope, all scales have at least four items unless there is suspicion that various dimensions exist within the same construct, as in the cases of autonomy, feedback, interdependence, and contextual variables. All those have just three items. Many refer to the work itself, not individual responses to work, since it is the properties of work itself that are



Major Categories	Categories	Subcategories	Definitions
MOTIVATIONAL WORK CHARACTERISTICS	Task characteristics (how the work itself is accomplished and the range and nature of tasks associated with a particular job)	Autonomy: -Work scheduling -Decision-making -Work methods	The extent to which a job allows freedom, independence, and discretion to schedule work, make decisions, and choose the methods used to perform tasks.
		Task variety	The degree to which to which a job requires employees to perform a wide range of tasks on the job.
		Task significance	The degree to which a job influences the lives or work of others, whether inside or outside the organization.
		Task identity	The degree to which a job involves a whole piece of work, the results of which can be easily identified.
		Feedback from job	The degree to which the job provides direct and clear information about the effectiveness of task performance.
	Knowledge characteristics (the kinds of knowledge, skill, and ability demands the job places on an individual)	Job complexity	The extent to which the tasks on a job are complex and difficult to perform (requires high-level skills, more mentally demanding, etc.).
		Information processing	The degree to which a job requires attending to and processing data or other information.
		Problem solving	The degree to which a job requires unique ideas or solutions and reflects more active cognitive processing. This involves generating unique or innovative ideas or solutions, diagnosing and solving nonroutine problems, and preventing or recovering from errors.
		Skill variety	The extent to which a job requires an individual to use a variety of different skills to complete the work.
		Specialization	The extent to which a job involves performing specialized tasks or possessing specialized knowledge and skill.
SOCIAL CHARACTERISTICS	Social support		The degree to which a job provides opportunities for advice and assistance from others.
	Interdependence: - Initiated interdependence - Received interdependence		The degree to which the job depends on others and others depend on it. Interdependence can be either initiated or received depending whether work flows from one job to other jobs, or is affected by work from other jobs.
	Interaction outside organization		The extent to which the job requires employees to interact and communicate with individuals external to the organization.
	Feedback from others		The degree to which others in the organization provide information about performance (for example, coworkers and supervisors).
CONTEXTUAL CHARACTERISTICS	Ergonomics		The degree to which a job allows correct or appropriate posture and movement.
	Physical demands		The level of physical activity or effort required in the job.
	Work conditions		The environment within which a job is performed: health hazards, noise, temperature, cleanliness, etc.
	Equipment use		The variety and complexity of the technology and equipment used in a job.

Figure 1. Conceptual Structure of the WDQ: Definitions.

of interest, not idiosyncratic reactions. Items were grouped according to the features they examine, not randomly distributed. That choice was in keeping with Schriesheim, Solomon, and Kopelman (1989), who showed that grouping items had different psychometric advantages (e.g., convergent and discriminant validity), particularly when measuring work characteristics.

The data were collected by students – juniors and seniors in a business administration course. They were asked to administer the questionnaire in paper-and-pencil form to family members, kin, and acquaintances

with at least 15 years of full-time work experience. The questionnaire was administered first, then a brief interview was conducted to gauge the main tasks and other duties of the job, and identify the corresponding job name or title in the Dictionary of Occupational Titles (DOT; U.S. Department of Labor, 1991) and its O\*NET code. This guaranteed data from a very heterogeneous range of jobs. Data were collected from 540 workers holding 243 different jobs; 22 out of the 23 professional groups represented in O\*NET; and an average job tenure of 15 years ( $SD = 9.80$ ).

As we will see later on in detail (in the Method and Results sections), to determine the instrument's validity, Morgeson and Humphrey (2006) used confirmatory factor analysis (CFA) to compare different factorial models, but they also tried to determine to what extent scores on the WDQ scales are consistent with data published previously about jobs and occupations. Therefore, information about indicators of cognitive skills or social/interactive or contextual aspects of work, provided by O\*NET or the Dictionary of Occupational Titles, could be interpreted as independent, preliminary evidence for the discriminant and convergent validity of the main categories of work characteristics. As Morgeson and Humphrey (2006) propose, "evidence that responses to the WDQ are related to these external measures would be powerful because it suggests that the measures correspond to some larger objective reality unaffected by perceptual biases" (p. 1327).

The authors' argument about what relations to expect between the different WDQ measures and external measures – coming from the O\*NET or gathered using other measurement techniques – is long, thorough, and incorporates measures like job descriptions (cognitive, interpersonal, and physical), occupational categories, and varied results. Specifically, in the present study, according to the data available for this adaptation and adjustment of procedure, these original hypotheses from Morgeson and Humphrey's (2006) study are important to consider and will go on to be empirically tested.

Hypothesis 4a: Jobs in professional occupations will have higher levels of knowledge characteristics and autonomy than jobs in non-professional occupations.

Hypothesis 4b: Jobs in non-professional occupations will have higher levels of physical demands and less positive work conditions than jobs in professional occupations.

Hypothesis 4c: Jobs in "human life" occupations will have higher levels of task significance than jobs in other occupations.

Hypothesis 4d: Jobs in sales occupations will have higher levels of interaction outside the organization than jobs in other occupations.

## Method

### Participants

A total of 1035 subjects participated in this study, representing 492 different jobs. To ensure consistency with the U.S. study, this sample of workers represented many of the various occupational groups compiled in the Standard Occupational Classification (SOC)

(U.S. Department of Commerce, 2000). Morgeson and Humphrey used the same classification system as a criterion in their original study.

Participants' average age was approximately 39 years ( $SD = 12.50$ ), with an average of 11 years' ( $SD = 11.07$ ) tenure at their respective jobs. The sample's equal distribution according to sex was noteworthy, with 49% men and 51% women. Essential characteristics of the sample, that is, number of participants, age, work experience in their job, and sex are displayed in Table 1. That information is organized according to the occupational groups proposed in the SOC.

In reference to the sample's descriptive data, we would like to emphasize certain important aspects. First of all, all 23 SOC occupational groups are represented in the sample, but in one case, only by a minimal number ("farming, fishing and forestry"). In Morgeson and Humphrey's original study, 22 were represented, all but "building and grounds cleaning and maintenance occupations." Second, as we mentioned above, an equal representation of men and women was achieved, which is noteworthy and unexpected given the convenience sampling strategy used. Third, the sample tends to represent more professional (e.g., "management," "business and financial" "office and administrative support," "education") than non-professional jobs (e.g., "building and grounds cleaning and maintenance," "transportation and material moving"), but not as dramatically as in the U.S. sample. Fourth, in all occupations, tenure in current job was relatively long, which is consistent with the U.S. sample and ensured employees were knowledgeable about the main characteristics of their jobs. On that note, we should point out that everyone was required to have at least three years of general work experience and 6 months' tenure in their current job.

### Procedure

This section will first describe the process of adapting the instrument into Spanish. Then it will detail the data collection and data analysis procedures utilized.

In adapting the WDQ into Spanish, we took into account the International Test Commission Guidelines for Translating and Adapting Tests (International Test Commission, 2010). With that in mind, we present some important specifications relating to the Spanish-language version and adaptation of items to the socio-cultural context.

This translation of the WDQ into Spanish pertains to European Spanish. Generally speaking, this version is expected to be valid for the Spanish spoken in Hispanic American contexts, at least that is what Spanish-speakers from countries like Chile, Colombia, Uruguay, Argentina, and Mexico have said. That being said,

**Table 1.** Descriptive Statistics of the Spanish Sample, by Occupational Category

SOC Occupational Category	Age (years)			Job Tenure (years)		Sex (% men)
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
1. Management	244	45.42	10.85	15.33	11.77	63
2. Business and financial	79	36.54	10.58	8.56	9.69	47
3. Computer and mathematical	24	34.38	12.97	7.22	9.92	75
4. Architecture and engineering	12	35.17	13.22	11.29	12.13	83
5. Life, physical, and social science	24	29.96	7.61	3.85	4.25	38
6. Community and social services	4	35.00	12.83	6.25	4.19	0
7. Legal	12	44.91	11.16	15.33	10.46	83
8. Education, training, and library	63	39.30	12.01	12.69	10.80	32
9. Arts, design, entertainment, sports, and media	39	35.41	12.48	9.08	11.11	54
10. Healthcare practitioners and technical	41	39.90	12.88	12.08	10.92	20
11. Healthcare support	19	41.00	11.06	12.61	10.69	5
12. Protective service	15	41.73	10.83	9.87	9.14	53
13. Food preparation and serving related	24	36.96	12.95	5.83	6.91	38
14. Personal care and service	17	41.82	15.08	9.41	9.70	47
15. Sales and related	107	34.21	11.91	7.25	8.25	32
16. Office and administrative support	171	40.06	12.64	12.11	11.77	39
17. Farming, fishing, and forestry	1	–	–	–	–	100
18. Construction and extraction	31	36.39	13.10	9.92	11.13	87
19. Installation, maintenance, and repair	42	41.36	12.35	13.43	11.65	76
20. Production	28	38.50	13.51	10.21	11.91	64
21. Transportation and material moving	20	42.05	14.15	11.33	9.76	95
22. Military specific	4	27.00	5.42	6.50	7.77	75
23. Building and grounds cleaning and maintenance	14	47.64	8.89	12.71	11.61	0
Total	1035	39.79	12.50	11.40	11.07	49

Note: *N* = 1035

there are no doubt differences that would justify empirical research to verify results, or at least an expert panel for each country in the Spanish-speaking world.

The sociocultural adaptation of items might be the most critical factor of all in the translation process. A back-translation technique was utilized, along with an expert panel in which up to eight judges took part, all with knowledge of the subject and adequate mastery of both languages. First of all, experts on this subject with mastery of both languages translated the original instrument. In so doing, their criterion was to strive to conserve each question's exact meaning, varying only their idiomatic expression when necessary. We then proceeded to back-translation, and high equivalency was found between the original test and the back-translated version generated by independent translators. Last, the aforementioned expert panel was convened. Its main objective was to make sure questions have sense and clarity, and to correct any possible errors of content or format, thereby producing the final version of the instrument.

A notable departure from the original test is the items' order. As described above, Morgeson and Humphrey grouped items pertaining to each characteristic together,

like Schriesheim et al. (1989) recommend, instead of randomly distributing items throughout the data-collection instrument. In the present case, items were sequentially distributed to maximize the distance on the final form between any two items corresponding to the same characteristic. To do so, items were numbered like on the original form, then reordered according to the following pattern: 1, 10, 20, 30, 40, 50, 60, 70, 2, 11, 21, ... etc. Thus, nine items from other categories were presented between any two items that measure the same characteristic. Obviously, since not all characteristics have the same number of items, it was not always possible to maintain the exact same distance between them. This approach avoided an important issue that many subjects reported – the similarity of various items, which in a few cases led participants to reject the test entirely and stop. The appendix includes the relation between the original WDQ items and their respective versions in Spanish, and the details about their order.

The data collection process was quite similar to the one Morgeson and Humphrey utilized, recruiting students in their last year of university. They were asked to administer the questionnaire in paper-and-pencil form to

family members, kin, and acquaintances with full-time work experience of three years or more, and at least six months' tenure in their current job. The questionnaire was administered first, then a brief interview was conducted to determine the job's main tasks and other duties, and match those to jobs in the Dictionary of Occupational Titles and their corresponding O\*NET codes. This ensured data from a wide variety of jobs.

As far as data analysis procedures, to establish the instrument's factor structure, we followed a similar plan as the WDQ's authors. Using a confirmatory factor analysis (CFA) technique, we were able to obtain empirical evidence of the instrument's construct validity and internal dimensionality (Williams, Ford, & Nguyen, 2004). Six different models were compared; they were based on conceptual elements of the instrument. The first, one-factor model was used to test whether participants would manage to distinguish among the instrument's different dimensions. The second model has four factors, corresponding to the four major categories discussed in the work characteristics literature review (Task Motivational, Knowledge Motivational, Social, and Contextual). The third model has 18 factors, corresponding to the dimensions of work specified *a priori*. The fourth model is the same as the third, except Interdependence is split into Initiated and Received, so it consists of 19 factors. The fifth model has 20 factors; it is the 18-factor model (third model) with the Autonomy variable broken down into three components: Work scheduling autonomy, Decision-making autonomy, and Work methods autonomy. The sixth and final model, with 21 factors, makes both those changes to the third model, that is, it divides both Interdependence and Autonomy.

All models but the first, with one factor, were extracted from the authors' original model, displayed in Figure 1. This technique was believed to be the best for several reasons: a) Theoretically, various factor structures were possible, and CFA made it possible to test different alternative models' goodness of fit; thus, a model would not be selected based on its goodness of fit alone, but on its goodness of fit relative to different available options. b) Theoretical models are previously defined, and by testing various models, the researcher is less likely to favor one model over the others, which tends to occur in exploratory factor analysis (EFA).

To determine the six models' (1, 4, 18, 19, 20, and 21 factors) goodness of fit, we utilized the four goodness of fit indicators that were used in constructing the original instrument:  $\chi^2/df$ , comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). In addition, three indicators were calculated that were not included in Morgeson and Humphrey's original study: the Tucker-Lewis index (TLI), Akaike information

criterion (AIC), and Bayesian information criterion (BIC).

Regarding the goodness of fit levels found through CFA, according to the indices that appear in the literature, a  $\chi^2/df$  ratio less than or equal to 3 indicates acceptable goodness of fit, but that index is strongly affected by sample size (Hair, Black, Babin, & Anderson, 2010); values of RMSEA under 0.03 indicate excellent goodness of fit to the data, under 0.05 very good, and under 0.08 good (Williams et al., 2004); meanwhile, SRMR values under 0.08 indicate good fit to the data, while values less than or equal to 0.09 are acceptable as long as RMSEA or CFI corroborates the model's goodness of fit (Hu & Bentler, 1999); finally, values of CFI equal to 0.95 would indicate that a model shows good fit to the data (Hair et al., 2010; Hu & Bentler, 1999), though some authors maintain that values of .90 or even .80 are acceptable (Hair et al., 2010). As for the additional indicators, TLI values closest to 1 show the best fit; meanwhile, the indicators BIC and AIC, which serve to compare models, tend to penalize complexity so the higher their value, the lower a model's goodness of fit (Arbuckle, 2013). In addition, magnitudes of increase and decrease were applied as criteria: first, as Chen (2007) proposed, RMSEA increases of less than 0.015 indicate irrelevant differences that may support the most parsimonious model; and second, as Cheung and Rensvold (2002) suggested, decreases in CFI of more than 0.01 will be considered relevant.

In analyzing convergent and discriminant validity indexes, we followed Shipp, Burns, and Desmul's guidelines (2010). They suggest that as a convergent validity index, item-factor loadings should exceed .70, and that how many of those loadings are significant should be considered as well. Meanwhile, for discriminant validity, they suggest that correlations between factors not exceed .85.

CFA was carried out using maximum likelihood estimation and the statistics program IBM SPSS AMOS, version 20. Now given that maximum likelihood estimation is sensitive to not meeting the assumption of normal distribution, we tested for noticeable deviation in the data using Mardia's test of multivariate normality (Mardia, 1974). We also retested the proposed structure using a bootstrap method, which meant retesting the structure in 200 random replacement samples.

The sample's descriptive statistics were analyzed as well, including disaggregated data by occupational category and analysis of the skewness and kurtosis of all the scales' items. Furthermore, we applied reliability analysis based on Cronbach's alpha, and mean difference analysis to determine whether the dimensions of the WDQ can detect differences between occupations (like in the original study). All those analyses



were carried out using the statistics program IBM SPSS, version 20.

**Results**

*Factor structure of the WDQ in spanish*

In determining multivariate normality, Mardia's coefficient yielded standardized values all under the recommended maximum of 5 points: Task Motivational Work Characteristics = 2.197; Knowledge Motivational Work Characteristics = 1.844; Social Work Characteristics = 1.1756; Physical or Contextual Work Characteristics = 1.316.

Bootstrap estimations yielded almost negligible biases in the estimators obtained through maximum likelihood estimation. The bias of loadings on the dimensions of Task Motivational Work Characteristics ranged from -.004 to .008, with bias in standard error ranging from -.003 to .002 on task dimensions. Bias in factor loadings on Knowledge Motivational Characteristics fell between 0 and 0.151, with bias in corresponding standard error ranging from -.005 to .001. The bias in factor loadings on Social Work Characteristics ranged from -.005 to 0.103, with bias in standard error between -.007 and .004. Bias in factor loadings on Contextual Work Characteristics ranged from -.003 to .007, with bias in corresponding standard error ranging from -.004 to .001. Nevertheless, none of these biases reached the level of statistical significance with respect to zero.

As far as CFA results, Table 2 presents goodness of fit statistics for each proposed model, in the cultural adaptation as well as the original version of the instrument (except the single-factor model). We observed that the one-factor model, which was not included in the U.S. version but was in this adaptation, had the poorest goodness of fit, especially judging from comparative fit indices, which were the most important in this case: CFI, BIC, and AIC, indicating that participants were indeed able to distinguish among factors. Second, we observed that the pattern of goodness of fit improvement across the proposed models was similar in the two populations, consistent with the U.S. study, particularly when it comes to RMSEA. Larger discrepancies were observed, however, in the goodness of fit indices CFI and SRMR; but the models' ranking according to comparative fit followed a similar pattern. Keep two things in mind. First, the sample size used in the cultural adaptation is practically twice that of the U.S. study, which has a negative impact, increasing the magnitude of different goodness of fit statistics in the Spanish sample. Second, every single model showed fewer degrees of freedom in the U.S. sample, leading us to assume the original authors set restrictions on their models to

**Table 2.** Confirmatory Factor Analysis Results from the WDQ by Morgeson and Humphrey (2006) and Its Spanish Adaptation

Work Design Model	$\chi^2$ (US)	$\chi^2$ (SP)	Df (US)	Df (SP)	ratio $\chi^2/df$ (US)	ratio $\chi^2/df$ (SP)	SRMR (US)	SRMR (SP)	RMSEA (US)	RMSEA (SP)	CFI (US)	CFI (SP)	TLI (SP)	AIC (SP)	BIC (SP)
1 factor	-	31540	-	2850	-	11.06	-	0.11	-	0.09	-	0.34	0.32	31846.98	32603.13
4 factors	19010	23745	2839	2849	6.70	8.33	0.12	0.16	0.11	0.08	0.40	0.52	0.51	24056.78	24814.87
18 factors	5686	11938	2678	2817	2.12	4.23	0.06	0.15	0.05	0.06	0.89	0.79	0.78	12310.72	13229.96
19 factors (split interdependence)	5280	11714	2659	2813	1.99	4.16	0.06	0.15	0.04	0.05	0.90	0.79	0.78	12094.26	13033.27
20 factors (split autonomy)	5435	11382	2639	2806	2.06	4.05	0.06	0.15	0.05	0.05	0.90	0.80	0.79	11776.26	12946.86
21 factors	5027	11157	2618	2802	1.92	3.98	0.06	0.15	0.04	0.05	0.91	0.81	0.80	11559.80	12553.17

Note: N = 540 (US; United States sample); N = 1035 (SP; Spanish sample); SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation; CFI = comparative fit index. Additional indicators (Spanish SP sample only): TLI = Tucker-Lewis index; AIC = Akaike information criterion; BIC = Bayesian information criterion. The 1-factor model was only tested in the Spanish adaptation process.

improve goodness of fit (maybe by correlating error terms) that were not sufficiently documented. With that in mind, one might think the goodness of fit values reported in the U.S. sample are overly benign; but that does not prevent us from comparing models relative to one another.

Regarding the additional indicators utilized (TLI, and to compare models, BIC and AIC), the 21-factor model continues to show the best goodness of fit, despite being the most complex. In effect, these indicators penalize complexity, yet comparing it to the other models, it seems to be the best. Regarding our analysis of the magnitude of increases and decreases, those data also tend to align with the 21-factor model proposed by the authors. While some increases in RMSEA are slightly less than 0.015, which might prompt a search for a more parsimonious solution, the decreases in CFI are slightly greater than .01, supporting the factor solution the authors proposed. That finding along with considerations presented above support the 21-factor solution.

Once the 21-factor model was identified as fitting the Spanish adaptation best (same case for the U.S. version), we analyzed factor configurations corresponding to each of the four major categories of work characteristics. Thus, CFA was applied to Task Motivational Work Characteristics (7 factors), another to Knowledge Motivational Work Characteristics (5 factors), a third CFA explored Social Work Characteristics (5 factors), and a fourth examined Physical or Contextual Work Characteristics (4 factors). Table 3 presents goodness of fit indices obtained using said analysis strategy.

Based on those criteria, it can be said that all the indexes computed, except  $\chi^2/df$ , suggest good fit between the models and the data, indicating that the underlying factor structure of work design, per the WDQ, was reproduced in this empirical study's data. Figures 2, 3, 4, and 5 present the structures resulting from the various CFAs that determined the 21-factor model to be superior. Given the large sample size, the poor performance of the  $\chi^2/df$  statistic was to be expected.

### *Convergent and discriminant validity indices of the WDQ in spanish*

The following results present item-factor loadings, which provide convergent validity indexes, and correlations between factors, which provide discriminant validity indexes. Observing Figure 2, the three sub-factors of Task Motivational Characteristics (Work Scheduling Autonomy, Decision-making Autonomy, and Work Methods Autonomy) are highly correlated with one another, with values ranging from .82 to .91, and may constitute a unified autonomy factor, which is consistent with the current literature. Nonetheless, differentiating between these factors improves goodness of fit and, as the Discussion section will analyze, that is the most theory-consistent choice although it is not entirely consistent with discriminant validity indexes. The other four factors (Task Variety, Task Significance, Task Identity, and Feedback from Job) correlated with each other with coefficients ranging from .03 to .39, allowing for a discussion of relative independence between them all, with reasonable discriminant validity indexes. It is noteworthy that the Feedback from Job subfactor showed important correlations with the other subfactors, ranging from .30 to .49. All indicators' loadings on their corresponding factors were significant ( $p < .001$ ), ranging in magnitude from .42 (pertaining to R66) to .92 (corresponding to R41), so generally speaking, they meet the convergent validity requirements.

In Figure 3, which portrays CFA results for the dimension Knowledge Motivational Characteristics, the correlations between different subfactors and items in each subfactor appear. Relations between subfactors were high, ranging from .51 (Job Complexity and Problem Solving) to .96 (Information Processing and Problem Solving). In other words, the Problem Solving subfactor had the highest correlation, with Information Processing, as well as the lowest, with Job Complexity. These results suggest a set of interrelated factors should be discussed, which would justify their treatment as an independent block. In terms of correlation coefficients between factors, we maintain they are

**Table 3.** *Confirmatory Factor Analysis Results for the Spanish Adaptation of the WDQ by Morgeson and Humphrey (2006), According to Macro Work Design Factors*

Work Design Model	$\chi^2$	df	ratio $\chi^2/df$	SRMR	RMSEA	CFI	TLI
Motivational work characteristics: task (7 factors)	1026.16	231	4.44	0.07	0.05	0.95	0.94
Motivational work characteristics: knowledge (5 factors)	1428.71	160	8.92	0.05	0.08	0.86	0.84
Social work characteristics (5 factors)	848.83	142	5.97	0.06	0.06	0.90	0.88
Physical or contextual work characteristics (4 factors)	560.54	71	7.89	0.07	0.08	0.93	0.91

Note: N = 1035 (SP: Spanish sample). SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index.

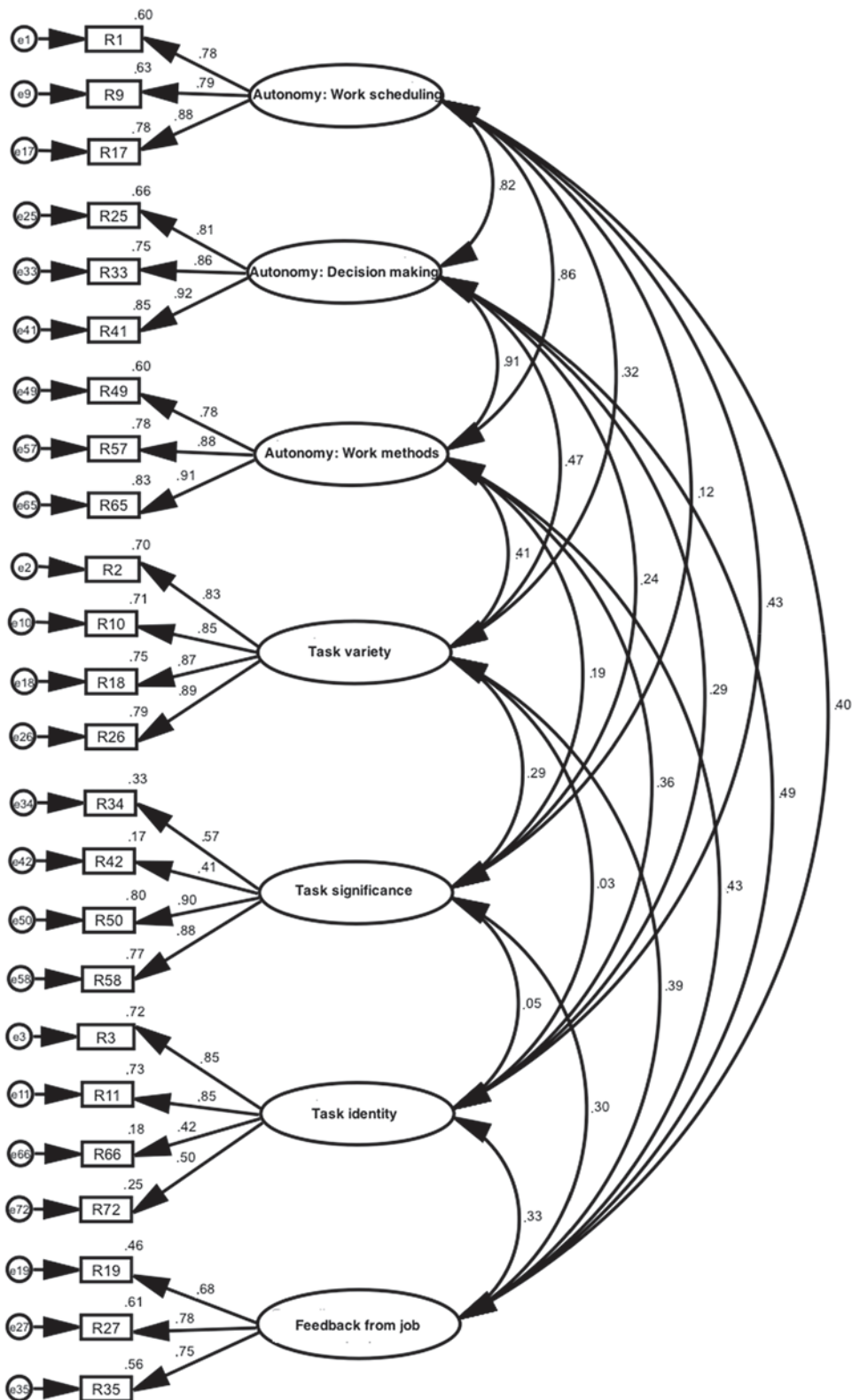


Figure 2. Task Motivational Work Characteristics.

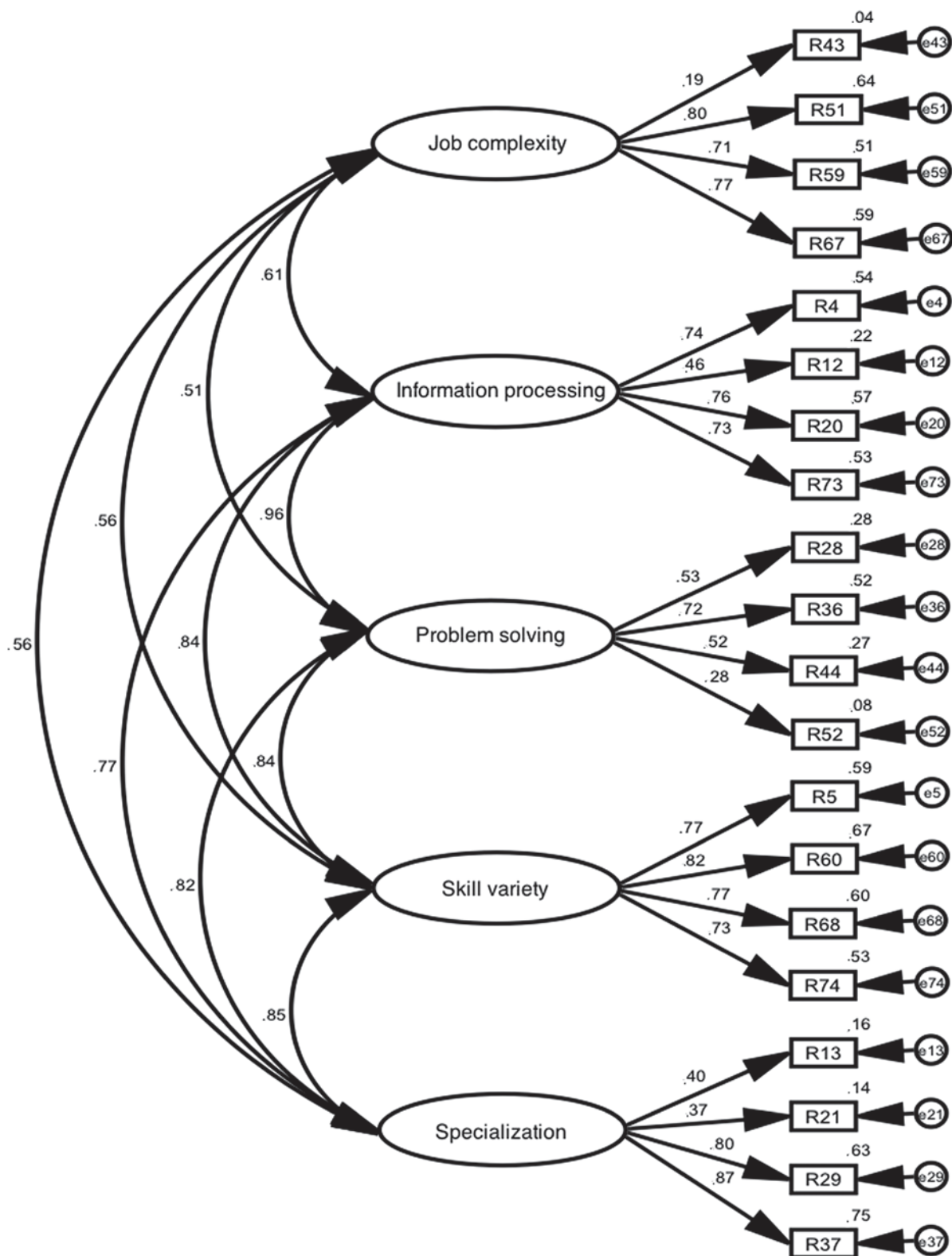


Figure 3. Knowledge Motivational Work Characteristics.



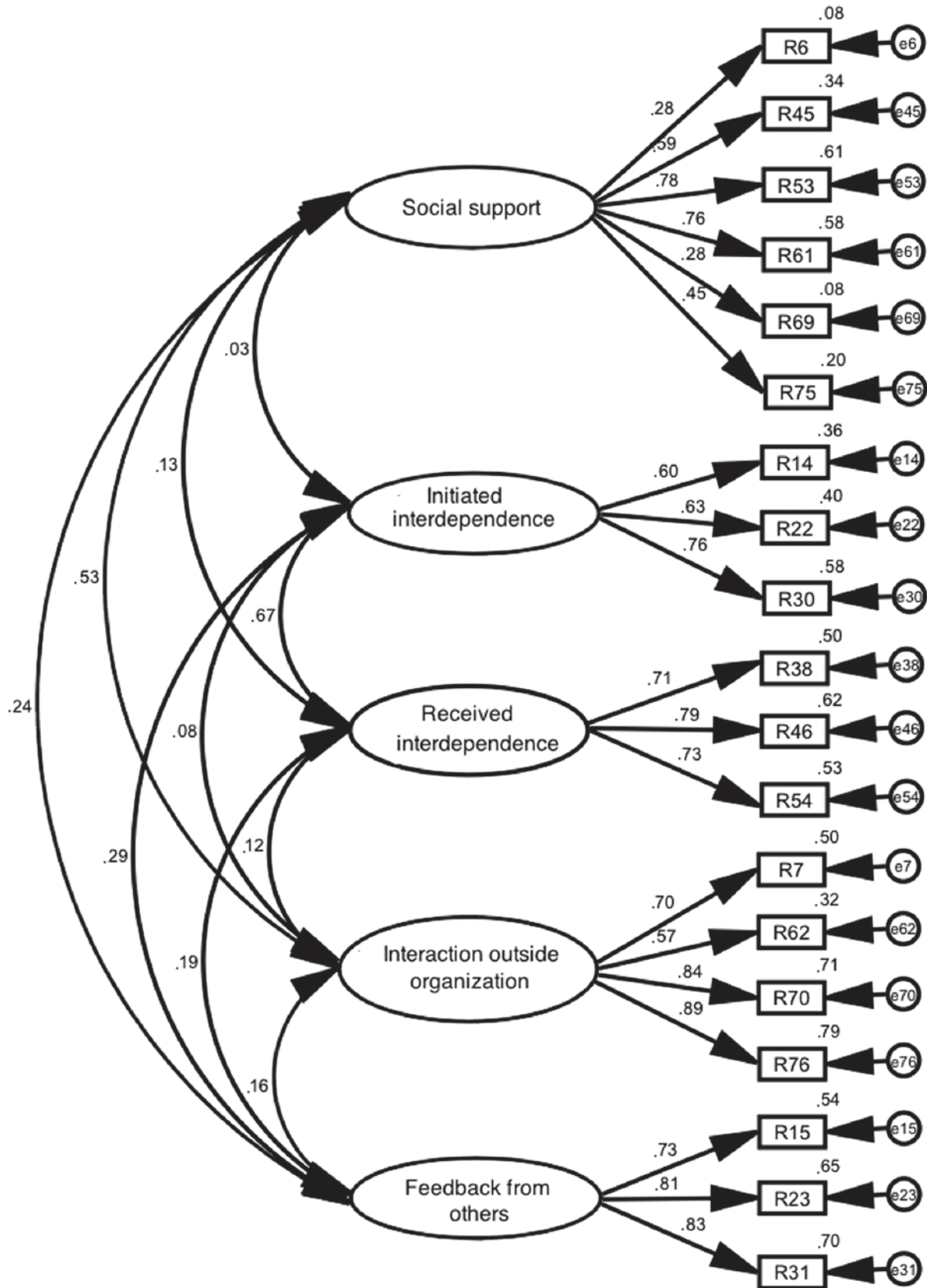


Figure 4. Social Work Characteristics.

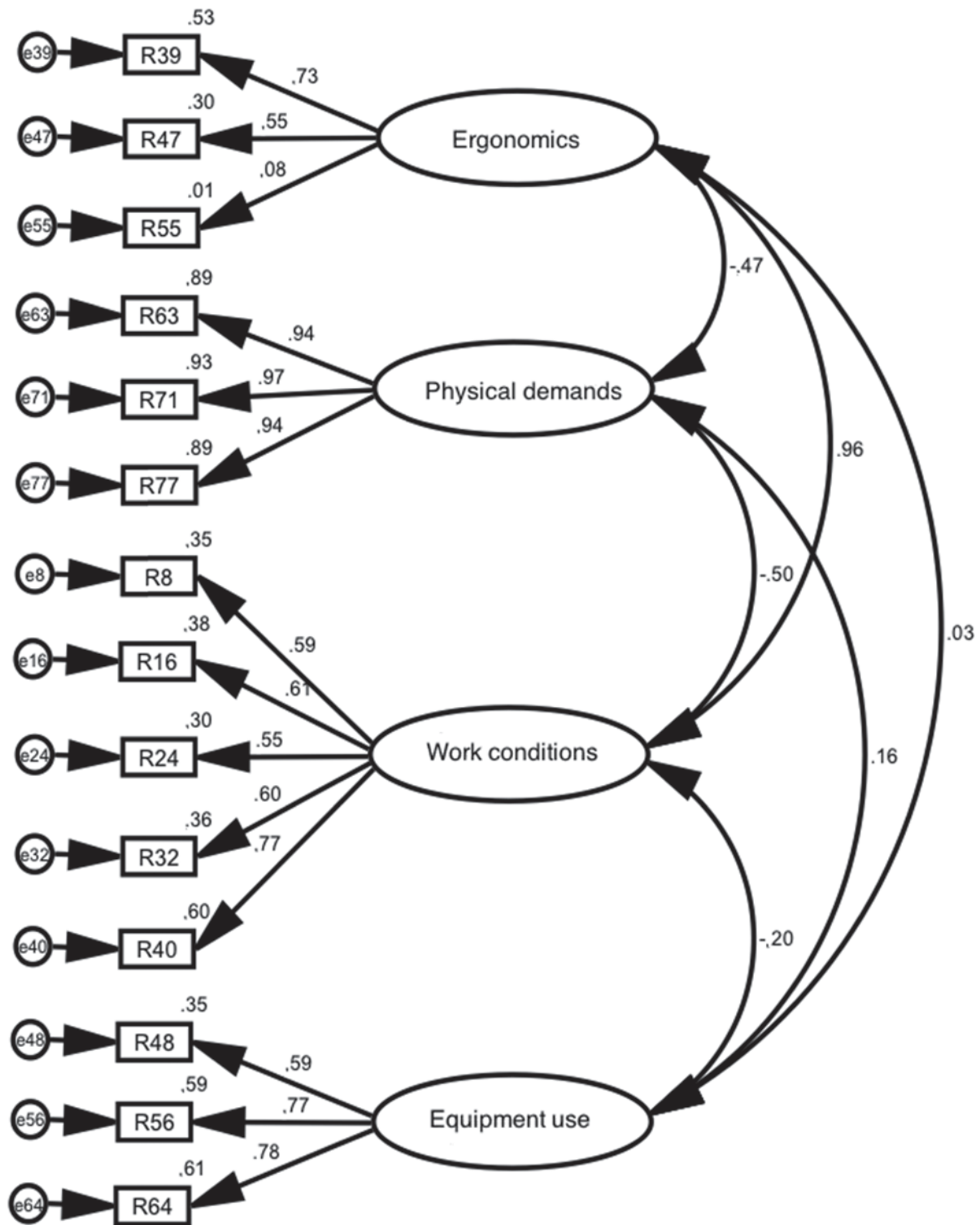


Figure 5. Contextual Work Characteristics.

reasonable evidence of discriminant validity. In this case, item loadings onto their respective factors were relatively low, two were under .30; nonetheless, the remaining item-factor correlations easily account for convergent validity.

Figure 4 describes the CFA pertaining to Social Work Characteristics. Here, five subfactors are found with correlations ranging from .03 (Social Support and Initiated Interdependence) to .67 (Initiated Interdependence and Received Interdependence). Relations among different

subfactors were moderate, which can provide discriminant validity evidence. Most of the loadings were over .60, with more than half over .70 and only two under .30; the above leads us to maintain that in general, evidence of convergent validity was found.

And finally, Figure 5 describes the CFA corresponding to Contextual Work Characteristics, finding four subfactors with correlations ranging from .03 to .96. Notice there were negative correlations between Ergonomics and Physical Demands (-.47), Physical Demands and Work Conditions (-.50), and Work Conditions and Equipment Use (-.20). The highest correlation was found between Ergonomics and Work Conditions (.96), and the lowest was between Ergonomics and Equipment Use (.03); in general, correlation coefficients were moderate, so it can be said that evidence of discriminant validity was found. All loadings were over 0.5, except for item R55, which was extremely low (0.08). Given these data, in this case, there is no clear, identifiable evidence of convergent validity.

#### *Reliability of the spanish-language WDQ scales*

Table 4 presents different descriptive statistics pertaining to items on the scales of the Spanish-language WDQ, including skewness and kurtosis data. Responses to each item clearly show adequate dispersion across response options, demonstrating the instrument's ability to measure different levels of these features. Furthermore, the items in general show good correlations with their respective dimensions, conveying their theoretical belonging. In reference to Contextual/Physical dimensions, these showed weaker performance that, as you will see, is associated with results on the Ergonomics dimension.

Table 5 presents various descriptive and psychometric statistics pertaining to the WDQ. Means and standard deviations are displayed in the first two columns. The data indicate acceptable variability, but as expected, a certain trend toward the middle of the response scale. The third column addresses internal consistency, reporting Cronbach's alpha values for each scale. The numbers are good or very good, except on the Ergonomics (.38) and Problem Solving (.60) scales, where internal consistency did not meet the accepted minimums for psychometric goodness of fit (around .70); on the weakest dimension, Ergonomics, although a slight change in internal consistency is observed when the inverse item is eliminated (it becomes .56), it was not enough to impact the instrument's reliability (global internal consistency and mean reliability were unchanged) or other results (descriptive statistics and the instrument's goodness of fit results), so it was kept. On the whole, Cronbach's alpha values are slightly lower in the Spanish sample than in the U.S. sample, but on

various scales – Decision Making Autonomy, Work Methods Autonomy, and Physical Demands – they are slightly higher in the Spanish sample. The global internal consistency (of 77 items) obtained for this adaptation of the WDQ was Cronbach's alpha of .92, indicating a high level of homogeneity across items. Furthermore, mean reliability for the set of scales was Cronbach's alpha of .77, compared to .87 in the U.S. sample.

The last two columns of Table 5 present interrater correlations (the extent to which judges' ratings of their jobs covary with other workers' ratings, represented as an intra-class correlation coefficient, ICC2; Bliese, 2000) and interrater agreement (the absolute level of agreement among workers, that is, to what extent raters assign the same values on average, with the index  $r_{wg}$ ; James, Demaree, & Wolf, 1984). In general, results suggest that worker agreement is relatively high when they assign scores to work characteristics, with overall agreement in the results of the U.S. and Spanish samples. Differences were found in the ICC2 values of only three work characteristics that Morgeson and Humphrey's original study did not find significant (see Table 5). High levels of interrater agreement ( $r_{wg}$  index) in the U.S. and Spanish samples suggest the results are not the fruit of idiosyncratic perceptions of the people in those samples considering multiple judges were in broad agreement in their ratings of work characteristics.

#### *Occupational indexes of the spanish WDQ's construct validity*

As discussed at the end of the Introduction, Morgeson and Humphrey (2006) formulated four hypotheses about the likelihood that certain occupations would show high or low levels of specific work design characteristics, that being an index of construct validity. Considering the available data about this adaptation and adjusted procedure, we chose to replicate this analysis.

In empirically testing hypotheses, we used the same criteria the original authors used to form occupational categories. Thus, non-professional occupations included jobs in the SOC categories (U.S. Department of Commerce, 2000) "food preparation and serving related occupations," "farming, fishing, and forestry," "construction and extraction," "installation, maintenance, and repair," "production," "transportation and material moving," "military specific occupations," and "building and grounds cleaning and maintenance" (the latter was added in the present study; it was not covered by Morgeson & Humphrey). Professional occupations, on the other hand, included jobs in the remaining SOC categories. Human-life focused

**Table 4.** Descriptive Statistics of Items on the Different Scales of the WDQ in Spanish

Dimension	Item	Mean	Median	Mode	SD	Skewness	SE of skewness	Kurtosis	SE of kurtosis	Min.	Max.	Distribution of responses (%)					Item-dimension correlation	Item-total test correlation	
												1	2	3	4	5			
1	Autonomy: work scheduling	R1	3.64	4.00	4	1.20	-0.69	0.07	-0.37	0.15	1	5	7.5	10.0	21.1	33.1	28.2	0.68	0.42
		R9	3.50	4.00	4	1.25	-0.45	0.07	-0.79	0.15	1	5	8.7	13.4	23.8	27.5	26.6	0.72	0.43
		R17	3.67	4.00	4	1.13	-0.67	0.07	-0.29	0.15	1	5	5.0	11.7	20.3	36.6	26.3	0.77	0.53
2	Autonomy: decision making	R25	3.55	4.00	4	1.20	-0.58	0.07	-0.56	0.15	1	5	7.5	12.9	20.5	35.0	24.2	0.76	0.61
		R33	3.51	4.00	4	1.20	-0.46	0.07	-0.71	0.15	1	5	7.0	14.3	23.6	30.7	24.4	0.81	0.64
		R41	3.50	4.00	4	1.19	-0.45	0.07	-0.71	0.15	1	5	7.0	14.5	23.8	31.0	23.8	0.83	0.63
3	Autonomy: work methods	R49	3.48	4.00	4	1.19	-0.48	0.07	-0.62	0.15	1	5	7.8	13.0	24.6	32.3	22.2	0.73	0.60
		R57	3.39	4.00	4	1.21	-0.40	0.07	-0.68	0.15	1	5	8.4	14.7	25.9	30.6	20.2	0.81	0.53
		R65	3.51	4.00	4	1.20	-0.51	0.07	-0.66	0.15	1	5	7.7	13.9	21.5	33.5	23.3	0.81	0.57
4	Task variety	R2	3.95	4.00	5	1.08	-0.88	0.07	0.07	0.15	1	5	3.3	7.6	18.6	31.5	39.0	0.79	0.55
		R10	3.93	4.00	5	1.04	-0.86	0.07	0.23	0.15	1	5	3.3	6.2	20.5	34.6	35.5	0.80	0.57
		R18	3.89	4.00	5	1.09	-0.87	0.07	0.19	0.15	1	5	3.7	7.3	20.3	33.0	35.5	0.81	0.58
		R26	3.96	4.00	4	1.04	-1.01	0.07	0.66	0.15	1	5	2.9	6.8	16.3	38.1	35.8	0.83	0.58
5	Task significance	R34	3.26	3.00	4	1.37	-0.27	0.07	-1.15	0.15	1	5	15.1	15.8	20.7	24.7	23.7	0.56	0.43
		R42	3.50	4.00	4	1.02	-0.36	0.07	-0.36	0.15	1	5	3.5	12.7	31.4	35.7	16.7	0.41	0.58
		R50	3.18	3.00	4	1.31	-0.20	0.07	-1.06	0.15	1	5	13.8	17.6	24.2	24.8	19.5	0.71	0.43
		R58	3.21	3.00	4	1.31	-0.22	0.07	-1.07	0.15	1	5	13.5	17.7	23.1	25.9	19.8	0.70	0.41
6	Task identity	R3	3.77	4.00	5	1.10	-0.62	0.07	-0.34	0.15	1	5	3.9	9.2	24.8	30.5	31.6	0.63	0.20
		R11	3.85	4.00	4	1.05	-0.75	0.07	0.04	0.15	1	5	2.9	7.8	22.0	35.5	31.7	0.64	0.22
		R66	3.64	4.00	4	1.18	-0.57	0.07	-0.57	0.15	1	5	5.9	12.5	22.2	31.0	28.4	0.42	0.11
		R72	3.37	3.00	4	1.23	-0.34	0.07	-0.82	0.15	1	5	8.9	15.8	25.6	26.8	21.7	0.48	0.27
7	Feedback from job	R19	3.64	4.00	4	1.04	-0.50	0.07	-0.20	0.15	1	5	3.2	10.0	28.5	35.8	22.3	0.59	0.36
		R27	3.47	4.00	4	1.03	-0.41	0.07	-0.16	0.15	1	5	4.5	10.7	34.0	34.3	16.3	0.63	0.51
		R35	3.53	4.00	4	1.10	-0.50	0.07	-0.40	0.15	1	5	5.2	12.6	26.1	36.3	19.8	0.63	0.46
8	Job complexity	R43	3.51	4.00	4	1.31	-0.54	0.07	-0.84	0.15	1	5	10.6	13.4	18.0	29.9	28.1	0.17	0.03
		R51	3.42	4.00	4	1.23	-0.42	0.07	-0.84	0.15	1	5	8.7	16.5	20.7	32.2	21.9	0.59	0.36
		R59	3.30	3.00	4	1.16	-0.27	0.07	-0.74	0.15	1	5	7.7	17.7	27.7	30.9	15.9	0.58	0.23
		R67	3.35	3.00	4	1.17	-0.32	0.07	-0.74	0.15	1	5	7.4	16.8	26.6	31.3	17.9	0.59	0.26



**Table 4.** (Continued)

Dimension	Item	Mean	Median	Mode	SD	Skewness	SE of skewness	Kurtosis	SE of kurtosis	Min.	Max.	Distribution of responses (%)					Item-dimension correlation	Item-total test correlation
												1	2	3	4	5		
9 Information processing	R4	3.33	3.00	4	1.26	-0.28	0.07	-0.94	0.15	1	5	9.9	17.4	24.3	27.1	21.4	0.52	0.66
	R12	4.09	4.00	5	1.02	-1.18	0.07	1.00	0.15	1	5	3.2	4.8	14.3	34.8	42.9	0.41	0.40
	R20	3.68	4.00	4	1.12	-0.64	0.07	-0.30	0.15	1	5	5.0	10.6	22.3	35.4	26.7	0.67	0.61
	R73	3.81	4.00	4	1.09	-0.75	0.07	-0.09	0.15	1	5	4.1	8.5	21.4	34.2	31.9	0.65	0.58
10 Problem solving	R28	3.31	3.00	4	1.23	-0.33	0.07	-0.84	0.15	1	5	10.5	15.6	25.3	30.0	18.6	0.42	0.44
	R36	3.22	3.00	4	1.33	-0.26	0.07	-1.07	0.15	1	5	14.3	16.5	22.0	26.6	20.5	0.43	0.63
	R44	3.34	4.00	4	1.21	-0.31	0.07	-0.64	0.15	1	5	9.1	16.7	23.6	33.0	17.5	0.42	0.44
	R52	2.98	3.00	3	1.14	-0.00	0.07	-0.76	0.15	1	5	11.1	23.3	32.1	23.7	9.9	0.23	0.22
11 Skill variety	R5	3.86	4.00	4	1.05	-0.78	0.07	0.05	0.15	1	5	3.2	7.5	21.1	36.0	32.2	0.48	0.61
	R60	3.80	4.00	4	1.01	-0.80	0.07	0.42	0.15	1	5	3.0	7.4	21.6	41.8	25.9	0.60	0.58
	R68	3.82	4.00	4	0.99	-0.76	0.07	0.32	0.15	1	5	2.7	7.0	22.4	41.0	26.9	0.56	0.56
	R74	3.21	3.00	4	1.20	-0.27	0.07	-0.73	0.15	1	7	11.1	16.0	27.7	30.7	14.3	0.34	0.57
12 Specialization	R13	3.76	4.00	4	1.09	-0.64	0.07	-0.29	0.15	1	5	3.7	10.0	22.9	33.9	29.6	0.39	0.40
	R21	3.63	4.00	4	1.15	-0.54	0.07	-0.49	0.15	1	5	5.1	12.1	24.5	31.2	27.0	0.39	0.30
	R29	3.91	4.00	4	1.08	-0.94	0.07	0.25	0.15	1	5	4.1	8.0	16.0	37.1	34.8	0.62	0.53
	R37	3.60	4.00	4	1.07	-0.54	0.07	-0.31	0.15	1	5	4.3	11.5	25.3	37.4	21.5	0.58	0.64
13 Social support	R6	3.97	4.00	5	0.99	-0.81	0.07	0.16	0.15	1	5	2.0	6.2	20.2	35.7	35.9	0.39	0.18
	R45	3.62	4.00	4	1.12	-0.49	0.07	-0.50	0.15	1	5	4.5	11.6	26.7	31.5	25.7	0.55	0.35
	R53	4.16	4.00	5	1.03	-1.27	0.07	1.26	0.15	1	7	2.8	5.5	11.8	32.2	47.5	0.45	0.35
	R61	4.14	4.00	5	0.97	-1.18	0.07	1.13	0.15	1	5	2.0	4.8	14.0	34.5	44.5	0.49	0.31
	R69	3.17	3.00	3	1.29	-0.20	0.07	-0.99	0.15	1	5	13.5	17.2	25.5	25.2	18.4	0.35	0.30
	R75	3.52	4.00	4	1.06	-0.50	0.07	-0.09	0.15	1	5	4.7	10.0	31.4	35.4	18.4	0.53	0.35
14 Initiated interdependence	R14	2.80	3.00	1	1.36	0.12	0.07	-1.19	0.15	1	5	23.5	20.0	22.7	19.9	13.8	0.48	0.25
	R22	3.06	3.00	4	1.43	-0.11	0.07	-1.31	0.15	1	5	21.0	15.9	19.9	22.2	21.0	0.48	0.33
	R30	2.83	3.00	2	1.35	0.08	0.07	-1.13	0.15	1	5	20.6	22.3	21.6	21.1	13.7	0.58	0.25
15 Received interdependence	R38	3.23	3.00	3	1.16	-0.17	0.07	-0.74	0.15	1	5	8.3	18.0	31.7	26.3	15.7	0.59	0.31
	R46	3.19	3.00	4	1.28	-0.22	0.07	-1.01	0.15	1	5	12.3	19.1	22.8	28.1	17.6	0.66	0.22
	R54	2.93	3.00	3	1.31	0.01	0.07	-1.13	0.15	1	5	18.2	21.4	23.5	22.9	14.1	0.61	0.14

Table 4. (Continued)

Dimension	Item	Mean	Median	Mode	SD	Skewness	SE of skewness	Kurtosis	SE of kurtosis	Min.	Max.	Distribution of responses (%)					Item-dimension correlation	Item-total test correlation
												1	2	3	4	5		
16 Interaction outside organization	R7	3.58	4.00	5	1.39	-0.53	0.07	-1.03	0.15	1	5	11.4	14.0	16.8	21.2	36.6	0.64	0.38
	R62	2.55	2.00	1	1.40	0.48	0.07	-1.07	0.15	1	5	30.0	26.9	15.3	14.0	13.8	0.53	0.32
	R70	3.52	4.00	5	1.35	-0.54	0.07	-0.95	0.15	1	5	11.5	14.4	15.1	28.7	30.3	0.72	0.36
	R76	3.54	4.00	5	1.35	-0.53	0.07	-0.96	0.15	1	5	11.0	14.2	16.5	26.0	32.3	0.76	0.34
17 Feedback from others	R15	2.43	2.00	2	1.19	0.51	0.07	-0.60	0.15	1	5	26.4	29.9	24.9	11.9	7.0	0.65	0.27
	R23	2.82	3.00	3	1.22	0.14	0.07	-0.90	0.15	1	5	16.5	25.0	28.6	19.4	10.4	0.70	0.32
	R31	2.78	3.00	3	1.16	0.07	0.07	-0.77	0.15	1	5	15.7	24.9	31.3	20.5	7.2	0.71	0.36
18 Ergonomics	R39	3.29	4.00	5	1.44	-0.35	0.07	-1.19	0.15	1	5	18.3	11.8	19.0	24.3	26.5	0.32	0.23
	R47	3.34	3.00	4	1.20	-0.34	0.07	-0.73	0.15	1	5	9.1	14.5	28.2	29.2	19.0	0.32	0.23
	R55	2.79	3.00	3	1.14	0.17	0.07	-0.69	0.15	1	5	14.1	27.2	32.4	18.0	8.3	0.05	-0.38
19 Physical demands	R63	2.12	2.00	1	1.34	0.92	0.07	-0.43	0.15	1	5	47.5	20.6	13.1	9.7	9.1	0.91	0.01
	R71	2.00	1.00	1	1.29	1.08	0.07	-0.08	0.15	1	5	52.0	20.1	11.2	9.3	7.4	0.93	0.02
	R77	2.06	1.00	1	1.32	0.99	0.07	-0.31	0.15	1	5	50.1	19.9	11.7	10.1	8.1	0.91	0.02
20 Work conditions	R8	3.17	3.00	4	1.39	-0.20	0.07	-1.24	0.15	1	5	17.0	17.5	18.5	25.6	21.4	0.79	0.11
	R16	3.43	4.00	4	1.26	-0.48	0.07	-0.79	0.15	1	5	10.1	14.2	20.3	32.9	22.4	0.48	0.24
	R24	3.51	4.00	5	1.44	-0.50	0.07	-1.13	0.15	1	5	14.4	13.5	14.6	21.9	35.6	0.48	0.02
	R32	3.57	4.00	5	1.51	-0.61	0.07	-1.12	0.15	1	5	17.1	10.4	11.3	20.6	40.6	0.53	0.07
	R40	3.87	4.00	5	1.18	-0.93	0.07	0.01	0.15	1	5	6.1	8.2	15.8	32.6	37.3	0.63	0.22
21 Equipment use	R48	2.84	3.00	3	1.27	0.15	0.07	-1.00	0.15	1	5	18.1	24.1	26.7	18.5	12.8	0.51	0.32
	R56	3.00	3.00	3	1.31	-0.02	0.07	-1.06	0.15	1	5	16.6	19.5	27.1	20.6	16.1	0.62	0.31
	R64	2.54	2.00	3	1.24	0.35	0.07	-0.87	0.15	1	5	26.2	24.4	26.4	15.2	7.8	0.61	0.24

Note: N = 1035

**Table 5.** Means, Deviations, Reliability, and Statistics According to the 21-factor Model in U.S. and Spanish Samples

Construct	M (US)	M (SP)	SD (US)	SD (SP)	Internal Consistency <sup>a</sup> (US)	Internal Consistency <sup>a</sup> (SP)	Interrater Reliability <sup>b</sup> (US)	Interrater Reliability <sup>b</sup> (SP)	Interrater Agreement <sup>c</sup> (US)	Interrater Agreement <sup>c</sup> (SP)
<i>Task Characteristics</i>										
Work scheduling autonomy	3.93	3.60	.89	1.05	.85	.85	.53**	.66**	.76	.72
Decision making autonomy	4.12	3.52	.74	1.09	.85	.90	.46**	.75**	.84	.70
Work methods autonomy	3.99	3.45	.80	1.09	.88	.89	.44**	.73**	.79	.70
Task variety	4.13	3.93	.69	.95	.95	.92	.34**	.74**	.91	.77
Task significance	3.95	3.28	.81	.98	.87	.79	.30**	.48**	.80	.76
Task identity	3.61	3.65	.84	.86	.88	.74	.21*	.42**	.77	.81
Feedback from job	3.91	3.54	.64	.88	.86	.78	.01	.54**	.82	.81
<i>Knowledge Characteristics</i>										
Job complexity	3.85	3.39	.73	.87	.87	.69	.31**	.35**	.81	.81
Information processing	4.31	3.72	.67	.86	.87	.76	.58**	.45**	.92	.81
Problem solving	3.78	3.21	.83	.83	.84	.60	.38**	.27**	.83	.83
Skill variety	4.24	3.67	.59	.88	.86	.85	.27**	.58**	.90	.80
Specialization	3.99	3.72	.72	.80	.84	.71	.29**	.38**	.82	.84
<i>Social Characteristics</i>										
Social support	4.12	3.76	.52	.70	.82	.72	.29**	.30**	.91	.88
Initiated interdependence	3.56	2.89	.82	1.09	.80	.70	.14	.44**	.68	.70
Received interdependence	3.69	3.11	.86	1.04	.84	.78	.40**	.55**	.75	.73
Interaction outside organization	3.54	3.29	1.03	1.12	.91	.84	.51**	.56**	.82	.68
Feedback from others	3.54	2.67	.72	1.03	.88	.83	.07	.62**	.78	.73
<i>Work Context</i>										
Ergonomics	3.70	3.14	.77	.84	.64	.38	.42**	.17**	.80	.82
Physical demands	2.33	2.06	1.11	1.27	.95	.96	.53**	.90**	.77	.59
Work conditions	3.64	3.50	1.00	.96	.87	.76	.58**	.38**	.83	.77
Equipment use	3.37	2.79	.93	1.04	.82	.76	.41**	.51**	.70	.73

Table 5. (Continued)

Construct	<i>M</i> (US)	<i>M</i> (SP)	<i>SD</i> (US)	<i>SD</i> (SP)	Internal Consistency <sup>a</sup> (US)	Internal Consistency <sup>a</sup> (SP)	Interrater Reliability <sup>b</sup> (US)	Interrater Reliability <sup>b</sup> (SP)	Interrater Agreement <sup>c</sup> (US)	Interrater Agreement <sup>c</sup> (SP)
<i>Results and Correlations</i>										
Satisfaction	4.25		.56		.86		.36**		.92	
Training requirements	3.41		1.17							
Compensation requirements	52688		26101							
Relationship to data	4.08		1.42							
Cognitive ability	3.01		.69							
Information about work activities	3.40		1.03							
Relationship with people	3.18		2.17							
Communication activities	3.03		.90							
Physical ability	1.13		.82							
Performance on physical work activities	2.31		.72							
Physical work context	2.19		.39							

Note: <sup>a</sup> Alpha coefficient.

<sup>b</sup>ICC(2).

<sup>c</sup> $r_{wg}$ .



**Table 6.** Means on Work Characteristics by Occupational Category

Work Design Characteristics	Occupational Category	
	Professional	Non-professional
Job complexity	3.43	3.19
Information processing	3.81	3.25
Problem solving	3.25	2.97
Skill variety	3.71	3.46
Specialization	3.74	3.60
Work scheduling autonomy	3.67	3.20
Decision making autonomy	3.59	3.11
Work methods autonomy	3.53	3.07
Physical demands	1.87	3.03
Work conditions	3.62	2.87
	Human Life-Focused	Not Human Life-Focused
Task significance	3.99	3.22
	Sales	Non-Sales
Interaction outside organization	3.82	3.23

Note: All means were significantly different across occupational categories.

occupations, meanwhile, included jobs in the categories “community and social services,” “healthcare practitioners and technical,” “healthcare support,” and “protective service” occupations; not human life-focused occupations included all remaining occupational categories. Finally, sales occupations were jobs in the category “sales and related;” job titles in all other categories were considered non-commercial – or non-sales – jobs.

The occupational structure described above, and results, appear in Table 6. Evidently jobs in professional occupations had higher levels of Knowledge Characteristics, that is Job Complexity,  $t(1033) = 3.20$ ,  $p < .001$ ; Information Processing,  $t(1033) = 7.80$ ,  $p < .001$ ; Problem Solving,  $t(1033) = 3.95$ ,  $p < .001$ ; Skill Variety,  $t(1033) = 3.33$ ,  $p < .001$ ; and Specialization,  $t(1033) = 1.99$ ,  $p < .046$ . Professional job also showed higher levels of Work Scheduling Autonomy,  $t(1033) = 5.36$ ,  $p < .001$ ; Decision Making Autonomy,  $t(1033) = 5.21$ ,  $p < .001$ ; and Work Methods Autonomy,  $t(1033) = 4.93$ ,  $p < .001$ . As a result, Hypothesis 4a was confirmed for the eight work design characteristics considered. Morgeson and Humphrey (2006) did not manage to gather support for the Specialization characteristic; the present study did, though its effect size was small.

With respect to Hypothesis 4b, we found that jobs in non-professional occupations showed higher levels of Physical Demands,  $t(1033) = 11.25$ ,  $p < .001$ , and less favorable Work Conditions,  $t(1033) = 9.56$ ,  $p < .001$ , lending empirical support to our hypothesis. As for Hypothesis 4c, it has empirical support in the finding that jobs in human-life focused occupations displayed

higher levels of Task Significance,  $t(1033) = 6.71$ ,  $p < .001$ . Finally, jobs in sales occupations exhibited higher levels of Interaction Outside the Organization,  $t(1033) = 5.23$ ,  $p < .001$ , thus confirming Hypothesis 4d.

## Discussion

This study’s main objective was to adapt the most comprehensive, thorough measure of work design available, the Work Design Questionnaire by Morgeson and Humphrey (2006), into the Spanish language to give researchers and practitioners alike a good instrument with which to investigate, measure, and change the reality of work. The WDQ attempts to exhaustively measure work design. Toward that end, its authors considered the specialized literature on this subject, particularly the literature about Hackman and Oldham’s (1980) model of job characteristics and subsequent models. The result was an extensive questionnaire (77 items) that measures 21 different dimensions of work design. Indeed a very complete measure of work design, especially considering the number of measures other instruments use to do the same Job Diagnostic Survey –JDS– by Hackman and Oldham (1980) (5 measures); Multimethod Job Design Questionnaire –MJDQ– by Campion and Thayer (1985) (4 measures); Job Content Questionnaire –JCQ– by Karasek et al. (1998) (7 measures); the Measurement of Job Characteristics by Sims, Szilagyi, and Keller (1976) (6 measures); and the New Scales of Timing Control, Method Control, Monitoring Demand, Problem-solving Demand and Production Responsibility by Wall, Jackson, and Mullarkey (1995) (5 measures).

The WDQ appears in the context – it is partly a result of this context – of a paradigm shift in work design. From solely examining work itself, there has been movement toward considering it an activity undertaken within a social and technological context, thus broadening the scope of interest, and explaining and justifying the instrument's large number of measures. As a work measurement tool preferred by researchers around the world, the WDQ is playing an important role in this paradigm shift.

In short, this questionnaire has been translated and adapted into many languages (e.g., German by Stegmann et al., 2010; Chinese by Chiou et al., 2010; Polish by Hauk, 2014; and according to Morgeson, 2011, there are unpublished, preliminary adaptations into French, Italian, and Portuguese, and especially preliminary versions in Arabic, Hebrew, Japanese, and Korean), and it was deemed highly advantageous to translate it into Spanish, too. With that in mind, this study's objective was to premiere the Spanish version of the WDQ, and try to determine its internal consistency, factorial structure, and relation to certain other criteria that indicate validity. The discussion that follows will address and expound upon various aspects of the WDQ and its Spanish adaptation.

First, the WDQ lacks a clear theoretical framework. The set of dimensions that comprise it came from an in-depth review of documents, which identified numerous variables examined in the research literature of the last 60 years. A process of selection, synthesis, differentiation, and definition identified the 21 factors that were ultimately included in the questionnaire. The task of identifying, recognizing, and constructing items was similar. The authors indicate what items they took from other sources, and which they created new. Even so, probably not every potential dimension of work design was tapped. Aspects like motivation, the worker's emotional well-being, job security, a deeper exploration of the worker's personality, etc., and the time factor all warrant consideration.

That being said, its lack of a theoretical framework is an important limitation that is largely ameliorated by the fact that recently, probably semi-coincidentally, several purely theory articles were published that advocate for a reconsideration of work design. The views they propose constitute a real paradigm shift on the subject toward adoption of what, one way or another, has come to be called "extended work design theory" or "work design in situ." Such is the case of papers by Parker et al. (2001), Humphrey et al. (2007), and others. The simultaneity of these contributions to the field in different parts of the world, adopting almost a shared perspective, might be explained by the spirit of the times, as a need that is collectively, intuitively felt and answered. In any case, the question is

how far contextual design should go, and what variables it should take into account, and conversely, what environmental determinants of design should be examined. So far, what has been done is to break the old molds and propose more or less extensive lists of variables that are presumed to be important without the least bit of empirical support.

Based on this process of theoretical reflection and empirical construction of the instrument, the WDQ's length is justified. The time invested by each participant is acceptable, which becomes especially important when it is compared to other common methods; therefore, the WDQ seems ideal for working with large samples for mainly research purposes. However, its advantage in terms of data collection has a downside: certain constructs are evaluated quite superficially. In addition, it is missing high- and low-difficulty items; this makes it harder to compare jobs with extreme characteristics and reduces the instrument's sensitivity to small deviations within homogenous samples. In addition to this lack of depth, the WDQ cannot attempt to evaluate all relevant characteristics. Some recent theoretical reflections suggest a need to select characteristics based on the situation (Parker & Ohly, 2008). Despite those limitations, the WDQ includes strategies to avoid earlier instruments' failures and limitations; for instance, its response format is very simple, and all items are phrased affirmatively even though that means reverse scoring certain items.

After looking at certain general features of the instrument, there are aspects of the Spanish adaptation to consider. In the adaptation process, there were certain deviations from the original test that should be kept in mind: a) The first has to do with participants' differential work experience. Whereas Morgeson and Humphrey required respondents to have 15 years' experience in their job, this study merely required a minimum work experience of three years, and six months' tenure in their current job. Yet the data indicate that in this study, respondents' average experience in their current jobs was 11 years, which was basically equivalent to the original sample. b) Morgeson and Humphrey, based on some research, chose to group each dimension's items together when collecting data. This adaptation process began the same way, but changes had to be made because of respondents' high level of rejection of certain items being repeated almost word for word. Some of the differences in results might be due to that variation in item order. In particular, somewhat inferior results were observed in the internal consistency of scales compared to those Morgeson and Humphrey reported ( $\alpha$  values between .80 and .95 with an average of .87). Nevertheless, the total instrument's internal consistency (of 77 items) was Cronbach's alpha of .92, indicating a high level of

homogeneity between items. The various scales' reliability ranged from Cronbach's alpha of .70 to .96, except for three: Job Complexity ( $\alpha = .69$ ), Problem Solving ( $\alpha = .60$ ), and Ergonomics ( $\alpha = .38$ ). In the latter, which deviated a lot from expected values,  $\alpha$  would change slightly if the dimension's inverted item were eliminated ( $\alpha = .56$ ), but that change was not satisfactory and did not significantly improve other results, like the reliability of the scale on the whole (its internal consistency metrics stayed the same), descriptive statistics, or the instrument's goodness of fit results, which did not show greater variation. Considering that eliminating the Ergonomics item has little impact on the instrument's results, and that this problem is shared by Morgeson and Humphrey's original version as well as successive adaptations of it in other languages (e.g., Stegmann et al., 2010), we chose to keep the original instrument's structure. That being said, this is clearly a weakness to resolve, and an issue for this dimension's measurement stability (probably related to how items were worded), so to researchers and practitioners alike, we must urge care and caution when interpreting this factor of the Spanish WDQ.

Despite the above, it is noteworthy that the average global reliability of all the different dimensions was  $\alpha = .77$ , and that every dimension's reliability was higher (with the aforementioned exceptions) than its JDS equivalent (with reliability ranging from .65 to .70 and average reliability of .68 according to Taber & Taylor, 1990). This highlights the psychometric potential of this work design questionnaire.

It is also important to point out the high levels of interrater agreement (especially per the  $r_{wg}$  index) found in both the U.S. and Spanish samples. This suggests the results are not idiosyncratic perceptions, because multiple judges were in broad agreement in their appraisals of work characteristics. In any case, those values Morgeson and Humphrey (2006) regarded so highly are not as important if one considers that the test is reliable and valid, and therefore reliably captures true differences between the wide array of jobs that were studied. In other words, low interrater correlation and agreement could also be the result of meaningful variability in job design, variability which the WDQ captures reliably. In that case, low interrater correlation and agreement would be a better indicator than if the opposite were true.

In relation to the instrument's construct validity – and independently of the WDQ's lack of theoretical backing, which was reasonably well resolved above – what is certain is that the hypothesized 21-factor structure received considerable empirical support. The one-factor model did not show goodness of fit (that is, participants distinguish between factors), and other models did (with 4, 18, 19, and 20 factors, consistent

with Morgeson & Humphrey). However, it was the 21-factor model that showed the highest goodness of fit despite keeping all items in the Ergonomics dimension together (for reasons explained above). Along those lines, apparently the pattern of improvement in goodness of fit across the proposed models is similar in the U.S. and Spanish populations, especially in terms of the index RMSEA. There is, however, a larger discrepancy in goodness of fit according to the indices CFI and SRMR, even when the models' ranking in terms of comparative fit followed a similar trend. It is important to bear in mind that support for the authors' factor solution is consistent with the analysis of increase and decrease magnitudes. Thus, while some increases in RMSEA were slightly less than 0.015 (Chen, 2007), which might invite a quest for a more parsimonious solution, decreases in CFI were slightly greater than 0.01 (Cheung & Rensvold, 2002), supporting the factor solution the authors proposed. Therefore, considering these antecedents altogether, we chose to keep the 21-factor solution, because there was not enough reason to select a solution other than Morgeson and Humphrey's (2006).

Moreover, based on this model, applying CFA to the four major factorial dimensions generated important information about the goodness of fit of different latent factors – that is, Task Motivational (7 factors), Knowledge Motivational (5 factors), Social Work (5 factors), and Physical or Contextual Work Characteristics (4 factors). All models showed goodness of fit, thus confirming the appropriateness and stability of Morgeson and Humphrey's original model (2006). We also computed convergent and discriminant validity indices for the Spanish WDQ. Generally speaking, convergent validity requirements consistent with Shipp et al. (2010) were met, the exception being Ergonomics, in which case it could relate to the dimension's measurement stability, which eliminating an item would not correct. Furthermore, in terms of discriminant validity, the requirement that most correlations between factors be under .85 was met, except in the case of Autonomy Characteristics, which could be interpreted as a single factor if not for the fact that dividing it into three components is highly consistent with theory and adds to the goodness of fit of the factorial structure.

Notwithstanding the above, when CFA is applied to the total instrument, goodness of fit falls to medium or low levels due to the instrument's large number of items. That produces an exponential rise in the number of correlations between items that the model should explain, and keeps overall goodness of fit from being obtained. Nevertheless, we thought applying CFA to macro work design factors might end up being more suitable since the internal dimensionality of each set is evaluated, more specifically, which is replicated in the

results. This subject should undoubtedly be considered with an eye to future studies, especially the lower overall goodness of fit.

Additionally, the fact that different studies, adaptations, etc. have found the same factorial structure is evidence of confirmatory factor validity, because it rests on certain expectations about structure. However, the authors' reasoning holds up – despite certain inconsistencies – about what relations to expect among the various WDQ measures and different external measures stemming or derived from the application of other measurement techniques.

In view of the available data, we sought further evidence of the instrument's validity. We replicated the validity analysis of differences between occupational categories, examining whether WDQ dimensions can detect differences between jobs belonging to different occupations using cognitive, interpersonal, and physical variables. In other words, we tried to determine whether certain occupations, based on estimated scores on variables external to the WDQ, are more likely to present high or low levels of specific work design characteristics. Toward that end, Morgeson and Humphrey's (2006) four original hypotheses about the expected relation were tested. Results confirmed the hypothesized relationship across the board. From the above, we concluded that the results provide important empirical evidence favoring the Spanish WDQ's validity.

As far as possible methodological limitations, we analyzed the fact that data on all constructs were collected solely using questionnaires; thus relations could potentially have surfaced as a result of common-method bias. That is a risk we are willing to take, not only because differences were found in objective criteria (professional group, autonomy, management responsibility), but also because not "everything is correlated with everything else." Rather, patterns of results are differential; add to that the fact that confirmatory factor analysis establishes that effectively, different constructs were evaluated. For these reasons, and the fact that these results were reproduced in various other studies and adaptations into other languages, we are confident in the results obtained. That being said, the validation process still has a long way to go.

With that in mind, it would be good to establish consistency over time in the measures obtained. The response format is indeed so simple that if one observes respondents as they answer items, they would tend to think it does not matter if they answer 1 or 2, or 3 or 4 for example, when the reality is different. Yes, the response format should be quite simple, but it should also prevent respondents from falling into a routine that could render differences in response null. Therefore, we suggest creating an instrument with far fewer items and clearly differentiated response options, where choosing

between 1 or 2, for example, is a decision the respondent really must make responsibly and with a clear sense of the reality they presumably know.

Finally, though we have repeatedly argued that the WDQ has many dimensions, yet cannot include them all, there is strong conviction that a true instrument that allows for true design or redesign of work should have fewer measures. Work certainly is a complex reality, but is it really necessary to establish so many independent dimensions? Are so many dimensions truly independent? If a person were tasked with redesigning a job or other activity, would he or she know what to do with so many dimensions? As much as the empirical results lend their support, does it not seem that various aspects of the same dimension are being accounted for, rather than distinct dimensions? Therefore, it would be beneficial in the future to practice or test the reality, and in so doing, try to ascertain the different dimensions' higher or lower authenticity<sup>1,2</sup>.

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## Appendix

### Relation between WDQ Items and their Spanish-language Versions

Original Item in English	Item in Spanish
Task Characteristics	Características de tarea
<i>Autonomy</i>	<i>Autonomía</i>
<i>Work Scheduling Autonomy</i>	<i>Autonomía en la planificación del trabajo</i>
1. The job allows me to make my own decisions about how to schedule my work.	1. Mi puesto de trabajo me permite tomar mis propias decisiones acerca de cómo planificar en el tiempo mi trabajo. [1]
2. The job allows me to decide on the order in which things are done on the job.	2. Mi puesto de trabajo me permite decidir en qué orden realizar las tareas en mi trabajo. [9]
3. The job allows me to plan how I do my work.	3. Mi puesto de trabajo me permite planificar cómo hacer mi trabajo. [17]
<i>Decision-Making Autonomy</i>	<i>Autonomía en la toma de decisiones</i>
4. The job gives me a chance to use my personal initiative or judgment in carrying out the work.	4. Mi puesto de trabajo me da la oportunidad de ejercer mi iniciativa personal o mi juicio en la realización del trabajo. [25]
5. The job allows me to make a lot of decisions on my own.	5. Mi puesto de trabajo me permite tomar muchas decisiones por mí mismo. [33]
6. The job provides me with significant autonomy in making decisions.	6. Mi puesto de trabajo me da bastante autonomía en la toma de decisiones. [41]
<i>Work Methods Autonomy</i>	<i>Autonomía en el método de trabajo</i>
7. The job allows me to make decisions about what methods I use to complete my work.	7. Mi puesto de trabajo me permite tomar decisiones acerca de qué métodos utilizo en la realización de mi trabajo. [49]
8. The job gives me considerable opportunity for independence and freedom in how I do the work.	8. Mi puesto de trabajo me da amplias oportunidades para elegir, libre e independientemente, cómo hacer mi trabajo. [57]
9. The job allows me to decide on my own how to go about doing my work.	9. Mi puesto de trabajo me permite decidir por mí mismo cómo voy a hacer mi trabajo. [65]
<i>Task Variety</i>	<i>Variedad de tareas</i>
10. The job involves a great deal of task variety.	10. Mi puesto de trabajo conlleva una gran variedad de tareas. [2]
11. The job involves doing a number of different things.	11. Mi puesto de trabajo implica la ejecución de tareas diferentes. [10]

## Appendix (Continued)

Original Item in English	Item in Spanish
12. The job requires the performance of a wide range of tasks.	12. Mi puesto de trabajo requiere la realización de un amplio abanico de tareas. [18]
13. The job involves performing a variety of tasks.	13. Mi puesto de trabajo implica la realización de una variedad de tareas. [26]
<i>Task Significance</i>	<i>Significación de la tarea</i>
14. The results of my work are likely to significantly affect the lives of other people.	14. Es probable que los resultados de mi trabajo afecten de modo significativo la vida de otras personas. [34]
15. The job itself is very significant and important in the broader scheme of things.	15. Mi puesto de trabajo es en sí mismo muy significativo e importante en diversos ámbitos. [42]
16. The job has a large impact on people outside the organization.	16. Mi puesto de trabajo tiene un amplio impacto sobre personas fuera de la organización. [50]
17. The work performed on the job has a significant impact on people outside the organization.	17. El trabajo realizado en mi puesto tiene un impacto significativo sobre personas de fuera de la organización. [58]
<i>Task Identity</i>	<i>Identidad de tarea</i>
18. The job involves completing a piece of work that has an obvious beginning and end.	18. Mi puesto de trabajo implica completar una parte del trabajo que tiene un comienzo y un final muy claros. [66]
19. The job is arranged so that I can do an entire piece of work from beginning to end.	19. Mi puesto de trabajo está organizado de tal modo que puedo hacer un proceso de producción o prestación de servicio completo, de principio a fin. [72]
20. The job provides me the chance to completely finish the pieces of work I begin.	20. Mi puesto de trabajo me da la oportunidad de terminar totalmente las partes de trabajo que comienzo. [3]
21. The job allows me to complete work I start.	21. Mi puesto de trabajo me permite terminar el trabajo que comienzo. [11]
<i>Feedback From Job</i>	<i>Retroalimentación procedente del propio trabajo</i>
22. The work activities themselves provide direct and clear information about the effectiveness (e.g., quality and quantity) of my job performance.	22. Las actividades que realizo proporcionan por sí mismas y de modo directo y claro información sobre la eficacia (por ej., calidad y cantidad) de mi rendimiento laboral. [19]
23. The job itself provides feedback on my performance.	23. Mi puesto de trabajo proporciona por sí mismo retroalimentación sobre mi rendimiento. [27]
24. The job itself provides me with information about my performance.	24. Mi propio puesto de trabajo me facilita información sobre mi rendimiento. [35]
<i>Knowledge Characteristics</i>	<i>Características del conocimiento</i>
<i>Job Complexity</i>	<i>Complejidad del puesto</i>
25. The job requires that I only do one task or activity at a time (reverse scored).	25. Mi puesto de trabajo requiere que yo haga sólo una tarea o actividad al mismo tiempo. [43]
26. The tasks on the job are simple and uncomplicated (reverse scored).	26. Las tareas de mi puesto de trabajo son simples y no complejas. [51]
27. The job comprises relatively uncomplicated tasks (reverse scored).	27. Mi puesto de trabajo comprende tareas que son relativamente poco complejas. [59]
28. The job involves performing relatively simple tasks (reverse scored).	28. Mi puesto de trabajo implica la realización de tareas relativamente simples. [67]
<i>Information Processing</i>	<i>Procesamiento de información</i>
29. The job requires me to monitor a great deal of information.	29. Mi puesto de trabajo me exige atender a gran cantidad de información. [73]
30. The job requires that I engage in a large amount of thinking.	30. Mi puesto de trabajo requiere que desarrolle una gran cantidad de ideas. [4]
31. The job requires me to keep track of more than one thing at a time.	31. Mi puesto de trabajo requiere que preste atención a más de una cosa al mismo tiempo. [12]
32. The job requires me to analyze a lot of information.	32. Mi puesto de trabajo requiere que analice una gran cantidad de información. [20]

## Appendix (Continued)

Original Item in English	Item in Spanish
<i>Problem Solving</i>	
33. The job involves solving problems that have no obvious correct answer.	33. Mi puesto de trabajo implica solucionar problemas que no tienen una respuesta correcta evidente. [28]
34. The job requires me to be creative.	34. Mi puesto de trabajo requiere que sea creativo. [36]
35. The job often involves dealing with problems that I have not met before.	35. Mi puesto de trabajo con frecuencia supone abordar problemas que no he tenido anteriormente [44]
36. The job requires unique ideas or solutions to problems.	36. Mi puesto de trabajo requiere ideas o soluciones únicas a los problemas. [52]
<i>Skill Variety</i>	
37. The job requires a variety of skills.	37. Mi puesto de trabajo requiere una variedad de habilidades. [60]
38. The job requires me to utilize a variety of different skills in order to complete the work.	38. Mi puesto de trabajo requiere que utilice diferentes habilidades para realizar el trabajo. [68]
39. The job requires me to use a number of complex or high-level skills.	39. Mi puesto de trabajo requiere que utilice habilidades complejas o de alto nivel. [74]
40. The job requires the use of a number of skills.	40. Mi puesto de trabajo requiere la práctica de diversas habilidades. [5]
<i>Specialization</i>	
41. The job is highly specialized in terms of purpose, tasks, or activities.	41. Mi puesto de trabajo está muy especializado en términos de objetivos, tareas o actividades. [13]
42. The tools, procedures, materials, and so forth used on this job are highly specialized in terms of purpose.	42. Las herramientas, procedimientos, materiales, etc. usados en mi puesto de trabajo son muy específicos para conseguir los resultados del puesto. [21]
43. The job requires very specialized knowledge and skills.	43. Mi puesto de trabajo requiere conocimientos y habilidades especializados. [29]
44. The job requires a depth of knowledge and expertise.	44. Mi puesto de trabajo requiere gran conocimiento y pericia. [37]
<i>Social Characteristics</i>	
<i>Social Support</i>	
45. I have the opportunity to develop close friendships in my job.	45. Tengo la oportunidad de desarrollar estrechas amistades en mi trabajo. [45]
46. En mi puesto de trabajo tengo la posibilidad de conocer a otras personas.	46. En mi puesto de trabajo tengo la posibilidad de conocer a otras personas. [53]
47. I have the opportunity to meet with others in my work.	47. Tengo la oportunidad de encontrarme con otras personas en mi trabajo. [61]
48. My supervisor is concerned about the welfare of the people that work for him/her.	48. Mi supervisor/a se interesa por el bienestar de las personas que trabajan para él/ella. [69]
49. People I work with take a personal interest in me.	49. La gente con la que trabajo manifiestan interés personal por mí. [75]
50. People I work with are friendly.	50. Las personas con las que trabajo son amistosas. [6]
<i>Interdependence</i>	
<i>Initiated Intedependence</i>	
51. The job requires me to accomplish my job before others complete their job.	51. Mi puesto de trabajo requiere que yo realice mi trabajo antes de que otros concluyan el suyo. [14]
52. Other jobs depend directly on my job.	52. Otros puestos de trabajo dependen directamente del mío. [22]
53. Unless my job gets done, other jobs cannot be completed.	53. A menos que mi trabajo esté concluido, el de otros no puede concluirse. [30]
<i>Received Interdependence</i>	
54. The job activities are greatly affected by the work of other people.	54. Las actividades del puesto se ven muy afectadas por el trabajo de otros. [38]

## Appendix (Continued)

Original Item in English	Item in Spanish
55. The job depends on the work of many different people for its completion.	55. Mi puesto de trabajo depende del trabajo de diferentes personas para su terminación. [46]
56. My job cannot be done unless others do their work.	56. Mi puesto de trabajo no puede realizarse a menos que otros realicen su trabajo. [54]
<i>Interaction Outside Organization</i>	
57. The job requires spending a great deal of time with people outside my organization.	57. Mi puesto requiere pasar mucho tiempo con otras personas fuera de la organización. [62]
58. The job involves interaction with people who are not members of my organization.	58. Mi puesto de trabajo exige interactuar con personas que no son miembros de la organización. [70]
59. On the job, I frequently communicate with people who do not work for the same organization as I do.	59. En mi puesto frecuentemente me comunico con personas que no trabajan en la misma organización que yo. [76]
60. The job involves a great deal of interaction with people outside my organization.	60. Mi puesto de trabajo implica gran cantidad de interacción con personas de fuera de la organización. [7]
<i>Feedback From Others</i>	
61. I receive a great deal of information from my manager and coworkers about my job performance.	61. Recibo gran cantidad de información de mi superior y de mis compañeros sobre mi rendimiento laboral. [15]
62. Other people in the organization, such as managers and coworkers, provide information about the effectiveness (e.g., quality and quantity) of my job performance.	62. Otras personas de la organización, como directivos y compañeros, proporcionan información acerca de la eficacia (por ej., calidad y cantidad) de mi rendimiento en el puesto. [23]
63. I receive feedback on my performance from other people in my organization (such as my manager or coworkers).	63. Recibo retroalimentación de otras personas sobre mi rendimiento en la organización (tales como directores y compañeros). [31]
<i>Work Context</i>	
<i>Ergonomics</i>	
64. The seating arrangements on the job are adequate (e.g., ample opportunities to sit, comfortable chairs, good postural support).	64. La disposición de los asientos en el trabajo es adecuada (por ej., suficientes oportunidades para sentarse, sillas confortables, buen respaldo). [39]
65. The work place allows for all size differences between people in terms of clearance, reach, eye height, leg room, etc.	65. Mi lugar de trabajo es adaptable a todas las diferencias entre personas en lo que concierne a luminosidad, amplitud, visibilidad, etc. [47]
66. The job involves excessive reaching (reverse scored).	66. Mi trabajo implica una demanda o exigencia excesiva. [55]
<i>Physical Demands</i>	
67. The job requires a great deal of muscular endurance.	67. Mi puesto de trabajo requiere gran cantidad de resistencia muscular. [63]
68. The job requires a great deal of muscular strength.	68. Mi puesto de trabajo requiere gran cantidad de fuerza muscular. [71]
69. The job requires a lot of physical effort.	69. Mi puesto de trabajo requiere gran cantidad de esfuerzo físico. [77]
<i>Work Conditions</i>	
70. The work place is free from excessive noise.	70. Mi lugar de trabajo está libre de ruidos excesivos. [8]
71. The climate at the work place is comfortable in terms of temperature and humidity.	71. El ambiente en el lugar de trabajo es confortable en términos de temperatura y humedad. [16]
72. The job has a low risk of accident.	72. Mi puesto de trabajo tiene un bajo riesgo de accidente. [24]
73. The job takes place in an environment free from health hazards (e.g., chemicals, fumes, etc.).	73. Mi puesto de trabajo tiene lugar en un ambiente libre de riesgos para la salud (por ej., productos químicos, humos, etc.). [32]
74. The job occurs in a clean environment.	74. Mi puesto de trabajo tiene lugar en un ambiente limpio. [40]

**Appendix** (Continued)

Original Item in English	Item in Spanish
<i>Equipment Use</i>	<i>Uso de equipamiento</i>
75. The job involves the use of a variety of different equipment.	75. Mi puesto implica usar una variedad de equipos de producción diferentes. [48]
76. The job involves the use of complex equipment or technology.	76. Mi puesto implica el uso de tecnología o equipos complejos. [56]
77. A lot of time was required to learn the equipment used on the job.	77. Se requiere gran cantidad de tiempo para aprender a usar el equipo técnico de producción en mi puesto de trabajo. [64]

*Note:* Since the ordering of items in the Spanish version of the WDQ differed from that of the U.S. version, the Spanish item numbers appears in [] next to each Spanish-language item.