Validation of the Writing Process Questionnaire in Two Hispanic Populations: Spain and Mexico

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Abstract: Thesis work is the first important research where the PhD candidate has to take primary responsibility for their work. Sometimes it is forgotten, or at least not enough attention is paid to the fact, that for many PhD students it is also the first time they have to face such a complex, *ultimately self-regulated learning task* (Sachs, 2002, p.99) as thesis writing. But what do the protagonists think about it? There is a gap in the literature concerning studies that focus on PhD students' writing conceptions as a main target. The aim of this study was to validate the structure of the Writing Process Questionnaire developed by Lonka and her colleagues (Lonka et al., 2014). To do this, we asked two groups of 631 Spanish and 431 Mexican PhD students to complete the questionnaire, and used Exploratory Structural Equation Modeling (ESEM) to assess the validity of a hypothesized 6-factor model, and to test its invariance across the two groups.

The results confirmed the broad 6-factor structure of the questionnaire but indicated that the *knowledge transforming* sub-scale needed to be revised into a more specific *knowledge creation* factor. This modified structure generalized across both the Spanish and Mexican samples. We suggest that the revised structure for the knowledge transforming factor reflects the fact that these two groups of Spanish-speaking PhD students perceive the development of knowledge in writing as a solitary rather than a collaborative process. Our research provides evidence that the Writing Process Questionnaire is a reliable and generalizable measure, having shown strong invariance properties in the two populations studied.

Keywords: writing conceptions, questionnaire, culture, validation, invariance, doctoral education

1. Introduction

It is commonly agreed that in order to survive academia and become professional scholars, student researchers need to get involved in research experiences that help them to develop as scientists (Taraban & Logue, 2012). They also need to learn how to communicate their research. This is especially challenging for doctoral students in that a) the thesis is the basis on which their PhD degree is awarded (Cotterall, 2011), and b) they are expected to make a valuable contribution to the academic community at the same level as senior researchers. Nevertheless, interventions targeting academic writing in PhD studies are still not generalized (Chitez & Kruse, 2012; Lee & Aitchison, 2009) despite some interesting initiatives in different settings like Spain (e.g., Castelló, Iñesta, & Corcelles, 2013), UK (e.g. Ganobcsik-Williams, 2006; Wellington, 2010), Finland (e.g. Lonka, 2003), and Pennsylvania (e.g. Surratt, 2006), among others. Initiatives thus far have focused mainly on facilitating a regimen (continuous writing regardless of mood, time, and space; Boice, 1990), social support, peer feedback, self-assessment, awareness and the development of the writer's identity, as well as reflection on attitudes and feelings towards writing, and reflection on writing conceptions. In this paper, we focus on the measurement of writing conceptions in this population.

Writing conceptions are based on a specific understanding of textual practices (Candlin & Hyland, 1999; Lonka, 2003) including conceptions of oneself as a writer (Lonka et al., 2014). We conceive of these textual practices as problem-solving processes situated and contextualized beyond a merely solitary act, and hence our representation and approach to writing is that it is both an individual and a social activity (Castelló & Donahue, 2012; Tynjälä, Mason, & Lonka, 2001). Within this framework, we conceive writing as a learning tool, that is, with an epistemic function as was assumed in Vygotsky´s work (1978) and later taken up by Bereiter and Scardamalia (1987). We will not consider here the debate regarding the validity of self-report measures compared to behavioural or biological measures (for an overview see Haeffel & Howard, 2010), but assume that collecting data about writing conceptions complements data gained by observing actions of writing.

Research on writing conceptions at graduate level (see table 1) has shown that writing conceptions may influence the final written product- its quality and productivity - and that they may be linked to the characteristics of the writers: their writing and revising strategies, their writing knowledge, their knowledge orientation, academic ability and beliefs in luck, their motivation and their level of experience. Studies focusing on this last aspect have highlighted that graduates show considerable immaturity, but in comparison to undergraduates, their writing experiences and habits are more similar to those of productive academics. In addition, these studies highlight the importance of writing conceptions in order to understand students' situated practices, which are always dependent on the learning context, and to improve writing instruction and supervision. This educational improvement should be addressed a)

within the context of increasing cultural diversity- especially in the supervisory feedback, b) within a discipline-specific learning and discourse community, c) as a collaborative experience, so that students have more opportunities to transform their writing representations and be more able to conceive writing as a social activity, and d) taking into account the impact of writing on students' identity.

Table 1. Studies analysing writing conceptions at graduate level

Focus of the research	References
Experiences from students in their writing process	(Hernandez, 1985; Torrance, Thomas, & Robinson, 1992*; Bishop, 1993; Baxter Magolda, 1998; Cotterall, 2011)
Relation between the thesis writing experience and the learning environment and/or the discipline	(Cuetara & Lecapitaine, 1991*; Ylijoki, 2001; Kamler, 2008; Delcambre & Dinahue, 2012*)
Evaluation of the writing process in relation to a writing intervention	(Koncel & Carney, 1992*; Torrance, Thomas, & Robinson, 1993*; Torrance & Thomas, 1994; Caffarella & Barnett, 2000*; DeLyser, 2003; Surratt, 2006*; Larcombe et al., 2007*; Maher et al., 2008; Aitchison, 2009*; Parker, 2009; Kwan, 2010)
Students' writing approaches	(Torrance et al., 1994*; Green, 2007; Lavelle & Bushrow, 2007*; Castelló, Iñesta, & Monereo, 2009*)
Evaluation of the feedback received from the students' writing	(Eyres, Hatch, Turner, & West, 2001; Hyland & Hyland, 2001; Kumar & Stracke, 2007; Li & Seale, 2007; Crossouard & Pryor, 2009; Can & Walker, 2011*; Wang & Li, 2011)
Beliefs and attitudes of students in their writing of the thesis	(Sachs, 2002*; White & Bruning, 2005*)
Conceptions of writing and how students see themselves as writers	(Lonka et al. 2014)*

Note. For an extended description of this review see Cerrato-Lara (2014)

* A questionnaire was used for data collection

The literature referenced in Table 1 has typically focussed on interests other than writing conceptions (e.g. the benefits of a collaborative writing intervention), except for the last three references. In this paper, we focus on the Writing Process Questionnaire (Lonka et al., 2014), with the aim of (i) assessing the reliability and validity of its factor structure, and (ii) assessing the invariance of this structure across Spanish and Mexican populations of PhD students.

The items for the questionnaire were originally developed by Lonka (1996, 2003) in the higher education context in general and reformulated according to the doctoral

context in Lonka et al. (2014). Following a pilot study of 41 PhD students from different fields who filled out an initial version of the questionnaire, ambiguous items were rephrased or deleted and further revised based on the feedback received from students, researchers and academics. Confirmatory factor analysis (CFA) was then carried out on the responses to the questionnaire provided by 669 PhD students from a major Finnish university. This identified a six-factor structure to the questionnaire (see Table 2).

Table 2. Latent constructs measured in The Writing Process Questionnaire

Blocks	Inability to write productively, not due to insufficient literary skills or intellectual capacity (Rose, 1980)
Procrastination	Postponing or failing to start tasks that are important in terms of success; such behaviour undercuts productivity (Lonka et al., 2014)
Perfectionism	Constant insistence on a perfect product, with the result that one attempts to rework material until it is free of all flaws, or ultimately giving up all efforts (Boice, 1993)
Innate Ability	Thinking that writers mainly work alone and they have a special, innate gift to communicate their valuable message (see, e.g. Sawyer, 2009)
Knowledge Transforming	Conceiving the writing process as a way of exploring and developing one's ideas, that is to say, as a tool for meaning-making and learning (see Bereiter & Scardamalia, 1987)
Productivity	Seeing oneself as a productive and active agent in the scholarly community (Pyhältö, Nummenmaa, Soini, Stubb & Lonka, 2012)

Note. For an extended description of each of these constructs see Lonka et al. (2014).

In what follows, we admistered this questionnaire to two samples of Spanish and Mexican students, and assessed the reliability and validity of the six-factor structure identified by Lonka et al. (2014).

2. Method

2.1 Participants

The participants in the Spanish sample were 631 Spanish PhD students (male: 42%; female: 58%; mean age: 31.5) from the Sciences (65.8%) and the Arts (34.2%); see Table 3 for more details. Almost all of them (92.3%) were conducting their research in Spanish universities (public: 88%; private: 4.3%) and the remaining (7.7%) in other Spanish research institutions.

Table 3. Spanish PhD students (n=631)

Disciplines[1]	Distribution	Gender		Age
		Male	Female	
Sciences	65.8%	42.8%	57.2%	29.8
Natural Sciences[2]	33%	39%	61%	29
Health Sciences	16%	31%	69%	31
Engineer. & Architec.	17%	61%	39%	30
Arts	34.2%	41.4%	58.6%	33.5
Arts & Humanities	18%	42%	58%	33
Legal & Social Scien.	16%	41%	59%	35

Note. [1]Classification by the Ministerio de Educación, Cultura y Deporte (*in italics*).
[2]The adding of *Natural,* although not in this classification, is included from now on in order to distinguish it from the supra-category *Sciences* that comprises the three scientific disciplines.

Compared with the figures provided by the INE (Instituto Nacional de Estadística [National Statistics Institute]) for 2011, the Spanish sample was well representative in terms of mean age and type of institution, and fairly representative in terms of gender (7% more females in our sample) and disciplines (Natural Sciences was also the predominant field, but was followed by Health Sciences and Legal & Social Sciences in the INE figures).

A complementary sample of 431 Mexican PhD students (male: 45%; female: 55%; mean age: 35.3) from the Sciences (56%) and the Arts (44%) working on their thesis in Mexico was also recruited.

2.2   Instrument

The Writing Process Questionnaire measures conceptions about academic writing, especially about thesis writing, and how PhD students see themselves as writers. It comprises 25 statements rated on six scales: Blocks, Procrastination, Perfectionism, Innate Ability, Knowledge Transforming and Productivity (see Table 4). Information on some socio-demographic background variables was also collected, covering the participants' gender, age, discipline, thesis format and country of origin.

In Lonka et al. (2014) the latent factor structure of the Writing Process Questionnaire supported a six-factor model. The six scales mentioned did not incorporate subscales. Moreover, blocks, procrastination, and perfectionism correlated positively with each other, as did knowledge transforming and productivity, supporting the convergent validity of these scales. On the other hand, productivity correlated negatively with procrastination and blocks, as did knowledge transforming and blocks and innate ability, supporting the discriminant validity of these scales. Reliability (Cronbach's Alpha) was .60 for Blocks, .81 for Procrastination, .67 for Perfectionism, .63 for Knowledge Transforming, .75 for Innate Ability, and .76 for Productivity.

Table 4. The Writing Process Questionnaire

Blocks	(Blk1) Q6:"My previous writing experiences are mostly negative"
	(Blk2) Q10:"I sometimes get completely stuck if I have to produce texts"
	(Blk3) Q14:"I find it easier to express myself in other ways than writing"
	(Blk4) Q15:"I only write when the situation is peaceful enough"
	(Blk5) Q19:"I hate writing"
Procrastination	(Proc1) Q3:"I often postpone writing tasks until the last moment"
	(Proc2) Q9:"Without deadlines I would not produce anything"
	(Proc3) Q11:"I find it difficult to start writing"
	(Proc4) Q18:"I start writing only if it is absolutely necessary"
Perfectionism	(Perf1) Q5:"I find it difficult to write, because I am too critical"
	(Perf2) Q24:"Writing is difficult because the ideas I produce seem stupid"
	(Perf3) Q21:"I could revise my texts endlessly"
	(Perf4) Q17:"I find it difficult to hand over my texts, because they never seem complete"
Innate Ability	(InAb1) Q16:"The skill of writing is something we are born with; it is not possible for all of us to learn it"
	(InAb2) Q23:"Writing is a skill, which cannot be taught"
Knowledge Transforming	(KTran1) Q26:"Writing often means creating new ideas and ways of expressing oneself"
	(KTran2) Q27:"Writing develops thinking"
	(KTran3) Q25:"Rewriting texts several times is quite natural"
	(KTran4) Q4:"Writing is a creative activity"
	(KTran5) Q1:"It is useful to get other people's comments on texts"
	(KTran6) Q2:"When I write I am concerned about whether the reader understands my text"
Productivity	(Produ1) Q8:"I produce a large number of finished texts"
	(Produ2) Q20:"I am a regular and productive writer"
	(Produ3) Q7:"I write regularly regardless of the mood I am in"
	(Produ4) Q22:"I write whenever I have the chance"

Note. Items ranged from 1 (do not agree) to 5 (fully agree)

Items were codified following their original version (see Lonka et al., 2014)

2.3 The translation and validation of the instrument

The questionnaire, originally written in Finnish and English, was translated and adapted to the Spanish context from the English version using forward-backward translation. The preliminary Spanish version was administered to a pilot sample of 206 PhD students at Ramon Llull University (Barcelona) in the academic years 2008-2009 and 2009-2010. The researchers asked a subsample of 40 students divided into groups of 10 to

comment critically on the meaning of each item and the doubts that they aroused. As a result, we slightly modified the phrasing of some items to make them more understandable. Some additional changes in wording and phrasing were conducted in April 2015 in order to adjust the questionnaire to the Mexican Spanish speaking population, and these were used in the Mexican version of the questionnaire.

The five-option Likert items of the questionnaire were kept as it was the original decision made by Lonka et al. (2014). Modifying this aspect would have potentially affected the comparability of both the original and Spanish versions.

2.4   Data collection

All universities and other research institutions across Spain were asked to participate in our study, and 29 universities and 17 research institutions agreed (38%). In January 2011 the participating centres received a web link through e-mail that redirected them to the survey, which they forwarded to their students, giving information about the purpose of the research, requesting their voluntary participation, and assuring them of the confidentiality of their data. For reasons of privacy, no students' e-mails were made available.

Of the total 1,017 PhD students who collaborated, 631 Spanish nationals were selected for this study. The 386 discarded respondents 1) were from a Spanish-speaking country different than Spain, even if they were studying their PhD in Spain; or 2) were from a non-Spanish-speaking country, again even if they were studying their PhD in Spain and were fluent in Spanish; or 3) were on a doctoral visit, as a new learning scenario could have influenced their writing conceptions; or 4) had not yet begun their thesis project, given our interest in investigating the writing conceptions of fully active doctoral students who were already writing; or 5) had already submitted or recently defended their thesis, given that our focus was not on the retrospective reporting of their thesis writing. These criteria were also applied in May 2015 for the Mexican data collection (for the first criterion, the discarded respondents were from a Spanish-speaking country different than Mexico, even if they were studying their PhD in Mexico). The Mexican PhD students also completed the questionnaire online, and the same ethical procedures were used as for the Spanish sample. From the total of 520 Mexicans that collaborated, 89 participants were discarded.

2.5   Statistical analysis

The structure of the instrument was examined through Exploratory Structural Equation Modeling (ESEM; for a review see Marsh et al., 2014). This approach was taken since it has been shown to be especially appropriate for assessing multidimensional constructs and is free from the pitfalls that arise when implementing Confirmatory Factor Analysis (CFA). In particular, it avoids the issues that arise from the fact that CFA sets all loadings to be zero excepting the one they are supposed to measure. In the first place, when implementing CFA the failure to support instruments which are otherwise appropriate leads to dubious practices such as parcelling or ex-post-facto modifications (Browne,

2001; Marsh et al., 2009, 2010). Second, the estimates of correlations between factors has been shown to be positively biased and inflated (Asparouhov & Muthén, 2009; Marsh et al., 2009, 2010; Schmitt & Sass, 2011). We agree with Marsh et al. (2014) that "most items have multiple determinants, so nonzero cross-loadings are inherent in psychological measurement and can often be logically anticipated". We believe ESEM to be the most suitable method to test measurement invariance (Meredith, 1993) between the Spanish and Mexican versions of the present questionnaire.

ESEM was implemented by specifying oblique, targeted rotation where items were specified to belong to their one theoretical dimension. Maximum Likelihood estimation was used. ESEM estimates loadings for all factors (six loadings here per item), and by target rotation the researcher specifies which is the theoretical factor the indicator measures, and hence the factorial solution is rotated towards this specification matrix. In our target model, each item only loads on one factor, following the Lonka et al. (2014) structure, as it is shown above in Table 4.

Invariance was assessed by implementing the procedure originally proposed by Marsh et al. (2009), where successive models constrain progressively different sets of parameters. In Model 1, we tested overall model fit where both nationalities were included in the model but no constrains were specified. This first step examined whether the same model applies to each group, and is called Configural invariance. In Model 2, Weak invariance was examined, which implies that factor loadings are constrained to be equal for both groups. In practice, it means that the latent construct and its relationship to the indicators is equal in both groups, and hence this is often also called metric invariance.

Model 3 adds to equal factor loadings equal uniqueness (the error component of the items in the model). Model 4 adds to equal factor loadings (Model 2) the constraint of equal factor variance-covariance matrix. Model 5 examined Strong invariance, which means that both factor loadings and item intercepts are fixed as equal for both groups. This is also often called scalar invariance because it enables comparisons between scores of both groups, based on the evidence that both item association to the construct and levels are equal.

Models were estimated successively and their goodness of fit was compared, with the aim of testing the invariance null hypothesis. When fit indices do not support the invariance null hypothesis, the process can be terminated. For this reason we only describe here models 1 to 5, as it was not necessary to continue the analysis beyond these. For a review of this complete series of invariance models, we recommend Marsh et al. (2009, 2014).

We followed the guidelines for measurement invariance proposed by Chen (2007) where, according to a significance level of .01, changes of $\leq -.010$ in CFI, and $\geq .015$ in RMSEA indicated equivalence to less restrictive models by not being able to reject the null hypothesis of invariance. Overall fit was taken into account based on conventional guidelines (Kline, 2015), according to which adequate thresholds are RMSEA$\leq$.05, CFI$\geq$.90, TLI$\geq$.90, and SRMR$\leq$.08.

Reliability was assessed through internal consistency analysis by means of standardized Cronbach's α coefficient (which is based on item correlations instead of covariances) for each of the six scales. The correlations between the subscales were estimated by Pearson correlation coefficients. It has been argued that alpha makes too stringent assumptions, such as tauequivalence (Sijtsma, 2009). Zinbarg et al (2005) discuss the suitability of different reliability indices and recommend the use of omega hierarchical (ωh), so we also calculated these coefficients for each scale.

Because The Writing Process Questionnaire is multidimensional in that it is composed by six different scales, ωh analysis were computed for the overall test, as an appropriate index of the extent to which all of the items in the questionnaire measure the same latent variable (in this method operationalized as general factor). Also because scale scores are to be interpreted on their own, ωh was obtained as well at the scale level. As with Cronbach's alpha, ωh is also directly relates to the number of items, and hence are expected to register smaller values when analysing shorter scales.

IBM SPSS Statistics 22, the free environment R (R Core Team, 2013), its package psych (Revelle, 2015), and Mplus (Muthén & Muthén, 2012) were used for the data analyses.

3. Results

The psychometric analyses mentioned above were conducted on the data from 631 Spanish and 431 Mexican PhD students:

3.1 Factorial structure and invariance

ESEM was run using Maximum Likelihood estimation and converged normally for the successive models tested for invariance, excepting Model 3 where it was not possible to reach successful estimation. Goodness of fit indices of models where invariance could be assumed are displayed in Table 5.

Strong invariance was reached but only partially, because constraints on item intercepts 25 and 4 had to be relaxed. As we can see, and according to the fit criteria of changes ≤ -.010 in CFI, (2) ≥.015 in RMSEA, the difference between Model 2 (weak invariance) and Model 5 (strong invariance) surmounts the threshold for the CFI index, staying within the limits once intercepts for items Q4 and Q25 are set free across both groups. Note also that the goodness of fit of Model 3 generally registered adequate fit indices overall although TLI was slightly below the threshold.

TLI is largely based on chi-square and thus, may be poor even for acceptable or good models. The TLI penalty for complexity is also more severe than CFI and for this reason might be particularly hard to fit with ESEM models. For these reasons we prefer to rely on a global picture for general model fit. TLI was nevertheless close to adequate, according to the rule of thumb described in the Methods section TLI≥.90.

Table 5. Goodness of tests statistics for comparing different invariance models

Model	Invariance hypothesis	RMSEA	CFI	TLI	SRMR	χ^2 (*df*)
1	Configural invariance	.049	.937	.885	.028	752.430 (330)
2	Weak invariance: factor loadings	.044	.931	.907	.041	904.545 (444)
3	Weak invariance + uniqueness					
4	Weak invariance + factor variance-covariance matrix	.044	.927	.906	.069	951.545 (465)
5(-Q4,Q25)	Partial Strong invariance: factor loadings + intercepts (excepting items Q4 and Q25)	.047	.919	.894	.043	1003.916 (461)
5	Strong invariance: factor loadings + intercepts	.049	.910	.884	.044	1062.541 (463)

Strong invariance implies that factorial structure, item loadings and item intercepts can be assumed to be equal across groups (Spanish and Mexicans in this case) except for the two aforementioned items. Therefore, an equal unit of measurement has been established, implying that individual scores can be compared between groups – with the caution that this does not apply to items Q4 and Q25. Table 6 shows the factorial structure and the item loadings of the invariant solution for both Spanish and Mexican samples. All target-loadings are shown, along with those cross-loadings ≥.40.

The factor solution described showed the Knowledge Transforming scale to be the most problematic. Although Lonka et al. (2014) wanted to retain this concept as multidimensional, they stated that in the future it may be split into two separate scales: the creative dimension (the items measuring writing as a creative activity: Q4, Q26, Q27) and the collaborative and revision dimension (the items measuring whether PhD students see writing as a social act, and how likely they are to revise their texts: Q1, Q2, Q25). The items for this last dimension were removed from further scale analysis for the following reasons: internal reliability analysis revealed no relevant contribution to scale consistency (improvement of .10 in Cronbach's alpha when removed, corrected item-total correlations below .30); loadings were all unacceptably low; and moreover, Q25 did not perform invariantly across the two samples. Although Q4 for the creative dimension functioned differently for both samples, it was decided to keep it and revise it further.

Table 6. Factorial structure and item loadings for Spanish (n=631) and Mexican (n=431) samples. Strong invariance model for The Writing Process Questionnaire

Items	F1	F2	F3	F4	F5	F6
(Blk1) Q6	.653					
(Blk2) Q10	.324	.515				
(Blk3) Q14	.664					
(Blk4) Q15	.019					
(Blk5) Q19	.704					
(Proc1) Q3		.811				
(Proc2) Q9		.677				
(Proc3) Q11		.627				
(Proc4) Q18		.399				
(Perf1) Q5			.550			
(Perf2) Q24	.403		.108			
(Perf3) Q21			.842			
(Perf4) Q17			.631			
(InAb1) Q16				.794		
(InAb2) Q23				.669		
(KTran1) Q26					.358	
(KTran2) Q27					.406	
(KTran4) Q4					.254	
(Produ1) Q8						.792
(Produ2) Q20						.793
(Produ3) Q7						.552
(Produ4) Q22						.519
	Factor Correlations					
F2	.557***					
F3	.570***	.407***				
F4	.368***	.104	.195*			
F5	.149	.169	.323**	-.109		
F6	-.626***	-.619***	-.212**	-.297***	.066	

Note 1. *p<0.05; **p<0.01; ***p<0.001

Note 2. Factor loadings are shown over .30 except for items Q4, Q15 and Q24 (reasons to keep them are given along the discussion of this work)

F1=Blocks. *F2*=Procrastination. *F3*=Perfectionism. *F4*= Innate Ability. *F5*=Knowledge creation. *F6*=Productivity

The original Knowledge Transforming scale was then shortened to Knowledge Creation (Figure 1). Consequently, the Spanish and Mexican version of The Writing Process Questionnaire contains 22 of the original 25 items.
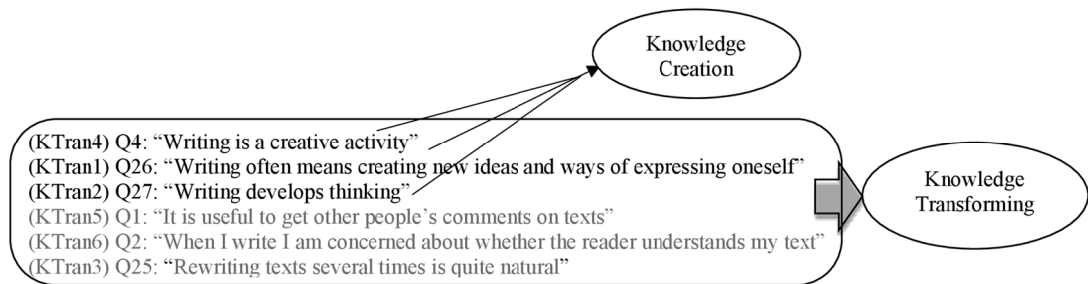

Figure 1. The Knowledge Transforming scale and selected items comprising the Knowledge Creation scale that worked for the Spanish and Mexican populations.

Item Q24, "Writing is difficult because the ideas I produce seem stupid", which loaded on Perfectionism in Lonka et al. (2014), loaded higher on Blocks in this Spanish and Mexican sample. We acknowledge this behaviour and point out that the multi-dimensionality of the Perfectionism scale identified in Lonka et al. (2014) (being too self-critical and endlessly revising the text: Figure 2) could easily explain the instability of this item.
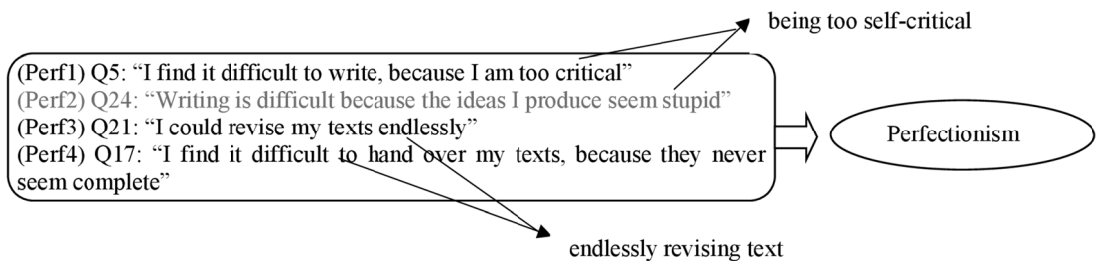

Figure 2. The Perfectionism scale, excluding the item loading in Blocks for the Spanish and Mexican population.

Lastly, item Q10 "I sometimes get completely stuck if I have to produce texts" loaded on Blocks in Lonka et al. (2014), but higher on Procrastination in our analysis. This could be explained since Blocks was indeed the most complex and multifaceted theoretical construct of all the factors.

3.2   Reliability

The structure of the scales followed that proposed by Lonka et al. (2014), except for the newly called *Knowledge Creation* scale, which consisted of only the three items belonging to this dimension and excluded the other three items that made up the full *Knowledge Transforming* scale in the original. Overall, the scales showed acceptable to good internal consistency, although lower for the Mexican version *(see Table 7)*. *Omega hierarchical* for the overall test was $\omega_h=.69$ in the Spanish sample and $\omega_h=.79$ in the Mexican.

Concerning within-scale unidimensionality, observe the ωh indices for estimates of the amount of variance attributable to a general factor within each scale, which were on average .70. Since Innate Ability is composed by only two items, and hence ωh does not have a meaningful interpretation, it was not computed for this scale.

Table 7. Internal consistency (Cronbach's standardized Alpha) and Omega hierarchical of the scales in the Writing Process Questionnaire

Factors	Cronbach's Alpha		Omega hierarchical	
	Spanish sample	Mexican sample	Spanish sample	Mexican sample
Blocks	.74	.70	.66	.65
Procrastination	.79	.78	.76	.78
Productivity	.75	.72	.77	.69
Knowledge Creation	.65	.57	.70	.75
Perfectionism	.65	.58	.70	.58
Innate Ability	.75	.53	-	-

3.3   Convergent and discriminant validity

The inter-factor correlations among the six scales shown in table 6 support the convergent and discriminant validity of the instrument. Thus, Blocks, Procrastination, Perfectionism and Innate Ability all correlated positively with each other, the one exception being Procrastination with Innate Ability. At the same time, Blocks, Procrastination, Perfectionism and Innate Ability correlated negatively with Productivity and did not correlate, except for Perfectionism' with Knowledge Creation. Neither Procrastination and Innate Ability nor Productivity and Knowledge Creation correlated with each other.). Note particularly the predominance of strong positive and negative correlations, especially of Blocks with Procrastination and Perfectionism for the first type, and of Productivity with Blocks and Procrastination for the second type). The bottom part of Table 6 shows the invariant inter-factor correlations, common to both the Spanish and Mexican samples.

The results of the psychometric analysis conducted with the Mexican sample supported those obtained with the Spanish sample, thereby supporting validation results of the instrument.

4. Discussion

Given that the analysis supports an invariant structure for the two samples, we focus first in what follows on discussing the similarities and differences of this structure with the structure proposed by Lonka et al. (2014). We then consider the implications of the patterns of correlations between the factors, and discuss avenues for future research.

Split in the original Knowledge Transforming factor for both the Spanish and the Mexican populations supports Lonka et al.'s (2014) suggestion about the need to treat this as two separate scales. However, the fact that some scale items were not consistent for the Spanish and Mexican population could be culture-related. As explained above, the items that loaded better on this factor described writing as a form of creating knowledge (the individual dimension). The items that did not work out, also showing unacceptable internal consistency, referred to writing as a social activity of (re)writing the text, either directly through comments and observations, or indirectly when writers take the reader's perspective (the collective/shared dimension of the factor). Considering the ratings for these items were low, this could indicate a very individualistic conception of creating knowledge among Spanish-speaking PhD students (at least for the two Hispanic populations measured), who do not perceive collaboration to be necessary. The absence of effective and supportive feedback on writing in higher education (e.g., Alvarez & Yañiz, 2015; Castelló & Mateos, 2015; Castelló, Mateos, Castells, Iñesta, Cuevas & Solé, 2012; Carlino, 2012) could partly explain this result. Moreover, collaborative writing, used particularly in article-based theses, was not widely practised in Spain when the data were collected[1] nor to date in Mexico[2]. In addition to the limited scaffolding and co-authoring, the research climate in these countries tends to promote higher competitiveness and more rigid hierarchical differences among researchers than in other societies if we consider the Hofstede's cultural dimensions theory (see Hofstede, 2011), which could affect students' conceptions of research and of collaborative writing.

The first item that loaded higher on a different factor than originally intended was Q24 "Writing is difficult because the ideas I produce seem stupid". This was orginally assumed to characterize perfectionist writers. However it could, at the same time, be a prototypical attitude shown by someone suffering from writer's block ("Writing is difficult because the ideas I produce seem stupid [I can't produce good ideas]"), or seeking justification for it ("Writing is difficult [it blocks me] because the ideas I produce seem stupid"). Given that perfectionism is often behind writing blocks (Henning, 1981), it is not surprising that this item came to load on the Blocks-factor (it may be a sign of perfectionism or of a block). However, we decided to keep it in the Perfectionism factor as originally and see how it performs in future samples.

The same decision to keep an item where it loaded originally was taken with Q10, originally part of Block scale, "I sometimes get completely stuck if I have to produce texts", but loading higher on Procrastination. In this case, this can be understood from a conceptual point of view as well: although the adjective "stuck" is inherently linked to the Block construct, it also makes sense that this state of mind leads to procrastination.

Contributions relating Procrastination and Blocks (i.e. Boice, 1996) support our statement. In fact, all problems in writing tend to correlate, but for diagnostic reasons it is good to keep them separate. Lonka et al. (2014) showed that the six-model solution was better than simply combining all possible problems into one factor.

Another item we suggest for future revision is Q15 "I only write when the situation is peaceful enough" considering its particularly low loading. This item may be quite situational in nature, or its content may not be appropriately included under the Blocks construct, but again we should test this with other samples, particularly since it did not show any weakness in Lonka et al. (2014). Moreover, deleting it do not contribute to better scale consistency. The same happens with the last item we suggest for future revision: Q4 "Writing is a creative activity". Its inclusion does not negatively affect the reliability of the scale either, and we consider it more sensible to examine it in the future, based on different samples, rather than deleting it because of a low loading in this specific study.

The coefficients of reliability tended to be optimal for the uni-dimensional constructs Procrastination, Productivity and Innate Ability. This was also the case for Blocks, in spite of its multi-dimensionality, since it is the scale containing more items, which is likely to increase reliability. An exception was Innate Ability for the Mexican sample, which scored surprisingly low on reliability. Indeed, all factors in the Mexican version tended to be of slightly lower reliability than in the Spanish sample. Concerning the two remaining scales, Perfectionism was a multi-dimensional construct, and Knowledge Creation included fewer items than in its original form, and therefore were slightly less reliable. Nevertheless, considering it is not a psychological test, reliabilities may be less critical (Fishman & Galguera, 2003). In addition, conceptions of writing are multidimensional in nature and their straightforward measurement in different cultures is challenging.

The general lower reliability in the Mexican version could be attributed to the fact that it was adapted from standard Spanish to Mexican Spanish by several native Mexican volunteers, but forward-backward translation was not strictly used (a more rigorous process at this stage could maybe have led to a better reliability).

Given the convergent and discriminant validity properties of the factors, it appears that being blocked, postponing, being very critical and perceiving writing as an innate ability are related to lower productivity, whereas PhD students who perceive themselves as more productive seem less prone to being blocked and critical, and less prone to postponing and to perceiving writing as an innate ability. In particular, the strong correlation between Productivity (understood as self-efficacy since we are measuring the sense of productivity) and Blocks should be explored in future studies considering the current gap in the literature (see Cerrato-Lara, 2014). This is not the case for the other strong correlation between Productivity (again with the same connotation) and Procrastination, which has been widely studied (e.g. Pajares, Britner, & Valiante; 2000), particularly outside writing tasks (e.g. Klassen et al., 2010; Klassen et

al., 2009; Klassen & Kuzucu, 2009; Klassen, Krawchuk, Lynch, & Rajani, 2008; Wolters, 2003; Ferrari, Parker, & Ware,1992).

Our results are in line with Lonka et al. (2014), and the pattern of correlations and non-correlations between the factors support the discriminant validity of the instrument. The main exception was that we found a correlation between Innate Ability and Productivity whereas Lonka et al. (2014) did not. Given this difference between the Finnish study and this study of Hispanic students, it would be interesting to explore in more detail the circumstances under which the belief in innate ability affects the self-efficacy of writers. We also found, like Lonka et al. (2014), that being very critical correlated with knowledge creation. However, we wonder if, taken to extremes, this might be detrimental to the flow of writing. It would therefore be interesting to explore this correlation in greater depth. This result contributes to the convergent validity of the instrument together with the positive correlations found among the problems in writing cited in the results. In particular, the strong correlations of Blocks with Procrastination and Perfectionism should be tested further in future studies considering the scarce literature on them (e.g. Boice, 1996; Henning, 1981). It would be interesting to investigate further the lack of correlation for Knowledge Creation with Blocks and Innate Ability (both negative in Lonka et al., 2014) and with Productivity (positive in Lonka et al., 2014). However, since in the present work this scale is not equivalent to the previous Knowledge Transforming scale, comparisons at this level are delicate. The two other non-correlations in the present work were the same for Lonka et al. (2014): Innate Ability and Knowledge Creation did not correlate with Procrastination.

In addition to identifying the convergent and divergent features of the scales, a further key finding was the strong invariance obtained across two different national samples. Strong invariance implies that configuration, factor loadings and intercepts are equivalent, making it possible to compare scores derived from both Spanish and Mexican versions of the instrument. Nevertheless, we recommend caution in relation to items Q4 and Q25, as these did not reach invariant intercept attributes. We suggest further evidence is collected on the functioning of these items.

5. Conclusions

Our study contributes to the development of specific tools for assessing PhD students' conceptions about academic writing. In this respect, The Writing Process Questionnaire, with the adjustments mentioned, is a reliable tool with which to investigate the writing conceptions of the Spanish and Mexican doctoral-student population that may facilitate (adaptive conceptions) or hinder (maladaptive conceptions) their writing process. Nevertheless, for future studies it would be interesting to enrich the instrument adding more items measuring writing conceptions, since most of them are linked to writing problems involved in the composing process.

The study not only validates an instrument in two populations, but also offers cultural insight into the scale that did not work: the possible development of knowledge

in writing conceived of as a solitary process in Spanish and Mexican research practices. Hypotheses emanating from this finding should be explored carefully. More research should be conducted to interpret our results, for instance collecting qualitative data through interviews. We are convinced that future research deeping on this aspect can make important contributions in the field of learning across cultures.

Notes

1. Only 22.6% of the Spanish PhD students in our sample were writing an article-based thesis. The article-based thesis only became widespread practice after the RD [Royal Decree] 99/2011.
2. Only 15.9% of the Mexican PhD students in our sample were writing an article-based thesis. To date there are other accepted ways of getting a PhD besides a monograph format like attending a research seminar, or having published one single article, or presenting a written document together with an article and in some cases also an oral presentation. In contrast, a combination of both articles and monograph together is required in only a few PhD programmes.

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