APA NLM
tapraid5/z1t-assess/z1t-assess/z1t00214/z1t2688d14z | xppws | S=1 | 3/12/14 | 11:40 | Art: 2013-1974

Psychological Assessment

1040-3590/14/$12.00 DOI: 10.1037/a0036472

BRIEF REPORT

Wording Effects and the Factor Structure of the 12-Item General Health Questionnaire (GHQ-12)

AQ: au

J. Gabriel Molina and Maria F. Rodrigo
Universitat de València

Josep-Maria Losilla and Jaume Vives
Universitat Autònoma de Barcelona

The 12-item version of the General Health Questionnaire (GHQ-12) has become a popular screening instrument with which to measure general psychological health in different settings. Previous studies into the factorial structure of the GHQ-12 have mainly supported multifactor solutions, and only a few recent works have shown that the GHQ-12 was best represented by a single substantive factor when method effects associated with negatively worded items were considered. Confirmatory factor analysis was applied to compare competing measurement models from previous research, including correlated traits, correlated methods ~~approaches~~ and correlated traits, correlated uniquenesses approaches, to obtain further evidence about the factorial structure of the GHQ-12. This goal was achieved with data from 3,050 participants who completed the GHQ-12 included in the Catalonian Survey of Working Conditions (Catalonian Labor Relations and Quality of Work Department, 2012). The results showed additional evidence that the GHQ-12 has a unidimensional structure after controlling for method effects associated with negatively worded items. Furthermore, we found evidence for our hypothesis about the spurious nature of the 3-factor solution in Graetz's (1991) model after comparing its fit with that found for alternative models resulting from different combinations of the negatively worded items. An implication of our results is that future research about the factor structure of the GHQ-12 should take method effects associated with negative wording into account in order to avoid reaching inaccurate conclusions about its dimensionality.

Keywords: psychological health, General Health Questionnaire (GHQ-12), method effects, wording effects, confirmatory factor analysis

Supplemental materials: http://dx.doi.org/10.1037/a0036472.supp

The General Health Questionnaire (GHQ) was developed by Goldberg (1972), and it has been widely used as a screening instrument for measuring general psychological health (GPH) in community and nonpsychiatric clinical settings (Goldberg & Williams, 1988). The questionnaire initially included 60 items, but shorter versions with 30, 28, 20, and 12 items have been developed. The shortest version, with 12 items (GHQ-12), is the most popular because of its brevity and ease of administration. Previous studies have reported good reliability and validity of the tests scores of this 12-item version of the GHQ in different samples and countries (Politi, Piccinelli, & Wilkinson, 1994; Rocha, Pérez, Rodríguez-Sanz, Borrell, & Obiols, 2011; Tait, French, & Hulse, 2003). The GHQ-12 has also been included as part of major national surveys, such as the British Household Panel Survey, the Health Survey for England, the Spanish Health Survey, the National Survey of Occupational Stress in Australian Universities, and the Israel Health and Nutrition Survey.

One of the most controversial aspects to be found in the literature about the GHQ-12 concerns the factor structure underlying the responses to this instrument. Although the GHQ-12 was originally developed as a unidimensional scale, this one-factor latent structure has found empirical support in only a few studies (e.g., Banks et al., 1980; Winefield, Coldney, Winefield, & Tiggermann, 1989). Some alternative multidimensional models, mainly with two or three factors, have been proposed as more appropriate. In this sense, the one with the most empirical support is the three-factor model proposed by Graetz (1991) (Campbell & Knowles, 2007; French & Tait, 2004; Gao et al., 2004; Mäkikangas et al. 2006; Padrón, Galán, Durbán, & Gandarillas, 2012;

J. Gabriel Molina and Maria F. Rodrigo, Department of Research Methods in Psychology, Universitat de València; Josep-Maria Losilla and Jaume Vives, Department of Psychobiology and Research Methods, Universitat Autònoma de Barcelona, Spain.

This research was supported by Grant PSI2010-16270 from the Spanish Ministry of Science and Innovation. We thank the Labor Relations and Quality of Work Department of the Government of Catalonia for its kind permission to access the data set from the Second Catalonian Survey of Working Conditions on which the analyses of this work were based.

Correspondence concerning this article should be addressed to J. Gabriel Molina, Department of Research Methods in Psychology, Universitat de València, Avenida Blasco Ibañez, 21, 46010-Valencia, Spain. E-mail: Gabriel.Molina@uv.es

APA NLM

tapraid5/z1t-assess/z1t-assess/z1t00214/z1t2688d14z | xppws | S=1 | 3/12/14 | 11:40 | Art: 2013-1974

Penninkilampi-Kerola, Miettunen, & Ebeling, 2006; Shevlin & Adamson, 2005). The three factors in Graetz's model are named GPH-1 (anhedonia and social dysfunction; 6 items), GPH-2 (anxiety and depression; 4 items), and GPH-3 (loss of confidence; 2 items). It is important to note that the first factor comprises the six positively worded (PW) items, whereas the six negatively worded (NW) items form the other two factors. The bidimensional model, where the six NW and the six PW items in the GHQ-12 are grouped into two factors, has also obtained wide support, especially in studies based on exploratory factor analysis (e.g., Andrich & Van Schoubroeck, 1989; Gao et al., 2012; Hankins, 2008; Politi AQ: 1 et al., 1994~~; Schmitz et al., 1999<zharvx~~). However, the validity and utility of these multifactor measurement models, mainly Graetz's model, have been questioned (Campbell & Knowles, 2007; French & Tait, 2004; Gao et al., 2004; Shevlin & Adamson, 2005). The most habitual argument against them and in favor of the unidimensional solution has been the repeatedly found high correlations between the factors. For example, the correlations between these three factors ranged from .83 to .90 in Gao et al. (2004), from .76 to .89 in Campbell and Knowles (2007), and from .72 to .84 in Padrón et al. (2012). Another argument used against Graetz's model has been the low discriminant validity of the factor scores derived from this model (Gao et al., 2004).

A more recent line of research has questioned the multidimensional nature of the GHQ-12. Hankins (2008) argued that multifactor models are just an artifact that results from the inclusion of PW and NW items in the questionnaire, so that the controversy about the factorial structure of the GHQ-12 might relate to underlying method effects. Including both types of items has been commonly recommended in textbooks about test design (e.g., Spector, 1992) as a way of reducing a number of response biases, such as acquiescence, disacquiescence and midpoint response styles. The psychometric literature has shown, though, that this mixture of items can create a spurious factorial differentiation whereby the PW items load on one factor and the NW items load on another (Schmitt & Stults, 1985).

Method effects associated with NW items have received special attention in the psychometric literature (e.g., Rosenberg Self-Esteem Scale; Lindwall et al., 2012; Marsh, 1996; Tomás & Oliver, 1999). In the case of the GHQ-12, a few recent works have focused on analyzing wording effects. Hankins's (2008) pioneering work on a representative English sample found that, after modeling wording effects for the NW items, the unidimensional model fitted better than both the two-factor model (NW vs. PW items) and Graetz's three-factor model. Working on a sample of Spanish postpartum women, Aguado et al. (2012) found a slightly better fit for the unidimensional model including wording effects than for Graetz's model, and they proved that the factor scores derived from Graetz's model provided little effective discrimination between diagnostic groups. Similarly, working with a sample of ~~384~~ Chinese university students, Ye (2009) found a good fit for the three models compared (i.e., the two multidimensional models considered previously and a unidimensional model with an additional method factor associated with the NW items); however, an analysis of the discriminant validity of the three models provided greater support for the unidimensional model with a method factor. Abubakar and Fischer (2012) worked with two samples of Kenyan adolescents and adults and found that the unidimensional models that partialed out the effects of negative wording provided the best structure representation of the GHQ-12. Finally, Smith, Oluboyede, West, Hewison, and House (2013) conducted a study with a representative sample of English individuals age 50 and over, and they also concluded that the unidimensional model including wording effects fitted the data better than the unidimensional model, the two-factor model and the Graetz three-factor model. Taken together, these studies have shown that the unidimensional model including method effects definitely has a better fit than the unidimensional model and a fit slightly better or equal to the multidimensional models, suggesting that the latter might just be an artifact due to wording effects.

Two procedures have been widely used in the literature to statistically control method biases: the correlated traits, correlated methods (CTCM) and the correlated traits, correlated uniquenesses (CTCU) confirmatory factor analysis (CFA) models. The advantages derived from the parameterization of method effects in the CTCM model led Lance, Noble, and Scullen (2002) to recommend this model over the CTCU model as long as there are no problems of nonconvergent or inadmissible solutions. Both procedures have been used to deal with method effects in the GHQ-12: Ye (2009) applied the CTCM model, whereas Hankins (2008); Aguado et al. (2012); and Smith et al. (2013) used the CTCU model. As far as we know, only the study by Abubakar and Fischer (2012) applied both models to analyze the factor structure of the GHQ-12; however, they did not go deeper into the pros and cons of using both procedures.

To clarify all the above review, the first row of Table 1 shows T1 the five CFA models that have been mainly considered in the study of the GHQ-12 factor structure, and the rest of the table summarizes the results from all the studies where, among the models compared, either the CTCU or the CTCM models (Models 4 and 5, respectively) were considered. The first column in Table 1 AQ: 2 provides the reference for these studies and some clues to their sampling design, whereas the other columns report the goodness-of-fit indices obtained for the five models. Empty cells stand for models that were not considered in the corresponding studies.

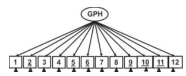
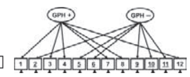
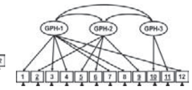
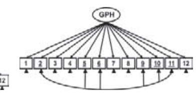
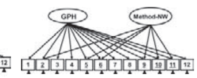
We hypothesized, in light of the aforementioned evidence, that the unidimensional model including method effects associated with the NW items would have a better fit than the multidimensional models traditionally considered in the literature to explain the factor structure of the GHQ-12. Thus, our main aim in this study was to examine the factor structure of the GHQ-12 by comparing the competing CFA models from previous research, including both the CTCU and the CTCM approaches, with a representative and comprehensive Spanish sample of workers. Moreover, we hypothesized that the good fit obtained by Graetz's model, the multifactor model with the biggest support in previous studies, might just be an artifact due to an overparameterization associated with multifactor solutions.

Method

Participants

Data from the Second Catalonian Survey of Working Conditions (Catalonian Labor Relations and Quality of Work Department, 2012) were used in this study. The survey was designed to yield a representative sample of all employees living in Catalonia (Spain) according to the Eurostat definition of employee (Euro-

Table 1
Fit indexes for the alternative models of the 12–item General Health Questionnaire

		Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*
						
	df	54	53	51	39	48
Hankins (2008) English general population, *N* = 3705	CFI	.85	.93	.95	.97	
	RMSEA [90% CI]	.125 [.121, .128]	.086 [.082, .090]	.073 [.069, .077]	.068 [.064, .073]	
Ye (2009) Chinese university students, *N* = 348	CFI		.98	.99		.99
	RMSEA	>.090	.056	.054		.055
	TLI		.98	.98		.98
	SRMR		.057	.057		.051
Aguado et al. (2012) Spanish postpartum women, *N* = 363	CFI	.96		.96	.97	
	RMSEA	.110		.100	.100	
	TLI	.982		.985	.985	
Abubakar & Fischer (2012) Kenyan adults, *N* = 427	CFI	.89	.96	.97	.93	.96
	RMSEA [90% CI]	.08 [.070, .091]	.047 [.035, .058]	.043 [.030, .055]	.068 [.056, .080]	.048 [.036, .061]
	TLI	.86	.95	.96	.90	.95
	SRMR	.055	.036	.035	.046	.034
Abubakar & Fischer (2012) Kenyan adolescents, *N* = 696	CFI	.86	.94	.94	.92	.94
	RMSEA [90% CI]	.075 [.066, .084]	.049 [.040, .059]	.049 [.039, .059]	.061 [.051, .072]	.053 [.043, .063]
	TLI	.83	.92	.93	.88	.92
	SRMR	.051	.035	.034	.041	.035
Smith et al. (2013), Wave 3 English aged 50 and over, *N* = 6237	CFI	.85	.93	.95	.97	
	RMSEA [90% CI]	.11 [.110, .120]	.082 [.079, .084]	.069 [.066, .072]	.059 [.056, .063]	
The present work Spanish workers, *N* = 3050	CFI	.94	.96	.97	.99	.97
	RMSEA [90% CI]	.067 [.063, .071]	.055 [.051, .059]	.050 [.045, .054]	.041 [.036, .046]	.054 [.050, .059]
	TLI	.93	.95	.96	.97	.96
	SRMR	.200	.150	.110	.082	.095

Note. Competing models tested for the 12–Item General Health Questionnaire in first row. Underlined numbers identify negatively worded items. GPH: General Psychological Health factor; GPH +: General Psychological Health factor for positive items; GHQ –: General Psychological Health factor for negative items; GPH–1: Social dysfunction; GPH–2: Anxiety and depression; GPH–3: Loss of confidence; Method–NW: Method factor associated with negatively worded items; df = degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; TLI = Tucker–Lewis Index; SRMR = Standardized Root Mean Square Residuals.

found, 2012). The sample was collected through a random procedure, with municipalities, households, and individuals as sample units in each of the three stages of the sampling design. Data were collected by professional interviewers by means of a computer-assisted personal interviewing (CAPI) technique in private households. The sampling error was 1.63% with a response rate of 25.7%. The sample comprised a total of 3,601 participants (55.4% men and 44.6% women) with a mean age of 40.5 years (*SD* = 11.2; range from 17 to 82). Participants were predominantly European (88.4%); 7.8% were American, 2.7–% were African, 0.6 were Australian, and 0.5 were Asian. All the analyses of this study were conducted with the response data from the 3,050 participants who responded to the GHQ-12 included in the survey. No significant differences were found between the entire survey sample and the study sample in terms of sex, age, level of studies completed, workplace size, and activity sector; therefore, missing data were assumed to be at random.

Measures

As part of the Second Catalonian Survey of Working Conditions (Catalonian Labor Relations and Quality of Work Department, 2012), respondents completed the GHQ-12, a self-report scale that contains six PW items (e.g., "Have you been able to face up to problems?") and six NW items (e.g., "Have you been losing confidence in yourself?"). The GHQ-12 was validated in Spain by Lobo and Muñoz (1996). A peculiar characteristic of the GHQ-12 has to do with its differentiated response scale for the PW items (i.e., *more than usual*; *same as usual*; *less than usual*; and *much less than usual*) and the NW items (i.e., *not at all*; *no more than usual*; *rather more than usual*; and *much more than usual*). The 4-point scoring scheme (i.e., 0, 1, 2, 3) was applied in our study given that, on the one hand, some empirical studies (Banks et al., 1980; Campbell & Knowles, 2007) have supported this graduated scoring method over the originally proposed dichotomous scoring procedure and, on the other hand, it has been the most widely applied scoring scheme. Thus, total scores in the GHQ-12 ranged from 0 to a maximum of 36, with higher scores indicating lower levels of GPH.

Statistical Analysis

We estimated a series of confirmatory factor models with LISREL 8.70 (Jöreskog & Sörbom, 2004) using the weighted least squares estimator. The first row of Table 1 shows the specification of all of these CFA models. We estimated three models that do not incorporate method effects: the intended GHQ-12 unidimensional measurement model (Model 1); the two-factor model with PW and NW items defining, respectively, each factor (Model 2); and the Graetz three-factor model (Model 3). Two models were estimated to examine the method effect associated with the NW items: Model 4, a unidimensional model with correlated errors (i.e., a CTCU model), and Model 5, a unidimensional model with an additional factor for the NW items (i.e., a CTCM model). The goodness-of-fit indices that had been most commonly applied in previous works were computed: the comparative fit index (CFI); the Tucker–Lewis index (TLI); the root mean square error of approximation (RMSEA) with its 90% confidence interval; and the standardized root mean square residual (SRMR). Values greater than 0.95 for the CFI and TLI and lower than 0.06 and 0.08 for the RMSEA and SRMR, respectively, were considered to indicate good model fit.

Results

The frequency distributions for the PW items were quite similar, as were those for the NW items; however, a clear difference appeared when the groups of items were compared. For every PW item, the response category with the highest frequency was *Same as usual,* whereas for all the NW items it was *Not at all.* Accordingly, the means were higher for the PW items (average M = ~~1~~.99) than for the NW items (average M = ~~1~~.40). On the contrary, the variability in the responses was higher for the NW items (average $SD = 0.62$) than for the PW items (average $SD = 0.35$). As regards the bivariate relationships between items, there were important differences between the PW and the NW items in terms of the value of the polychoric correlations. Thus, the pairwise correlations between the PW items ranged from 0.25 to 0.61 (average correlation = 0.43), whereas those between the NW items ranged from 0.40 to 0.85 (average correlation = 0.61).

The goodness-of-fit statistics obtained in our work for the five models compared are shown in the last row of Table 1. Comparing the fit of the models without method effects (Models 1, 2, and 3), one can observe that Model 1 showed the worst fit (i.e., the four goodness-of-fit indices did not reach the cutoff criteria considered), as it did in most of the studies compared; only Aguado et al. (2012) reported a good fit for this one-factor model. Although Models 2 and 3 both showed a reasonable fit, it was marginally better for Model 3, as reported in previous research. None of the three models, though, had an SRMR value below the usual cutoff value of .08. There was a high degree of correlation between the three factors in Model 3 (for a description of the factors, see our discussion of Graetz's model in the introduction): $r_{(\text{GPH-1, GPH-2})} = .66$; $r_{(\text{GPH-1, GPH-3})} = .55$; $r_{(\text{GPH-2, GPH-3})} = .86$. Similar results, obtained in previous studies (see the introduction), have suggested that these factors are not independent and that a more parsimonious solution might be attained. An additional aspect to be noted is that, in most of these studies, the highest relationship corresponds to the two factors containing the NW items (GPH-2 and GPH-3). This raised the issue of whether the improved fit in Model 3 compared to Model 2 might come from just considering an additional factor in the model, taking into account the general rule that the addition of any factor to a model can improve the overall model fit (Schönberger & Ponsford, 2010). Were GPH-2 and GPH-3 two meaningful factors or just the result of the differentiation of a higher order factor into two nondistinct subfactors?

To obtain evidence about this question, we applied the method used by Schönberger and Ponsford (2010) and Wouters, Booysen, Ponnet, and Van Loon (2012) to assess whether a specific factor can be considered to be meaningful in a specific factor structure. Applied to our case, this involved comparing the fit of Model 3 with a number of three-factor models where the NW items were interchanged in factors GPH-2 and GPH-3 (combinations of 3-3 and 4-2 items were allowed), whereas the PW items were kept as measures of GPH-1. The assignment of the NW items to factors GPH-2 and GPH-3 was achieved in a systematic way, so we obtained 24 three-factor models as a result of all the possible combinations. The results of the 24 CFAs executed showed that 14 of the models were not identified; the remaining 10 models showed a good fit to the data (see Table S1 in the online supplemental materials, which also shows the specification and the item factor loadings for each model). Only the SRMR index was over the cutoff value for all the models, as was the case for Model 3. If the fit of these 10 models is compared with that of Graetz's model, quite similar results can be observed; for example, the RMSEA for these 10 models ranged from .051 to .056 and, in every case, the respective RMSEA 90% CIs overlapped with that of Model 3 [.045, .054]. Both results, the high correlation between the factors (mainly between the NW-item factors) and the fact that alternative models resulting from a different combination of NW items resulted in similar fit indices, provided evidence against the validity of the test scores derived ~~with~~ Graetz's model.

As for the two models that include a method effect associated with NW items (Models 4 and 5; i.e., CTCU vs. CTCM), both showed a very good fit to the data, slightly better than that for Model 3 (see Table 1). Model 4 fitted better than Model 5 according to all of the goodness-of-fit indices; moreover, their respective RMSEA 90% CIs did not overlap. An in-depth inspection of the parameter estimates in Model 4 showed that all factor loadings for the GPH factor were positive and statistically significant, ranging from .22 to .84; moreover, the 15 pairs of correlated uniquenesses among the NW items were also statistically significant and ranged from .26 to .70. With regard to Model 5, all factor loadings were positive and statistically significant, ranging from .19 to .79 for the GPH factor and from .45 to .91 for the method factor associated with the NW items.

Discussion

This study extended the examination of method effects in the responses to the GHQ-12. Our results are in line with those of a few previous studies that have found support for its unidimensional structure once method effects associated with NW items were taken into account. In previous research about the factor structure of this questionnaire, the studies that include method effects in the measurement model of the GHQ-12 have been more the exception than the rule, and the good fit obtained by multidimensional models (mainly the two-factor model and the three-factor Graetz model) could be explained by the artificial grouping of PW and NW items. Moreover, the criticism commonly aimed at the Graetz model (see the introduction) has been reinforced here with an additional argument. Thus, it was shown how alternative structurally equivalent models, where the PW items were kept fixed and the NW items were randomly grouped into two factors, fitted the data as well as the Graetz model, which provides further support for the lack of substantive meaning for the two factors containing the NW items. We conclude, in light of the results of the present study, that the good fit found for multidimensional models in the literature is due to the artificial grouping of NW versus PW items. An immediate implication of this conclusion is that future research about the factor structure of the GHQ-12 should take method effects associated with negative wording into account in order to avoid reaching inaccurate conclusions about its dimensionality. Another implication of this result has to do with a likely bias in the estimation of the relationships between the GHQ scores and a number of covariates (see Podsakoff, MacKenzie, & Podsakoff, 2012, for a further review of the effects that method biases have on individual measures and on the covariation between different constructs).

As far as the discussion about the CTCU and the CTCM parameterizations of method effects is concerned, it is worth noting that we did not find any kind of discussion about the pros and cons of using both frameworks in the context of the GHQ-12. If we delve deeper into the reasons for the better fit of the CTCU model (Model 4) than the CTCM model (Model 5) in our study, a possible explanation comes from the fact that method effects are not explicitly modeled in CTCU models, so different method effects may underlie the observed correlated uniquenesses; on the contrary, any hypothesized method effect will be modeled as a separate latent variable in CTCM models. As a consequence, CTCM models will give rise to better specified and more parsimonious solutions; yet, if relevant method effects are missing in the model, this will necessarily result in a solution with a worse fit than that derived from a CTCU model. Thus, a further inspection of the relationships between the GHQ-12 items and, more specifically, between the adjacent equally worded items showed that the correlations between adjacent items were much higher for the pairs of adjacent equally worded items (average correlation = .71) than for the pairs of adjacent items worded in opposite directions (average correlation = .27). These results suggest the presence of an additional method effect consisting of a kind of *response inertia* between adjacent equally worded items that deserves specific research in the future.

A relevant question has to do with the nature of the wording effects in the GHQ-12. This issue is even more challenging for this questionnaire than for others, given the different response scale used for the PW and the NW items in the GHQ-12. As hypothesized by Hankins (2008), the response bias could result from the different response scales used for the NW items and the PW items more than from other explanatory factors. Further research should address the specific contribution of both aspects (i.e., NW items and a different response scale) to the presence of method effects. It is not possible to distinguish either aspect in the usual correlational research using the GHQ-12, and, consequently, (quasi)experimental research would be required to address this issue.

An important strength of this work derived from the quality criteria associated with the survey design of the Catalonian Survey of Working Conditions (i.e., sampling framework, random sampling, face-to-face administration by professional interviewers at home, high response rate). As a consequence, this study was based on a representative and comprehensive sample, in contrast to most previous studies about method effects in the responses to GHQ-12, which were based on limited target populations and/or nonprobability sampling. The above characteristics of our sample can be considered relevant: ~~O~~n the one hand, representativeness supports the generalization of the factorial structure found in the sample to our target population; on the other hand, the fact of relying on a comprehensive sample can be positively considered if we take into account that the GHQ-12 is widely used as a screening instrument in the general population. However, given the use of the GHQ-12 in not only community but also clinical settings, further research is needed to test if its factorial structure remains invariant in a clinical sample. Moreover, research about the measurement invariance across age, sex, country, ethnicity, or educational level would be welcomed in order to support comparisons of GPH scores between those groups.

A limitation of this study is that we focused on modeling method effects associated with NW items but not with PW items. The studies on wording effects in different personality and social psychology scales have traditionally paid much more attention to the presence of negative wording. For the widely studied Rosenberg Self-Esteem Scale, the majority of studies have found that method effects are primarily associated with NW items (DiStefano & Motl, 2006; Horan, DiStefano, & Motl, 2003; Marsh, 1996; Tomás & Oliver, 1999). Some recent studies, though, have found a better fit for models including method effects from both NW and PW items (Marsh, Scalas, & Nagengast, 2010; Quilty, Oakman, & Risko, 2006; Wu, 2008). In the context of the GHQ-12, more studies are needed to better understand the method effects associated with positive and negative wording and to quantify the relative importance of different potential sources of method effects (e.g., positive wording, negative wording, and response inertia effects).

References

Abubakar, A., & Fischer, R. (2012). The factor structure of the 12-item General Health Questionnaire in a literate Kenyan population. *Stress and Health, 28,* 248–254. doi:10.1002/smi.1420

Aguado, J., Campbell, A., Ascaso, C., Navarro, P., García-Esteve, L., & Luciano, J. V. (2012). Examining the factor structure and discriminant validity of the 12-item General Health Questionnaire (GHQ-12) among Spanish post-partum women. *Assessment, 19,* 517–525. doi:10.1177/1073191110388146

Andrich, D., & Van Schoubroeck, L. (1989). The General Health Questionnaire: A psychometric analysis using latent trait theory. *Psychological Medicine, 19,* 469–485. doi:10.1017/S0033291700012502

Banks, M., Clegg, C., Jackson, P., Kemp, N., Stafford, E., & Wall, T. (1980). The use of the General Health Questionnaire as an indicator of mental health in occupational studies. *Journal of Occupational Psychology, 53,* 187–194. doi:10.1111/j.2044-8325.1980.tb00024.x

Campbell, A., & Knowles, S. (2007). A confirmatory factor analysis of the GHQ12 using a large Australian sample. *European Journal of Psychological Assessment, 23,* 2–8. doi:10.1027/1015-5759.23.1.2

Catalonian Labor Relations and Quality of Work Department. (2012). *Segunda Encuesta Catalana de Condiciones de Trabajo [Second Catalonian Survey of Working Conditions].* Barcelona, Spain: Author.

DiStefano, C., & Motl, R. W. (2006). Further investigating method effects associated with negatively worded items on self-report surveys. *Structural Equation Modeling, 13,* 440–464. doi:10.1207/s15328007sem1303_6

Eurofound. (2012). *Fifth European Working Conditions Survey*. Luxembourg, Luxembourg: Publications Office of the European Union.

French, D. J., & Tait, R. J. (2004). Measurement invariance in the General Health Questionnaire-12 in young Australian adolescents. *European Child & Adolescent Psychiatry, 13,* 1–7. doi:10.1007/s00787-004-0345-7

Gao, F., Luo, N., Thumboo, J., Fones, C., Li, S.-C., & Cheung, Y. B. (2004). Does the 12-item General Health Questionnaire contain multiple factors and do we need them? *Health and Quality of Life Outcomes, 2,* Article 63. doi:10.1186/1477-7525-2-63

Gao, W., Stark, D., Bennett, M. I., Siegert, R. J., Murray, S., & Higginson, I. J. (2012). Using the 12-item General Health Questionnaire to screen psychological distress from survivorship to end-of-life care: Dimensionality and item quality. *Psycho-Oncology, 21,* 954–961. doi:10.1002/pon.1989

Goldberg, D. P. (1972). *The detection of psychiatric illness by questionnaire*. London, United Kingdom: Oxford University Press.

Goldberg, D. P., & Williams, P. (1988). *A user's guide to the General Health Questionnaire*. Windsor, United Kingdom: NFER-Nelson.

Graetz, B. (1991). Multidimensional properties of the General Health Questionnaire. *Social Psychiatry and Psychiatric Epidemiology, 26,* 132–138. doi:10.1007/BF00782952

Hankins, M. (2008). The factor structure of the twelve item General Health Questionnaire (GHQ-12): The result of negative phrasing? *Clinical Practice and Epidemiology in Mental Health, 4,* Article 10. doi:10.1186/1745-0179-4-10

Horan, P. M., DiStefano, C., & Motl, R. W. (2003). Wording effects in self-esteem scales: Methodological artifact or response style? *Structural Equation Modeling, 10,* 435–455. doi:10.1207/S15328007SEM1003_6

Jöreskog, K., & Sörbom, D. (2004). *Lisrel 8.70 [Computer software]*. Chicago, IL: Scientific Software International.

Lance, C. E., Noble, C. L., & Scullen, S. E. (2002). A critique of the correlated trait-correlated method and correlated uniqueness models for multitrait–multimethod data. *Psychological Methods, 7,* 228–244. doi:10.1037/1082-989X.7.2.228

Lindwall, M., Barkoukis, V., Grano, C., Lucidi, F., Raudsepp, L., Liukkonen, J., & Thøgersen-Ntoumani, C. (2012). Method effects: The problem with negatively versus positively keyed items. *Journal of Personality Assessment, 94,* 196–204. doi:10.1080/00223891.2011.645936

Lobo, A., & Muñoz, P. E. (1996). Versiones en lengua española validadas [Validated Spanish-language versions]. In D. Goldberg & P. Williams (Eds.), *Cuestionario de Salud General GHQ (General Health Questionnaire): Guia para el usuario de las distintas versiones. Barcelona,* Spain: Masson.

Mäkikangas, A., Feldt, T., Kinnunen, U., Tolvanen, A., Kinnunen, M., & Pulkkinen, L. (2006). The factor structure and factorial invariance of the 12-item General Health Questionnaire (GHQ-12) across time: Evidence from two community-based samples. *Psychological Assessment, 18,* 444–451. doi:10.1037/1040-3590.18.4.444

Marsh, H. W. (1996). Positive and negative global self-esteem: A substantively meaningful distinction or artifactors? *Journal of Personality and Social Psychology, 70,* 810–819. doi:10.1037/0022-3514.70.4.810

Marsh, H. W., Scalas, L. F., & Nagengast, B. (2010). Longitudinal tests of competing factor structures for the Rosenberg Self-Esteem Scale: Traits, ephemeral artifacts, and stable response styles. *Psychological Assessment, 22,* 366–381. doi:10.1037/a0019225

Padrón, A., Galán, I., Durbán, M., & Gandarillas, A. (2012). Confirmatory factor analysis of the General Health Questionnaire (GHQ-12) in Spanish adolescents. *Quality of Life Research, 21,* 1291–1298. doi:10.1007/s11136-011-0038-x

Penninkilampi-Kerola, V., Miettunen, J., & Ebeling, H. (2006). Health and disability: A comparative assessment of the factor structures and psychometric properties of the GHQ-12 and the GHQ-20 based on data from a Finnish population-based sample. *Scandinavian Journal of Psychology, 47,* 431–440. doi:10.1111/j.1467-9450.2006.00551.x

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63,* 539–569. doi:10.1146/annurev-psych-120710-100452

Politi, P. L., Piccinelli, M., & Wilkinson, G. (1994). Reliability, validity and factor structure of the 12-item General Health Questionnaire among young males in Italy. *Acta Psychiatrica Scandinavica, 90,* 432–437. doi:10.1111/j.1600-0447.1994.tb01620.x

Quilty, L. C., Oakman, J. M., & Risko, E. (2006). Correlates of the Rosenberg Self-Esteem Scale method effects. *Structural Equation Modeling, 13,* 99–117. doi:10.1207/s15328007sem1301_5

Rocha, K., Pérez, K., Rodríguez-Sanz, M., Borrell, C., & Obiols, J. E. (2011). Propiedades psicométricas y valores normativos del General Health Questionnaire (GHQ-12) en población general española [Psychometric properties and normative values of the General Health Questionnaire (GHQ-12) in a general Spanish population]. *International Journal of Clinical and Health Psychology, 11,* 125–139.

Schönberger, M., & Ponsford, J. (2010). The factor structure of the Hospital Anxiety and Depression Scale in individuals with traumatic brain injury. *Psychiatry Research, 179,* 342–349. doi:10.1016/j.psychres.2009.07.003

Shevlin, M., & Adamson, G. (2005). Alternative factor models and factorial invariance of the GHQ-12: A large sample analysis using confirmatory factor analysis. *Psychological Assessment, 17,* 231–236. doi:10.1037/1040-3590.17.2.231

Smith, A. B., Oluboyede, Y., West, R., Hewison, J., & House, A. O. (2013). The factor structure of the GHQ-12: The interaction between item phrasing, variance and levels of distress. *Quality of Life Research, 22,* 145–152.

Schmitt, N., & Stults, D. M. (1985). Factors defined by negatively keyed items: The results of careless respondents? *Applied Psychological Measurement, 9,* 367–373. doi:10.1177/014662168500900405

Spector, P. E. (1992). *Summated rating scale construction: An introduction*. Newbury Park, CA: Sage.

Tait, R. J., French, D. J., & Hulse, G. K. (2003). Validity and psychometric properties of the General Health Questionnaire-12 in young Australian adolescents. *Australian and New Zealand Journal of Psychiatry, 37,* 374–381. doi:10.1046/j.1440-1614.2003.01133.x

Tomás, J. M., & Oliver, A. (1999). Rosenberg's Self-Esteem Scale: Two factors or method effects. *Structural Equation Modeling, 6,* 84–98. doi:10.1080/10705519909540120

Winefield, H. R., Coldney, R. D., Winefield, A. H., & Tiggermann, M. (1989). The General Health Questionnaire: Reliability and validity for Australian youth. *Australian and New Zealand Journal of Psychiatry, 23,* 53–58. doi:10.3109/00048678909062592

Wouters, E., Booysen, F. I. R., Ponnet, K., & Van Loon, F. (2012). Wording effects and the factor structure of the Hospital Anxiety and Depression Scale in HIV/AIDS patients on antiretroviral treatment in South Africa. *PLoS ONE, 7*(4), e34881. doi:10.1371/journal.pone.0034881

Wu, C. H. (2008). An examination of the wording effect in the Rosenberg Self-Esteem Scale among culturally Chinese people. *Journal of Social Psychology, 148,* 535–551. doi:10.3200/SOCP.148.5.535-552

Ye, S. (2009). Factor structure of the General Health Questionnaire (GHQ-12): The role of wording effects. *Personality and Individual Differences, 46,* 197–201. doi:10.1016/j.paid.2008.09.027

Received July 4, 2013
Revision received February 11, 2014
Accepted February 27, 2014 ■