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Confirmatory factor analysis of the General Self-Efficacy Scale

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Abstract

A confirmatory factor analysis of the factor structure of the adapted General Self-Efficacy Scale, created by Sherer et al. (1982) [Psychological Reports, 51, 663–671], was conducted to assess whether the scale's purported 3 factors emerged. The results generally supported the 3-factor model, but a model with 3 correlated factors and one higher-order factor (general self-efficacy) proved to fit the data even better.

Keywords: Self-efficacy; Elderly

1. Confirmatory factor analysis of the General Self-Efficacy Scale

Since the percentage of people of 65 years and older has increased threefold since 1900 (Van Nostrand et al., 1993), the interest in studying factors that may explain changes in the various domains of functioning that occur with aging has grown exponentially. Self-efficacy is thought to be one such factor. Self-efficacy is defined as the belief of a person in his or her ability to organize and execute certain behaviors that are necessary in order to produce given attainments. Self-efficacy theory (Bandura, 1977, 1986, 1997) posits that efficacy beliefs influence the types of activity people choose to engage in, the level of effort they spend, and their perseverance in the face of difficulties. In light of maintaining autonomy or independent living of senior citizens, it is relevant to understand these influences in order to develop

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measures that can be taken to direct these influences in a positive way. This may result in keeping the various domains of functioning of older people as strong as possible.

Self-efficacy theory emphasizes domain-specificity, implying that the strongest relationships exist between beliefs regarding a specific behavior performance and the performance of that behavior. However, various and numerous experiences of failure and success in different domains of functioning may generate more generalized beliefs of self-efficacy that have explanatory value as well. Sherer et al. (1982) developed a measure to tap these generalized beliefs, the General Self-Efficacy Scale (GSES). The original scale consisted of 17 items that are scored on a 5-point Likert scale. Woodruff and Cashman (1993) obtained a factor structure, based on the original 17-item scale, that represented the three aspects underlying the scale; i.e. willingness to initiate behavior, 'Initiative', willingness to expend effort in completing the behavior, 'Effort', and persistence in the face of adversity, 'Persistence'. The three subscales had moderate, positive correlations with one another. To date, the present authors are not aware of any study that corroborated this factor structure. Based on pilot-studies with elderly persons, five items were excluded because of low item-rest correlations and ambiguous wording, resulting in a 12-item version of the scale (GSES-12). Furthermore, exploratory factor analysis on a large sample of elderly persons suggested moving one item from subscale Persistence to subscale Initiative (Bosscher et al., 1997).

The aim of the present study was to determine whether the factor structure of the GSES as suggested by Woodruff and Cashman (1993), and taking into account the shift of one item based on exploratory factor analysis, could be cross-validated in an independent sample of subjects using confirmatory factor analysis. In particular, the study intended to investigate two competing models: a model with three uncorrelated first-order factors (model 1), and a model with three related first-order factors with one superordinate higher-order factor (model 2).

2. Method

2.1. Subjects

The present study is part of the Longitudinal Aging Study Amsterdam (LASA). LASA is a 10 year interdisciplinary study on predictors and consequences of changes in autonomy and well-being in the aging population of the Netherlands. Details of the study have been described elsewhere (Smit and de Vries, 1994). LASA uses the sample recruited by the study Living Arrangements and Social Networks of Older Adults in the Netherlands (LSN: Knipscheer et al., 1995). LSN participants were approached for the first LASA cycle after 11 months. The LSN/LASA cohort was based on a random sample of older adults (aged 55–85 years) stratified for age, sex, and expected mortality 5 years into the study. To ensure large enough numbers of subjects in the 75–85 cohort after 10 years, this age category was oversampled. Registers of 11 municipalities in areas in the west, north–east, and south of the Netherlands provided the sampling pool, so that a sample representative of the Dutch older population with respect to geographic region and degree of urbanization could be selected. Subjects were interviewed in their homes by specially trained lay interviewers. Informed consent was obtained from all subjects according to approved university procedures.

The number of respondents in the LSN sample was 3,805 (refusal rate 28.1%; deceased/too frail/ineligible 10.3%). From these, a total of 3,107 were willing to participate in the main LASA interview, giving a response rate of 81.7% (refusal rate 10.4%; deceased/too frail/ineligible 7.9%). For respondents with severe mental or physical impairments ($n = 178$), a shortened version of the interview was available. Because some of the measures relevant to this study were not included in the shortened version and because of item-nonresponse, the final number of respondents was 2,860.

2.2. Statistical procedure and results

Confirmatory factor analysis with maximum likelihood, using LISREL VIII (Jöreskog and Sörbom, 1993), was employed to assess how well the data fit the two models. Each subscale represented a latent variable and each item was an indicator variable. Both models seemed to fit the data well. The χ^2 was significant in both models (model 1, χ^2 ($df = 54$) = 843.51, $p < 0.01$; model 2, χ^2 ($df = 51$) = 355.50, $p < 0.01$). This apparent lack of fit is not surprising because very small differences between expected an observed correlations in large samples can lead to a significant χ^2 (Cole, 1987). Other fit indexes showed good fits for both models. Goodness-of-fit index was high for both models (GFI = 0.95 and 0.98 for models 1 and 2, respectively), as was the adjusted goodness-of-fit (AGFI = 0.93 and 0.97, respectively). The root mean square residual also suggested a good fit to the data (RMSR = 0.10 and 0.04, respectively). Nonincremental fit indexes, such as Bentler–Bonett Normed Fit Index (NFI), Bentler–Bonett NonNormed Fit Index (NNFI), and the Comparative Fit Index (CFI) confirmed these good fits (Model 1: NFI = 0.83, NNFI = 0.80, CFI = 0.83; Model 2: NFI = 0.93, NNFI = 0.92, CFI = 0.94), but the fits were consistently better for the higher-order model.

Standardized factor loadings and residuals for both models are presented in Table 1. It appears from Table 1 that two items, item 1 of subscale Effort and item 5 in subscale Persistence, have relatively lower loadings on their designated factor, when compared across all other items.

To assess the internal consistency of the subscales and the higher-order scale, Cronbachs alpha was computed for each subscale and for the total scale. These are listed in Table 2. All values are high enough, >0.60, to warrant the improvement of the GSES-12 and its subscales by the adoption of new items. Homogeneity of the (sub)scale(s) was assessed by inspecting the mean inter-item correlation and the clustering of the inter-item correlations around their mean. Clark and Watson (1995) have recommended a mean inter-item correlation between 0.15 and 0.20 for broad constructs and between 0.40 and 0.50 for more narrow constructs. While the GSES-12 satisfies this recommendation as a broad construct, the means for the subscales do not satisfy the criterion for narrow constructs. However, their homogeneity is underlined by the inter-item correlations that cluster strongly around their means (see Table 2).

3. Conclusion

The purpose of this research note was to replicate the factor structure of the 12-item GSES (Sherer et al., 1982) on a large sample of elderly persons using confirmatory factor analysis

Table 1
Standardized factor loadings and residuals of items on the GSES-12

Items	Three-factor		Higher order	
	loading	residual	loading	residual
Initiative				
(1) If something looks too complicated I will not even bother to try it	0.74	0.45	0.73	0.46
(2) I avoid trying to learn new things when they look too difficult	0.50	0.75	0.52	0.72
(3) When trying to learn something new, I soon give up if I am not initially successful	0.60	0.63	0.60	0.64
Effort				
(1) When I make plans, I am certain I can make them work	0.57	0.68	0.56	0.69
(2) If I can't do a job the first time, I keep trying until I can	0.49	0.76	0.51	0.74
(3) When I have something unpleasant to do, I stick to it until I finish it	0.53	0.72	0.52	0.74
(4) When I decide to do something, I go right to work on it	0.56	0.68	0.57	0.68
(5) Failure just makes me try harder	0.41	0.83	0.39	0.85
Persistence				
(1) When I set important goals for myself, I rarely achieve them	0.37	0.86	0.40	0.84
(2) I do not seem capable of dealing with most problems that come up in my life	0.61	0.63	0.63	0.65
(3) When unexpected problems occur, I don't handle them very well	0.62	0.62	0.63	0.60
(4) I feel insecure about my ability to do things	0.62	0.62	0.61	0.62

Table 2
Internal consistency and homogeneity of the GSES-12 and its subscales

(Sub)scale	Cronbach's alpha	Mean inter-item correlation	Inter-item correlations min–max
GSES-12	0.69	0.16	–0.04–0.45
Initiative	0.64	0.38	0.30–0.45
Effort	0.63	0.26	0.16–0.33
Persistence	0.64	0.31	0.23–0.39

with maximum likelihood estimates. The three subscales that were shown in an exploratory study by Woodruff and Cashman (1993) were forced into the solution. Based on pilot work, one item was forced into a different subscale. Two items showed relatively lower factor loadings, but neither for reasons of content nor for reasons of internal consistency it seemed justified to delete these items. The results of the factor analysis showed a good fit on two models, either a model with three uncorrelated factors or a correlated model with one higher-order factor. Comparison of the fit indexes suggests the best fit for the higher-order model. Therefore, the GSES-12 is interpreted as a unidimensional broad construct, which is in accordance with the aim of the scale, i.e. to tap general expectations of self-efficacy.

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