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Feelings of Unsafety Among Older People: Psychometric Properties of the EFU-scale

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Abstract

Feelings of unsafety have negative consequences on social outcomes (decreased social participation and lifelong learning). Specifically a large number of older adults report distressing levels of feelings of unsafety. In order to develop intervention strategies we need accurate estimates of feelings of unsafety among older people using elder-friendly instruments. Although some measurement instruments exist, psychometric properties have not yet been adequately examined. This article describes the psychometric properties for the self-report 8-item 'Elders Feelings of Unsafety' (EFU) scale. Factor analyses on data from the Belgian Ageing Studies (N=39,846) provide evidence of good reliability and validity of the EFU-scale. Next, multiple group analyses indicate full configural, full metric and partial scalar invariance. The scale model does not vary across age groups.

1. Introduction

Feelings of unsafety or related expressions such as fear of crime, feelings of uncertainty or insecurity can have negative consequences on individuals in terms of lower psychological wellbeing (Phelan et al., 2010) and decreased health (Jackson & Stafford, 2009) as well as in terms of social outcomes such as decreased social participation and later life learning due to higher precautionary behaviour and not going out in the evening (Kappes et al., 2013;

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Markowitz et al*.,* 2001). Amerio and Rocatto (2005) consider these to be one of the most serious problems afflicting individuals and communities. In particular among older people, feelings of unsafety are closely related to quality of life (Bowling & Zahava, 2007) and a large number of older adults report distressing levels of feelings of unsafety (Acierno et al., 2004; Hayman, 2011). Since the emergence of the first studies exploring fear of crime/feelings of unsafety, many researchers have concentrated on the topic from different viewpoints. These include: (1) defining the variable and developing adequate measures, (2) identifying predictors, (3) examining possible consequences and (4) developing strategies to reduce feelings of unsafety**.** There has been a particularly strong tradition of examining the second topic, i.e. the search for explanations of the variation in fear of crime, regardless of a thorough definition and with little concern for any measurements (Jackson, 2005). A number of researchers in the ageing field, however, have argued that there is an urgent need for studies that have a closer look at the conceptual and methodological development of the concept of fear of crime (e.g. Acierno et al., 2004; Gray et al., 2011). Although some instruments exist, psychometric properties of the version adapted for older people have not yet been adequately examined. In response to this lacuna, this article aims to make a methodological contribution by validating the Elders Feelings of Unsafety scale as an appropriate instrument for measuring feelings of unsafety among older people, while including the oldest old. In doing so, we aim to present a validly measured instrument that is meaningful to the daily lives of older adults. Overlooking the literature on fear of crime, Jackson (2006) concludes that in studies a substantiated operationalization is hardly ever used. Researchers often reproduce old measures without giving these a sufficient methodological evaluation. Most early studies, and some even up to now, use a single indicator: 'How safe do you feel or would you feel being out alone in your neighborhood after dark?'. A related question is the item used in the General Social Survey: 'Is there any area right around here, that is within a mile, where you would be afraid to walk alone at night?'. Already in early studies on feelings of unsafety, several researchers (e.g. Garofalo 1979 in Hale 1996; Lagrange & Ferraro, 1987) formulated critiques on this 'standard question'. The most important remarks can be summarized as follows:

(1) being alone after dark is something people do not do regularly anyway,
(2) the question doesn't take the three dimensions (cognition, affect and behavior) of fear of crime into account,
(3) the question is ambiguous because of the use of 'do you feel?' and 'would you feel?' in one phrase, and
(4) the item doesn't distinguish between offense specific fear and concern over safety.

Although these critiques are well-known, these standard questions or similar one-item questions have still been used in recent research (e.g. Dallago et al., 2009, Kitchen & Williams, 2010, Liu et al., 2009). Against this, several studies indicate that fear of crime is not a one-dimensional feeling, but consists of different dimensions: e.g. personal fear vs. altruistic fear (Snedker, 2006), fear of crime against the person vs. fear of crime against property (Acierno et al., 2004; Jackson, 2005), fear vs. trust (Walklate & Mythen, 2008), objective risk vs. subjective risk (Lee, 2007) and cognitive perception vs. affective experience vs. behavior. The latter classification in particular receives ample treatment and support in the literature. The *cognitive* component, often named risk perception, expresses an individual's assessment of a specific situation as threatening or dangerous and can be assessed by asking questions such as: Do you think people in your neighborhood are safe? How often do you think something is about to happen? Besides risk assessment, the cognitive modality encompasses also the estimation of the magnitude of crime. The second component, the *affective* experience, articulates the feeling of fear, assessed by answers to how often do you feel afraid? How worried are you …? Finally, the *behavioral dimension* may be reflected in visible behavior such as avoidance, preventive or self-protective behavior (Gabriel & Greve, 2003; Kappes et al., 2013). In Belgium, Elchardus and Smits (2003) have developed a questionnaire that measures these three components of general feelings of *safety* in the general population. This questionnaire is regularly used in policy and academic research. The instrument contains eight items, which are derived from conversations and pieces of writing concerning unsafety. Elchardus and Smits (2003, in Dutch) have examined the psychometric properties of the scale for adults on two samples of adults living in Flanders (Belgium). Confirmatory factor analyses (CFA) support a one-factor model and provide good fit measures (sample 1: agfi=0.998 / sample 2: agfi=0.997) and factor loadings ranging from .50 to .75. However, this questionnaire needed to be adapted for older people because two items of the original questionnaire were not applicable to older adults. e.g. Out of fear that I will get mugged, I lock my car door immediately when I get in. As older people (in particular, the oldest old), less often drive the car, this item has a risk to show high missing values. Consequently, Elchardus and colleagues developed an adapted version and replaced the age-specific questions by two other questions. However, up to now, no evaluation and validation of this scale of feelings of unsafety for older people has been undertaken. Finally, it is important to evaluate and validate a scale

amongst different "old" age categories. A final important socio-gerontological observation is that policy makers often aim to reduce feelings of unsafety among "the older population" and that older people are generally treated as one homogeneous group. People are often located into the category of 'the aged' or 'the elders' as from 55, 60 or 65 years old. Nevertheless, within the academic literature it is acknowledged that the population older people is widely heterogeneous (De Donder et al., 2012) and we cannot assume that a measurement instrument has the same meaning across different subpopulations (in this case age groups). This requires paying methodological attention to cross-validation (Pauwels & Pleysier, 2005). Consequently, since previous quantitative research has given too little attention to validating measures and to the basic general criteria for measurement instruments (factor structure, internal validity, proper formulation, reliability) (Vanderveen, 2006), this paper seeks to contribute to the methodological literature about the measurement of elders feelings of unsafety by evaluating how well the scale developed by Elchardus and Smits fits to measure feelings of unsafety in later life by; (1) determining whether the items represent one or more underlying structures; (2) testing the internal validity of a summed score; (3) testing the internal reliability of the scale and (4) cross-validating the scale for different (older) age groups (60-69, 70-79 and 80+).

2. Methods

The data for this study originated from the Belgian Ageing Studies (BAS), a research project that has been conducted in several municipalities in the Dutch speaking part of Belgium (Flanders) since 2004. This project aimed to gather information from older people about their perceptions about various aspects related to quality of life and living conditions in later life. The BAS project collected information from 39.846 home-dwelling people aged 60 and over in 99 Flemish municipalities. Those living in institutional settings were excluded from the research. Addresses were randomly selected from population registers in each municipality. The sample design was stratified, using particular quota where the variables of gender and age (60 to 69, 70 to 79 and 80+) were matched to the makeup of the underlying population. One of the advantages of this kind of sampling was the assurance of a proportional presence of the most vulnerable age group (80+). The sampling fraction depended on the size of the municipality, varying between N=182 and N=1592. The municipalities were not randomly selected. Each municipality could freely decide to participate in the research project or not. Consequently, the global dataset was not representative at a national level, but every sample was representative for the specific municipality and the global dataset is representative for 99 municipalities. All respondents (N=39846) were interviewed in their homes using a structured questionnaire. Respondents ranged in age from 60 to 107 years, with a median of 70 years. 46.1% were male, which corresponds to the population ratio in Belgium and most respondents (61.2%) disposed of a monthly household income lower than 1499 euro. The survey used a highly structured interview. The interview-design was developed to maximize the response. In cooperation with the provincial government, local authorities and members of local senior organizations the research project was developed and carried out. In each municipality, between 30 and 100 older volunteers participated in the project. All volunteers received several training sessions. The volunteers invited respondents to participate in the research project by sending them a letter and subsequently contacting the respondents face to face a few days later. The questionnaire was meant to be self-administered, although volunteers were allowed to clarify the meaning of questions, if requested. Depending on the municipality, interviews were completed with 65 to 85% of the eligible persons who were contacted. In order to reduce the potential bias of non-response, volunteers received replacement addresses in the same quota category, from an additional sample, to exchange for respondents who refused or were hampered in filling in the questionnaire. Respondents were assured of their right to refuse to answer and the privacy of their responses. Feelings of unsafety were measured using eight items developed by Elchardus and Smits (2003) (see table 1). The items of this scale were reviewed by academic researchers to establish content validity. They agreed that the questionnaire items met the underlying theoretical perspectives of feelings of unsafety. Furthermore, the set of statements was reviewed by an expert panel of local and regional policymakers and senior organizations to determine the face validity of the items. Besides reviewing the clearness of items, the expert panel was asked to determine whether each single item was applicable to the life situation of older people. Based on their recommendations and comments raised, some items were revised slightly concerning phrasing and ruling out ambiguity. Table 1 offers an overview of the eight, from Dutch translated items, used for the Elders Feelings of Unsafety scale. Responses were elicited on a 5-point Likert scale anchored by 'completely disagree' (1) and 'completely agree' (5): higher values represent higher feelings of unsafety.

The statistical analytical strategy consisted of several steps. First, a model might very well fit a single dataset, but this is no guarantee for an adequate fit in other sets of data. Therefore, 40 (and for the multiple group analysis: 20) equal sized groups were selected at random out of the dataset to allow split sample analysis. The results were compared for consistency. Second, preliminary analysis comprised data screening to identify possible response patterns and outliers, missing data analysis to avoid jeopardizing the overall construct validity of the scale, assumption testing and the analyzing of sampling adequacy. The most common practice of missing data analysis is 'mean substitution'. This method, however, deforms estimated variances and correlations (Schafer & Graham, 2002). Therefore, we opted to use Maximum Likelihood Estimators (ML), in particular the Expectation-Maximization (EM) algorithm (Verleye, 1996). Third, the underlying structure of the instrument was examined using Exploratory Factor Analysis (EFA) and the dimensionality of the scale through a principal component analysis with a Promax rotation. The decision of a Promax rotation instead of a Varimax rotation was based on Finch (2006, p. 1) who concludes that 'two approaches are equally able to recover the underlying factor structure, regardless of the correlations among the factors, though the oblique method is better able to identify the presence of a simple structure'. Fourth, AMOS 17.0 was used for the Confirmatory Factor Analysis (CFA) to assess how well the data fitted the hypothesized structure. In the hypothesized model error terms were not allowed to correlate. As the method of estimation, Maximum Likelihood (ML) was used. Then, to test whether path coefficients in the EFU-scale were invariant across the three age groups (60-69, 70-79 and 80+) we applied Multiple Group Analysis using AMOS 17.0 (Byrne, 2008; Cheung & Rensvold, 2002; Pauwels & Pleysier, 2005). Finally, to analyse differences in latent mean ratings and standard deviations of the Elders Feelings of Unsafety scale for each age group we applied one-way analyses of variance (one-way-ANOVA). Significant differences between sub-groups were assessed through Post hoc Scheffé tests.

3. Results

The preliminary analysis revealed no items with limited discriminating character: there were no items scores lower than 2.00 or higher than 4.00 on average or with high positive or negative kurtosis and skewness values. The test for multicollinearity or singularity in the data indicated that the determinant of the correlation matrix, with a value of 0.019, was above the necessary maximum. Furthermore the 'Kaiser-Meyer-Olkin measure of sampling adequacy' (0.89) was considered to be meritorious. Finally, Bartlett's test of sphericity was significant ($p<.001$). Consequently, all items could be included and factor analysis was appropriate (Field, 2006). Exploratory Factor analysis revealed one underlying dimension with an eigenvalue of 4.46 corresponding to an explained variance of 55.73 %, indicating that all items assess one component: feelings of unsafety**.** The analysis showed no items with structure coefficients lower than .66, which is well above the minimum of .50. An overview of these factorloadings is presented in Table 1. Examining reliability, Cronbach's alpha for the EFU-scale was very acceptable (0.89). The Confirmatory Factor Analysis was hypothesized to validate the solution that was found in the exploratory factor analysis on the previous sample, expecting eight items to load on one component. Our hypothesized one-factor model showed a good fit to the data ($\chi^2(18) = 116.63$, $p<.001$). The goodness of fit estimates were GFI = .97, TLI= .96, CFI = .97, and RMSEA = .074 with a 90% interval between .062 and .087. Based on these measures of overall fit, there is evidence that the hypothesized model of feelings of unsafety is a good-fitting model (Carlson & Mulaik, 1993; Hair et al., 2007).

Table 1. Feelings of unsafety: item fit statistics and discrimination

EFA: factorloa-dings	Measure	Error	INFIT mean square	OUTFIT mean square	Item discrimination	Item name and number
.72	-.62	.01	1.06	1.13	.84	2. These days it is not safe to let children out on the streets without supervision.
.71	-.58	.01	1.1	1.2	.75	7. These days an alarm system is more than just a gadget.
.83	-.57	.01	.72	.73	1.31	4. You have to be extra careful when you are out on the streets at night.
.74	-.56	.01	1.14	1.14	.89	6. After nightfall I don't open the door when someone rings.
.79	-.37	.01	.84	.84	1.21	5. These last 10 years the streets have become less safe

.66	.23	.01	1.24	1.25	.74	8. When I go away on holiday I don't dare to leave my house unwatched.
.80	.55	.01	.87	.76	1.25	1. These days it is not safe to be out on the streets at night.
.71	1.91	.02	1.18	.96	1.01	3. I seldom go out alone because I am afraid of being mugged.

The results of the CFA are presented in Figure 1. Factor loadings ranged from .59 to .82 and the residuals (e) were allowed to correlate for two item pairs (e01-e03 and e07-e08). This led to a significant decrease in RMSEA compared to the model without correlated residuals (from .118 to .074). This acceptance of substantial overlap between both pairs of items was theory driven. Items 1 and 3 are strongly content related. "Not safe to be out on the streets at night" (item 1) and "seldom go out alone because afraid of being mugged" (item 3): both measured the extent of the feeling of unsafety on the streets. Moreover, item 7 (an alarm system is more than a gadget) and item 8 (When on holiday I don't dare leave the house unwatched) assess the feeling of unsafety in and around the house. The decision to accept the correlation between the residuals gained the upper hand on the decision to exclude item 3 and item 7, due to a lower RMSEA of the CFA when all items were included (0.074 versus 0.088).
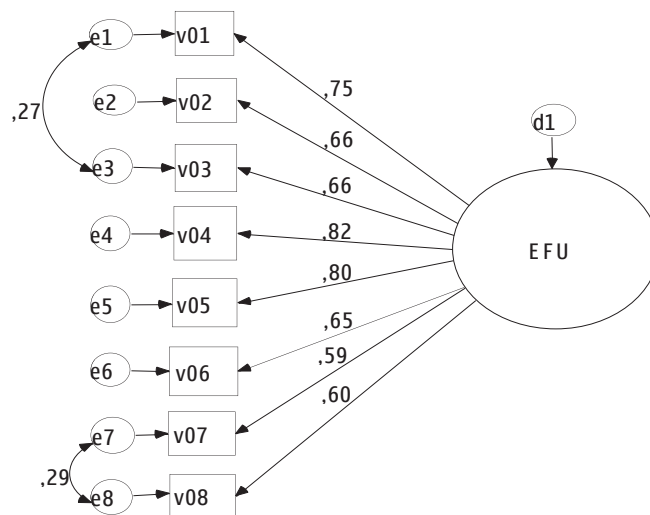

Fig. 1 Confirmatory Factor Analysis of the EFU-scale: One-factor solution (n=994)

The procedure of measurement invariance included several steps. In an initial phase, the baseline model was estimated for each group separately. The results showed a good fit between the hypothesized model and the observed data for all age groups (see table 3). The goodness of fit estimates (GFI and CFI) amply exceeded the cutoff score while RMSEA was below the agreed cutoff score. These parameters indicated that the proposed EFU-scale represented a good fit in the three age groups (60-69, 70-79, 80+).

Table 2. Goodness-of-Fit statistics for the three age groups

	60-69 (n = 947)	70-79 (n = 701)	80 and above (n = 316)
GFI	.96	.97	.95
TLI	.94	.96	.93
CFI	.96	.97	.96
RMSEA	.09	.07	.09

Due to the good fit in the age groups, we proceeded to testing for the invariance of the EFU-scale across the groups. The first test, on configural invariance, required that the three groups had an identical underlying factor structure. The fit of this estimated model provided the baseline value against which all the following models were

compared. The model, under the restriction of an identical factor structure, produced an adequate goodness of fit across the three age groups. CFI (.96) surpassed the cutoff criterion of .95, while the RMSEA did not exceed .10. This implied that the factor structure was identical in the three subgroups. The next step was testing for metric invariance or testing for the invariance of all factor loadings (the strength between each item and its underlying construct) between the different groups. As expected, goodness of fit statistics related to the testing of this metric model yielded a well-fitting model. The CFI of the metric model was 0.96; in comparison with the former model (CFI = .96). That was a difference of .00 (<.01): the model fit did not increase or decrease and consequently, factor loading parameters were found to be invariant across the groups. The final, constrained model tested for scalar invariance and thus additionally checked whether the intercept values are identical across groups. In comparison with the metric model, CFI decreased with .02 (from .96 to .94) which was not acceptable. However, if we found support for a partial scalar invariance model (i.e., at least two items with invariant factor loadings and item intercepts) we could still analyze for differences in latent means across age groups (Steenkamp & Baumgartner, 1998). Considering the modification indices, the intercepts of item 6 were relaxed and were not forced to be invariant. The CFI of this model was .95, which implied a decrease of .01 and was acceptable. Furthermore, a RMSEA of .04 suggested a good fit for this model. Therefore, any differences between the latent means of these latent variables when comparing the age groups are interpretable.

In calculating these latent means all three sub-group comparisons yielded significant relations (60-69 vs. 70-79: $p<.05$; 60-69 vs. 80+: $p<.001$; 70-79 vs. 80+: $p<.01$). As expected, feelings of unsafety were higher among the oldest age group. Respondents aged 80 and above scored on average 3.7 (SD = .87) on a maximum of 5 on the EFU-scale. Respondents between 70-79 scored lower (M=3.5, SD=.97) and respondents aged between 60 and 69 scored the lowest with a mean of 3.3 (SD = .94).

4. Discussion

The focus of the present study was methodological. The article starts with the lack of an appropriate measurement instrument for older people. Before being able to investigate feelings of unsafety among older people, a solid measurement instrument has to be correctly validated. This article filled this void by presenting the validation of this instrument among elders to create the EFU-scale. In examining the underlying structure there is evidence that the hypothesized model of feelings of unsafety is a good-fitting model. Using the EFU-scale to compare (old) age groups seemed to be rash, without previously testing measurement invariance across the different groups. Therefore, this paper has explored the structure of the EFU-scale in three age groups through Multiple Group Analysis. The analysis yields full configural invariance of the EFU-scale (three age groups use the same factor structure), full metric invariance (an equal change in feelings of unsafety causes an equal change on the EFU-scale for the three age groups), and partial scalar invariance (any differences between the latent means of the age groups are interpretable). Therefore, it is suggested that the EFU-scale can be used to examine feelings of unsafety in later life across the three age groups. In comparison to most other measurements of fear of crime, this study has five advantages. First, the scale comprises eight items with a different reference to time, a reference to place, a reference to a specific situation and references to feelings, behavior and cognitive evaluation. Second, the analyses are performed on different samples of the Belgian Ageing Studies, with a better size and representativeness than most studies that include indicators of fear of crime/feelings of unsafety and elderly people. The dataset used in this study was a stratified representative sample (for age and gender) of 39,846 respondents with a response rate between 65% and 85%. Furthermore, the dataset entailed the possibility of split sample analysis to test if the modified models can be confirmed and if the findings of the analysis can be replicated. Fifth, this study has given thorough attention to validating measures and to the basic general criteria for measurement instruments (factor structure, internal validity, proper formulation, reliability). Despite these strengths of the present study and the CFA approach, some limitations have to be considered. A shortcoming is that only Dutch-speaking Belgians have participated. Cross-validating the EFU-scale by including French-speaking residents in Belgium, but also broader internationally, would enrich the validity of this measurement instrument. Future research could offer further insights here.

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