



## DISASTER RECOVERY CONVICTION SCALE REGARDING ELDERLY INDIVIDUALS

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## Abstract

**Objective:** This study aims to develop the “Disaster Recovery Conviction Scale regarding Elderly Individuals” and to contribute to the literature by considering the vulnerabilities of elderly individuals as a result of their fragile nature.

**Methods:** The scale development consisted of forming a question pool, obtaining expert opinions, creating a trial form, and the stages of validity and reliability. While examining the validity of the scale, construct validity, convergent validity and internal validity were examined. The exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed to determine construct validity. To determine the internal validity, a 27% subgroup-group comparison was made.

**Results:** The Kaiser-Meyer-Olkin (KMO) value for the 12 items evaluated in developing the scale was found to be 0.763, and the Bartlett test result was found to be 261.827 ( $p<0.001$ ). It was concluded that the fit values were at the desired level and that the structure of the scale was confirmed. It demonstrates strong internal validity, enabling precise differentiation between individuals with low scores and those with high scores on the scale. The “Disaster Recovery Conviction Scale regarding Elderly Individuals” which was developed, consists of a single dimension and eight items, from which 54.01 of the variances in the disaster recovery conviction can be explained. The Cronbach  $\alpha$  reliability coefficient of the scale was calculated to be 0.87, which indicates high reliability.

**Conclusion:** As a result of the analyses, it is observed that the ‘Disaster Recovery Belief Scale for Elderly Individuals’ is at an acceptable level in terms of scope, content and structure.

**Keywords:** Conviction, disaster, disaster rescue, elderly individual, scale.

## Introduction

Disasters are one of the greatest challenges faced by societies and affect millions of people worldwide every year.<sup>1</sup> Disasters, which occur on average once a week anywhere in the world and affect millions of people, have become an international concern.<sup>2</sup> To address this concern, societies need to be prepared for disasters. However, despite the increasing frequency of disasters worldwide, it remains evident that societies are not yet fully prepared to effectively respond to them.<sup>3</sup> The level of societal preparedness for disasters is directly correlated with the effectiveness of disaster response and recovery, with higher preparedness facilitating more efficient coping mechanisms. The reason for this is that societies that are aware of their vulnerabilities are more likely to be prepared for disasters.<sup>4</sup>

Disasters affect all people living in disaster-prone areas, but they do have a bigger impact on elderly individuals, who are among the vulnerable groups in society.<sup>5,6</sup> Studies have revealed that the physical health of elderly adults is affected by disasters to a greater extent than that of younger adults.<sup>7,8</sup> Especially considering that the elderly population is estimated to reach two billion people, or 22% of the world's population by 2050, it becomes clear that importance should be given to the needs of elderly individuals before, during and after disasters and that these should be prioritized.<sup>9</sup>

When the studies are examined, it can be observed that the disease and death rates related to disasters increase in elderly adults, and that this is caused by factors such as pre-existing physical and mental diseases, disabilities and individual special needs in a significant part of the elderly.<sup>5,10</sup> In a study conducted after the Hanshin-Awaji earthquake that occurred in Kobe in 1995, it was determined that 44% of the deaths in some areas affected by the earthquake were persons over the age of 65.<sup>11</sup> Similarly, in a study conducted after Hurricane Katrina, which occurred in the United States in 2005, it was reported that 73% of the people who lost their lives were people aged 60 and older.<sup>12</sup> Nonetheless, this shows that the death rates of elderly individuals tend to increase due to the post-disaster effect of secondary disasters, which makes them also more vulnerable groups pre-disaster.<sup>9</sup> Therefore, it is thought that elderly individuals worry before disasters occur, because they feel vulnerable to a possible disaster, which anxiety reveals the concept of recovery conviction both for themselves as the rescue teams.

There is limited information about the recovery convictions of elderly individuals in disasters. Therefore, recovery convictions need to be further investigated to minimize the vulnerability of the elderly population and to better understand their special needs, their convictions towards rescue teams, and their characteristics in disaster preparedness. During the literature review, to my knowledge, no scale developed to measure disaster recovery convictions of elderly individuals was found. In this respect, it is thought that this scale will contribute to future studies to determine the situation regarding the recovery conviction of elderly individuals, especially in countries like Türkiye where disasters are frequently experienced.

In this regard, this study aims to develop the "Disaster Recovery Conviction Scale" and contribute to the literature, considering the vulnerabilities experienced by elderly individuals due to their chronic diseases and physical disabilities, and their fragile nature which causes their inadequate and slow mobility compared to younger individuals.

## Methods

The development of the "Disaster Recovery Conviction Scale regarding Elderly Individuals" consisted of forming a question pool, obtaining expert opinions, creating a trial form, and the stages of validity and reliability.

### Forming a question pool

In forming the question pool, the literature was examined in line with the keywords "disaster", "recovery conviction" and "old age", and the statements related to the purpose of the study that were found, were included in the question pool. Accordingly, a total of 12 statements was added to the question pool.

### Obtaining expert opinion

The opinions of 6 academic experts (1 expert in public health, 1 nurse, 1 geriatric specialist, 1 expert in disaster management, 1 psychologist, 1 Turkish language expert) were sought regarding the statements in the draft form (consisting of 12 items). Improvements were made to some items in line with expert suggestions. After the corrections, the draft form was rearranged to include the 14-item statement.

### Pilot application

After the draft form was designed, a pilot application was carried out to determine whether these expressions were correctly understood by the selected sample group. In this study, the content-verified draft form was applied as a pilot to a sample group of 10 people and it was concluded that all expressions were understood correctly.

### Design and implementation of the draft form

The statements in the draft form were arranged in a 3-point Likert scale with the responses 1="disagree", 2="unsure", 3="agree".

In this study, data collection forms were distributed to elderly individuals across various regions of the country through online applications, and the data were gathered electronically. During the sampling process, a ratio of five participants per item on the scale was taken into account.<sup>13</sup> Accordingly, the sample of the study consisted of 271 elderly individuals (143 for EFA and 128 for CFA). This number meets the sufficient sample size stated in the literature for scale studies. In this study, 57.1% of the sample from which data were collected for EFA was female and the average age of the sample was 73.3±4.2 years. A rate of 61.4% of the sample from which data were collected for CFA was female and the average age was calculated to be 71.4±3.9.

### Validity and Reliability

The validity of the scale was obtained by examining construct validity, convergent validity and internal validity. EFA and CFA were calculated for construct validity, and AVE (Average Variance Extracted) and CR (composite reliability) were calculated for convergent validity, whereas the internal validity was determined to be below 27% by comparing the subgroup-group. For the reliability of the scale, the Cronbach  $\alpha$  internal consistency coefficient was calculated, and in addition, the split-half reliability was calculated.

## Results

In this section, the results of the validity and reliability of the scale development process are included.

### Preliminary statistics

In this section, primarily, the suitability of the data for factor analysis was investigated. In order to determine the suitability of the data for factor analysis, it is recommended to perform item reliability, calculate the Kaiser-Meyer-Olkin coefficient and perform the Bartlett sphericity test before factor analysis.<sup>14,15</sup>

### Kaiser-Meyer-Olkin coefficient and Bartlett test of sphericity

The Kaiser-Meyer-Olkin coefficient allows us to obtain information about whether the data matrix is suitable for factor analysis and whether the data structure is suitable for factor extraction. Kaiser-Meyer-Olkin is expected to be 0.60 or more. The Bartlett's test is another calculation method that examines whether there is a relationship between variables based on partial correlations. The fact that the calculated chi-square statistic is significant can be regarded as evidence of the normality of the scores.<sup>15</sup> The Kaiser-Meyer-Olkin value for the 12 items evaluated to develop the Disaster Recovery Conviction Scale regarding Elderly Individuals was found to be 0.763, and the Bartlett test result was found to be 261.827 ( $p < 0.001$ ). These values show that the trial form is suitable for factor analysis.

### Validity

Validity entails that the measurement tool used is suitable for the feature to be measured, the data fully reflect the nature of the feature to be measured, and that the data are purposeful at the same time.<sup>16</sup>

While examining the validity of the scale, construct validity, convergent validity and internal validity were examined. EFA

and CFA were performed to determine construct validity. To determine the internal validity, a 27% subgroup-group comparison was made.

### Construct validity

Construct validity was examined by exploratory factor analysis and confirmatory factor analysis. Exploratory factor analysis is a process that helps to determine under which headings the items in a measurement tool that is prepared and implemented as a draft will be collected, and to find factors based on the relationships between variables, and is a method frequently used to examine the construct validity of a scale.<sup>15,17</sup> When determining the number of factors to be included in a scale, the eigenvalue of each sub-dimension in factor analysis must be at least 1 or higher and explain at least 5% of the variance. Additionally, it is a widely accepted fundamental principle that the variance explained by the scale should exceed the unexplained variance.<sup>17</sup>

In the analysis, it was observed that there were 2 factors with eigenvalues greater than 1. When the component matrix was examined, it was observed that the two-factor structure contained many overlapping items. Additionally, it was determined that one of the factors composed of 3 items. Since the Cronbach  $\alpha$  value for the three-item factor was below the desired limits, it was decided that it would be more functional to transform the scale into a single-factor structure.

For the item selection process in factor analysis, the factor item load values of the sub-factor in which the items are located must be at appropriate levels. The factor loading value of each item was required to be greater than 0.30.

As a result of the principal component analysis, the factor loading values of some statements (I3, I4, I5, I6, I7, I12) were excluded from the scale because they were below 0.30. After this process, a structure consisting of 8 items was formed. In the resulting structure, the factor loadings of the items varied between 0.337 and 0.883 (Table 1).

**Table 1.** Factor items and Item factor loading values

Item no.	Statement	Factor loading
<b>I9</b>	I believe that in disasters, rescuers will try not to hurt me physically	0.883
<b>I10</b>	I believe that in disasters, rescuers will try not to hurt me emotionally/ psychologically	0.835
<b>I1</b>	I believe that in disasters, I and elderly people like me will be the last to be saved.	0.707
<b>I2</b>	I believe that elderly people are left to fend for themselves in disasters	0.680
<b>I13</b>	I believe that my family will make a lot of effort to save me in disasters.	0.457
<b>I14</b>	I believe that rescuers have insufficient knowledge about saving elderly individuals in disasters.	0.421
<b>I8</b>	I believe that the elderly should be rescued as a priority in disasters.	0.384
<b>I11</b>	I believe that those who prioritize saving the elderly in disasters have stronger religious beliefs.	0.337
<b>Explained variation</b>		<b>54.01</b>

In Figure 1, it can be observed that the standard factor load values of the items are distributed between  $\lambda = -0.40$  and  $\lambda = 0.81$ , and the error variances of the items are distributed between  $\epsilon = 0.34$  and  $\epsilon = 0.97$ .

In our research, the Cronbach  $\alpha$  reliability coefficient for the entire scale was found to be .87. This value shows that the reliability of the items in the scale is high and that they aim to measure the same concept.

An attempt was made to confirm the single-factor structure obtained as a result of EFA with CFA. For this purpose, a single-factor model was established and the goodness of fit

values of the model were examined. When the goodness of fit values of the scale are examined, it can be observed that  $\chi^2/df=4.1$ , AGFI=0.90, CFI=0.95, GFI=0.91, RMSA=0.08, NFI=0.91. Although the fit indices were within the required limits, it was observed that RMSA, one of the comparative fit indices, had borderline values for an acceptable fit. Therefore, the NFI, another comparative fit index, was examined, and it was determined that the NFI indicated an acceptable model fit. In line with these findings, it was concluded that the fit values were at the desired level and therefore the structure of the scale was confirmed (Table 2).

**Table 2.** Goodness-of-fit values of the Disaster Recovery Conviction Scale regarding Elderly Individuals.<sup>18,19</sup>

Compatibility Criteria	Good fit	Acceptable fit	Value obtained in this study	Result
<b>X<sup>2</sup>/df</b>	≤3	3<x <sup>2</sup> /df<5	4.1	Acceptable fit
<b>RMSEA</b>	≤0.05	≤0.08	0.08	Acceptable fit
<b>CFI</b>	>0.95	>0.90	0.95	Good fit
<b>NFI</b>	>0.95	>0.90	0.91	Acceptable fit
<b>GFI</b>	≥90	≥85	0.91	Good fit
<b>AGFI</b>	≥90	0.89<AGFI<0.85	0.90	Good fit

AGFI: Adjustment Goodness of Fit Index; GFI: Goodness of Fit Index; CFI: Comparative Fit Index; NFI: Normed Fit Index RMSEA: Root Mean Square Error of Approximation

### Internal validity

Whether the structure created as a result of EFA and CFA has internal validity was determined by a 27% subgroup- group comparison. For subgroup-group comparison, the 27% group with high scores from the scale and the 27% group with low scores from the scale were compared with the "t test in independent groups" (Table 3).

In table 3, the internal validity findings of the Disaster Recovery Conviction Scale regarding Elderly Individuals were tested by comparing the 27% subgroup/group, and it was determined that the mean scores of the group with the highest average score and the subgroup with the lowest average score from the scale showed a statistically significant difference from each other ( $p<0.001$ ). The obtained scale structure shows that the scale accurately distinguishes individuals with low scores and individuals with high scores in the scale, meaning it has internal validity.

**Table 3.** Findings regarding the 27% subgroup-group comparison

Group	n	Average	SS	t	p
Group	35	23.24	3.21	-19,283	0.000
Subgroup	35	11.73	2.83		

\* $p<0.001$

### Discussion

This study aims to develop the disaster recovery conviction scale regarding elderly individuals. The validity and reliability of this study were established in accordance with the relevant literature.

When the studies are analysed, it is observed that elderly individuals are among the most vulnerable groups in disasters.<sup>5,20</sup> Research indicates that both personal and social factors contribute to the vulnerability of the elderly in disasters.<sup>21,22</sup> However, elderly people believe that individual limitations are a critical vulnerability factor in disasters, as noted in this study.<sup>22</sup> Furthermore, elderly people recognise that inequality, together with lack of access to social supports, makes them even more vulnerable when faced with a disaster.<sup>23</sup> Considering the studies conducted, a measurement tool was created to determine the perceptions of elderly individuals' recovery conviction in disasters.

The construct validity of the scale was examined by EFA and CFA analysis. In factor analysis, the preferred factor load of 0.30 was sufficient.<sup>24</sup> As a result, a single-factor structure was obtained, and the variance ratio explained by this structure was 54.01%, which is an ideal value for a single-factor

measurement tool. This is due to the fact that an accepted basic principle is that the variance explained by the scale is greater than the variance it cannot explain.<sup>17</sup>

The structure of the scale was verified through CFA, and when the goodness of fit values are examined, it can be observed that the obtained values are at an acceptable level.<sup>18,19</sup> When the findings obtained for construct validity are considered as a whole, it can be concluded that the structure of the scale was validated and confirmed.

In Likert scales, ensuring internal consistency is a primary objective. Internal consistency shows how compatible the items that make up the scale are with each other. The most frequently used method for this is known as the calculation of the Cronbach  $\alpha$  reliability coefficient. The desired Cronbach  $\alpha$  reliability coefficient, which can be considered sufficient on the Likert scale, is desired to be over 0.70 and as close to 1 as possible. For this purpose, the Cronbach  $\alpha$  reliability coefficient was calculated in the study and a value of .87 was obtained. This value shows that the scale is within the reliability limits and is high.<sup>25,26</sup>

When the validity and reliability findings of the scale are evaluated jointly, it can be concluded that the Disaster Recovery Conviction Scale regarding Elderly Individuals made valid and reliable measurements.

It is recommended that the results of this study be applied in different populations and different sample groups.

### Limitations

There are some limitations in the design and development of the Disaster Recovery Conviction Scale regarding Elderly Individuals. First and foremost, since the scale was developed in Turkish, additional validity and reliability studies should be conducted, taking different cultural contexts into account. In this study, the analyses were limited because we evaluated elderly individuals living in Türkiye were evaluated. Second, the criterion-related validity of the scale was not assessed in this study, as no data were collected simultaneously using the scale and other comparable measures.

### Conclusion

When the validity and reliability findings of the scale are evaluated jointly, it can be concluded that the Disaster Recovery Conviction Scale regarding Elderly Individuals made valid and reliable measurements.



## Instructions for the Disaster Recovery Conviction Scale regarding Elderly Individuals

The purpose of this study was the development of the 'Disaster Recovery Conviction Scale regarding Elderly Individuals' to measure the convictions of elderly individuals in disaster recovery. From the analyzes performed it can be observed that the "Disaster Recovery Conviction Scale regarding Elderly Individuals" is at an acceptable level in terms of scope, content and structure.

The "Disaster Recovery Conviction Scale regarding Elderly Individuals" which was developed, consists of a single dimension and eight items, from which 54.01 of the variances in the disaster recovery conviction can be explained. The Cronbach  $\alpha$  reliability coefficient of the scale was calculated to be .87, which indicates high reliability. The scale is a 3-point Likert, consisting of the following items 1="disagree", 2="unsure", 3="agree". The lowest score that can be obtained from this scale, in which three items are scored in reverse (I1, I2, I8), is eight, whereas the highest is 24. This scale is only applied to individuals aged 65 and older. The increase in score shows that the elderly are highly confident that they would be rescued in case of a disaster.

### Conflict of Interest

The authors have no conflicts of interest to disclose

### Ethics and permissions

The necessary ethical permissions for the study were obtained from the Ethics Committee of Kayseri University (dated: 12.02.2024, numbered: 89244).

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### Author Contributions

The study was designed by EG.

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