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## The General Self-Efficacy Scale with South African First Responders: Insights from Three Psychometric Paradigms

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### Abstract

Self-efficacy is a key psychological resource that influences how individuals cope with stress, adapt to challenges, and sustain performance under pressure. In high-risk occupations, self-efficacy can confer resilience and promote hardiness. Although the General Self-Efficacy Scale (GSE) is one of the most widely used measures of this construct, limited research has examined its psychometric properties in South African contexts. The present study sought to evaluate the dimensionality, reliability, and validity of the GSE among South African first responders using three complementary analytic frameworks namely, Classical Test Theory, Rasch measurement modelling, and Mokken scale analysis. Results consistently supported a unidimensional structure of the GSE, with nine of the ten items demonstrating strong psychometric performance. One item performed less robustly but remained within acceptable limits. Scale-level analyses revealed excellent internal consistency and reliability across approaches. In addition, self-efficacy showed significant positive associations with resilience and hardiness, providing evidence of construct validity and supporting the theoretical links between these protective psychological resources. These findings indicate that the GSE is a psychometrically sound measure for use in South African first responder populations and can be employed confidently in both research and applied contexts. The study further underscores the value of targeting self-efficacy in interventions designed to strengthen coping and resilience in high-stress occupational groups.

**keywords:** Classical test theory; Rasch analysis; Mokken scale analysis; self-efficacy; reliability; validity.

## Introduction

Self-efficacy refers to an individual's belief that they have the capacity and skills to organize and implement the behaviors needed to cope with anticipated demands (Schwarzer & Jerusalem, 1995). It represents an optimistic sense of personal competence and is linked to health and well-being, improved quality of life, motivation and accomplishment (Whitehall et al., 2021). Various studies have reported on the relationship between self-efficacy and chronic disease outcomes including cardiovascular disease (Banik et al., 2018), hypertension (Salmanpour et al., 2025) and chronic obstructive pulmonary disease (Selzler et al., 2020). Higher levels of self-efficacy have been linked to better adherence to prescribed medication regimens, improved engagement in physical activity, and greater commitment to dietary modifications that are essential to the management of chronic diseases (Bravo et al., 2020; Peters et al., 2019; Wang et al., 2022).

Self-efficacy has been associated with job satisfaction, improved work performance, organizational commitment and reduced risk of burnout (Carter et al., 2018; Lim et al., 2022). Employees with higher levels of self-efficacy are more likely to perceive themselves as competent in fulfilling their roles, which in turn fosters greater confidence in navigating work-related challenges (Carter et al., 2018; Hur et al., 2021). This sense of capability often translates into higher levels of motivation, persistence, and goal attainment, contributing positively to overall job performance. Moreover, strong self-efficacy enhances employees' resilience in the face of workplace stressors, reducing the likelihood of burnout or disengagement (Hur et al., 2021; Wang & Wang, 2022).

Self-efficacy has also been shown to exert mediating influences on a range of health, well-being, and performance-related outcomes. For example, self-efficacy was found to mediate the effect of craving on smoking abstinence among cardiac patients (Berndt et al., 2013). Research on individuals with acquired mobility impairments found that self-efficacy served as a mediator in the relationship between impairment and life satisfaction, indicating that perceptions of personal capability are important in shaping psychological adjustment in the face of adversity (Rogowska et al., 2020). Self-efficacy has also been found to mediate the relationship between work-related stress and job burnout among school teachers (Yu et al., 2015) and resilience and academic performance among adolescents (Supervía et al., 2022).

Given the central role of self-efficacy across health, wellbeing and performance related dimensions, the accurate assessment of the construct remains critical for both research and applied settings. The most widely used measure of self-efficacy is the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995). The instrument was developed to provide a standardized measure of individuals' perceived capability to cope with a broad array of life demands and challenges. The GSE has been validated across numerous cultural, clinical, and occupational populations, and its psychometric properties have been extensively examined in various countries including Greece (Mystakidou et al., 2008), Italy (Rossi et al., 2025), South Africa (Nel & Boshoff, 2016), Korea (Kim et al., 2023) and Spain (Herrero et al., 2014). The scale typically yields internal consistencies ranging between .75 and .91 (Kim et al., 2023; Rossi et al., 2025; Zeng et al., 2022). A

cross-national study investigated the psychometric properties of various adaptations of the GSE across 25 countries and provided evidence supporting the assumption that the scale is unidimensional (Scholz et al., 2002). More recent research has continued to support a one-factor structure of the GSE, including studies conducted in Italy (Rossi et al., 2025), Sweden (Dahlberg et al., 2022) and Serbia (Dahlberg et al., 2022). However, other studies have identified alternative structures, reporting two- and three-factor solutions.

Zeng and colleagues (Zeng et al., 2022) using both confirmatory and exploratory factor analysis in a Chinese sample, identified a two-factor structure comprising action self-efficacy and coping self-efficacy. Their study further demonstrated satisfactory levels of internal consistency and criterion validity. Herrero and colleagues (Herrero et al., 2014) found that a Principal Component Analysis of the GSE produced a three-factor structure, which was subsequently confirmed through Confirmatory Factor Analysis (CFA) in a Spanish sample. Similarly, Bosscher and Smit (1998) supported a model with 3 correlated factors (initiative, effort, and persistence) and one higher-order factor (general self-efficacy) in a Dutch sample. These findings suggest that, although the GSE is often treated as unidimensional, its underlying structure may vary depending on cultural, linguistic, or population-specific factors.

The present study aimed to extend existing research by evaluating the psychometric properties of the GSE within a South African first responder population using three complementary methodological frameworks namely, classical test theory (CTT), Rasch measurement modeling, and Mokken scale analysis (MSA). First responders, including police officers, paramedics, and firefighters, are repeatedly exposed to highly stressful and potentially traumatic situations in the course of their duties. These occupational demands place them at elevated risk for adverse mental health outcomes (Vujanovic et al., 2021; Yung et al., 2022; Zegel et al., 2023).

Despite these risks, first responders are also required to function effectively under pressure, make rapid decisions in critical contexts, and provide essential services to the public (Zegel et al., 2023). Self-efficacy is a central psychological resource that may buffer the negative effects of occupational stressors and promote adaptive coping in this population (Huard et al., 2021; O'Neil & Kruger, 2022; Seidman et al., 2024). Valid and reliable assessment of self-efficacy in this group is therefore essential, both for advancing research on psychological adaptation in high-risk occupations and for informing interventions aimed at strengthening coping and resilience. Yet, there has been limited psychometric evaluation of the GSE among first responders, particularly in the South African context where they face additional challenges such as resource constraints, high rates of community violence, and systemic pressures within emergency services (Ntamatamala & Adams, 2022; Padmanabhanunni & Pretorius, 2025).

Using these three methodological approaches in combination provides a more robust and nuanced assessment of the scale's reliability, validity, and dimensional structure (Pretorius et al., 2021). CTT offers traditional indices of internal consistency and item performance while Rasch analysis enables examination of item-level functioning, scale invariance, and fit to a probabilistic

measurement model. MSA provides further insights into the hierarchical nature and scalability of the items (Mokken, 2011; Sijtsma et al., 2011). By applying these complementary techniques, this study sought to generate a comprehensive evaluation of the GSE, thereby contributing to the evidence base for its use in high-stress occupational groups such as first responders in the South African context.

## Materials and Methods

### Participants and Procedures

This study was part of a larger project that focused on the mental health of first responders and potential protective factors in respect of well-being. Participants ( $n = 429$ ) were first responders and consisted of police officers ( $n = 309$ ) and paramedics ( $n = 120$ ) in the Western Cape Province of South Africa. On account of South Africa's privacy legislation, it was not possible to obtain a database for random sampling and thus the sample of first responders was therefore a convenience sample. Google Forms were used to develop electronic versions of the instruments described in the Measures section and this electronic link was posted on Facebook groups that consisted of first responders together with an explanation of the aims of the study and an invitation to participate. Permission to conduct the study was also received from the South African Police Services (reference number: 3/34/2) and the Western Cape Department of Health (reference number: WC\_202307\_041). Thus, research assistants went to police stations and hospitals in person to invite participants and shared the link with them.

Slightly more than half of the sample were men (55%) and were married (51%). The majority of the sample worked in an urban area (92.3%). In terms of educational qualification and 49.2% had completed matric (grade 12), while 49.7% was in possession of a post-matric qualification. The mean age of the sample was 39 years ( $SD = 9.93$ ) and the youngest participant was 19 years of age, while the oldest participant was 64 years old. The average number of years that participants served as first responders was 13.24 years ( $SD = 9.65$ ).

### Measures

In addition to a brief socio-demographic questionnaire, participants completed the following instruments:

- The GSES (Schwarzer & Jerusalem, 1995) is a 10-item measure of perceived self-efficacy which reflects optimistic self-beliefs about the ability to achieve one's goals. The 10 items are responded to on a 4-point scale ranging from 1 (*not at all true*) to 4 (*exactly true*). An example item of the GSE scale is "thanks to my resourcefulness, I know how to handle unforeseen situations". Higher scores on the GSES reflect higher levels of self-efficacy. The authors of the GSES reported reliability estimates (Cronbach's alpha) ranging between 0.82 and 0.93 in five different German samples, and provided evidence of concurrent and predictive validity. In South Africa one study reported a Cronbach's alpha of 0.93 for the GSES when used with young adults (Twinomurinzi & Msweli, 2019).
- The Connor-Davidson Resilience Scale-10 (CDRISC-10: Campbell-Sills & Stein, 2007) is a revised 10-item measure of resilience based on the original

25-item version of the CDRISC (Connor & Davidson, 2003). The CDRISC-10 uses a five point Likert scale that ranges from 0 (*not true at all*) to 4 (*true nearly all of the time*). An example item of the CDRISC is “I tend to bounce back after illness, injury, or other hardships”. Higher scores on the CDRISC reflect higher levels of resilience. The developers of the 10-item version of the CDRISC reported an estimate of internal consistency of 0.85 in an undergraduate sample and provided evidence of construct validity (Campbell-Sills & Stein, 2007). In South Africa (Pretorius & Padmanabhanunni (2022) reported a Cronbach’s alpha of 0.95 and confirmed the unidimensionality of the CDRISC-10.

- The Dispositional Resilience Scale (DRS: Bartone, 1995) is a 15-item measure of psychological hardiness, a personality style that includes finding meaning and actively engaging in life's experiences (commitment), a belief that it is possible to control events and circumstances (control), and embracing adversity and change as opportunities for growth and development (challenge). The DRS is responded to on a four-point scale ranging from 0 (*not at all true*) to 3 (*completely true*) an example item of the DRS is “by working hard you can always achieve your goals”. High scores on the DRS indicates higher levels of psychological hardiness. The author of the DRS reported a reliability coefficient of 0.83 for hardiness scores and provided evidence of predictive and criterion-related validity (Bartone, 1995).

## Ethics

The research project was approved by the Humanities and Social Sciences Ethics Committee of the University of the Western Cape (ethics reference number: HS23/2/4, May 23, 2023). The study adhered to the guidelines of the Declaration of Helsinki. Participants provided informed consent and no identifying particulars were collected.

## Data Analysis

CTT indices were obtained with IBM SPSS for windows version 30 (IBM Corp. Armonk, NY, USA). Rasch analysis was conducted with Winsteps version 5.8 (Linacre, 2023), and MSA with package “Mokken” (van der Ark, 2012) in R software (R Development Core Team, 2020). In addition, IBM SPSS Amos for windows version 28 was used for structural equation modeling (SEM).

To assess the dimensionality of the GSES the following analyses were conducted:

- The automated item selection procedure (AISP) was used to examine dimensionality in MSA. This procedure assigns 0 to an item if it is not scalable (does not load on a scale) and as many values as there are dimensions within a scale. Thus, if AISP assigns a 1 to some items and a 2 to other items this would indicate that the scale is multidimensional. In MSA we also examined the assumption of monotonicity which is the probability of endorsing higher levels of the items as the values of the latent variable increases. MSA provides an indication of the number of violations (#vi), the

significance of the violations (#zsig) and what is called a *Crit* value. *Crit* values greater than 80 are regarded as serious violations of monotonicity, while values less than 80 are deemed acceptable (van der Ark, 2012).

- Exploratory factor analysis (EFA: principal components with varimax rotation) and the ratio test was also used to examine the factor structure of the GSES. Prior to the EFA we examined the suitability of the data for factor analysis with the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy (should be greater than 0.50) and Bartlett’s test of sphericity (should be significant) (Shrestha, 2021). In terms of the ratio of the first to the second eigenvalue, a ratio of greater than three indicates that the first component accounts for significantly more variance than the second component (Slocum-Gori & Zumbo, 2011).
- In Rasch Analysis a principal component analysis (PCA) of the residuals after the Rasch component was removed was used to determine if the GSES was multidimensional. If this PCA identifies that the first contrast has an eigenvalue greater than two it reflects that the instrument is multidimensional (Linacre, 2023).
- Lastly, we used parallel analysis to examine the dimensionality of the GSES. It has been found that parallel analysis performed better under a range of varying conditions than other methods of identifying the number of factors to retain (Zwick & Velicer, 1986). In parallel analysis, eigenvalues obtained in the current study are compared to eigenvalues obtained in simulated datasets ( $n = 1000$ ), and the number of eigenvalues in the current study that is greater than the 95<sup>th</sup> percentile of eigenvalues (or the mean) obtained in the simulated datasets represents meaningful factors (Lim & Jahng, 2019). For example, if two eigenvalues in the current data is greater than the 95<sup>th</sup> percentile of simulated eigenvalues, it would imply that there are two meaningful factors.

We examined the functioning of the 10 items of the GSES using means, standard deviations, interitem correlation, item-total correlations (*ITC*), factor loadings, and the  $H_i$  coefficient (for individual items) in MSA. These indices contribute to the assessment of construct validity as they would verify whether items reflect a similar content domain (interitem correlations) and whether they contribute to the measurement of the latent construct (item-total correlation, factor loading and  $H_i$  coefficient). It is recommended that interitem correlations should be between 0.15 and 0.85 while the average interitem correlation should be between 0.15 and 0.50 (Clark & Watson, 2019). If interitem correlations are below 0.15 it would reflect that these items do not share the same content domain, if higher than 0.85 it would indicate redundancy of items. For *ITC* thresholds as low as 0.30 have been recommended (Larsson et al., 2021), while a factor loading of 0.40 represents a moderate relationship between an item and the latent construct (Stevens, 2002).

At the scale level, the following were assessed:

- the reliability of the GSES in terms of Cronbach’s alpha, McDonald’s omega, composite reliability (CR), and Mokken scale reliability ( $MS_{rho}$ ). For research purposes, an acceptable reliability coefficient should be greater than 0.70 (DeVon et al., 2007).

- the construct validity of the GSES by using the Rasch indices of person and item separation and reliability. Person separation greater than 2 and person reliability greater than 0.80 would indicate that the scale is able to distinguish between high and low scorers on the latent construct, while item separation greater than 3 and item reliability greater than 0.80 would reflect that an item difficulty hierarchy exists (Linacre, 2023).
- average variance extracted (AVE) which indicates the amount of variance that the latent variable has in common with the items that contribute to its measurement. An AVE greater than 0.50 serves as evidence of convergent validity since it would indicate that the latent construct accounts for more than 50% of item variance (Cheung et al., 2024).
- the strength of the scale as measured by the scalability coefficient (H-coefficient) in MSA. An H-coefficient less than 0.40 should be regarded as a weak scale, between 0.40 and 0.50 a moderate scale, and greater than 0.50 a strong scale (Wind, 2017).

## Results

### Dimensionality

MSA indicated that item 2 (“If someone opposes me, I can find the means and ways to get what I want”) showed one violation of monotonicity ( $\#v_i = 1$ ), although this was not statistically significant ( $\#z_{sig} = 0$ ). The Crit value for this item was 17. The AISP in MSA assigned all 10 items a value of 1, suggesting that the scale should be treated as unidimensional. In Rasch analysis, a PCA of the residuals (after removing the Rasch dimension) found that the first contrast had an eigenvalue of 1.69. The KMO measure of sampling adequacy was 0.92 and Bartlett’s test was significant thus indicating that the data is appropriate for factor analysis. EFA extracted one factor that accounted for 55.14% of the variance, with the ratio of the first to second eigenvalue being 6.89. The results of the parallel analysis are reported in Table 1.

**Table 1.** Results of Parallel Analysis of the General Self-Efficacy Scale

| Root | Eigenvalues  |                        |                                               |
|------|--------------|------------------------|-----------------------------------------------|
|      | Current data | Mean of simulated data | 95 <sup>th</sup> Percentile of simulated data |
| 1    | 5.513        | 1.248                  | 1.317                                         |
| 2    | 0.840        | 1.170                  | 1.219                                         |
| 3    | 0.678        | 1.112                  | 1.152                                         |
| 4    | 0.659        | 1.062                  | 1.099                                         |
| 5    | 0.543        | 1.017                  | 1.053                                         |
| 6    | 0.435        | 0.972                  | 1.006                                         |
| 7    | 0.409        | 0.928                  | 0.960                                         |
| 8    | 0.332        | 0.882                  | 0.918                                         |
| 9    | 0.320        | 0.833                  | 0.873                                         |
| 10   | 0.270        | 0.775                  | 0.824                                         |

Parallel analysis in Table 1 also supported unidimensionality, with only one eigenvalue (5.18) exceeding the 95th percentile of eigenvalues obtained in the simulated studies (1.32); the second eigenvalue (0.84) was below the 95th percentile (1.22).

### Item Functioning

Table 2 presents indices for the 10 GSE items, including inter-item correlations, descriptive statistics (means and standard deviations), item-total correlations, factor loadings, and  $H_i$  coefficients from MSA.

**Table 2.** Item Level Indices for the General Self-Efficacy Scale

| Item      | Item1  | Item2  | Item3  | Item4  | Item5  | Item6  | Item7  | Item8  | Item9  | Item10 |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Item1     | —      |        |        |        |        |        |        |        |        |        |
| Item2     | 0.39** | —      |        |        |        |        |        |        |        |        |
| Item3     | 0.57** | 0.41** | —      |        |        |        |        |        |        |        |
| Item4     | 0.46** | 0.31** | 0.56** | —      |        |        |        |        |        |        |
| Item5     | 0.51** | 0.30** | 0.58** | 0.64** | —      |        |        |        |        |        |
| Item6     | 0.54** | 0.33** | 0.49** | 0.51** | 0.56** | —      |        |        |        |        |
| Item7     | 0.38** | 0.29** | 0.47** | 0.50** | 0.52** | 0.60** | —      |        |        |        |
| Item8     | 0.51** | 0.33** | 0.48** | 0.54** | 0.54** | 0.54** | 0.60** | —      |        |        |
| Item9     | 0.55** | 0.36** | 0.51** | 0.49** | 0.54** | 0.51** | 0.54** | 0.64** | —      |        |
| Item10    | 0.54** | 0.34** | 0.53** | 0.50** | 0.58** | 0.51** | 0.44** | 0.59** | 0.68   | —      |
| Mean      | 3.10   | 2.75   | 3.02   | 3.04   | 3.06   | 3.11   | 3.07   | 3.07   | 3.11   | 3.12   |
| SD        | 0.78   | 0.83   | 0.79   | 0.79   | 0.80   | 0.84   | 0.82   | 0.81   | 0.78   | 0.78   |
| ITC       | 0.67** | 0.44** | 0.69** | 0.67** | 0.72** | 0.69** | 0.65** | 0.72** | 0.73** | 0.70** |
| $\lambda$ | 0.74** | 0.52** | 0.76** | 0.75** | 0.79** | 0.76** | 0.73** | 0.79** | 0.79** | 0.78** |
| $H_i$     | 0.53   | 0.41   | 0.54   | 0.53   | 0.56   | 0.55   | 0.51   | 0.55   | 0.57   | 0.55   |
| SE        | 0.03   | 0.04   | 0.03   | 0.03   | 0.03   | 0.03   | 0.03   | 0.03   | 0.03   | 0.03   |

Note. ITC = item-total correlation,  $\lambda$  = factor loading,  $H_i$  = H-coefficient for individual items (Mokken Scale Analysis), SE = standard error of  $H_i$ .

\*\*p < 0.001



The inter-item correlations ranged between 0.29 and 0.68, all statistically significant, with an average of 0.50. Item-total correlations were significant and exceeded 0.30 (range: 0.44–0.73). Factor loadings were also statistically significant and above 0.50 (range: 0.52–0.79).  $H_i$  coefficients were all above 0.30, ranging from 0.41 to 0.57.

Item 2 (“*If someone opposes me, I can find the means and ways to get what I want*”) performed less strongly compared to the other items. Its inter-item correlations were smaller, and it was the only item with an item-total correlation below 0.50 (0.44). While its factor loading (0.52) met the acceptable threshold, it was noticeably lower than the other items (all above 0.70). Similarly, item 2 had the lowest  $H_i$  coefficient (0.41). Although acceptable, these values indicate that item 2 was weaker than the rest of the scale.

### Scale Functioning

Table 3 reports the indices at the scale level for both the full 10-item GSE and a 9-item version excluding item 2. Despite item 2’s relatively poor performance, the scale-level indices for both versions exceeded recommended thresholds.

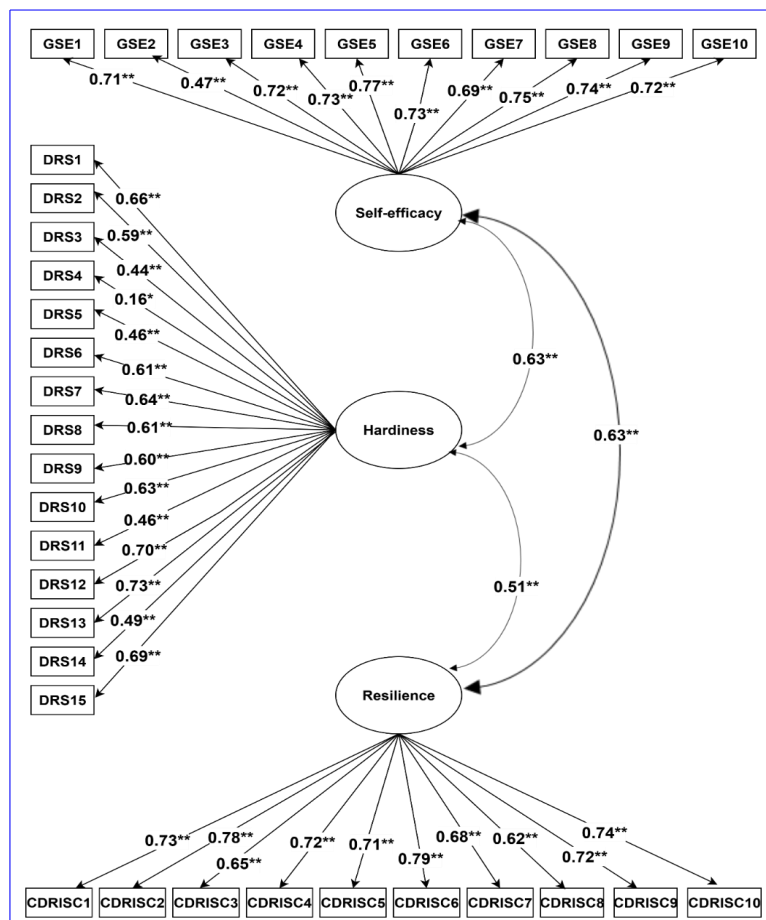
**Table 3.** *Classical Test Theory, Rasch and Mokken Indices for the GSES at the Scale Level*

| Index                               | 10-item GSE | 9-item GSE | Cutoff Criteria |
|-------------------------------------|-------------|------------|-----------------|
| <u>CTT indices</u>                  |             |            |                 |
| Cronbach’s alpha                    | 0.91        | 0.91       | > 0.70          |
| McDonald’s Omega                    | 0.91        | 0.91       | > 0.70          |
| Composite reliability               | 0.92        | 0.93       | > 0.70          |
| Average variance extracted          | 0.55        | 0.58       | > 0.50          |
| Standard error of measurement       | 1.63        | 1.61       | Small values    |
| <u>Rasch indices</u>                |             |            |                 |
| Person separation                   | 2.47        | 2.45       | > 2             |
| Person reliability                  | 0.86        | 0.86       | > 0.80          |
| Item separation                     | 3.51        | 0.78       | > 3             |
| Item reliability                    | 0.92        | 0.38       | > 0.90          |
| <u>Mokken indices</u>               |             |            |                 |
| H-coefficient                       | 0.53        | 0.56       | > 0.50          |
| SE of H                             | 0.02        | 0.02       | N/A             |
| Mokken scale reliability $MS_{rho}$ | 0.91        | 0.92       | > 0.70          |

In terms of reliability, Cronbach’s alpha, McDonald’s omega, CR, and  $MS_{rho}$  were all above 0.90, indicating excellent reliability. Construct validity was supported, with person reliability (0.86) and separation (2.47) exceeding cut-offs, and item reliability (0.92) and separation (3.51) meeting thresholds. The average variance extracted (AVE) was 0.55, which is considered acceptable. The H-coefficient from MSA was 0.53, indicative of a strong scale. The SEM examined the latent constructs of self-efficacy, hardiness, and resilience, along with their

indicators (measurement model) and interrelationships (structural model). Figure 1 presents the SEM.

**Figure 1.** SEM of the Latent Constructs and their Indicators and the Relationship Between Latent Constructs



*Note.* DRS1 to DRS15 = the 15 items of the Dispositional Resilience Scale, GSE1 to GSE10 = the 10 items of the General Self-Efficacy Scale, CDRISC1 to CDRISC19 = the 10 items of the Connor-Davidson Resilience Scale. Rectangles are observed variables, ellipses are latent variables. All regression coefficients are standardised.

\*  $p < 0.05$  \*\*  $p < 0.001$

Fit indices demonstrated acceptable to good model fit: relative  $\chi^2 = 2.01$ , CFI = 0.93, SRMR = 0.05, RMSEA = 0.05, and PClose = 0.700. Factor loadings for the GSE items ranged between 0.47 and 0.77, exceeding the minimum threshold of 0.40. Descriptive statistics and reliability for the other latent constructs were: hardiness ( $M = 26.34$ ,  $SD = 8.37$ ,  $\alpha = 0.88$ ) and resilience ( $M = 26.48$ ,  $SD = 8.02$ ,  $\alpha = 0.92$ ).

As shown in Figure 1, self-efficacy was significantly positively associated with both resilience and hardiness ( $r = 0.63$ ,  $p < 0.001$ : for both), reflecting large effects.

## Discussion

The present study examined the psychometric properties of the GSE among South African first responders using three complementary approaches namely CTT, Rasch analysis, and MSA. There were several important findings.

Across the three methods, the results consistently supported the unidimensional structure of the GSE. Exploratory and parallel analysis, as well as Mokken scaling, confirmed that the items function as indicators of a single underlying construct of general self-efficacy. This is consistent with earlier large-scale cross-national work that conceptualized the GSE as unidimensional (Scholz et al., 2002), while also aligning with more recent validation studies in other settings (Dahlberg et al., 2022; Lazić et al., 2021; Rossi et al., 2025). The current results therefore contribute further evidence that the unidimensionality of the GSE holds in high-stress occupational groups within the South African context.

At the item level, most items demonstrated strong psychometric performance, with satisfactory inter-item correlations, item-total correlations, and factor loadings. Item 2 (“If someone opposes me, I can find the means and ways to get what I want”) emerged as the weakest item, showing relatively lower correlations and scalability indices compared to the rest of the scale. Although its performance fell within acceptable limits, this finding corresponds to results from previous studies that have identified Item 2 as problematic (Bonsaksen et al., 2013; Sun et al., 2021). This is likely due to its phrasing and potential overlap with interpersonal assertiveness rather than general self-efficacy (Lönnfjörð & Hagquist, 2018). Nevertheless, excluding this item did not substantially improve the overall reliability or validity of the scale, suggesting that the 10-item version remains robust.

Consistent with previous studies (Kim et al., 2023; Zeng et al., 2022), the GSE demonstrated excellent reliability across all indices, including internal consistency and composite reliability, with convergent validity further supported by the average variance extracted. Rasch analysis confirmed adequate person and item reliability, while MSA indicated strong scalability. These results underscore the robustness of the GSE when applied in occupationally high-stress populations such as first responders. The scale’s association with resilience and hardiness also provides support for its construct validity, as self-efficacy is theoretically linked to these protective psychological resources (O’Neil & Kruger, 2022; Senewiratne et al., 2025; Zeng et al., 2021).

The findings have several important implications. First, the validation of the GSE in a first responder sample provides researchers and practitioners with a psychometrically sound tool for assessing a critical psychological resource in this group. Given the elevated occupational stressors and trauma exposure experienced by first responders in South Africa (Ntamatamala & Adams, 2022; O'Neil & Kruger, 2022), reliable assessment of self-efficacy is vital for monitoring well-being and informing intervention strategies. Second, the demonstrated associations between self-efficacy, resilience, and hardiness highlight the potential role of self-efficacy as a target for training and interventions designed to enhance coping and adaptation in high-risk occupational settings.

Cognitive-behavioural therapy (CBT) has been shown to be an effective approach for enhancing self-efficacy across a range of populations and clinical conditions (Molla Jafar et al., 2015; Rogiers et al., 2022; Yang et al., 2022). CBT interventions work by modifying maladaptive cognitions, strengthening problem-solving skills, and promoting adaptive coping strategies, which directly contribute to an individual's confidence in managing challenging situations (Alshahrani et al., 2022). For first responders, who face repeated exposure to occupational stressors and potentially traumatic events, CBT techniques can be particularly valuable in reinforcing perceptions of personal capability (Alshahrani et al., 2022). Group-based CBT formats may also provide opportunities for peer modelling and social reinforcement, further strengthening efficacy beliefs (Ottisova et al., 2022). By embedding CBT-based strategies into resilience-building and occupational wellness programmes, organisations can promote adaptive functioning, enhance coping capacity, and reduce the risk of burnout and psychological distress among first responders.

The study had several limitations. The study relied on self-report data, which may be influenced by social desirability and response biases. The sample was drawn from South African first responders, and while this addresses an important gap in the literature, it may limit the generalizability of findings to other occupational or cultural groups. Future research could extend this work by conducting longitudinal analyses to examine the predictive validity of the GSE for outcomes such as mental health, job performance, and resilience over time. Further cross-cultural validation would also help clarify whether item-level inconsistencies, such as the weaker performance of Item 2, are population-specific or reflect broader issues with the scale's wording.

## Conclusion

The present study provides support for the reliability and validity of the GSE among South African first responders. The results reinforce the unidimensional nature of the scale, confirm its excellent psychometric performance, and highlight its relevance in relation to resilience and hardiness. These findings strengthen the evidence base for the use of the GSE in high-stress occupational groups and underscore its value for both research and applied practice.

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