

Preliminary validation of the Cognitive Emotion Regulation Questionnaire (CERQ) in aspiring firefighters: an exploratory factor analysis

Mireia Cano-Gallent ^a

<https://orcid.org/0009-0008-0325-5320>

Jordi Niñerola-i-Maymí ^{a, b}

<https://orcid.org/0000-0002-0877-8162>

Anna Roca-Martínez ^a

<https://orcid.org/0009-0002-3736-6295>

Anna Figueras-Masip ^a

<https://orcid.org/0009-0007-9747-6839>

^a Institut de Seguretat Pública de Catalunya. Spain.

^b Corresponding author: Ctra. C-17 Barcelona-Ripoll, km 13,5. 08100 Mollet del Vallès (Vallès oriental. Spain). Email: ispc-seleccio@gencat.cat

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Abstract

Background. There are few studies on emotional regulation in members of safety and emergency services. However, those that are to be found in the scientific literature indicate the benefits and risks that the use of certain strategies exerts on emotional regulation. Here, a preliminary study for the validation and adaptation of the Cognitive Emotion Regulation Questionnaire is presented.

Methods. The study sample comprised 239 aspiring firefighters (92.89 % male and 7.11 % female), aged 23-43 years.

Results. The results revealed a structure of nine factors and two suprafactors, which reduced the number of items to 32. The new model explains 63 % of the variability of the data. The scale used has good internal consistency despite the changes in dimensionality. As for the reliability of the factors, analysis indicates temporal stability, and also temporal stability between the two suprafactors, showing high correlations between administrations.

Conclusions. The results obtained are similar to those recorded for the original version and for the validation in Spanish, maintaining the original factor structure. One difference observed is the behaviour of the suprafactors in aspiring firefighters, suggesting that in order to pass the basic training course, candidates need to combine both strategies (adaptive and less adaptive).

Keywords

CERQ, firefighter, emotional regulation, exploratory factor analysis.

Recommended reference

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Títol (català)

Validació preliminar del Qüestionari de regulació emocional cognitiva (Cognitive Emotion Regulation Questionnaire, CERQ) en aspirants a bomber: anàlisi factorial exploratòria

[L'article sencer en català es pot descarregar a <https://doi.org/10.1344/reire.42270>]

Resum

Antecedents. Hi ha pocs estudis sobre la regulació emocional en membres dels cossos de seguretat i emergències. Així i tot, hi ha estudis científics que indiquen els beneficis i riscos de l'ús de determinades estratègies en la regulació emocional. L'objectiu d'aquest estudi és validar i adaptar el Qüestionari de regulació emocional cognitiva (Cognitive Emotion Regulation Questionnaire, CERQ).

Mètode. Hi van participar 239 aspirants a bomber (92,89 % homes i 7,11 % dones), d'entre 23 i 43 anys.

Resultats. Els resultats van mostrar una estructura de 9 factors i 2 suprafactors, amb una reducció a 32 ítems. El nou model explica el 63 % de la variabilitat de les dades. L'escala té bona consistència interna, tot i els canvis de dimensionalitat. Pel que fa a la fiabilitat dels factors, té estabilitat temporal, així com entre els 2 suprafactors, amb correlacions altes entre les administracions.

Conclusions. Els resultats obtinguts són similars a la versió original i a la validació en espanyol, i mantenen l'estructura factorial. Una diferència observada és el comportament dels suprafactors en els aspirants a bomber, la qual cosa ens porta a inferir que per superar el curs de formació bàsica és necessari combinar ambdues estratègies (adaptatives i menys adaptatives).

Paraules clau

CERQ, bomber, regulació emocional, anàlisi factorial exploratòria.

Título (castellano)

Validación preliminar del Cuestionario de regulación emocional cognitiva (Cognitive Emotion Regulation Questionnaire, CERQ) en aspirantes a bombero: análisis factorial exploratorio

[La versión completa en castellano de este artículo se puede descargar en <https://doi.org/10.1344/reire.42270>]

Resumen

Antecedentes. Hay pocos estudios sobre la regulación emocional en miembros de cuerpos de seguridad y emergencias. Aun así, hay estudios científicos que indican los beneficios y riesgos del uso de determinadas estrategias en la regulación emocional. El objetivo de este estudio es validar y adaptar el Cuestionario de regulación emocional cognitiva (Cognitive Emotion Regulation Questionnaire, CERQ).

Método. Participaron 239 aspirantes a bombero (92,89 % hombres y 7,11 % mujeres), entre los 23 y 43 años.

Resultados. Los resultados mostraron una estructura de nueve factores y dos suprafactores, con una reducción a 32 ítems. El nuevo modelo consigue explicar el 63 % de la variabilidad de los datos. La escala utilizada tiene buena consistencia interna a pesar de los cambios de dimensionalidad. En cuanto a la fiabilidad de los factores del cuestionario, tiene estabilidad temporal, así como entre los dos suprafactores mostrando correlaciones altas entre las administraciones.

Conclusiones. Los resultados obtenidos son parecidos a la versión original y a la validación en español, manteniendo su estructura factorial. Una diferencia observada es el comportamiento de los suprafactores en los aspirantes a bombero, llevándonos a inferir que para superar el curso de formación básica es necesario combinar ambas estrategias (adaptativas y menos adaptativas).

Palabras clave

CERQ, bombero, regulación emocional, análisis factorial exploratorio.

1. Introduction

Emotion regulation is one of the professional skills considered most important in the training of aspiring firefighters. As Evans (2019) pointed out, the intense demands placed on fire service personnel, together with the benefits and risks associated with the emotions experienced and the strategies used to manage them, pose a real challenge in this profession. In this vein, Ferreira (2013) stated that firefighters and other professional groups involved in medical emergencies or rescue operations are exposed to stressful situations that increase the risk of developing different psychopathological disorders.

The findings published in the scientific literature demonstrate the fundamental role of emotion and coping with it in this group, and there are a large number of references on the importance of the role of emotion regulation in relation to different factors that affect the lives of firefighters. For example, Huang *et al.* (2019) demonstrated the importance of emotion regulation in the prevention of posttraumatic stress in Chinese firefighters who had suffered a stressful shock. Other studies obtained similar results in samples of firefighters from other countries such as South Korea (Lee, 2019) and the United States (Paltell *et al.*, 2019; Smith *et al.*, 2011).

Other studies examining emotional coping style in the firefighting profession showed a relationship between poor Emotion regulation and certain clinical symptomatology such as insomnia, increased risk of depression (Hom *et al.*, 2016), alcohol consumption (Smith *et al.*, 2011) and anxiety (Khadem *et al.*, 2017).

In this sense, an important contribution to the psychometric assessment of emotion regulation at the cognitive level was the *Cognitive Emotion Regulation Questionnaire* (CERQ; Garnefski *et al.*, 2001). This instrument has been widely used by the scientific community, and has been translated and psychometrically adapted to a large number of culturally disparate languages such as Persian (Abdi *et al.*, 2012), Chinese (Li & Wu, 2020) and Japanese (Fujisato *et al.*, 2017). There are different validations of its psychometric properties in Spanish, both in Latin America (Dominguez Lara & Medrano, 2016a) and in a Spanish sample (Domínguez-Sánchez *et al.*, 2013).

The CERQ has been used in a wide range of samples such as people with fibromyalgia (Reche Camba, 2019), patients with different psychopathological disorders (Potthoff *et al.*, 2016), as well as in different samples according to age (Navarro-Loli *et al.*, 2020) or university students (Dominguez Lara & Medrano, 2016b). In the case of firefighters, the use of the CERQ has been limited to the study of coping strategies in relation to posttraumatic stress disorder (Mashhadi *et al.*, 2018) and suicidal ideation (Kim & Yook, 2018; Park *et al.*, 2022).

However, no references to the use of the CERQ in samples of firefighters in Spain or Latin America have been found, even though it is essential to have a method of analysis to identify the emotion regulation capacities of firefighters, especially in the initial training stage of the profession, in order to achieve better professional performance.

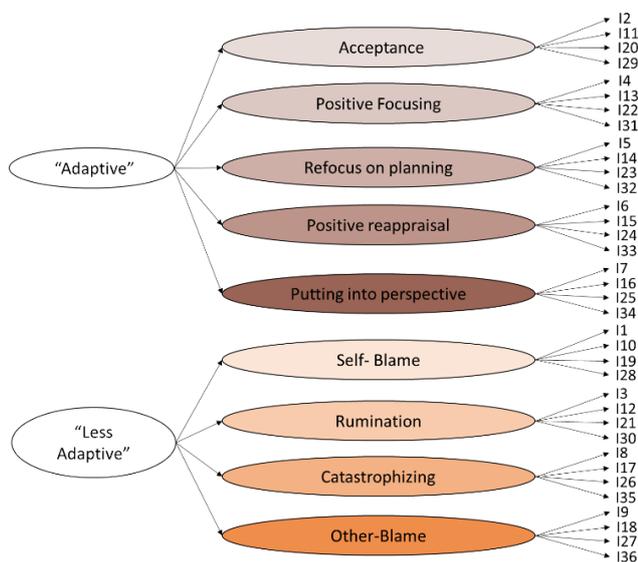
The main objective of this research was thus to conduct a preliminary study of the validation and adaptation of the Spanish version of the *Cognitive Emotion Regulation Questionnaire* (Domínguez-Sánchez *et al.*, 2013) in a sample of aspiring firefighters of the Generalitat de Catalunya. The validation of the questionnaire was performed through an analysis of its factorial structure, reliability, and internal consistency.

The first specific objective was to describe the factorial structure/dimensionality of the Spanish version of the *Cognitive Emotion Regulation Questionnaire* in aspiring firefighters, using the exploratory factor analysis technique. A second objective was to analyse the reliability and internal consistency of the nine factors of the CERQ as determined by dimensionality analysis.

In accordance with our objectives, we put forth the following hypotheses:

- 1) Based on previous research (Garnefski *et al.*, 2001; Reche Camba, 2019), we expected to find that the resulting model would fit the nine factors corresponding to the nine emotion regulation strategies (Figure 1). The nine-factor model may take two formats:
 - a. Nine-factor model by clustering CERQ items (Self-blame, Acceptance, Rumination, Positive focusing, Refocus on planning, Positive reappraisal, Putting into perspective, Catastrophizing, and Other-blame).
 - b. Model with nine specific factors distributed among two suprafactors referring to "Adaptive" (Acceptance, Positive Focusing, Refocus on planning, Positive reappraisal and Putting into perspective) and "Less Adaptive" (Self-blame, Rumination, Catastrophizing and Other-blame) strategies.
- 2) Adequate levels of reliability or internal consistency were expected to be found in the different subscales of the CERQ. Recommendations from the scientific literature (Frías-Navarro, 2022) require values above 0.70 in Cronbach's alpha for the nine subscales to determine an optimal correlation among the construct items.

Figure 1
Theoretical model CERQ with 36 items



2. Method

2.1. Sample

The sample comprised 239 subjects, of whom 227 (94.98%) responded to the first administration of the CERQ at the beginning of the basic training course and 137 (57.32%) responded to the second administration of the CERQ

at the end of the training course. A total of 125 subjects (52.72%) responded to both administrations of the questionnaire (Figure 2).

Of the total number of applicants in our sample (Table 1), 222 (92.89%) were male and 17 (7.11%) were female. The ages of this class of firefighter candidates ranged from 23 to 43 years, with an average of 32.61 years (standard deviation \pm 4.829).

At the end of the course, 98.79% were considered to have passed the Basic Training Course for Firefighters and went on to the next stage of the competitive examination process, while 1.21% dropped out during the course and consequently did not progress to the next stage of the process.

Figure 2

Graph of the sample of aspiring firefighters according to the process of administration of the CERQ

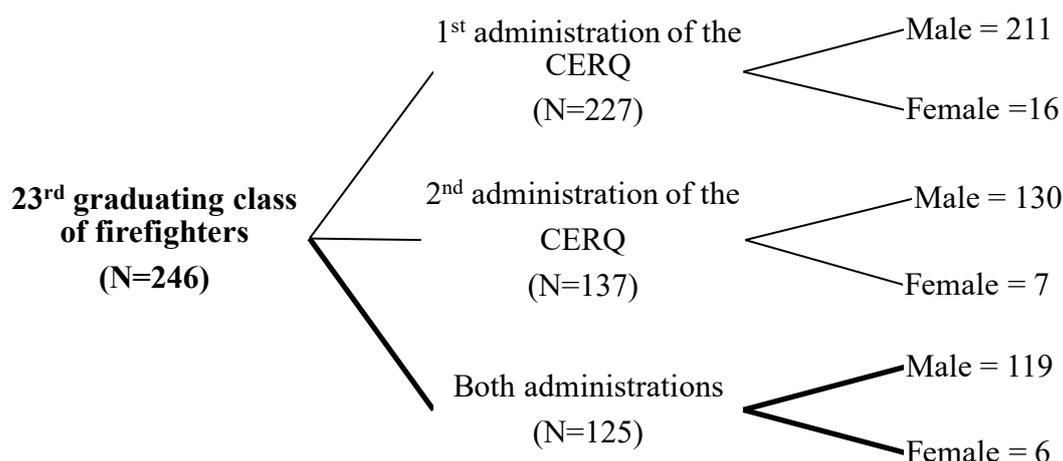


Table 1

Descriptive statistics of sample of aspiring firefighters

| | Sample CERQ-B | | | Total applicants for the Basic Firefighter Training Course 2022 | |
|--------|---------------|----------|------------|-----------------------------------------------------------------|---------------|
| | N total | Mean age | Average SD | N passed | % Passed BTCF |
| Male | 222 | 31 | 4.862 | 227 | 92.27 % |
| Female | 17 | 32 | 4.556 | 19 | 7.73 % |
| Total | 239 | 31 | 4.836 | 246 | 100 % |

2.2. Evaluation instrument

The *Cognitive Emotion Regulation Questionnaire*, CERQ (Garnefski *et al.*, 2001) – a multidimensional questionnaire constructed to identify the cognitive emotion regulation strategies, or cognitive coping strategies, that people use after experiencing negative events or situations – was used to conduct the study. The CERQ is a self-report questionnaire that is used internationally for both research and diagnostic purposes and can be used as a general or specific coping questionnaire (Reche Camba, 2019).

The CERQ (table 2) is a 36-item questionnaire that assesses nine dimensions consisting of four items each. Item responses for each subscale are five-point Likert-type (1 = hardly ever to 5 = almost always). Dimension scores can range from 4 to 20, revealing that higher scores correspond to a higher frequency of use of that specific strategy.

Below are the definitions by different authors of the nine dimensions into which the 36 CERQ items are distributed:

- a. *Self-blame*: A cognitive process in which the individual attributes blame to oneself for what one has experienced (Jermann *et al.*, 2006). Blame often has implications for individuals' emotions and behaviours during and after stressful situations.
- b. *Acceptance*: The cognitive process of trying to live with the stressful situation without generating negative emotions and referring to thoughts of resignation to what has happened (Carver *et al.*, 1989, cited by Garnefski *et al.*, 2002).
- c. *Rumination*: This consists of focusing thoughts on gravity, sustained over time (Nolen-Hoeksema *et al.*, 1994, cited by Garnefski *et al.*, 2002), the event and its possible consequences (Fernández Cruz *et al.*, 2020).
- d. *Positive refocusing*: This consists of directing attention to pleasant thoughts that diminish the effect of the stressful situation. It requires not focusing exclusively on the negative consequences of an event, but looking for the least negative aspects (Fernández Cruz *et al.*, 2020).
- e. *Refocus on planning*: This refers to thinking through the steps to be taken and how to manage negative events. We could say that this strategy is the cognitive part of coping focused on action, but it does not automatically imply that the actual behaviour will follow (Garnefski *et al.*, 2017).
- f. *Positive reappraisal*: Thoughts of acceptance of what is experienced and resignation to what has happened (Garnefski *et al.*, 2017). These thoughts aim to assign a positive meaning to those negative events in terms of personal growth (Reche Camba, 2019).
- g. *Putting into perspective*: This involves putting the stressful event into perspective by comparing it with others in order to relativise its severity (Fernández Cruz *et al.*, 2020).
- h. *Catastrophising*: This is the disproportionate and extremely serious anticipation of the ensuing consequences (Fernández Cruz *et al.*, 2020).
- i. *Other-blame*: Obsessive attribution of the cause of the action to others (Fernández Cruz *et al.*, 2020).

Table 2

Original questionnaire of 36-item Cognitive Emotional Regulation Questionnaire (CERQ)

| | (Casi) nunca | A veces | Regularmente | A menudo | (Casi) siempre |
|------------------------------------------------------------------------------------------------------|--------------|---------|--------------|----------|----------------|
| 1. Siento que soy el único culpable de lo que ha pasado | 1 | 2 | 3 | 4 | 5 |
| 2. Creo que tengo que aceptar lo que ha pasado | 1 | 2 | 3 | 4 | 5 |
| 3. Pienso a menudo en cómo me siento en relación con lo que me ha pasado | 1 | 2 | 3 | 4 | 5 |
| 4. Pienso en algo más agradable que lo que me ha ocurrido | 1 | 2 | 3 | 4 | 5 |
| 5. Pienso en qué es lo mejor que podría hacer | 1 | 2 | 3 | 4 | 5 |
| 6. Creo que puedo aprender algo de la situación | 1 | 2 | 3 | 4 | 5 |
| 7. Creo que todo podría haber sido mucho peor | 1 | 2 | 3 | 4 | 5 |
| 8. A menudo pienso que lo que me ha pasado es mucho peor que lo que les ha ocurrido a otras personas | 1 | 2 | 3 | 4 | 5 |
| 9. Me parece que otros son culpables de lo ocurrido | 1 | 2 | 3 | 4 | 5 |
| 10. Me siento único/a responsable de lo ocurrido | 1 | 2 | 3 | 4 | 5 |
| 11. Creo que tengo que aceptar la situación | 1 | 2 | 3 | 4 | 5 |
| 12. Me preocupa lo que piense y sienta sobre lo que me ha pasado | 1 | 2 | 3 | 4 | 5 |
| 13. Pienso en cosas agradables que nada tienen que ver con lo que me ha pasado | 1 | 2 | 3 | 4 | 5 |
| 14. Pienso en cuál sería la mejor forma de enfrentarme a la situación | 1 | 2 | 3 | 4 | 5 |
| 15. Creo que lo que ha pasado me puede hacer más fuerte | 1 | 2 | 3 | 4 | 5 |
| 16. Creo que otras personas pasan por experiencias mucho peores | 1 | 2 | 3 | 4 | 5 |
| 17. Sigo pensando en lo terrible que ha sido lo que me ha pasado | 1 | 2 | 3 | 4 | 5 |
| 18. Me parece que otros son responsables de lo que ha ocurrido | 1 | 2 | 3 | 4 | 5 |
| 19. Reflexiono sobre los errores que he cometido en este asunto | 1 | 2 | 3 | 4 | 5 |
| 20. Creo que no puedo cambiar nada de lo ocurrido | 1 | 2 | 3 | 4 | 5 |
| 21. Quiero entender por qué la experiencia que he tenido me hace sentir así | 1 | 2 | 3 | 4 | 5 |
| 22. Pienso en algo agradable en vez de pensar en lo ocurrido | 1 | 2 | 3 | 4 | 5 |
| 23. Pienso en cómo cambiar la situación | 1 | 2 | 3 | 4 | 5 |
| 24. Creo que la situación tiene también su lado positivo | 1 | 2 | 3 | 4 | 5 |
| 25. Creo que no ha sido tan malo en comparación a otras cosas | 1 | 2 | 3 | 4 | 5 |
| 26. Frecuentemente pienso que lo que he sufrido es lo peor que le puede pasar a una persona | 1 | 2 | 3 | 4 | 5 |
| 27. Pienso en los errores que otros han cometido en este asunto | 1 | 2 | 3 | 4 | 5 |
| 28. Básicamente considero que la causa de lo que me ha ocurrido debe estar en mí mismo | 1 | 2 | 3 | 4 | 5 |
| 29. Creo que debo aprender a vivir con ello | 1 | 2 | 3 | 4 | 5 |
| 30. Pienso continuamente en los sentimientos que la situación ha provocado en mí | 1 | 2 | 3 | 4 | 5 |
| 31. Pienso en experiencias agradables | 1 | 2 | 3 | 4 | 5 |
| 32. Pienso en un plan acerca de lo mejor que podría hacer | 1 | 2 | 3 | 4 | 5 |
| 33. Busco los aspectos positivos de la cuestión | 1 | 2 | 3 | 4 | 5 |
| 34. Me digo que hay cosas peores en la vida | 1 | 2 | 3 | 4 | 5 |
| 35. Pienso continuamente en lo horrible que ha sido la situación | 1 | 2 | 3 | 4 | 5 |
| 36. Pienso que, básicamente, la culpa es de otros | 1 | 2 | 3 | 4 | 5 |

Source: Domínguez-Sánchez *et al.* (2013).

2.3. Procedure

Initially, all students from the 23rd graduating class of the BCF were invited to participate voluntarily. With this invitation, students were given the opportunity to participate in a study investigating the influence of training

and experience on coping styles. Data were collected anonymously and voluntarily, and were handled with strict confidentiality.

The 239 subjects responded to the CERQ through the virtual platform, based on the Moodle 4.0 platform that allows the registration of surveys (Ros Martínez de la Hidalga, 2008), of the School of Firefighters, Civil Protection and Rural Agents of the *Institut de Seguretat Pública de Catalunya*.

The students who accepted the invitation responded to the CERQ questionnaire during two separate periods. The first administration of the questionnaire took place one month after the start of the course and the students had 11 days to respond to the invitation; the second administration took place one month before the end of the course, when they had another 11 days to answer the questionnaire.

2.4. Analysis

For data processing, the items belonging to the less adaptive strategies were recoded. The new measurement for each of the factors was interpreted as follows: obtaining low scores tends to a less adaptive strategy while the maximum scores show an adaptive strategy of the individuals, regardless of whether the items are part of the group of adaptive or less adaptive factors. This recoding at the time of analysis allowed a clearer and more accurate reading of the data obtained.

Three different analyses were carried out for the preliminary validation of the CERQ in firefighters.

First, Exploratory Factor Analysis (EFA) was used to determine whether the structure of the variables in the different factors was maintained as reported by Garnefski et al. (2002). To carry out this analysis, we followed the recommendations of Ferrando et al. (2022) both in terms of sample size and data adequacy, as well as limiting the factorial weight to 0.5 to determine the inclusion of an item in a factor, using the same criteria established by Capdevila Ortís et al. (2004).

Secondly, once the structure for the CERQ model in firefighters had been established, the internal consistency (α Cronbach) and then test-retest reliability were analysed, using the nine factors and the two suprafactors that make up the structure of the CERQ model for our group of firefighters as a measure.

3. Results

In the results section, we will first focus on determining the structure of the model and whether it differs from the original model (Figure 1). To do this, a principal component analysis (with VARIMAX rotation) was performed, which explained 58.98% of the total variability of the data. To determine the dimensionality of the CERQ in firefighters, we excluded from the analysis those items with a factor loading of less than 0.5 and ensured that no item was represented in more than one factor. At the end of our review of the factor loadings (Table 3), we eliminated items 6, 8, 20 and 27 of the original version published by Garnefski *et al.* (2002), with factor loadings of 0.352, -0.035, 0.366 and 0.440 respectively.

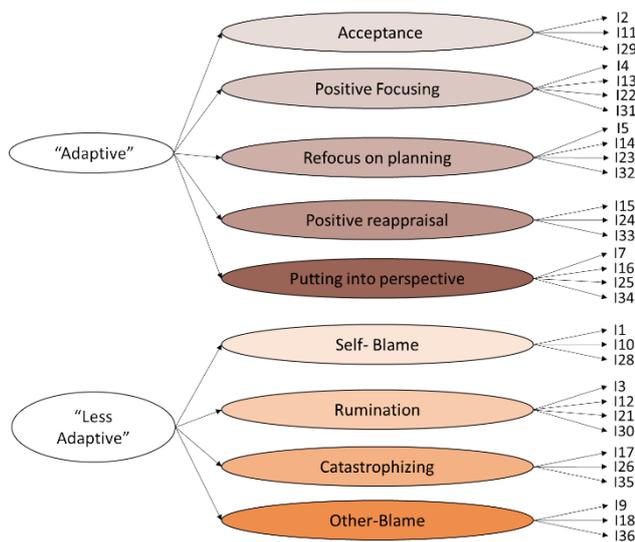
Table 3
Factor weights of the 32 final CERQ items, distributed into nine factors

| Factor | Item | CERQ factorial weight for firefighters |
|----------|-----------------------------------------------------------------------------------------------|----------------------------------------|
| 1 | Acceptance | |
| | 2. I think that I have to accept that this has happened | 0.821 |
| | 11. I think I have to accept the situation. | 0.838 |
| | 29. I think that I must learn to live with it | 0.645 |
| 2 | Positive refocusing | |
| | 4. I think of nicer things than what I have experienced | 0.801 |
| | 13. I think of pleasant things that have nothing to do with it | 0.850 |
| | 22. I think of something nice instead of what has happened | 0.857 |
| | 31. I think about pleasant experiences | 0.556 |
| 3 | Refocus on planning | |
| | 5. I think of what I can do best | 0.727 |
| | 14. I think about how I can best cope with the situation | 0.696 |
| | 19. I think about the mistakes I have made in this matter | -0.717 |
| | 23. I think about how to change the situation | 0.602 |
| | 32. I think about a plan of what I can do best | 0.565 |
| 4 | Positive reappraisal | |
| | 15. I think that I can become a stronger person as a result of what has happened | 0.539 |
| | 24. I think that the situation also has its positive sides | 0.831 |
| | 33. I look for the positive sides to the matter | 0.721 |
| 5 | Putting into perspective | |
| | 7. I think that it all could have been much worse | 0.710 |
| | 16. I think that other people go through much worse experiences | 0.769 |
| | 25. I think that it hasn't been too bad compared to other things | 0.658 |
| | 34. I tell myself that there are worse things in life | 0.739 |
| 6 | Self-blame | |
| | 1. I feel that I am the one to blame for it | 0.747 |
| | 10. I feel that I am the one who is responsible for what has happened | 0.776 |
| | 28. I think that basically the cause must lie within myself | 0.500 |
| 7 | Focus on thought/rumination | |
| | 3. I often think about how I feel about what I have experienced | 0.672 |
| | 12. I am preoccupied with what I think and feel about what I have experienced | 0.700 |
| | 21. I want to understand why I feel the way I do about what I have experienced | 0.706 |
| | 30. I dwell upon the feelings the situation has evoked in me | 0.765 |
| 8 | Catastrophising | |
| | 17. I keep thinking about how terrible it is what I have experienced | 0.562 |
| | 26. I often think that what I have experienced is the worst that can happen to a person | 0.791 |
| | 35. I continually think how horrible the situation has been | 0.758 |
| 9 | Blaming others | |
| | 9. I feel that others are to blame for it | 0.819 |
| | 18. I feel that others are responsible for what has happened | 0.802 |
| | 36. I feel that basically the cause lies with others | 0.751 |
| | Items deleted after the first analysis | |
| | 6. I think I can learn something from the situation | 0.352 |
| | 8. I often think that what I have experienced is much worse than what others have experienced | -0.035 |
| | 20. I think that I cannot change anything about it | 0.366 |
| | 27. I think about the mistakes others have made in this matter | 0.440 |

There were no repeated items in any factor, although item 19 (*I think about the mistakes I have made in this matter*) changed factor with respect to the existing literature (Garnefski *et al.*, 2002; Reche Camba, 2019) and was incorporated into the *Refocus on planning* factor (as an adaptive strategy).

Factor analysis of the 32 final items (Figure 3) and the previous nine-factor structure explained 63.5% of the total variability in the data (Table 4). The item numbering in the following tables corresponds to the final version of the 32-item firefighter CERQ for preliminary validation.

Figure 3
CERQ model for firefighters with 32 items



Firstly, we observed that the sample of applicants resorted most frequently to the adaptive strategy of positive focus, allowing the person to focus on pleasant thoughts that diminished the effect of the stressful situation they were experiencing at the time of data collection, compared to the other strategies recorded in the questionnaire. Based on the percentage data variability, it can be inferred that certain cognitive strategies were more commonly utilised within the sample, when the scenarios they face tended to be dynamically changing.

Table 4
Results of final factor analysis of CERQ for firefighters, with the percentage of variance explained by the nine extracted factors

| Factor | Sum of the squared saturation of the extraction | | |
|-----------------------------|-------------------------------------------------|------------|---------------|
| | Total | % variance | % accumulated |
| 1. Positive focusing | 4.998 | 15.618 | 15.618 |
| 2. Refocus on planning | 3.152 | 9.849 | 25.467 |
| 3. Rumination | 2.905 | 9.079 | 34.545 |
| 4. Putting into perspective | 1.850 | 5.781 | 40.326 |
| 5. Positive reappraisal | 1.753 | 5.478 | 45.804 |
| 6. Other-blame | 1.648 | 5.149 | 50.953 |
| 7. Acceptance | 1.484 | 4.637 | 55.590 |
| 8. Self-blame | 1.378 | 4.308 | 59.898 |
| 9. Catastrophizing | 1.166 | 3.645 | 63.542 |

The internal consistency of the measurement scale was calculated using Cronbach's alpha. Table 5 shows the Cronbach's α coefficients, which ranged between 0.80 and 0.49. These values indicate the reliability of the scale used; we can see that some factors have satisfactory coefficients, but others have more modest coefficients.

Table 5

Internal consistency of the CERQ firefighter total score and its nine factors, based on Cronbach's alpha calculation

| Factor (F) and suprafactor (SF) | Average (DT) B | Cronbach's Alpha B |
|----------------------------------------|-----------------------|---------------------------|
| F1. Positive refocusing | 21.41 (3,240) | .742 |
| F2. Refocus on Planning | 11.18 (3,752) | .808 |
| F3. Rumination | 13.45 (3,512) | .747 |
| F4. Putting into perspective | 12.69 (3,902) | .757 |
| F5. Positive reappraisal | 13.73 (1,682) | .724 |
| F6. Blaming others | 13.72 (1,253) | .493 |
| F7. Acceptance | 12.12 (2,621) | .708 |
| F8. Self-blame | 12.89 (1,808) | .520 |
| F9. Catastrophising | 14.59 (0,783) | .568 |
| SF1. Adaptive | 55.79 (6,990) | .722 |
| SF2. Disadaptive | 66.38 (6,234) | .676 |
| Total | 124,17 (9,307) | .674 |

The value obtained by calculating Cronbach's alpha indicates the reliability of the answers given. According to Dominguez-Lara (cited by Frías-Navarro, 2022), at values below 0.60 the reliability of the scale could be considered inadequate because the measurement error is large, but we must take into account the changes in the dimensionality of the model following application of the exclusion criteria, which mean that some factors have fewer items than others.

The reliability of the CERQ was analysed for temporal stability using Pearson's correlation between the test scores (initial administration) and the retest (final administration), in the 125 firefighter applicants who completed both administrations of the questionnaire (Table 6).

Table 6

Test-Retest reliability of CERQ for firefighters

| Factor (F) and suprafactor (SF) | Test-retest | P |
|----------------------------------------|--------------------|------------|
| F1. Positive focusing | .555 | .01 |
| F2. Refocus on Planning | .645 | .01 |
| F3. Rumination | .638 | .01 |
| F4. Putting into perspective | .471 | .01 |
| F5. Positive reappraisal | .409 | .01 |
| F6. Blaming others | .606 | .01 |
| F7. Acceptance | .681 | .01 |
| F8. Self-blame | .525 | .01 |
| F9. Catastrophising | .577 | .01 |
| SF1. Adaptive | .738 | .01 |
| SF2. Disadaptive | .688 | .01 |
| Total | .769 | .01 |

Note. N = 125.

All factors showed a significant correlation ($p < 0.01$) between the test and retest scores, but there was a disparity between the Pearson correlation values of the factors at the individual level.

A Pearson's correlation analysis was carried out with the two suprafactors (Adaptive-Disadaptive) at the two moments of CERQ administration (Table 7). High positive correlations were observed between the same suprafactor at the two different moments, but there were no significant differences between the two suprafactors at each of the two moments.

Table 7

Test-retest correlation of the CERQ suprafactors (Adaptive/Less Adaptive) for firefighters

| | Adaptive 1 | Less adaptive 1 |
|-----------------|-------------------|------------------------|
| Adaptive 2 | .738** | .031 |
| Less adaptive 2 | .138 | .688** |

Note: **p < 0.01. N = 125.

The test-retest for the two suprafactors turned out to be statistically significant in both scenarios, but with similar levels of correlation, indicating that these factors still measure the same thing after 4 months of training.

4. Discussion

The factor analysis carried out allows us to present a preliminary version of the *Cognitive Emotional Regulation Questionnaire* (CERQ) in its adaptation to a specific group such as firefighters. The final version includes 32 items distributed into nine factors that explain 63.5% of the total variability of the data, with moderate internal consistency (Cronbach's alpha = 0.674) and good test-retest reliability (correlation coefficient = 0.769).

These results are similar to those of the original version of the CERQ (Garnefski *et al.*, 2002) as well as its validation in Spanish (Domínguez-Sánchez *et al.*, 2013), maintaining its factorial structure of nine factors and two suprafactors but deleting four of the 36 items in both original versions. Similarly, item 19 (*I reflect on the mistakes I have made in this matter*) in our sample presented higher factor loadings in the Refocus on planning factor, which implies a change in adaptive thinking. This could be explained by the fact that within a group of firefighters who are in the training phase, where mistakes can have academic but not operational repercussions, it is essential to have a certain capacity for cognitive flexibility. This ability should allow reflection on the mistakes that have been made to facilitate the consolidation of knowledge and experience for future occasions.

One difference that was found, in relation to the original version and the Spanish version of the CERQ, was the behaviour of the suprafactors. We observed that in the sample of aspiring firefighters there was no significant relationship between adaptive and less adaptive thoughts, which leads us to think that in order to pass the basic training course for firefighters it is necessary to use both strategies. This differs from other samples, such as clinical patients (Reche Camba, 2019), in which there was a clear differentiation between those thoughts that improved their state and those that made it worse. In this vein, in future research it would be desirable to address a change in the labels "Adaptive" and "Disadaptive" in professional groups such as the fire brigade, as they may be misleading.

In line with the above, we should note that if one of the two factors is predominant, a particular type of coping strategy is used (adaptive or maladaptive). However, when we analysed it in depth in our sample, we found that there was a degree of adaptability and flexibility that enabled the firefighters to combine both types of strategy to carry out the work for which they were preparing.

4.1. Limitations and future directions of study

This study has opened the door to the planning of more projects on emotion regulation in the field of security and emergencies, which will be important as such professionals serve the general population, and are more frequently exposed to stress factors than the general population due to the type of work they do. Along these lines, in the process of validating the CERQ, aspects were raised that should be addressed in the future:

- a) To determine whether similar findings are observed regarding the reflection on errors committed in both experienced professional firefighters and aspiring candidates, it is important to consider the context in which they operate. Given that the aspiring candidates are primarily exposed to simulated emergency situations within a controlled environment, as opposed to real-life experiences, this poses a limitation to our sample.
- b) Reduced versions of the CERQ should be explored to examine the data and assess whether its measures are modified with the intention of gaining a better understanding of the strategies employed by this group.
- c) A specific CERQ model adapted to emergency and security forces should be developed.
- d) Reformulating the labels: a new definition of the suprafactors (Adaptive and Disadaptive) should be developed for security and emergency forces, to provide a clear and concise concept in relation to the work tasks performed. In this vein, we should consider the possibility that in certain samples, such as ours, the factors that Garnefski *et al.* (2001) identified as disadaptive function as valid strategies for achieving certain objectives.
- e) The influence of the basic training course as an intervention in the modification of emotion regulation strategies in aspiring firefighters should be examined.

Although, as we have said, this project opens the door to exploring new possibilities for study, it did have several limitations that should be addressed in future studies. One aspect would be the recruitment of more subjects to make up the sample; in this sense we were limited by the number of applicants who enter training each year, so we could consider creating cohorts of applicants every 5 years, allowing a more global view, but making comparisons in turn between the different promotions and groups in the public security system.

In short, this preliminary study suggests that a new version of CERQ for aspiring firefighters could lead to the development of a suitable, valid and reliable instrument to identify emotion regulation strategies in an emergency corp.

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