PSYCHOMETRIC PROPERTIES OF THE GENERAL EATING SELF-EFFICACY SCALE AMONG FEMALES TREATING OVERWEIGHT

PROPRIEDADES PSICOMÉTRICAS DA ESCALA DE AUTOEFICÁCIA ALIMENTAR GLOBAL EM MULHERES EM TRATAMENTO DE EXCESSO DE PESO

A.O.
ARTIGO ORIGINAL

Rui Poínhos[1*] iD ; Estela Caetano[1] iD ; Joana Mesquita Guimarães[1] iD ; Sílvia Pinhão[1,2] iD ; Bruno MPM Oliveira[1,3] iD ; Flora Correia[1,2,4] iD

[1] Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, Rua do Campo Alegre, n.º 823, 4150-180 Porto, Portugal

[2] Serviço de Nutrição do Centro Hospitalar Universitário de São João, E.P.E, Alameda Prof. Hernâni Monteiro, 4200-319 Porto, Portugal

[3] Laboratório de Inteligência Artificial e Apoio à Decisão, Instituto de Engenharia de Sistemas e Computadores – Tecnologia e Ciência, Campus da Faculdade de Engenharia da Universidade do Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

[4] Grupo de Investigação e Desenvolvimento em Nefrologia e Doenças Infeciosas do Instituto de Investigação e Inovação em Saúde da Universidade do Porto (i3S), Rua Alfredo Allen, n.º 208, 4200-135 Porto, Portugal

*Endereço para correspondência:

Rui Poínhos
Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto,
Rua do Campo Alegre, n.º 823,
4150-180 Porto, Portugal
ruipoinhos@fcna.up.pt

ABSTRACT

INTRODUCTION: Self-efficacy refers to the beliefs in the ability to organise and implement action plans needed to achieve a certain result and to the feeling of control over the behaviours and environment. Despite this construct having some degree of generalisation when considering related tasks or behaviours, as in eating behaviour, only the General Eating Self-Efficacy Scale assesses global features of eating self-efficacy. This instrument showed good psychometric properties among Portuguese higher education students.

OBJECTIVES: To study the psychometric properties of the General Eating Self-Efficacy Scale among female patients treating overweight and to study the relationship of eating self-efficacy with age, education and Body Mass Index.

METHODOLOGY: We studied a sample of 63 women attending Nutrition appointments to treat overweight: mean age of 40 years (SD = 11), mean education of 9 years (SD = 4) and mean Body Mass Index of 36.4 Kg/m² (SD = 7.0).

RESULTS: Similarly to the original study among higher education students, the scale showed good reliability (α = 0.864) and a unifactorial structure, with the extracted factor explaining 67.4% of the overall variance. The associations with other instruments revealed good convergent and discriminant validity. General Eating Self-Efficacy Scale score did not significantly correlate with either age (r = -0.004, p = 0.973), years of education (r = -0.223, p = 0.090) or Body Mass Index (r = -0.164, p = 0.215).

CONCLUSIONS: The results of this study show that the General Eating Self-Efficacy Scale presents good psychometric properties among females treating overweight and that it appears to be a useful tool for use in clinical settings.

KEYWORDS

Eating behaviour, Eating self-efficacy, Overweight, Psychometric properties, Scale

RESUMO

INTRODUÇÃO: A auto-eficácia refere-se às crenças na capacidade de organizar e implementar planos de acção necessários para alcançar determinado resultado e à sensação de controlo sobre os comportamentos e ambiente. Apesar de este constructo ter algum grau de generalização quando consideradas tarefas ou comportamentos relacionados, como no caso do comportamento alimentar, apenas a Escala de Auto-Eficácia Alimentar Global avalia aspetos gerais da auto-eficácia alimentar. Este instrumento mostrou boas propriedades psicométricas em estudantes portugueses do ensino superior.

OBJETIVOS: Estudar as propriedades psicométricas da Escala de Auto-Eficácia Alimentar Global em mulheres em tratamento de excesso de peso e estudar a relação da auto-eficácia alimentar com a idade, escolaridade e Índice de Massa Corporal.

METODOLOGIA: Foi avaliada uma amostra de 63 mulheres acompanhadas em consultas de nutrição para tratamento de excesso de peso: idade média de 40 anos (DP = 11), escolaridade média de 9 anos (DP = 4) e Índice de Massa Corporal médio de 36,4 Kg/m² (DP = 7,0).

RESULTADOS: Tal como no estudo original em estudantes do ensino superior, a escala apresentou boa fiabilidade (α = 0,864) e uma estrutura unifatorial, com o fator extraído a explicar 67,4% da variância total. As associações com outros instrumentos revelaram boa validade convergente e discriminante. A pontuação na Escala de Auto-Eficácia Alimentar Global não teve correlação significativa com a idade (r = -0,004, p = 0,973), a escolaridade (r = -0,223, p = 0,090) ou o Índice de Massa Corporal (r = -0,164, p = 0,215).

CONCLUSÕES: Os resultados deste estudo indicam que a Escala de Auto-Eficácia Alimentar Global apresenta boas propriedades psicométricas em mulheres em tratamento de excesso de peso e que este instrumento parece ser adequado para uso em contextos clínicos.

PALAVRAS-CHAVE

Comportamento alimentar, Auto-eficácia alimentar, Excesso de peso, Propriedades psicométricas, Escala

INTRODUCTION

The concept of self-efficacy refers to (a) the beliefs in the ability to organise and implement action plans needed to achieve a certain result and (b) the feeling of control over the behaviours and environment (1-3). This judgment on the individual's own competence and on the ability to overcome difficulties does not® necessarily correspond to the person's real competences regarding a certain task (3). Self-efficacy determines the initiation, maintenance and cessation of strategies or behaviours (2, 4, 5), and it has been shown that it is a good predictor of several health-related behaviours, namely eating behaviour.

The definition of self-efficacy implies that it is a specific feature for each task (2, 3, 6) and, as such, its assessment should be task-specific (7). Nevertheless, self-efficacy has some degree of generalisation when considering related tasks or behaviours, as in eating behaviour (7-9). Moreover, people have difficulties discriminating the circumstances under which they have problems controlling their eating behaviour, or those problems tend to be broad (10). Self-efficacy is a dimension of self-concept, which corresponds to the person's own image, while self-esteem is the evaluative component of self-concept (11-14). Self-efficacy is also related to (internal) locus of control, which refers to an allocation of responsibility or cause (internal or external) regarding a certain domain or behaviour (15).

Regarding eating self-efficacy, several scales have been proposed, and one of them assesses global features of food self-efficacy, the General Eating Self-Efficacy Scale (GESES) (16), while most refer to specific clinical conditions or to the consumption of certain foods (e.g. 17-20). GESES' psychometric properties have been studied among Portuguese higher education students (16), where it showed good convergent and discriminant validity with the "Self-Concept Clinical Inventory" (SCCI) (21) and the Health Locus of Control Scale (22). However, this does not allow to extrapolate such properties to clinical settings, where this instrument may be useful. Hence, it is relevant to study its psychometric properties in clinical samples.

OBJECTIVES

To study the psychometric properties of the GESES in a sample of female patients attending Nutrition appointments to treat overweight and to study the relationship of eating self-efficacy with age, education and Body Mass Index (BMI) among those patients.

METHODOLOGY
Procedures

This study is part of the project "Aspectos cognitivos e comportamentais da alimentação: Elementos para uma compreensão integrada", approved by the Ethics Committee of the Centro Hospitalar Universitário de São João (CHUSJ). It was conducted on a convenience sample of outpatients attending Nutrition appointments to treat overweight in CHUSJ (a central hospital in Porto, Portugal). The inclusion criteria were: age between 18 and 65 years, and the absence of diseases with dietary therapy different from the recommended for treating overweight. Data collection took place between May 2011 and September 2013.

Potential participants were invited, and the study's aims and procedures were explained before obtaining their written informed consent. Sociodemographic and clinical data were gathered from clinical records. BMI was calculated based on measured height and weight. All procedures were standardized prior to data collection. The participants were given the project's protocol for later filling, as well as a prepaid envelope to return the questionnaires.

Instruments

In this study, data from three questionnaires were used: the GESES (16), the SCCI (21) and the Health Locus of Control Scale (22).

The GESES was developed based on the factor "self-efficacy" of the SCCI. It comprises five items, answered in a 5-point scale ranging from "Don't agree" to "Agree a lot". Each item is scored from 0 to 4 points (item 1 is quoted reversely) and the overall score is obtained by the sum of the scores in all items, leading to a total of 0 to 20 points, with higher scores corresponding to higher eating self-efficacy. The final version of this scale may be found in Poínhos et al. (2013) (16).

SCCI is a Likert-like scale that assesses emotional and social self--concept features, composed of 20 items scored from 1 to 5. Each item is composed of a sentence that the respondent must classify from "Don't agree" to "Agree a lot". Besides its overall score, SCCI allows the valuation of six factors; factor 2 is composed of items related to the individual's ability to face and solve problems and difficulties, being called "self-efficacy factor". In each item, factor and overall score, higher scores correspond to higher self-concept (21).

SCCI was used to study both convergent and discriminant validity. Due to the transversality of self-concept, positive associations with SCCI scores were expected. The association with SCCI's self-efficacy factor was expected to be the highest, but not with a determination coefficient above 50% ($r < 0.707$), in order to assure a specific assessment of eating self-efficacy.

The study of the discriminant validity also included the study of the associations with locus of control. Besides the conceptual discrepancy between self-efficacy and locus of control, this analysis supplies the need to assure that the use of control-related expressions when adapting GESES' items from SCCI didn't generate an excessive approximation to internal locus of control. The instrument used to assess locus of control was the Health Locus of Control Scale (22), composed of 14 items with seven possible answers (from "totally disagree" to "totally agree"), and scored 1 to 7. The overall score corresponds to the sum of the score in all items, and higher scores correspond to internal locus of control.

Sample

A total of 185 individuals (67.9% females) were invited, all of which accepted to participate in the study. From the initial sample, 85 participants (77.6% females) returned the protocol (devolution rate of 45.9%). Due to the low number of males who completed their participation, the analysis was performed only for females.

From the 66 female participants, data from three were further excluded due to incomplete filling of the General Eating Self-Efficacy Scale, and thus the reliability analysis and the factorial analysis were performed in a sample of 63 women. Another four participants had incomplete data in the ICAC or the Health Locus of Control Scale, and were therefore not included in the study of convergent and discriminant validity.

Statistical Analysis

The statistical analysis was performed in IBM SPSS version 27.0 for Windows. The reliability of the scale was assessed using the tau-equivalent reliability, usually called Cronbach's α. The scale was submitted to factorial analysis through principal component extraction (without rotation). The factorial analysis models were validated using the sampling adequacy measure of Kaiser-Meyer-Olkin (KMO) and Bartlett's test, and analyzed through the scree plots method (23). Pearson's correlation coefficient was used to measure the association between pairs of variables. Results were considered statistically significant when $p < 0.05$.

RESULTS

The sample had a mean age of 40 years (SD = 11) and a mean education of 9 years (SD = 4). Participants had BMI values between 24.5 and 60.8 Kg/m^2 (mean = 36.4, SD = 7.0).

The application of GESES required a small amount of time to be completed (about one minute), and had absence of doubts and a reduced rate of incompleteness (4.5%). Moreover, the scale showed good reliability ($\alpha = 0.864$). Table 1 presents the values of Cronbach's α, item-total correlations and the value of α if each item is excluded. All item-total correlations are above 0.4 and the exclusion of most items would decrease the value of α. The exclusion of item 1 would increase the value of α, but given the initial α value we decided to maintain all five items.

A factorial analysis (principal components extraction method) was performed (Table 2). The results of both the KMO and Bartlett's test show good sample adequacy. Only one factor with eigenvalue higher than 1 was extracted, explaining about two thirds (67.4%) of the overall variance. The scree plot analysis also suggested a unifactorial structure. All items presented an association above 0.5 with the extracted factor. Table 3 presents the associations of GESES total score with the SCCI (overall score and factors) and the Health Locus of Control Scale. GESES had a positive association with SCCI's overall score, and the association with the self-efficacy factor was higher than with any other factor. The determination coefficient of that correlation was of 33.5%, and thereby below the predefined criterion of $r2 < 50\%$. The association with the Health Locus of Control Scale was not significant.

GESES's score had very weak and non-statistically significant negative correlations with age ($r = -0.004$, $p = 0.973$), years of education ($r = -0.223$, $p = 0.090$) and BMI ($r = -0.164$, $p = 0.215$).

DISCUSSION OF THE RESULTS

The analysis showed good psychometric properties of the GESES in our sample composed of female outpatients attending Nutrition appointments to treat overweight. We highlight its good reliability and the fact that the associations with other measures show its convergent and discriminant validity. The factorial analysis revealed that the scale has a unifactorial structure; given the theoretical and conceptual assumptions on which it was developed, this result evidences its construct validity. We also highlight the high proportion of variance explained by the extracted factor. Moreover, the scale showed to be easy and quick to apply.

In this sample, the level of eating self-efficacy didn't present an association with age, education or BMI. The comparison of these results with prior research is conditioned by the previously referred lack of studies using scales that assessed general features of eating self-efficacy. A recent paper presenting the development of an eating self-efficacy scale revealed a negative relationship with BMI [24]. However, the correlation between them was very weak and, indeed, very similar in strength to the association found in the present study. The main limitation of this study is that it was carried out in a convenience sample from only one clinical site and only among females. Nevertheless, the convergence of results with those from the original study, carried out in a sample of higher education students from both sexes [16], indicates the adequacy of the use of this instrument in different groups and contexts.

CONCLUSIONS

GESES presented good psychometric properties among female patients treating overweight and it was not significantly correlated with age, education or BMI. Thus, this instrument appears to be a useful tool in clinical settings.

FUNDING

CONFLICTS OF INTEREST

None of the authors reported a conflict of interest.

Table 1

Reliability analysis (n = 63)

CRONBACH'S α = 0.864		
ITEMS	ITEM-TOTAL CORRELATION	α IF ITEM EXCLUDED = 0.864
1 – Desisto de controlar a minha alimentação quando encontro dificuldades	0.426	0.904
2 – Sou rápida(o) a tomar decisões e a implementar medidas para controlar a minha alimentação	0.627	0.850
3 – Enfrento e resolvo os problemas relativos ao controlo da minha alimentação	0.850	0.796
4 – Sou persistente a resolver as dificuldades em controlar a minha alimentação	0.847	0.795
5 – Encontro sempre energia para vencer as dificuldades em controlar a minha alimentação	0.740	0.822

Table 2

Factorial analysis through principal component extraction (without rotation) (n = 63)

Kaiser-Meyer-Olkin		0.815
Bartlett's test (p)		< 0.001
Largest eigenvalue		3.372
Variance explained by the first factor (%)		67.4
Correlation with the first factor	Item 1	0.565
	Item 2	0.785
	Item 3	0.931
	Item 4	0.920
	Item 5	0.850

Table 3

Associations with self-concept and health locus of control (n = 59)

SELF-CONCEPT CLINICAL INVENTORY	r	p
– Overall score	0.357	0.006
– Factor 1: Social acceptance/rejection	0.097	0.466
– Factor 2: Self-efficacy	0.579	< 0.001
– Factor 3: Psychological maturity	0.171	0.196
– Factor 4: Impulsiveness-activity	0.259	0.048
– Factor 5	0.267	0.041
– Factor 6	0.019	0.884
	r	p
Health Locus of Control Scale	0.021	0.874

r: Pearson's correlation coefficient

AUTHORS' CONTRIBUTIONS

RP, BMPMO and FC: Were responsible for the conceptualization and design of the study; RP, JMG, SP and FC: Were responsible for data collection; RP, EC and BMPMO: Were responsible for the design, analysis and interpretation of the data; RP and EC: Were responsible for writing the first draft of the manuscript, and all authors contributed to and agreed with the final version.

REFERENCES

1. Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. Psychol Rev. 1977;84:191-215.

2. Bandura A. Human agency in social cognitive theory. Am Psychol. 1989;44:1175-84.

3. Bandura A. Self-efficacy: The exercise of control. New York: Freeman and Company; 1997.

4. Bandura A. Health promotion by social cognitive means. Health Educ Behav. 2004;31:143-64.

5. Lent RW, Maddux JE. Building a socio cognitive bridge between social and counselling psychology. Couns Psychol. 1997;25:240-55.

6. Hofstetter CR, Sallis JF, Hovell MF. Some health dimensions of self-efficacy: analysis of theoretical specificity. Soc Sci Med. 1990;31:1051-6.

7. AbuSabha R, Achterberg C. Review of self-efficacy and locus of control for nutrition- and health-related behavior. J Am Diet Assoc. 1997;97:1122-32.

8. Schwarzer R, Renner B. Social-cognitive predictors of health behavior: Action self-efficacy and coping self-efficacy. Health Psychol. 2000;19:487-95.

9. Pawlak R, Colby S. Benefits, barriers, self-efficacy and knowledge regarding healthy foods: Perception of African Americans living in eastern North Carolina. Nutr Res Pract. 2009;3:56-63.

10. Glynn SM, Ruderman AJ. The development and validation of an eating self-efficacy scale. Cognit Ther Res. 1986;10:403-20.

11. Brown JD. The self. New York: McGraw-Hill; 1998.

12. Burns R. The self-concept: Theory, measurement, development and behaviour. New York: Longman Group; 1986.

13. Butler R, Gasson S. Self esteem/self concept scales for children and adolescents: A review. Child Adolesc Ment Health. 2005;10:190-201.

14. Faria L, Fontaine AM. Avaliação do conceito de si próprio de adolescentes: Adaptação do SDQ I de Marsh à população portuguesa. Cad Consult Psicol. 1990;6:97-105.

15. Rotter B. Generalised expectancies for internal and external control of reinforcement. Psychol Monogr Gen Appl. 1966;80:1-28.

16. Poínhos R, Canelas H, Oliveira BMPM, Correia F. Desenvolvimento e validação de uma escala de auto-eficácia alimentar. Alim Hum. 2013;19:65-72.

17. Clark MM, Abrams DB, Niaura RS. Self-efficacy in weight management. J Consult Clin Psychol. 1991;59:739-44.

18. Latimer L, Walker LO, Kim S, Pasch KE, Sterling BS. Self-efficacy scale for weight loss among multi-ethnic women of lower income: A psychometric evaluation. J Nutr Educ Behav. 2011;43:279-83.

19. Van der Bijl J, van Poelgeest-Eeltink A, Shortridge-Baggett L. The psychometric properties of the diabetes management self-efficacy scale for patients with type 2 diabetes mellitus. J Adv Nurs. 1999;30:352-8.

20. Pinto AM, Guarda AS, Heinberg LJ, DiClemente CC. Development of the Eating Disorder Recovery Self-Efficacy Questionnaire. Int J Eat Disord. 2006;39:376-84.

21. Serra AV. O «Inventário Clínico de Auto-Conceito». Psiquiatr Clin 1986;7:67-84.

22. Ribeiro JLP. Reconstrução de uma escala de locus-de-controlo de saúde. Psiquiatr Clin. 1994; 15:207-14.

23. Cattell RB. The scree test for the number of factors. Multivariate Behav Res. 1966;1:245-76.

24. Lombardo C, Cerolini S, Alivernini F, Ballesio A, Violani C, Fernandes M, Lucidi F. Eating self-efficacy: validation of a new brief scale. Eat Weight Disord. 2021;26:295-303.