ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ - ORIGINAL PAPER

ΝΟΣΗΛΕΥΤΙΚΗ 2024, 63(2): 71-78 • HELLENIC JOURNAL OF NURSING 2024, 63(2): 71-78

Μετάφραση και στάθμιση της ελληνικής εκδοχής του Μέτρου Ενεργοποίησης Ασθενών-13 [Patient Activation Measure (PAM)-13] σε ασθενείς με γλαύκωμα

Abstract at the end of the article

Translation and Validation of the Greek Version of the Patient Activation Measure-13 in Glaucoma Patients

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Υποβλήθηκε:23/10/2023
Επανυποβλήθηκε:26/11/2023
Εγκρίθηκε:10/05/2024

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Introduction: The Patient Activation Measure 13 (PAM-13) questionnaire assesses patient activation levels, indicating their self-management and self-care behaviors. This instrument has been translated into various languages and utilized in numerous settings, including chronic disease care. However, till today, it has not been translated and validated in Greek.
Aim: To translate and validate the PAM-13 questionnaire into the Greek language.
Material & methods: A cross-sectional study on glaucoma patients who were attending the outpatient ophthalmological clinic of a University Hospital in Heraklion - Greece, was conducted. A convenience sampling method was employed to recruit 216 participants. Data collection occurred between April and October 2023. Two qualified independent linguistic translators performed the translation from English to Greek, followed by a reverse translation to English. Feedback from 10 Greek glaucoma patients was considered, and experts in psychometrics assessed face and content validity. Internal consistency was assessed using Cronbach's alpha. Intra-rater reliability was assessed using the intraclass correlation coefficient (ICC) in a random subgroup of participants. Exploratory Factor Analysis (EFA) was conducted to identify the factor structure of the Greek version of the PAM-13 questionnaire. Confirmatory Factor Analysis (CFA) was used to determine model fit. Statistical analyses were performed using STATA (version 12) for CFA and IBM SPSS (version 26) for other analyses. The significance level was set at $\alpha = 0.05$.
Results: Most of the study participants were male (56.5%), and the mean [±Standard Deviation] age of the sample was 63.6 (±15) years. The ICC between initial and reassessment scores for the Greek version of PAM-13 was 0.998, $p<0.001$. Data suitability for factor analysis was confirmed by a significant Bartlett Test of Sphericity ($p <0.001$) and a high Kaiser-Meyer-Olkin Measure of 0.957. EFA identified a single factor explaining 68.2% of the total variance in the 13 questionnaire items. CFA supported a

one-factor model with acceptable global fit indices (SRMR = 0.07, CD = 0.98, CFI = 0.90), endorsing the adoption of the 13-item one-factor solution for the Greek version of the PAM-13 questionnaire. Finally, the internal consistency of the full PAM13-D scale, measured by Cronbach's alpha, was 0.961.

Conclusions: The Greek-validated PAM-13 questionnaire is a reliable tool for assessing patient activation in Greek-speaking populations. Its strong internal consistency and one-factor structure make it valuable for healthcare professionals and researchers. Further research is needed to address limitations and apply the Greek PAM-13 in various settings.

Key words: *Patient activation, questionnaire, reliability, self-management, validity.*

Introduction

The Patient Activation Measure 13 (PAM-13) questionnaire is a tool that is employed to evaluate the degree of patient activation in the management of their own health. The initial version of this tool was created by Hibbard et al.,[1] in the English language, representing a 22-item questionnaire, while one year later the short form of the above-mentioned tool, consisting of 13 items, was published.[2] It gauges patients' knowledge, abilities, and confidence in managing their health and healthcare.

The PAM-13 questionnaire has been translated into numerous languages, including Spanish, Italian, Turkish, Dutch, German, Norwegian, Danish, Korean, Hebrew, and Malay,[3-12] and has exhibited commendable psychometric properties in diverse research endeavors.[13] It has been utilized in various contexts, encompassing the provision of care for chronic illnesses, hospital settings, and self-management interventions.[11,14] The questionnaire has exhibited robust reliability in terms of internal consistency and construct validity.[13] It has been employed to identify patients with low levels of activation and to customize interventions to cater to their specific requirements. The PAM-13 questionnaire enables individualized assessment of changes in activation levels, which is deemed to be a more accurate reflection of actual change as compared to group averages.

To date, the PAM-13 tool has not been translated and validated in the Greek language for use in Greek patient populations. Therefore, this study aims to fill this gap by translating the original English version of the PAM-13 into Greek and validating the Greek version in patients with glaucoma to assess their level of activation. The validation of the Greek version of the PAM-13 tool is expected to provide Greek clinicians with a reliable and valid tool for both research and clinical purposes in the context of chronic diseases.

Materials and methods

The PAM-13 consists of 13 items on a Likert scale. Each item has four response categories with scores from 1 to 4: (1) strongly disagree, (2) disagree, (3) agree, and (4) agree strongly. Patient activation is quantified by a mean score ranging from 1 to 4. Higher scores represent higher levels of patient activation (1=lowest activation level, 4=highest activation). Participants completed sociodemographic questions regarding age (years) and biological gender (male or female).

A cross-sectional study was conducted on patients with diagnosed glaucoma who will attend the outpatient ophthalmological clinic of a general University Hospital of Heraklion, Crete - Greece. For the collection of the data, the sampling method of convenience was used. Data collection for the questionnaire took place between April 2023 and October 2023, and 216 patients were recruited in total.

After receiving permission and license materials from Insignia Health, the PAM-13 was translated and culturally weighed according to the "Minimal Translation Criteria" (Minimal Translation Criteria, Mapi Research Institute. 2020. Available online: https://www.mapi-institute.com/ (accessed on May 18, 2020), as follows: Firstly, the original questionnaire was translated from English to Greek. The translation was done by two qualified independent linguistic translators, both native speakers of English and Greek. Each translator produced a draft in Greek without any mutual consultation. Secondly, reverse translation from Greek to English was carried out by another translator. This version of the questionnaire was distributed to 10 Greek glaucoma patients who visited the hospital and agreed to answer and comment on the tool. It is important to mention that these people were excluded from the study. The researchers discussed the comments of these patients. Subsequently, two professors, experts in psychometrics, judged the

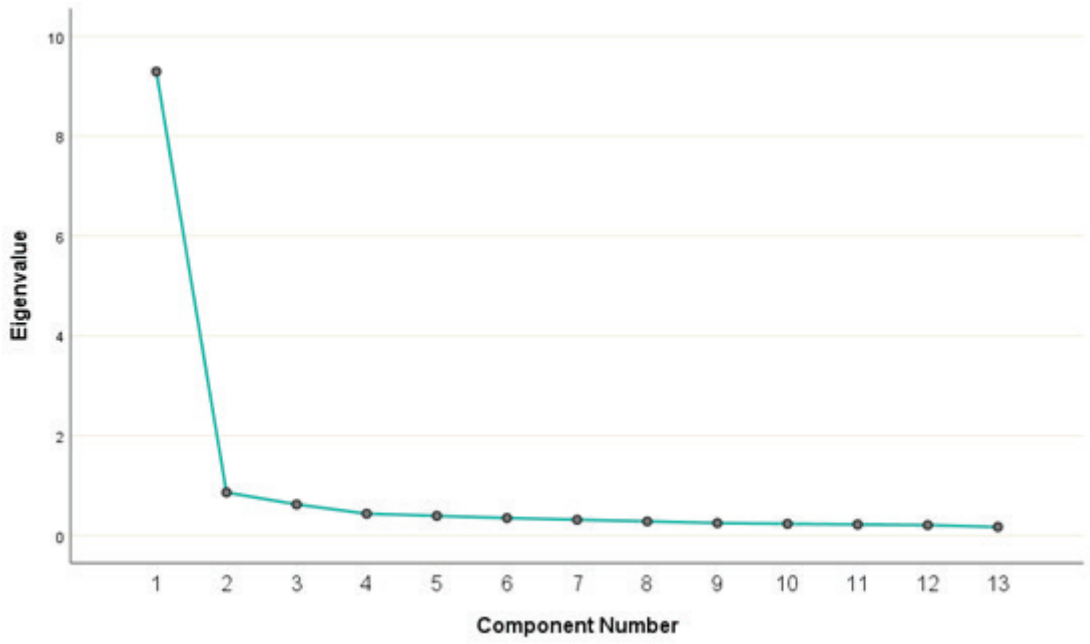

Figure 1. *Scree plot*

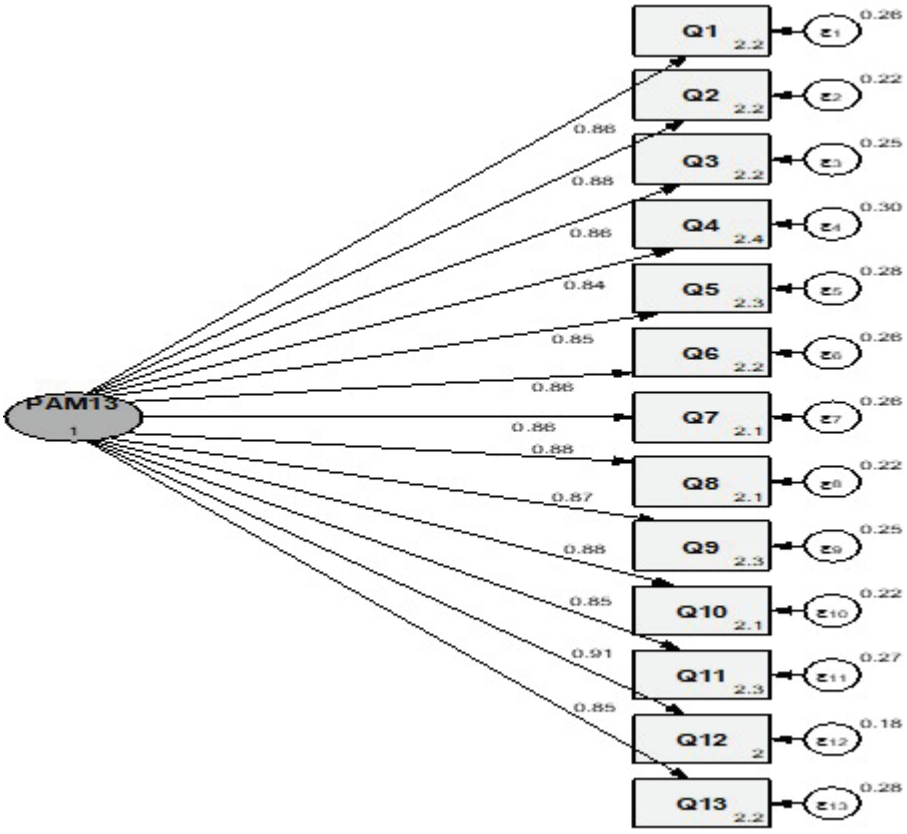

Figure 2. *Confirmatory factor analysis of the Greek version of PAM-13 questionnaire*

Table 1. *Item-Total Statistics*

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PAM-13 #1	26.73	101.939	0.822	0.957
PAM-13 #2	26.72	102.343	0.827	0.957
PAM-13 #3	26.77	102.895	0.814	0.957
PAM-13 #4	26.70	103.737	0.792	0.958
PAM-13 #5	26.71	103.396	0.792	0.958
PAM-13 #6	26.75	102.716	0.792	0.958
PAM-13 #7	26.79	104.224	0.733	0.959
PAM-13 #8	26.85	104.350	0.718	0.960
PAM-13 #9	26.75	103.567	0.790	0.958
PAM-13 #11	26.77	102.167	0.805	0.957
PAM-13 #11	26.78	102.769	0.795	0.958
PAM-13 #12	26.75	100.712	0.821	0.957
PAM-13 #13	26.77	103.237	0.797	0.958

Table 2. *Percentage distribution of responses*

	Strongly disagree	Disagree	Agree	Agree strongly
PAM-13 #1	27.8%	35.6%	19.4%	17.1%
PAM-13 #2	26.9%	34.3%	24.1%	14.8%
PAM-13 #3	27.8%	36.1%	22.7%	13.4%
PAM-13 #4	23.1%	38.9%	24.1%	13.9%
PAM-13 #5	27.3%	30.1%	30.6%	12.0%
PAM-13 #6	30.1%	31.0%	24.5%	14.4%
PAM-13 #7	29.2%	35.6%	21.3%	13.9%
PAM-13 #8	31.9%	37.0%	16.7%	14.4%
PAM-13 #9	25.5%	38.9%	21.8%	13.9%
PAM-13 #11	31.0%	32.4%	20.8%	15.7%
PAM-13 #11	30.1%	33.3%	22.2%	14.4%
PAM-13 #12	34.3%	26.4%	20.4%	19.0%
PAM-13 #13	29.6%	31.0%	27.8%	11.6%

** Cronbach's alpha coefficient for the total PAM13-D = 0.961*

face and content validity of the tool. The final version of the Greek questionnaire was then available to conduct the study.

Internal consistency was assessed by Cronbach's alpha. A Cronbach alpha coefficient >0.7 indicates sufficient reliability for research purposes and suggests that items are interdependent and homogeneous in terms of the constructs they measure. For clinical applications, α > 0.8 is desirable.

Intra-rater reliability was determined by calculating the intraclass correlation coefficient (ICC) on the initial assessment and the reassessment after a 2-week interval in a random subgroup of the participants. Values below 0.5 indicate poor reliability, between 0.5 and 0.75 moderate reliability, between 0.75 and 0.9 good reliability, and any value above 0.9 shows excellent reliability. Setting a minimum acceptable reliability of 0.8, a significance level of 5%, a power of 99%, and an expected abandonment rate of 10%, the minimum sample size was estimated at 19 people. So, 20 people were selected randomly and participated in the intra-rater reliability analysis.

Exploratory Factor Analysis (EFA) was conducted to identify a variable factor structure. EFA, using the principal component extraction method with Varimax rotation, was conducted to determine the factor structure of the 13 items of the PAM-13 questionnaire (Greek version). The Bartlett's test of sphericity was conducted to examine the correlation among the items. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was computed to quantify the degree of intercorrelations among the variables and the appropriateness of factor analysis. To justify factor analysis, KMO values should exceed 0.60. For the final model, we used a combination of the following selection criteria: (a) sample size ≥200; (b) scree plot; (c) each factor contains items with loading ≥0.50 while at the same time loading <0.50 to all other factors; (d) each factor contains at least three items with loading ≥0.50; and (e) the proportion of the total variance explained by the retained factors should be at least 60%.

Confirmatory Factor Analysis (CFA) was conducted to determine the model's fit. Adequate or good fit was indicated by a Standardized Root Mean Squared Residual (SRMR) less than or equal to 0.08, a coefficient of determination (CD) greater than or equal to 0.90, and a comparative fit index (CFI) greater than or equal to 0.90.

Data analysis

The statistical analyses were conducted using STATA (version 12) for the CFA and IBM SPSS (version 26) for the remainder. The significance level alpha was set at 0.05.

Ethics

Permission to use the questionnaire was obtained from Insignia Health. This research was reviewed and approved by the Hellenic Mediterranean University Ethics Committee with number 142/08.04.2023 and the Ethics Committee of the University Hospital from where the patient sample was recruited (number 10/22.03.2023). This survey was carried out in full compliance with the new General Data Protection Regulation (GDPR) [EU 2016/679] 25.5.2018 on sensitive personal data. Prior to its implementation, the relevant licenses were secured by the respective services. The data collected were anonymous; their use was made solely for the purposes of the survey and for access to them by the lead researcher. The participants consented in writing, having been fully informed that the procedure was anonymous, that their personal data and answers would be used exclusively for research purposes, and that at any time they would be able to leave.

Results

The sample comprised 216 participants, 94 (43.5%) females and 122 (56.5%) males, with a mean age of 63.6±15 years. 153 (70.8%) participants have received primary, 32 (14.8%) secondary, and 31 (14.4%) tertiary education.

The ICC between the initial assessment and reassessment of the questionnaire was 0.998 (CI 95% 0.995–0.999), p<0.001. This coefficient indicates that scores on the Greek version of PAM-13 were moderately consistent between the two occasions. The Bartlett Test of Sphericity was 2513.56 (p <0.001). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.957, showing that the data is suitable for factor analysis. The 13 items were analyzed via the principal component extraction method using a Varimax rotation. According to the criteria, one factor was identified (**Figure 1**). The total explained variance was 68.2%.

A one-factor model was conducted by CFA (**Figure 2**), giving acceptable global fit indices. The resulting global fit indices (SRMR = 0.07, CD = 0.98, CFI = 0.90) showed that the 13 items in the one-factor solution proposed by the primary researchers should be accepted for the Greek version of the PAM-13 questionnaire. As shown in **Tables 1 & 2**, the Cronbach's alpha coefficient for the full PAM13-D scale of 13 items was 0.961.

Discussion

According to the aim of the present study, the PAM-13 questionnaire was translated from its original English version to the Greek one, and afterwards, a validation study was conducted among patients with glaucoma. As aforementioned, the main findings of

this study include excellent reliability as expressed by the Cronbach alpha value of 0.961 and strong intra-rater reliability (ICC = 0.998). Likewise, factor analysis revealed a single-factor structure, with the one-factor model validated through CFA (SRMR = 0.07, CD = 0.98, CFI = 0.90).

The Cronbach alpha coefficient should have values higher than 0.59 and lower than 0.95,[15] and ICC values greater than 0.90 are indicative of excellent reliability.[16] Thus, high Cronbach's alpha (0.961) and ICC (0.998) coefficients demonstrate strong internal consistency and reliability, making the Greek PAM-13 suitable for both research and clinical applications, while the study's rigorous translation process, including expert and patient review, ensures the questionnaire's cultural relevance. Besides, it seems that the one-factor structure identified in factor analysis and confirmed through CFA simplifies the assessment process and aligns with the English version of the PAM-13.

All the above reveal that the Greek version of PAM-13 is a valid and reliable instrument for assessing patient activation in the Greek chronic disease patients' setting, including patients with glaucoma. This instrument can contribute to a deeper understanding of patient activation in Greek healthcare contexts, allowing for targeted interventions to improve patient engagement and self-management. Lastly, researchers and clinicians can use the Greek PAM-13 to tailor healthcare interventions, monitor patient progress, and assess the effectiveness of patient engagement strategies.

However, despite the strengths of this study, some limitations are raised. Attendees of the outpatient ophthalmological facility at a particular hospital in Greece may not accurately reflect the larger patient population afflicted with glaucoma. Thus, the findings of this study may not be applicable to alternative healthcare environments or medical conditions. It is important to note that this research was exclusively conducted within a solitary clinical context, thereby potentially restricting the generalizability of these results to other regions or categories of healthcare establishments within Greece.

Conclusions

Taking everything into account, the Greek validated version of the PAM-13 questionnaire is a reliable and culturally appropriate tool for assessing patient activation in Greek-speaking populations. The Greek PAM-13 has strong internal consistency, excellent reliability, and a one-factor structure, making it a valuable resource for healthcare professionals and researchers. The aforementioned progress has the potential to cultivate a healthcare system in Greece that prioritizes the needs and preferences of patients, ultimately leading to enhanced patient outcomes. Further research, addressing the main limitations of the present study and characterized by a multi-center design and investigation of the application of the Greek PAM-13 in various healthcare settings, is needed.

ΠΕΡΙΛΗΨΗ

Μετάφραση και στάθμιση της ελληνικής εκδοχής του Μέτρου Ενεργοποίησης Ασθενών-13 [Patient Activation Measure (PAM)-13] σε ασθενείς με γλαύκωμα

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Εισαγωγή: Το Μέτρο Ενεργοποίησης Ασθενών-13 (PAM-13) αξιολογεί τα επίπεδα ενεργοποίησης των ασθενών, υποδηλώνοντας τις συμπεριφορές αυτοδιαχείρισης και αυτοφροντίδας τους. Το εν λόγω ερωτηματολόγιο έχει μεταφραστεί σε διάφορες γλώσσες και έχει χρησιμοποιηθεί σε πολυάριθμα περιβάλλοντα, συμπεριλαμβανομένου εκείνου της φροντίδας ασθενών με χρόνια νοσήματα. Ωστόσο, μέχρι σήμερα, δεν έχει μεταφραστεί στην ελληνική γλώσσα, ούτε έχει σταθμιστεί σε ελληνικό πληθυσμό.
Σκοπός: Η μετάφραση και στάθμιση του PAM-13 στην ελληνική γλώσσα.
Υλικό και μέθοδοι: Πραγματοποιήθηκε συγχρονική μελέτη σε ασθενείς με γλαύκωμα που προσέρχονταν στα εξωτερικά οφθαλμολογικά ιατρεία ενός Πανεπιστημιακού Νοσοκομείου στο Ηράκλειο - Ελλάδα. Χρησιμοποιήθηκε δειγματοληψία ευκολίας για την προσέλκυση 216 συμμετεχόντων. Η συλλογή δεδομένων πραγματοποιήθηκε μεταξύ Απριλίου και Οκτωβρίου 2023. Η μετάφραση πραγματοποιήθηκε από τα Αγγλικά στα ελληνικά από δύο ανεξάρτητους μεταφραστές και ακολούθησε αντίστροφη μετάφραση στα Αγγλικά. Ελήφθη υπόψη η ανατροφοδότηση από 10 Έλληνες ασθενείς με γλαύκωμα, ενώ ειδικοί στην ψυχομετρία αξιολόγησαν την εγκυρότητα και την αξιοπιστία του ερωτηματολογίου. Η εσωτερική συνοχή αξιολογήθηκε με τη χρήση του Cronbach's alpha. Η ενδοβαθμολογική αξιοπιστία αξιολογήθηκε με τη χρήση του συντελεστή ενδοταξικής συσχέτισης (ICC) σε μια τυχαία υποομάδα συμμετεχόντων. Διεξήχθη διερευνητική ανάλυση παραγόντων (EFA) για τον προσδιορισμό της παραγοντικής δομής της ελληνικής εκδοχής του PAM-13. Η επιβεβαιωτική ανάλυση παραγόντων (CFA) χρησιμοποιήθηκε για τον προσδιορισμό της καταλληλότητας του μοντέλου. Οι στατιστικές αναλύσεις πραγματοποιήθηκαν με τη χρήση του STATA (έκδοση 12) για την CFA και του IBM SPSS (έκδοση 26) για τις άλλες αναλύσεις. Το επίπεδο σημαντικότητας ορίστηκε σε α = 0,05.
Αποτελέσματα: Οι περισσότεροι από τους συμμετέχοντες ήταν άνδρες (56,5%) και η μέση [± τυπική απόκλιση] ηλικία του δείγματος ήταν 63,6 (±15) έτη. Το ICC μεταξύ των βαθμολογιών της αρχικής αξιολόγησης και επαναξιολόγησης για την ελληνική εκδοχή του PAM-13 ήταν 0,998, p<0,001. Η καταλληλότητα των δεδομένων για παραγοντική ανάλυση επιβεβαιώθηκε από το Bartlett Test of Sphericity (p<0,001) και το μέτρο Kaiser-Meyer-Olkin 0,957. Η EFA προσδιόρισε έναν μοναδικό παράγοντα που εξηγεί το 68,2% της συνολικής διακύμανσης των 13 στοιχείων του ερωτηματολογίου. Η CFA υποστήριξε ένα μονοπαραγοντικό μοντέλο με αποδεκτούς συνολικούς δείκτες προσαρμογής (SRMR = 0,07, CD = 0,98, CFI = 0,90), υπογραμμίζοντας την υιοθέτηση της μονοπαραγοντικής λύσης των 13 στοιχείων για το PAM-13. Τέλος, ο συντελεστής Cronbach's alpha, ήταν 0,961.
Συμπεράσματα: Το PAM-13 είναι ένα αξιόπιστο εργαλείο για την αξιολόγηση της ενεργοποίησης των ασθενών σε ελληνόφωνους πληθυσμούς. Η ισχυρή εσωτερική συνοχή του και η μονοπαραγοντική δομή το καθιστούν πολύτιμο για τους επαγγελματίες υγείας και τους ερευνητές. Περαιτέρω έρευνα είναι αναγκαία.

Λέξεις-ευρετηρίου: *Αξιοπιστία, αυτοδιαχείριση, εγκυρότητα, ενεργοποίηση ασθενών, ερωτηματολόγιο*

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