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The reliability and validity of the compulsory citizenship behaviors (CCBs) scale: Six-step R-based psychometrics protocol among nurses in Turkey

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Abstract

Purpose: This study aims to assess the validity and reliability of the compulsory citizenship behaviors (CCBs) scale among Turkish nurses.

Methods: The sample of this cross-sectional study consisted of 530 Turkish hospital nurses. We performed a six-step protocol to test the validity of the scale.

Findings: The scale formed a unidimensional scale with good homogeneity ($H = 0.79$) and reliability ($\alpha = 0.94$). The confirmatory factor analysis indicated that the five-item single factor measurement model of the scale well fit the data (GFI = 0.98, CFI = 0.99, TLI = 0.98, SRMR = 0.02, RMSEA = 0.10).

Practical Implications: The Turkish version of the CCBs scale satisfactorily met psychometric criteria in Turkish nurse samples and is recommended for further research.

KEYWORDS

compulsory citizenship behaviors, nurses, nursing, reliability, validation

1 | INTRODUCTION

The construct of compulsory citizenship behaviors (CCBs), defined as "compulsory organizational citizenship behaviors",[1] is a rising research topic in the nursing management literature.[2,3] According to Vigoda-Gadot,[1] "CCB may be viewed as another means by which those with authority and power take advantage of other, less powerful individuals who simply cannot resist or say no" (p. 83). He also emphasized that CCBs refer to "employees' engagement in extra-role, but not necessarily voluntary, behaviors that are conducted under duress and not as a result of the self-driven goodwill of the individual himself/herself" (p. 387). As this suggests, the voluntary nature of extra-role behaviors is missing in the CCBs.

After a comprehensive review of the current literature on CCBs, 16 studies were detected in the period from 2006 to 2021 that were published in the English language and indexed in the Web of Science database. The majority of the studies (10 publications) were published in the last 5 years. The publications were mostly published by Chinese academics ($k = 9$), followed by Turkish ($k = 3$) and Israeli ($k = 2$) scholars. All quantitative research papers used the Vigoda-Gadot's CCBs scale. Three articles[2–4] were written by Turkish researchers.

Although Ahmadian et al.[4] performed confirmatory and exploratory factor analysis to construct validity, Harmancı Seren and Ünaldı Baydın[5] conducted scale validation on nurses and performed more comprehensive psychometric tests than Ahmadian et al.[4] These two studies' validation processes mainly focused on parametric tests, such as reliability and factor analyses.[6] However, beginning with exploratory factor analysis and Cronbach's α is mostly misleading.[7] According to this view, conventional techniques require more data collection to prove other validity types, such as criterion validity and face validity. Applied researchers need more conversant psychometric analyses to minimize measurement errors, misleading conclusions, and erroneous decisions. The originality of this study is that it combines parametric and nonparametric item response theories with classical test theory (CTT) to minimize this erroneousness of the existing methods.

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2 | BACKGROUND

Past research indicates that the CCBs are harmful to individuals and organizations. For instance, Unaldi Baydın et al.[2] found a positive and statistically significant correlation between nurses' job stress and the CCBs. Yildiz and Elibol[3] also found that the CCBs positively affect nurses' turnover intentions and, in turn, social loafing behaviors. Nurses, as healthcare providers, encounter numerous stressors, such as a high workload,[8] work-family conflict,[9] work/time pressure, and even pressure from decision authority[10]; the stressful nature of nursing begins with their formal education in nursing schools.[11] As the CCBs are significant drivers of job stress, determining their levels and managing them effectively is essential for decision-makers and hospital managers. Although there is an increasing number of studies investigating the adverse effects of the CCBs, this research interest is still limited in the nursing management literature. In this context, we need reliable and valid scales in cross-cultural studies to develop the structure of this construct, determine its levels in the nursing profession, and ensure effective management of these behaviors.

The studies have shown that CCBs are positively associated with careerism,[12] turnover intention and social loafing,[3] workload,[13] moral disengagements and employee silence,[14] emotional exhaustion,[15] authoritarian leadership,[16] citizenship pressure, and work-family conflict.[17] Meanwhile, there are also negative relations among the CCBs employee creativity and creative self-efficacy.[18]

A recent study[7] introduced a six-step protocol that overcame the weaknesses of the conventional validity process of existing scales. More specifically, the six-step protocol enables researchers to use both parametric and nonparametric item response theories to prove scale validation. This research approach will provide a more robust statistical background for existing scales and provide clear information to researchers who want to develop new scales or revised scales addressing the current scales' insufficient or problematic aspects. The other striking feature of the six-step protocol is that it is reproducible, comprehensive, and more accessible for the researcher who has mastered fundamental statistical issues but does not know how to implement a straightforward validity procedure in practice.[7] In this study, we assess the validity of the Turkish version of the CCBs scale to help Turkish researchers and managers measure the CCBs in the nursing profession correctly.

3 | METHODS

In this study,[7] six-step protocol was performed to assess the validity and reliability of the Turkish version of Vigoda-Gadot's CCBs scale. The main reason for following this protocol is that it is more potent than the past techniques for assessing different aspects of a measurement tool. In addition, replicating the protocol in the *R* context is easy and straightforward.[7,19] The steps of the protocol are as follows: descriptive statistics (Step 1), nonparametric item response theory (IRT) (Step 2), parametric IRT (Step 3), factor analysis (Step 4), CTT, (Step 5), and finally, total (sub)scale scores (Step 6).[7] The methodological details of all steps are presented below.

Step 1: In this stage, the mean, median, *SD*, and minimum and maximum values of each item were assessed. Also, to display the distributional structure of all five items, visualization techniques such as histogram were employed.

Step 2: Item characteristics were examined based on parametric and nonparametric IRT. Accordingly, to test the homogeneity of the scale, Mokken scale analysis (MSA) was performed. MSA assesses each item's scalability at certain homogeneity levels.[20] To see each item's distribution at a specific homogeneity level, an automatic item selection procedure (AISP) was performed. In this step, unscalable items ($x \leq 30$) must be deleted from further analysis.[7]

Step 3: Because the CCBs scale (a) has a unidimensional structure, (b) consists of five items (polytomous), and (c) has all items measured with a 5-point Likert scale, to assess item characteristics, the rating scale model was used.[7,21] Items' infit and outfit values play a significant role in this stage of determining "the extent to which actual responses fit the logistic function estimated for a particular item."[7] In other words, these two indicators are useful for the detection of model deviations.[19] Infit and outfit values are also sensitive to extreme scores.[22] In this respect, minimum and maximum infit and outfit thresholds (0.6–1.4) are used to eliminate problematic items.[7]

Step 4: To test the scale's construct validity, exploratory and confirmatory factor analyses were performed.

Step 5: At this stage, CTT was performed to assess[23] α reliability and other alternative reliability tests (e.g., β and Guttman's λ 6 (G6)) to prove internal consistency.[7]

Step 6: At this stage, total scores of the CCBs were summarized and calculated to detect whether overall scale scores were affected by extreme scores. Ceiling and floor effects are the types of effects proper to extreme scores. The acceptable range of the extreme scores is <15%.[7]

3.1 | Aim

This study aimed to examine the psychometric properties of Vigoda-Gadot's[1] the CCBs scale by following the six-step protocol of Dima[7] to measure the level of the CCBs of nurses.

3.2 | Design

A cross-sectional study was conducted in the validation process of the scale. Data were collected from 545 nurses. The sample consists of nurses who worked or work in private and public hospitals in Istanbul, the largest and most crowded Turkish city.

3.3 | Participants

First, we reached 37 nurses through personal contacts. We then organized a series of online meetings to explain the study's purpose and distributed an online survey link for them to share with their colleagues. A total of 545 nurses participated in the study. After conducting Mahalanobis distance,[24] 15 observations were determined as outliers and excluded from the study. After deleting the outliers, 530 valid surveys were analyzed (response rate: 530/545 = 97.2%). To calculate sample adequacy, the "pwr" package for R software[25] was used. First, we calculated the scale's overall inter-item correlation as $r = 0.735$. A power analysis was then performed and calculated as 100 based on the sample size ($n = 530$), significance level ($p = 0.05$), and correlation coefficient ($r = 0.735$). In this respect, we concluded that the study sample size was considered adequate for this study.[26] The majority of the nurses, who participated in the study, were females 406 (76.6%). Although the age of participants was range from 21 to 47 with a mean of 31.66 ($SD = 6.53$), other characteristics of the sample are presented in Table 1.

3.4 | Data collection

Snowball sampling was used to collect data from nurses. The main reason for selecting this method is that we tried to minimize face-to-face interaction because of the COVID-19 pandemic. Second, as nurses work under extreme conditions in this complicated ongoing process, we tried to decide on the best time to fill in the questionnaires. Third, because of social desirability bias and the negative theme of the CCBs, we tried to ensure that nurses would be voluntarily involved in the study and would not be affected by managerial or other related pressure.

TABLE 1 Demographic characteristics of the sample ($n = 530$)

	n	%
Gender		
Male	124	23.4
Female	406	76.6
Education		
Doctorate	21	4
Master	92	17.4
Graduate	417	78.7
Age ($\bar{X}$ = 31.66 (6.53))		
20–25	101	19.1
26–30	164	30.9
31–35	109	20.6
36–40	83	15.7
41 and over	73	13.8
Sector		
Public	448	84.5
Private	82	15.5
Total	530	100

The inclusion criteria of this study were (1) currently working in a hospital in Istanbul, (2) sharing tasks with other nurses, (3) working in nonmanagerial positions, and (4) having at least one year of work experience.

The measure was translated into the Turkish language following Brislin's[27] back-translation method and measured with a 5-point Likert-type scale (1: Strongly Disagree, 5: Strongly Agree). First, the scale was translated into the Turkish language by two independent researchers. Two translators checked the translated version of the scale. After their revisions and consensus, the scale was back-translated into the English language (see Appendix A). After this, two experts compared the original version and the back-translated version of the scale to construct the final version of the scale. Completing the questionnaire lasted approximately 5 min. All questions were set as mandatory to avoid missing data problems. Therefore, all participants who filled out the online questionnaire answered all the questions in the questionnaire.

Compulsory Citizenship Behaviors measured five items developed by Vigoda-Gadot.[1] The items of the scale are as follows: "The management in my hospital puts pressure on employees to engage in extra-role work activities beyond their formal job tasks;" "There is social pressure in my hospital to work extra hours, beyond the formal workload and without any formal rewards;" "I feel that I am expected to invest more effort in my job than I want to and beyond my formal job requirements;" "I feel that I am forced to help other nurses beyond my formal obligations and even when I am short on time or energy;" "I feel that I am forced to assist my supervisor against my will and beyond my formal job obligations."

3.5 | Ethical considerations

Before conducting this study, we obtained ethical approval from the Istanbul University's Ethics Committee of Social Sciences and Humanities Research (decision No.: 67787).

3.6 | Data analyses

Studies in nursing management strongly advise the use of *R* in scientific papers because of its numerous advantages.[7,28] *R* is an open-source platform that grants researchers limitless options to conduct their research.[29] It is also more powerful than conventional statistical tools in terms of data visualization and analysis options. To test the validity of Vigoda-Gadot's CCBs scale, we follow the six-step procedure in Dima.[7] The total score of the CCBs was calculated by summing all five-item scores with equal weights. The minimum score is five, and

the maximum score is 25. Accordingly, higher scores refer to higher levels of the CCBs displayed by nurses.

4 | RESULTS

4.1 | Descriptive statistics

The descriptive statistics of the total CCBs indicate that their scores were between 5 and 25, with a mean of 16.74 ($SD = 5.27$) and a median of 18.00 (Figure 1).

On the other hand, as seen in Figure 2, inter-item correlation coefficients ranged from $r = 0.60$ to $r = 0.83$. As there was no negative correlation, all correlations were positive and statistically significant ($p < 0.001$); thus, all items were included in further analyses.

4.2 | Mokken scale analysis

MSA indicated that the scale is homogeneous ($H = 0.793$; $SE = 0.017$), and five-item H coefficients (range from .74 to .82) were higher than the cutoff value of 0.40.[19] Table 2 also indicates that the AISP analysis identified no nonscalable items below the threshold values ($x \leq 30$).[7,20] In other words, all the items measured the same construct, that is, the CCBs.

4.3 | Parametric IRT

With its rating scale model for ordinal items, IRT is a useful approach for unidimensional scales' fitness evaluation. According to this theory, infit and outfit criteria are useful criteria for eliminating items not ordered according to the theory.[7] According to this view, the infit and outfit scores for this study were in an acceptable mean squares range of 0.6–1.4; while the calculated infit values of this study were in the range of 0.64–1.20, outfits ranged from 0.62 to 1.21. In this respect, we concluded that there was no misfit in the data.

4.4 | Factor analysis

We performed exploratory and confirmatory factor analyses to test the construct validity. Bartlett's test indicated correlation adequacy—X2(10) = 2522.3337, $p < 0.001$—and the Kaiser-Meyer-Olkin (KMO) test indicated the measured sampling adequacy as 0.85. Maximum likelihood estimation was used with direct oblimin rotation because of the expected factor correlation. After testing all five items, no item was split across other factors using the criterion that loadings must be >0.300. A parallel analysis, scree plot examination, and old and new Kaiser rotation suggested one overall factor structure (Figure 3).

The measurement model (Figure 4) was tested for confirmatory factor analysis, and it indicated a good fit with the indices (GFI = 0.98, AGFI = 0.92, NFI = 0.99, CFI = 99, TLI = 0.98, SRMR = 0.02, RMSEA = 0.10; $p < .05$ [90% CI: 0.065–0.150]). All fit indices were above the threshold values recommended by past research.[30-32] As seen in Table 3, all estimates and standardized factor loadings were found to be statistically significant ($p < 0.001$).

4.5 | Classical test theory

Cronbach's[23] suggested that satisfactory reliability levels should be above the threshold value of $\alpha = 0.70$. In this respect, the Cronbach's α reliability level of the scale was calculated as $\alpha = 0.94$, which is acceptable. The results of other reliability tests, namely ω (0.94), β (.87), and G6 λ (.94), were also consistent with the Cronbach's α internal reliability coefficient.

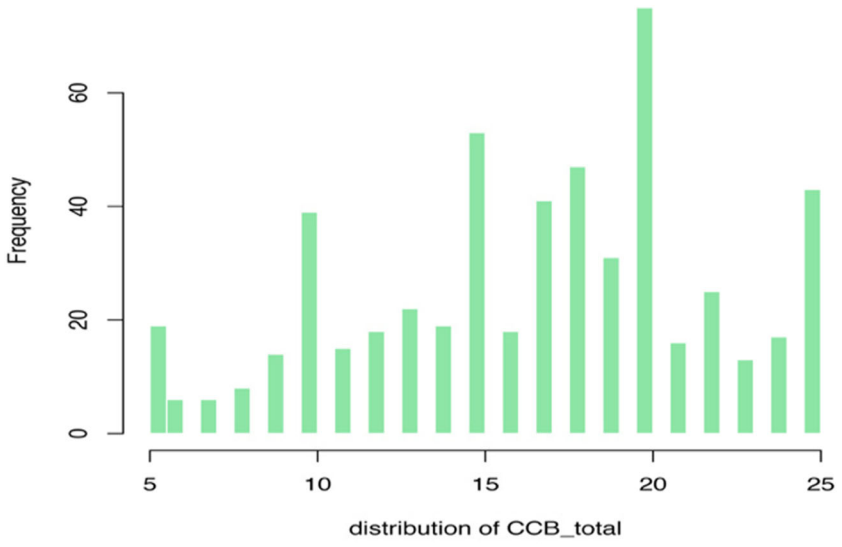


FIGURE 1 The distribution of the total CCBs scores. CCB, compulsory citizenship behavior

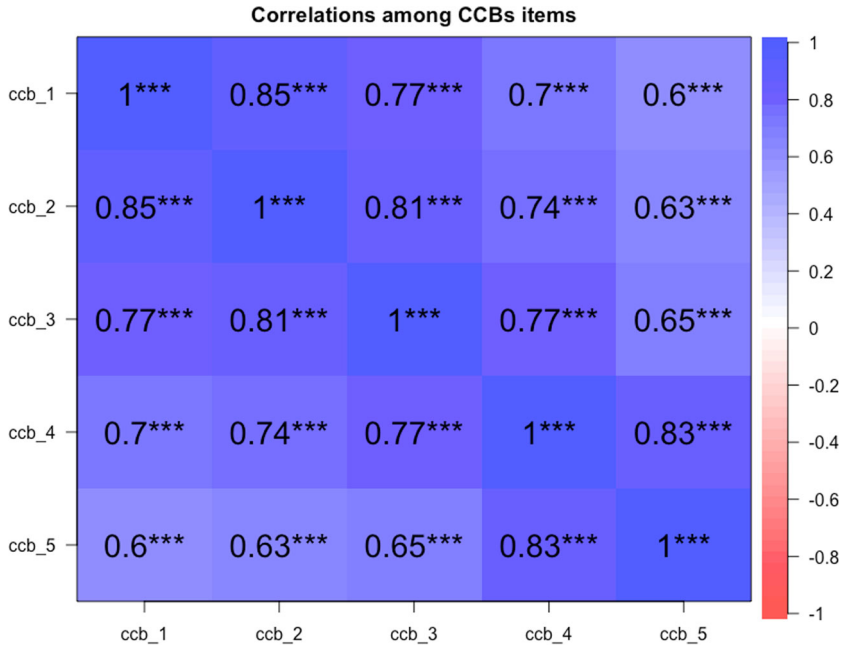


FIGURE 2 Inter-item correlations of the CCBs. CCB, compulsory citizenship behavior

TABLE 2 Mokken scaling for the CCBs items

Item	Homogeneity threshold levels											
	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60
ccb_1	1	1	1	1	1	1	1	1	1	1	1	1
ccb_2	1	1	1	1	1	1	1	1	1	1	1	1
ccb_3	1	1	1	1	1	1	1	1	1	1	1	1
ccb_4	1	1	1	1	1	1	1	1	1	1	1	1
ccb_5	1	1	1	1	1	1	1	1	1	1	1	1

Note: Numbers represent which subscale the item belongs to; 0 indicates the item is unscalable at that homogeneity level.

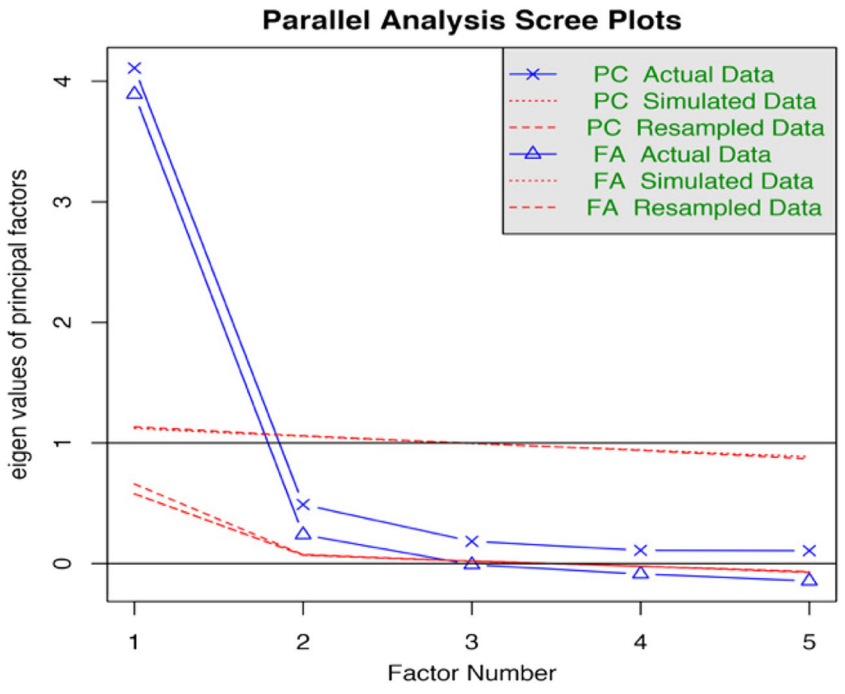


FIGURE 3 Parallel analysis scree plots for the eigenvalues of principal factors

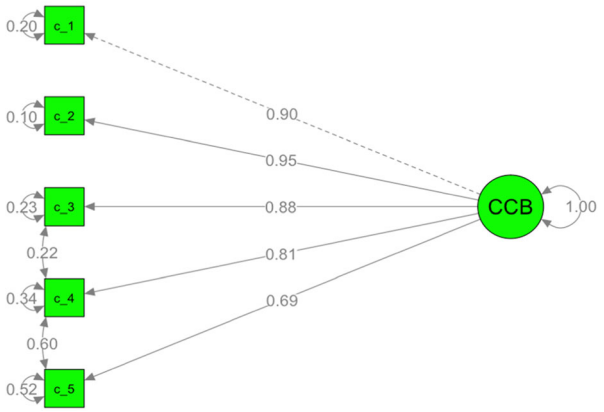


FIGURE 4 The confirmatory factor analysis results of the CCBs Scale. CCB, compulsory citizenship behavior

TABLE 4 Summary of the responses to each item of CCB

Item no	Min	Max	Median	Mean	*SD*
ccb_1	1	5	4	3.38	1.14
ccb_2	1	5	4	3.48	1.20
ccb_3	1	5	4	3.52	1.17
ccb_4	1	5	3	3.25	1.14
ccb_5	1	5	3	3.03	1.25
CCBs_Factor	1	5	3.48	3.34	1.06
Total CCBs	5	25	18	16.74	5.27

Abbreviation: CCB, compulsory citizenship behavior.

4.6 | Total scale scores

The total scores of the items and descriptive statistics are presented in Table 4. Dima[7] emphasized that if more than 15% of the respondents have extreme scores, there could be ceiling or floor effects that may cause measuring errors and lead to mistakes in further scale development processes. However, if the respondents' extreme scores are lower than 15%, the result of the measurement adequacy of a scale is satisfactory. As the mean and median values of the total CCBs scores are close to each other, the extreme differences only include 7% $(1 - (16.74/18) = 0.07)$, which is lower than 15%; therefore, there are no extreme scores in the data. Also, because the total score of the CCBs scale is in the acceptable distribution ($\bar{X}$ $(SD) = 16.74$ (5.27)) range (from 5 to 25), there are no ceiling and floor effects.

5 | DISCUSSION

The overall results indicate that the scale successfully met Dima's[7] the six-step protocol in Turkish nurses. The mean scores of the items ranged from 3.03 to 3.52. The calculated mean of the CCBs scale in our study is 3.34 ± 1.06. This is similar to the values in the original research (3.02 ± 0.86) conducted by Vigoda-Gadot[1] and past studies conducted on nursing samples, which were 2.51 ± 1.03,[3] 3.37 ± 1.07,[2] and 3.84 ± 0.89.[5] The similarity of the findings of studies conducted on Turkish nurses indicates that Turkish nurses are required to exhibit the CCBs. Supporting this notion, Harmancı Seren and Ünaldı Baydın[5] reported that Turkish nurses' level of the CCBs is high. National culture,[33] especially power distance and collectivism,[33] could be one reason for this result.[3] Managers in such cultures may think that they have the power to make everyone do what they want.

TABLE 3 Estimates and standardized factors loadings for CFA

Item no.	Estimate	*SE*	*z* value	*P*(>|z|)	Std. lv	Std. all
ccb_1	1.000	—	—	—	1.021	0.895
ccb_2	1.099	0.034	32.003	0.000***	1.122	0.923
ccb_3	0.995	0.035	28.128	0.000***	1.016	0.861
ccb_4	0.876	0.038	22.897	0.000***	0.894	0.772
ccb_5	0.836	0.045	18.600	0.000***	0.853	0.677

***$p < 0.001$.

Parametric and nonparametric item response theories indicated that the CCBs scale is unidimensional, which accords with the original study such that, according to MSA, item scalability was achieved at all homogeneity levels. The result of the MSA (nonparametric IRT) indicated that the scale is homogeneous ($H = 0.793$; $SE = 0.017$), and the five-item H coefficients are greater than the cutoff value of 0.40.[19] The AISP analysis identified no nonscalable items below the threshold values ($x \leq 30$).[7,20] In other words, all items measure the same construct: the CCBs. The mean square of item infit ranged between 0.64 and 1.20, and item outfit was between 0.62 and 1.21. These indicators prove that no extreme scores were found that affected the scalability of the scale.[7]

The exploratory factor analysis indicated that the one-factor structure of CCBs is valid, as it was in the original study.[1] Accordingly, the KMO (0.85) and Bartlett tests ($X^2(10) = 2522.3337$, $p < 0.001$) indicated sufficient sampling adequacy and intercorrelation among the CCBs. Supporting these results, in our study, CFA showed that the data fit the model well (GFI = 0.98, AGFI = 0.92, NFI = 0.99, CFI = 99, TLI = 0.98, SRMR = 0.02; RMSEA = 0.10; $p < .05$ [90% CI: 0.065–0.150]). These results are consistent with past studies conducted on nurses.[5]

The calculated internal consistency of the scale in our study was found to be $\alpha = 0.94$, which is higher than that of the original study ($\alpha = .83$) and threshold value ($\alpha = 0.70$) suggested by Cronbach.[23] The results of past studies indicate that the interval of Cronbach's α levels for the CCBs ranges from 0.74 to 0.94 ($k = 16$, $\bar{X} = 0.85$, $M = 0.87$).[12] In this respect, it is easy to say that the reliability level of the scale is high. The results of the other

reliability tests ($\beta = .87$, $\lambda = 0.94$; $\omega = 0.94$) are also consistent with Cronbach's α coefficient.

Finally, the scale's total scores and descriptive statistics indicate that the mean and median values of the total CCBs score were found to be close to each other. The extreme differences only comprise 7% ($1 - (16.74/18) = 0.07$), which is lower than 15%. This means there are no extreme scores in the data,[7] indicating that there were no ceiling or floor effects in the data.

5.1 | Limitations

Although the psychometric properties of the Turkish version of the CCBs scale met all stages of the six-step protocol, the research has some limitations. First, this study's target population consists of nurses; therefore, to generalize the results to other professions, researchers need to conduct further research on other jobs. Second, although we collected data by using the snowballing method, it has a cross-sectional design. Accordingly, we highly recommend that further researchers conduct longitudinal research to clarify causal relations among the CCBs and other related factors. The CCBs scale is a self-reported questionnaire measuring compulsory extra-role behaviors in the current workplace. However, in high-power distance cultures and highly collectivist cultures like Turkey, employees may be afraid to report unsatisfactory situations because of managerial pressure.[3,33] To minimize this possibility, further researchers could include socially desirable bias as a control variable in their models. Finally, since this study focused on the scale's validation, we did not include other possible antecedents or consequences of the CCBs in the model. Further research could integrate other related factors that have the potential to minimize these behaviors such as leader-member exchange, ethical leadership, and leader-member exchange[34] into their models as independent or moderator variables.

6 | CONCLUSION

The six-step protocol results indicated that the Turkish version of Vigoda-Gadot's five-item CCBs scale successfully met all psychometric properties. The scale can be used to measure nurses' CCBs. The correct measurement of nurses' CCBs can help decision-makers and managers be aware of the CCBs. It can also help to develop solutions and precautions to minimize its detrimental effects on nurses' positive psychology. Meanwhile, because the CCBs are a growing research field and the content of the CCBs is expanding in parallel with work environment changes, the content of these behaviors should be revised by further researchers.

Additionally, given the five-item structure of the CCBs scale, past researchers have argued that short scales are mostly preferable because of complaints about the repetitive (crosscheck items) items. However, using short scales could exclude some critical facets of a specific construct inadvertently. In this respect, there need to be further qualitative studies to update the content of the CCBs.

6.1 | Implications for nursing management

Nurses are pivotal actors in sustainable health systems. Their psychological and psychic well-being is crucial for themselves, patients, and their organizations. The CCBs adversely affect the positive psychological states of nurses. To prevent the unfavorable effects of the CCBs, nurse managers and hospital managers should clearly define job descriptions. Hospital managers or other powerful agents in their current workplace should provide a work environment where nurses can voluntarily exhibit extra-role behaviors.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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REFERENCES

1. Vigoda-Gadot E. Redrawing the boundaries of OCB? An empirical examination of compulsory extra-role behavior in the workplace. *J Bus Psychol*. 2007;21(3):377-405.
2. Unaldi Baydin N, Tiryaki Sen H, Kartoglu Gurler S, Dalli B, Harmanci Seren AK. A study on the relationship between nurses' compulsory citizenship behaviours and job stress. *J Nurs Manag*. 2020;28(4):851-859.
3. Yildiz B, Elibol E. Turnover intention linking compulsory citizenship behaviours to social loafing in nurses: a mediation analysis. *J Nurs Manag*. 2020:1-11. https://doi.org/10.1111/jonm.13200
4. Ahmadian S, Sesen H, Soran S. Expanding the boundaries of compulsory citizenship behavior: its impact on some organizational outputs. *Bus Econ Horiz*. 2017;13(1):110-118.
5. Harmancı Seren AK, Ünaldı Baydın N. Zorunlu Vatandaşlık Davranışı Ölçeği' nin Türkçede Geçerlik ve Güvenirlik Çalışması: Hemşireler Üzerinde Bir Araştırma. *Sağlık ve Hemşirelik Yönetimi Dergisi*. 2017;4(2):43-49.
6. Robinson MA. Using multi-item psychometric scales for research and practice in human resource management. *Hum Resour Manage*. 2018;57(3):739-750.
7. Dima A. Scale validation in applied health research: tutorial for a 6-step R-based psychometrics protocol. *Health Psychol Behav Med*. 2018;6(1):136-161.
8. Lanz JJ, Bruk-Lee V. Resilience as a moderator of the indirect effects of conflict and workload on job outcomes among nurses. *J Adv Nurs*. 2017;73(12):2973-2986.
9. Yildiz B, Yildiz H, Ayaz Arda O. Relationship between work-family conflict and turnover intention in nurses: a meta-analytic review. *J Adv Nurs*. 20211–14. https://doi.org/10.1111/jan.14846
10. Labrague LJ, McEnroe-Petitte DM, Leocadio MC, Van Bogaert P, Cummings GG. Stress and ways of coping among nurse managers: an integrative review. *J Clin Nurs*. 2018;27(7-8):1346-1359.
11. Latif RA, Nor MZM. Stressors and coping strategies during clinical practice among diploma nursing students. *Malays J Med Sci*. 2019;26(2):88-98.
12. Yildiz B, Ayaz AO. İyi Bir Asker Mi İyi Bir İllüzyonist Mi Kariyerizm ile Zorunlu Vatandaşlık Davranışları Arasındaki İlişkide İşten Ayrılma

Niyetinin Rolü. *Business and Economics Research Journal*. 2018;9(1):151-167. http://doi.org/10.20409/berj.2018.97
13. Liu F, Chow IH, Huang M. Increasing compulsory citizenship behavior and workload: does impression management matter? *Front Psychol*. 2019;10(1726):1-10.
14. He P, Peng Z, Zhao H, Estay C. How and when compulsory citizenship behavior leads to employee silence: a moderated mediation model based on moral disengagement and supervisor–subordinate Guanxi views. *J Bus Ethics*. 2019;155(1):259-274.
15. He P, Wang X, Wu M, Estay C. Compulsory citizenship behavior and employee silence: the roles of emotional exhaustion and organizational identification. *Soc Behav Pers*. 2018;46(12):2025-2047.
16. Shu CY, Chiang YH, Lu CH. Authoritarian leadership supervisor support and workers' compulsory citizenship behavior. *Int J Manpower*. 2018;39(3):468-485.
17. Liu Y, Zhao H, Sheard G. Organizational citizenship pressure, compulsory citizenship behavior, and work–family conflict. *Soc Behav Pers*. 2017;45(4):695-704.
18. He P, Zhou Q, Zhao H, Jiang C, Wu YJ. Compulsory citizenship behavior and employee creativity: creative self-efficacy as a mediator and negative affect as a moderator. *Front Psychol*. 2020;11(1640):1-16.
19. Cilar L, Pajnkihar M, Štiglic G. Validation of the Warwick-Edinburgh Mental Well-being Scale among nursing students in Slovenia. *J Nurs Manag*. 2020;28(6):1335-1346.
20. Sijtsma K, van der Ark LA. A tutorial on how to do a Mokken scale analysis on your test and questionnaire data. *Br J Math Stat Psychol*. 2017;70(1):137-158.
21. Paek I, Cole K. *Using R for Item Response Theory Model Applications*. New York: Routledge; 2019.
22. DeMars CE. Infit and outfit: interpreting statistical significance and magnitude of misfit in conjunction. *J Appl Meas*. 2017;18(2):163-177.
23. Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika*. 1951;16(3):297-334.
24. Reiser B. Confidence intervals for the Mahalanobis distance. *Commun Stat-Simul C*. 2001;30(1):37-45.
25. Champely S. (2020). pwr: basic Functions for Power Analysis. R package version 1.3-0. https://CRAN.R-project.org/package=pwr
26. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum; 1988.
27. Brislin RW. Back-translation for cross-cultural research. *J Cross Cult Psychol*. 1970;1(3):185-216.
28. Stiglic G, Watson R, Cilar L. R you ready? Using the R programme for statistical analysis and graphics. *Res Nurs Health*. 2019;42(6):494-499.
29. R Core Team. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing; 2020. https://www.R-project.org/
30. Maydeu-Olivares A. Maximum likelihood estimation of structural equation models for continuous data: standard errors and goodness of fit. *Struct Equ Model*. 2017;24(3):383-394.
31. Gerhard C, Buechner RD, Klein AG, Schermelleh-Engel K. A fit index to assess model fit and detect omitted terms in nonlinear SEM. *Struct Equ Model*. 2017;24(3):414-427.
32. Shi D, Lee T, Maydeu-Olivares A. Understanding the model size effect on SEM fit indices. *Educ Psychol Meas*. 2019;79(2):310-334.
33. Hofstede G. 2021. Hofstede insights, country comparison. https://www.hofstede-insights.com/country-comparison/turkey/
34. Yildiz B, Yildiz H. The effects of ethical leadership, servant leadership and leader-member exchange on compulsory citizenship behaviors. *Int Bus Res*. 2016;9(2):19-33.

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APPENDIX A: ENGLISH AND TURKISH ITEMS OF THE COMPULSORY CITIZENSHIP BEHAVIORS SCALE

English	Turkish	Factor loadings
1. The management in this hospital puts pressure on nurses to engage in extra-role work activities beyond their formal job tasks	1. Çalıştığım hastanedeki yönetim, hemşirelerin mevcut görev tanımlarının ötesinde davranmaları için baskı yapmaktadır.	0.85
2. There is social pressure in my hospital to work extra hours, beyond the formal workload and without any formal rewards	2. Çalıştığım hastanede herhangi bir karşılığı olmaksızın, hemşireler üzerinde olması gereken iş yükünün ötesinde fazladan çalışmaları için sosyal baskı vardır.	0.90
3. I feel that I am expected to invest more effort in my job than I want to and beyond my formal job requirements	3. İşimde yasal iş gereklerim ve istediğim dışında fazla çaba harcamam yönünde bir beklenti olduğunu hissediyorum.	0.90
4. I feel that I am forced to help other nurses beyond my formal obligations and even when I am short on time or energy	4. Yeterli zaman ve enerjim olmadığında dahi yasal zorunluluğum olmamasına rağmen diğer hemşirelere yardım etmeye zorlandığımı hissediyorum.	0.90
5. I feel that I am forced to assist my supervisor against my will and beyond my formal job obligations	5. Özgür irademe karşı olmasına ve yasal zorunluluğum olmamasına rağmen yöneticime yardım etmeye zorlandığımı hissediyorum.	0.77

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