SOCIAL BEHAVIOR AND PERSONALITY, 2013, *41*(10), 1737-1746

http://dx.doi.org/10.2224/sbp.2013.41.10.1737

RELIABILITY AND VALIDITY OF A TURKISH VERSION OF THE TRUST IN NURSES SCALE

SEBNEM CINAR YUCEL
Ege University
SEMRA AY
Celal Bayar University

Our aim was to evaluate the reliability and validity of a Turkish version of the Trust in Nurses Scale (TNS). A group of people living in Turkey and receiving treatment for lung cancer at a chest hospital completed the scale. We assessed construct validity of the TNS using confirmatory factor analysis. We evaluated the reliability of the scale using coefficient alpha and the result for the internal consistency reliability of the scale was a coefficient alpha of .95. According to our results, the Turkish version of the TNS is a valid and reliable tool for the evaluation of trust in nurses among people in Turkey being treated for lung cancer.

Keywords: trust, nurses, cancer patients, Turkey.

As defined in a qualitative study conducted in the United States of America to investigate perceptions of people being treated for cancer in regard to patient-centered nursing care, *trust* is *the patients' confidence that nurses have provided care appropriately, reliably, and as successfully as possible* (Radwin, 2000; Radwin, & Alster, 1999). Competence in professional knowledge and interpersonal features of patient-centered care such as attentiveness, caring, coordination, and continuity were identified in that study as being among the antecedents of trust (Radwin & Cabral, 2010).

According to Radwin (2000), trust is the result of trust-inducing care processes considered as the features of patient-centered care. It has been established that when patients have high levels of trust in health-care professionals and

Sebnem Cinar Yucel, Faculty of Nursing, Ege University; Semra Ay, Vocational School of Health, Celal Bayar University.
Correspondence concerning this article should be addressed to: Dr. Sebnem Cinar Yucel, Ege University, Faculty of Nursing, 35100 Bornova-Izmir/Turkey. Email: **sebnemcinar@gmail.com**

institutions this will be associated with increased willingness to seek medical treatment, increased use of preventive health services, and greater compliance with treatment recommendations (Radwin, 2000).

Researchers have developed several tools to measure trust in organizational relationships (Cummings & Bromily, 1996). Some of these tools are specific to health care and measure patients' trust in physicians (Bova et al., 2012; Kao, Green, Davis, Koplan, & Cleary, 1998), others relate to primary care providers (Safran et al., 1998), the medical profession (Hall, Camacho, Dugan, & Balkrishnan, 2002), the health-care system, and health-care providers (Dinç, Korkmaz, & Karabulut, 2013). However, although several instruments have been developed to measure trust in physicians, there are none that specifically measure trust in nurses (Thom, Hall, & Pawlson). As patients' trust in and/or distrust of nurses is an important component in successful nursing care, patient trust/distrust has been the topic of studies conducted in North America, Europe, and Africa (Greeff et al., 2008; Radwin, & Alster, 1999; Sandoval, Brown, Sullivan, & Green, 2006). Our review of the national literature in Turkey revealed that a scale has been developed to measure trust in dyadic relationships (Çetinkaya, Kemer, Bulgan, & Tezer, 2008) and there is another one that is used to measure the quality of the trust relationship between physicians and dermatological patients (Yılmaz & Akkaya, 2009) and a third in which the topic of nurses' organizational trust is examined (Altuntas & Baykal, 2010). However, to our knowledge, no instrument has been developed to measure Turkish patients' trust in nurses.

Radwin (2000) developed the Trust in Nurses Scale (TNS) as a derivative of formulating a middle-range theory of patient-centered cancer nursing care. Psychometric properties of the TNS were first determined in a pilot sample (Radwin, Washko, Suchy, & Tyman, 2005). Then, the tool was used for a larger study in which the researchers investigated the relationships between patient-centered nursing care and desired patient outcomes in terms of the health-care system (Radwin, Cabral, & Wilkes, 2009). Data for the grounded theory study and items for the scale that was developed were sourced from material recorded in patient interviews (Radwin, 2000) and from scholarly literature.

Radwin and Cabral (2010) developed the English language version of the TNS and considered it as a valid and reliable tool after testing it with a sample of cancer patients using confirmatory factor analysis and structural equation modeling techniques (Radwin & Cabral, 2010). Each item in the TNS refers either to a nurse activity or to a patient perception, and the items are scored on a 6-point Likert-type scale. The overall score of the instrument is obtained by summing the item response scores. The higher the score, the higher is the level of patient trust in nurses. In Radwin and Cabral's study (2010), the internal consistency reliability (Cronbach's alpha) was determined as .81.

In Turkey, the current study is the first in which the psychometric properties of the TNS have been evaluated. We translated the TNS into Turkish in order to evaluate its psychometric properties in a sample of Turkish people receiving treatment for lung cancer.

Method

Participants

We collected data from people who were admitted to a chest diseases hospital in Turkey for treatment for lung cancer between February 2011 and June 2011. The sample comprised 166 participants. This sample size was sufficient to estimate the ten parameters (five path coefficients and five variances for the five items analyzed) using the commonly applied rule of thumb of five to ten subjects per parameter (Kline, 2005). The mean age of the study participants was 71.06 ± 9.76 years (min-max 38-94). Of the participants, 71.1% were male. The inclusion criteria required that the participants should be adult, have been diagnosed with lung cancer, and be physically and mentally competent to answer the questions.

Procedure

After we had informed the participants of the purpose of the study, we obtained their verbal consent. We collected the data at the hospital where we were conducting the research. For data collection we conducted one-to-one interviews with each of the participants. In addition to the TNS, we used another questionnaire to collect data about the demographic characteristics of the participants. Participation in this study was on a voluntary basis. Participants completed the TNS either on the day before their discharge from the hospital or on the day of discharge.

We examined language validity, content validity, and construct validity of the TNS in the Turkish context. To ensure the language validity, the original scale was first translated from English to Turkish by two English language linguists, three nurse academicians, and one medical oncologist. Then, three English language experts back translated it from Turkish to English. All translators worked independently and were not associated with the research in any other way. The original version of the scale and the back translations were carefully compared. The TNS was then evaluated by six academics from the school of nursing and finally we adapted the wording of the items in the Turkish version of the scale according to the suggestions made.

To ensure content validity, the final Turkish version of the TNS was evaluated by ten experts in the field (eight nurse academicians and two medical oncology doctors) who assessed each item in terms of clarity, intelligibility, and appro-

priateness to the purpose. Based on their proposals, we revised the statements and the tool took its final form. For example, the expression "…accurate information…" was changed to "…correct information…" so that it could be more easily understood by the respondents. We then arranged for 20 people being treated for cancer at the hospital to complete the scale and we made revisions in accordance with their feedback. These 20 people were not included in the final study.

We assessed the internal consistency reliability of the scale by calculation of a Cronbach's alpha reliability coefficient.

Data analysis

In order to estimate construct validity, we performed a confirmatory factor analysis (CFA), an analysis that has been frequently used as an indicator of the structural validity of a scale in recent years (Stevens, 2002). Initially data were entered into a customized Access database, and then imported into version 4.1.2 of the Mplus© (Muthén & Muthén, 2006) software program for structural equation models (SEM) and CFAs (Jöreskog & Sörbom, 2003).

Fit statistics included root mean square residual (RMR; criterion < .06), root mean square error of approximation (RMSEA; criterion < .06), comparative fit index (CFI; criterion > 0.95), Tucker-Lewis index (TLI; criterion > .95) and the standardized root mean square residual (SRMR; criterion < .08). We also calculated values for goodness of fit index (GFI), normed fit index (NFI), incremental fit index (IFI) and relative fit index (RFI). The criterion for GFI, NFI, IFI, and RFI is < .08 (Jöreskog, & Sörbom, 1993; Kelloway, 1998; Kline, 2005; Schumacker, & Lomax, 2004; Şimşek, 2007; Sümer, 2000). The GFI shows to what extent the model measures the sample variance–covariance matrix and is also accepted as the sample variance revealed by the model. GFI values range from 0 to 1 and, as they are sensitive to sample size, they yield small values in big samples; values equal to .90 and above are considered to indicate good fit. In addition, an RMR or RMSEA value of ≤ .05 indicates perfect compatibility but a value of ≤ .08 is considered as showing acceptable compatibility. The RMSEA is an absolute fit index of the difference between the covariance among the variables observed in the sample and the parameters suggested in the model; in other words, it is an index developed on the basis of the degree of error (Bayık, Uysal, Ardahan, & Ozkahraman, 2010; Şimşek, 2007; Sümer, 2000).

For the analysis of the descriptive statistics related to demographic data, the Statistical Package for the Social Sciences 15 for Windows (SPSS Inc., 2006) was used. The mean scores and standard deviations of the TNS were calculated.

When factor analysis is conducted, sample adequacy is an important issue. In order to determine whether or not the sample size was adequate, Kaiser–Meyer Olkin (KMO) measure of sampling adequacy and Barlett's (BS) test was used

(Akgül, 1997; Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz, & Demirel, 2008; Şencan, 2005). The KMO measure of sampling adequacy for our sample was found to be .89 with a statistically significant BS ($\chi^2 = 1157.679$, $p < .0001$). Thus, the data obtained were suitable for factor analysis (Akgül, 1997; Şencan, 2005; Tavşancil, 2006).

In order to establish the internal consistency reliability of the TNS we calculated Cronbach's coefficient alpha to establish the correlations between different items (coefficient α; criterion $\geq .70$). Other tools we used to test internal consistency of the scale were Spearman-Brown formula and split-half reliability. For all analyses, .05 and .001 respectively were considered as significant.

Ethical considerations

In order to use the TNS in this study, we obtained the author's permission via email. We obtained the approval of the hospital review boards for the protection of participants during all the phases of the psychometric testing.

Results

Validity analyses

In terms of construct validity, for the CFA, the KMO measure of sampling adequacy value was .85 with a statistically significant BS ($\chi^2 = 1157.679$, $p < .0001$).

We evaluated the five-item instrument using fit statistics criteria. The single-factor structure of the scale yielded acceptable and valid results as a result of the CFA. The observed data fit indices are presented in Table 1 and it can be seen that fit statistics for the TNS for the Turkish participants met the criterion of an acceptable level.

Table 1. *Fit Statistics for the Trust in Nurses Scale*

Fit Index	Value
CFI	.90
RMSEA	.05
TLI	.92
SRMR	.07
GFI	.90
RMR	.06
NFI	.90
IFI	.91
RFI	.90
χ^2/ *df* * (14.58/5)	2.92

Note. * $p = .001$.

There are a large number of fit indices used in SEM. Of them, the most widely used one is the chi square (χ^2) test. Another way used to identify the compliance of the data with a model is the calculation of the ratio of the chi square to the degrees of freedom. If this rate is below 5 the value is specified as acceptable (Kline, 2005). According to the results shown in Table 1 it can be interpreted that the model had an acceptable fit.

Item-factor correlation coefficients calculated with CFA are shown in Figure 1 where it can be seen that the observed data is compatible with the one-dimensional model. Items 1 and 2 of the scale had the highest coefficients, and item 5 had the lowest coefficient. However, all these values are above .60 and values at this level are considered as high values.

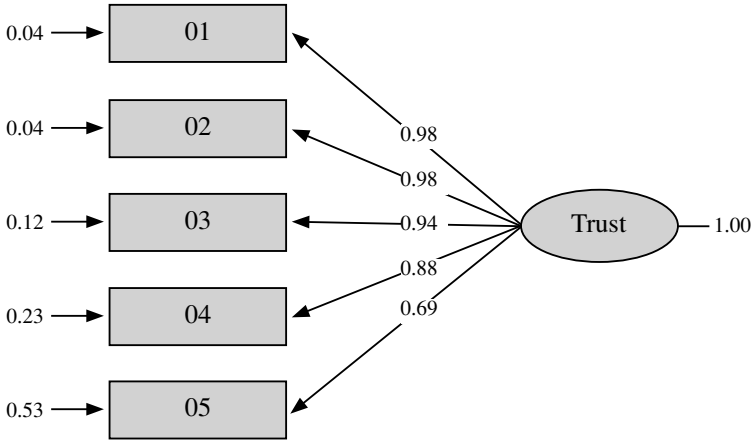

Figure 1. *Path diagram for the Trust in Nurses Scale.*

Reliability analyses

Descriptive statistics for the scale items are displayed in Table 2.

Table 2. *Descriptive Statistics for Items*

Item	*M* (*SD*)	*Mdn*
How often were your nurses there when you needed them?	5.58 (0.58)	6.00
How often did you believe that your nurses were acting in your best interest?	5.58 (0.58)	6.00
How often did you trust what your nurses told you?	5.53 (0.58)	6.00
How often did your nurses do what they said they would do?	5.47 (0.68)	6.00
How often did your nurses provide correct information about the cancer?	5.27 (0.72)	5.00
Total for scale items	27.45 (2.91)	29.00

The split-half and Spearman Brown were also used to test internal consistency of the scale. The split-half and Spearman Brown values for the Turkish version of the TNS were .97 and .88 respectively.

The general Cronbach alpha coefficient value of the Turkish version of the TNS was .95.

Discussion

In their study, when Radwin and Cabral (2010) evaluated the five-item instrument using the fit statistics criteria they found that three of the four fit statistics for the five-item instrument met the criteria: CFI = .99; TLI = .98; SRMR = .02. A fourth fit statistic did not: RMSEA = .07. The result of exploratory factor analysis indicated that 59% of the variance was explained by the five-item instrument. In our study the general Cronbach's alpha coefficient value of the Turkish version of the TNS indicated that items correlated with each other and served the whole measuring instrument with equal weight. In other words, the scale was homogeneous and the test measurements were reliable. Although there is no actual lower limit to the coefficient, this value is higher than the recommended value of .70 (Erefe, 2002; Tezbaşaran, 1997). In the comparison of the Cronbach's alpha value of our research with that of the original tool, the Cronbach alpha coefficient was higher in our study than in Radwin and Cabral's (2010) study. The Cronbach's alpha coefficient for the total scale was .81 in Radwin and Cabral's (2010) study. Our result shows that the single-factor scale structure of the Turkish version of the TNS is valid and reliable for use in measuring the level of trust in nurses shown by the people with lung cancer who were the participants in our study.

Limitations

Our findings cannot be generalized to the entire patient population in Turkey. The other limitation of this study is that the sample comprised people who were receiving treatment for lung cancer in a chest disease hospital. This may have introduced selection bias.

To our knowledge, no other study related to the validity and reliability of the TNS has yet been conducted in other countries. Nor has the instrument yet been assessed in populations diagnosed with other diseases or other types of cancer. Further testing should be conducted with random samples and with people with varied diagnoses. Further work is needed to investigate the psychometric properties of the TNS across a larger sample in different cultures with diverse populations. Despite these limitations, this study is of importance because it is the first study in which acceptable validity and reliability of the TNS has been demonstrated in a Turkish population.

Conclusion

We obtained evidence related to the psychometric properties of the TNS. It is suggested that this study may guide further clinical applications for the use of TNS in other patient populations.

Our analysis of the data collected from the participants in our study confirmed that the Turkish version of the TNS scale could be used to assess the level of trust in nurses among Turkish people receiving treatment for lung cancer.

References

Akgül, A. (1997). *Tıbbi Araştırmalarda İstatistiksel Analiz Teknikleri SPSS Uygulamaları* [SPSS statistical analysis techniques for medical research practices]. İzmir, Turkey: Council for Higher Education.

Altuntas, S., & Baykal, U. (2010). Relationship between nurses' organizational trust levels and their organizational citizenship behaviors. *Journal of Nursing Scholarship*, *42*, 186-194. **http://doi.org/fnp6tp**

Bayık, T. A., Uysal, A., Ardahan, M., & Ozkahraman, S. (2010). Barriers to Research Utilization Scale: Psychometric properties of the Turkish version. *Journal of Advanced Nursing, 66*, 456-464. **http://doi.org/fb2gt7**

Bova, C., Route, P. S., Fennie, K., Ettinger, W., Manchester, G. W., & Weinstein, B. (2012). Measuring patient-provider trust in a primary care population: Refinement of the Health Care Relationship Trust Scale. *Research in Nursing & Health*, *35*, 397-408. **http://doi.org/nwg**

Büyüköztürk, Ş., Kılıç-Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2008). *Bilimsel Araştırma Yöntemleri* [Scientific research methods]. Ankara, Turkey: Pegem.

Çetinkaya, E., Kemer, G., Bulgan, G., & Tezer, E. (2008). Validity and reliability studies of the Dyadic Trust Scale. *Turkish Psychological Counseling and Guidance Journal*, *29*, 65-74.

Cummings, L. L., & Bromily, P. (1996). The Organizational Trust Inventory (OTI): Development and validation. In R. Kramer & C. Prior (Eds.), *Trust in organizations* (pp. 302-330). Thousand Oaks, CA: Sage.

Dinç, L., Korkmaz, F., & Karabulut, E. (2013). A validity and reliability study of the Multidimensional Trust in Health-Care Systems Scale in a Turkish patient population. *Social Indicators Research*, *113*, 107-120. **http://doi.org/nwh**

Erefe, İ. (Ed.). (2002). *Veri Toplama Araçlarının Niteliği. Hemşirelikte Araştırma Süreç ve Yöntemleri* [The characteristics of data gathering instruments. In the principles, process, and methods of research in nursing]. Ankara, Turkey: Odak.

Greeff, M., Phetihu, R., Makoae, L. N., Diamini, P. S., Holzemer, W. L., Naidoo, J. R., … Chirwa, M. L. (2008). Disclosure of HIV status: Experiences and perceptions of persons living with HIV/AIDS and nurses involved in their care in Africa. *Qualitative Health Research*, *18*, 311-324. **http://doi.org/dvjct6**

Hall, M. A., Camacho, F., Dugan, E., & Balkrishnan, R. (2002). Trust in the medical profession: Conceptual and measurement issues. *Health Services Research*, *37*, 1419-1439. **http://doi.org/dhj6h2**

Jöreskog, K. G., & Sörbom, D. (1993). *Lisrel 8: Structural equation modeling with the Simplis command language*. Hillsdale, NJ: Lawrence Erlbaum.

Jöreskog, K. G., & Sörbom, D. (2003). *LISREL for Windows 8.54*. Lincolnwood, IL: Scientific Software International.

Kao, A. C., Green, D. C., Davis, N. A., Koplan, J. P., & Cleary, P. D. (1998). Patients' trust in their physicians: Effects of choice, continuity, and payment method. *Journal of General Internal Medicine*, *13*, 681-686.

Kelloway, E. K. (1998). *Using Lisrel for structural equation modeling: A researcher's guide*. Thousand Oaks, CA: Sage.

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford Press.

Muthén, L. K., & Muthén, B. O. (2006). *Mplus user's guide*. Los Angeles, CA: Muthén & Muthén.

Radwin, L. (2000). Oncology patients' perceptions of quality nursing care. *Research in Nursing & Health*, *23*, 179-190. **http://doi.org/czfv28**

Radwin, L., & Alster, K. (1999). Outcomes of perceived quality nursing care reported by oncology patients. *Research and Theory for Nursing Practice*, *13*, 327-343.

Radwin, L. E., & Cabral, H. J. (2010). Trust in Nurses Scale: Construct validity and internal reliability evaluation. *Journal of Advanced Nursing*, *66*, 683-689. **http://doi.org/dnctbq**

Radwin, L. E., Cabral, H., & Wilkes, G. (2009). Relationships between patient-centered cancer nursing interventions and desired health outcomes in the context of the health care system. *Research in Nursing & Health*, *32*, 4-17. **http://doi.org/c53qgw**

Radwin, L. E., Washko, M., Suchy, K. A., & Tyman, K. (2005). Development and pilot testing of four desired health outcome scales. *Oncology Nursing Forum*, *32*, 92-96. **http://doi.org/bxtj6m**

Safran, D. G., Kosinski, M., Tarlov, A. R., Rogers, W. H., Taira, D. H., Lieberman, N., & Ware, J. E. (1998). The Primary Care Assessment Survey: Tests of data quality and measurement performance. *Medical Care: Official Journal of the Medical Care Section, American Public Health Association*, *36*, 728-739.

Sandoval, G. O., Brown, A. D., Sullivan, T., & Green, E. (2006). Factors that influence cancer patients' overall perceptions of the quality of care. *International Journal for Quality in Health Care*, *18*, 266-274. **http://doi.org/cv8ngp**

Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.

Şencan, H. (2005). *Sosyal ve davranışsal ölçümlerde güvenirlik ve geçerlik* [The reliability and validity of social and behavioral measures]. Ankara, Turkey: Seçkin Yayıncılık.

Şimşek, Ö. F. (2007). *Yapısal Eşitlik Modellemesine Giriş-Temel İlkeler ve LİSREL Uygulamaları* [Introduction to structural equation modeling LISREL fundamental principles and practices]. Ankara, Turkey: Ekinoks .

SPSS Inc. (2006). *SPSS for Windows, Version 15.0*. Chicago, IL: SPSS Inc.

Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Mahwah, NJ: Lawrence Erlbaum.

Sümer, N. (2000). Yapısal eşitlik modelleri: Temel kavramlar ve örnek uygulamalar [Structural equation modeling: Basic concepts and best practices]. *Turkish Psychological Articles* (Türk Psikoloji Yazıları), *3*, 49-74.

Tavşancıl, E. (2006). *Tutumların ölçülmesi ve SPSS ile veri analizi* [Measurement of attitudes and data analysis with SPSS (3rd ed.)]. Ankara, Turkey: Nobel.

Tezbaşaran, A. (1997). *Likert Tipi Ölçek Geliştirme Kılavuzu* [The Likert Scale development guide]. Ankara, Turkey: Turkish Psychological Association.

Thom, D. H., Hall, M. A., & Pawlson, L. G. (2004). Measuring patients' trust in physicians when assessing quality of care. *Health Affairs*, *23*, 124-132. **http://doi.org/c45jps**

Yılmaz, S., & Akkaya, V. B. (2009). Hekim ile dermatoloji hastaları arasındaki ilişkide güven unsurunun ölçülmesi [Measuring trust between physician and dermatological patients]. *Turkderm*, *43*, 89-94.