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ORIGINAL ARTICLE

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Developing a valid and reliable Perceived Global Future Scale

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Abstract

Purpose: To develop a valid and reliable data collection tool to define individuals' perceptions of the global future.

Design and Methods: This methodological study was carried out on 870 participants in Istanbul, a city with the country's highest and most diverse population.

Findings: Content validity, construct validity, item analyses, and stability of the draft tool were tested. The seven-factor scale structure was confirmed. Cronbach's alpha coefficient of the scale was .93.

Practice Implications: The Perceived Global Future Scale, consisting of 36 items and seven dimensions, was used. It is a valid and reliable tool to define perceptions of individuals on the global future.

KEYWORDS

health, nursing, perceived future, reliability-validity

1 | INTRODUCTION

Recent developments in science and technology have affected social life in terms of culture, economy, and politics, given how global changes are influential on people's beliefs, values, and approaches around the world. Progress has a significant impact on the lives of individuals, who use different strategies to adapt. On the one hand, people use their skills to overcome uncertainty; their characteristics, such as being optimistic, deliberate, and visionary, can be helpful in this context. On the other, negative factors, such as wars, terror attacks, pandemics, health problems, environmental problems, and social dynamics, affect people's perception of their future and their perception of their society, country, and the world (Bodur & Kaya, 2017a; Saritas & Smith, 2011).

1.1 | Background

Thinking about the future is one of the essential characteristics of human nature. Over time, the act of thinking about the future has changed—it is no longer only an individual act. It has become an act to determine social progress. With the industrial revolution, researchers started to study various social subjects to analyze the long-term future and see the effects of long-term future decisions on a short-term period (European Commission, 2015). However, the first technical studies regarding this context are the so-called forecasting studies in the 1930s. By the 1960s, various effective methods, such as Delphi surveys grounded in the analysis of experts, scenario planning, cross-impact analysis, and computer-aided simulations, were put to use (Burmaoglu et al., 2016; Miles et al., 2016). For example, large companies operating mostly in the American defense industry used these methods to solve large-scale technological problems and in strategy development during the Cold War (Burmaoglu et al., 2016; Saritas, 2011).

Subsequently, studies questioning the future started to appear and attract attention. In his book, *Future Shock*, published in 1970, the futurist Alvin Toffler encouraged and led people to question the global future(Toffler, 1970). Meadows, Randers, and Behrens endeavored to model the results of limited resource procurement amid a rapidly growing world population and published their results in the seminal report "Limits to Growth" in 1972. In his book, *The Coming of Post-Industrial Society: A Venture in Social Forecasting* (1973), Daniel Bell, who conducted sociological studies on social changes, emphasized some serious threats that remain valid (Bell, 2001). These

This study was presented at the International Congresses of Education (ERPA) as an oral presentation on June 19–22, 2019 at Sakarya, Turkey.

studies formed a basis for the start of the scientific literature related to the future.

Studies that endeavor to determine the most accurate future probability and that generally concern science, technology, and engineering fall under the field called forecasting. These studies are founded on earlier works that relied on long-term thinking and experts' views (Miles et al., 2016; Saritas, 2011). Some new future alternatives are suggested following these developments and future-oriented politics and strategies. The "reactive" approach, which forecasts possible changes in the future, has been replaced by the "proactive" perspective, which aims to change and control the future, accepting different alternatives. However, a new approach is needed: one that focuses on market-driven science and technology that accounts for socio-demographic data. Many stakeholders contribute to making decisions for today's world to form an agreed future vision. Thus, the term "foresight" has recently started to be used. "Foresight" denotes "foreseeing," "expert view," and "reconciliatory view" (Saritas, 2011). It aims to communicate with, control, and create a future in a participatory and organized manner.

Futurist researchers have performed pioneering studies in various countries. The earlier studies were related to the education field in the United States. The next stage continued with works in secondary and primary schools. One of the most significant future-oriented projects was Torrence's Future Problem-Solving Programme, which continues to be applied. A total of 200,000 students had used the program material in 50 states of the United States by 1995 (Bodur & Kaya, 2017b; Gultekin, 2006). At present, lessons related to Future Studies are included in a large number of master's programs of some global universities in the United States, Great Britain, Japan, and Russia (Acceleration Studies Foundation, 2016). International organizations, such as the World Economic Forum, United Nations, European Union, WHO, and OECD, also have vision studies and trend reports globally for 2030 and 2050 (OECD, 2016; United Nations, 2018; WHO, 2015).

In terms of future studies in Turkey, some nongovernmental organizations and charities lead the current efforts (Turkish Futurism Association, 2015). For example, the Turkish Industry and Business Association (TUSIAD), which aims to guide society, contributes to individuals' and society's vision by publishing vision reports. Departments at universities in Turkey, such as informatics, engineering, technology, and innovation, have also started to engage in future studies. Scientific conferences and workshops related to forecasting the future have been held (Bodur, 2015; Turkish Futurism Association, 2015; TUSIAD, 2011).

The literature provides a number of measurement tools focusing on future time orientation. However, no tool has been developed for measuring individual and global perceptions of the future concerning futurism. Thus, the present study aimed to develop a measurement tool that can determine people's perceptions of the future. When thinking about the future is accepted as an indispensable part of human nature, this study's significance becomes clearer. Events such as the ongoing COVID-19 pandemic are the driving force for people to manage uncertainties and think about the future at the individual and global levels. This study's most important contribution would be in determining individuals' perceptions of the global future related to human beings, society, the environment, health, and technology. The research will also offer a valid and reliable future perception tool, which can be used in different professions. Specifically, this methodological study aimed to develop a data collection tool to define individuals' perceptions of the global future.

2 | METHODS

2.1 | Design

This study is a methodological study.

2.2 | Setting and sample

The sample consisted of 1000 individuals who matched the selection criteria. Candidates selected for the study had to have no cognitive, sensory, or oral communication obstacles, aged 18–65 years, and willingness to participate. The research was completed between June and December 2017 in Istanbul, a cosmopolitan city with a high population density and a high migration rate (TUIK, 2021). A total of 870 individuals agreed to participate, but only the filled 801 questionnaires were analyzed.

2.3 | Instruments

The data collection form consisted of two sections.

2.3.1 | Information form

This form was prepared according to the literature (Bodur, 2015; Bodur & Kaya, 2017b; Turkish Futurism Association, 2015) and consisted of 10 questions designed to gather data relevant to the research. The form included items on participants' age, sex, marital status, education level, status of having a child, income level, and their relatives' description of their future perception. The items related to individual, country, and global future were evaluated using a visual analog scale. The participants were asked to give one mark between 0 (*I strongly disagree*) and 10 (*I strongly agree*).

2.3.2 | Perceived Global Future Scale (Draft)

We derived the scale items from the literature (Bodur & Kaya, 2017b; UNESCO, 2015). Statements consisted of items related to possible changes in the basic areas of technology, environment, and demography, and service areas of health and education. The participants indicated their agreement to the items on the Perceived Global

Future Scale using a 5-point Likert-type scale from 5 = *strongly agree* to 1 = *strongly disagree*. All the items in the instrument were positive.

2.4 | Procedures

Before developing the tool used in this study, we reviewed the literature, subsequently formulating a 67-item pool of statements as a draft version of the Perceived Global Future Scale. We tested the content validity of the statements using the Lawshe technique (Lawshe, 1975) to determine if they were appropriate to the field intended to be measured. We also sought the opinions of 11 experts on the 67-item draft scale. The experts rated the suitability of the items on a three-point scale: 1 = *item measures the target construct*, 2 = *item is related to the target construct but is not necessary*, 3 = *item is not suitable to measure the target construct* (Figure 1).

2.5 | Data analysis

The data were analyzed using IBM SPSS Statistics for Windows, Version 21.0. We examined the corrected item-total correlations of the items, and then removed statements with lower correlation coefficients. We conducted Kaiser–Meyer–Olkin (KMO) and Bartlett's sphericity tests, followed by exploratory factor analysis, which showed how the scale items were grouped and what factors were formed in the background. Upon determining the factor structure, we defined the factor loadings of the items. Next, the items were examined, and the factor structure of the scale was determined. The Cronbach's alpha coefficients of the subscales and the scale were calculated to assess the factors' internal consistency. Finally, to determine its stability over time, we applied the tool twice on the same group of participants with a 2-week interval, as recommended in the literature (Erdogan et al., 2015; Polit & Beck, 2012).

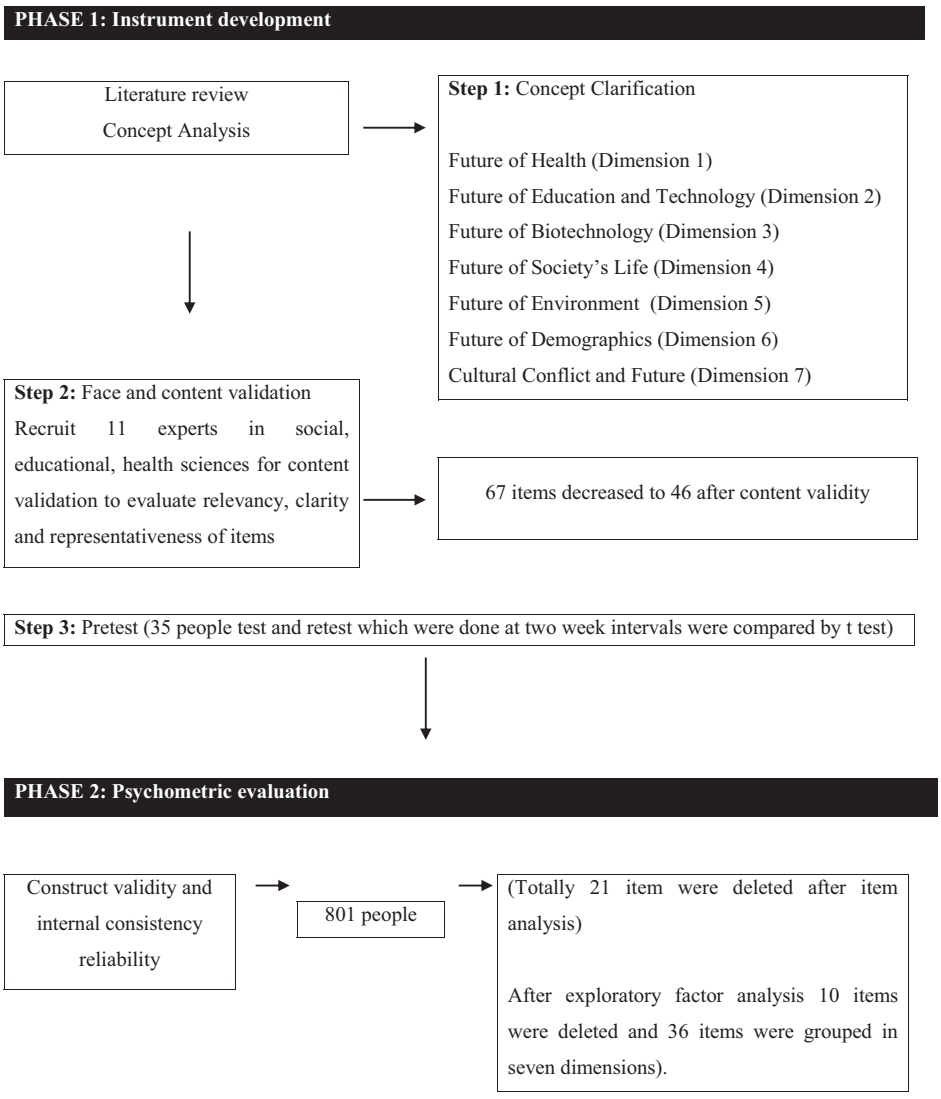

FIGURE 1 The development and validation process of the "Perceived Global Future Scale"

2.6 | Ethical consideration

We obtained approval for the study to be conducted from Istanbul University Social and Human Sciences Research Ethics Committee in Istanbul and permission from the participants (approval date and number: 06.07.2017, 2017.98.IRB3.81502). Each participant was informed about the study procedure and was asked if they would like to participate.

3 | RESULTS

3.1 | Participants' characteristics

The mean age of the participants was 28.10 ± 10.56 years. Of the 801 participants, 66.8% were women, 71.4% were single, 28.6% were married, 68.4% had a bachelor's degree, 22.7% had a child, and 60% had a mid-level income. To the item "How do you define yourself," the participants responded as follows: 42.7% were hopeful, 26.7% were worried, 34.2% were planning for their future, 42.8% were optimistic, and 7.6% were pessimistic.

3.2 | Content validity

According to the Lawshe technique, the content validity criterion was set as 0.59 because 11 experts' opinions were obtained (Lawshe, 1975). The content validity ratios of the items on the draft scale ranged between 0.19 and 1. A total of 21 items with content validity indices lower than 0.56 were removed. The final form of the scale consisted of 46 items.

3.3 | Item analysis

We examined the item-total score correlations of the 46 items for validity assessment of the draft scale. The coefficients of the correlation changed between 0.004 and 0.601 (Table 1). First, three items with an item-total correlation value below 0.15 were removed and re-analyzed. Second, nine items that had item-total correlation values below 0.25 were also removed (Table 1). After the third analysis, five more items were removed (Table 1). The item-total score correlations of the remaining 36 items were between 0.317 and 0.660 (Table 2).

3.4 | Construct validity

We conducted an exploratory factor analysis to examine the factor distribution of the scale items. KMO and Bartlett's sphericity tests were carried out before the analysis. The KMO test revealed a value of 0.937, and the sphericity test yielded $\chi^2 = 11918.52$ ($df = 630$, $p < .001$).

The exploratory factor analysis results showed that the factor loading of the remaining 36 items varied between 0.230 and 0.805 (Table 2). Items were distributed to seven factors that explained 55.26% of the total variance. We identified 11 items in the first, 6 in the second, 4 in the third, 6 in the fourth, 5 in the fifth, 2 in the sixth, and 2 in the seventh factor. The factor percentages explained were 25.18% for the first, 7.5% for the second, 6.47% for the third, 5.2% for the fourth, 4.35% for the fifth, 3.87% for the sixth, and 3.57% for the seventh factor (Table 2).

3.5 | Internal consistency analysis

We calculated the Cronbach's alpha validity coefficients to evaluate the internal consistency of the subscales and scale. Alpha values varied between .62 and .87 for the subscales; α was .93 for the total scale.

3.6 | Test–retest analysis

We performed a test–retest with 35 participants to evaluate the constancy of the tool over time (2-week interval). We used a paired-samples t test to compare the outcomes. Statistically, the measurements showed no significant difference ($t = 0.153$; $p > .879$).

4 | DISCUSSION

4.1 | Sample

To develop the Perceived Global Future Scale, we recruited 870 people for validity and reliability analysis but analyzed only the data collected from 801 participants who filled out the questionnaire appropriately. The literature recommends reaching various sample size numbers for testing validity and reliability. A meta-analysis by Anthoine et al. (2014) reported that the number of participants should be between 2 and 20 times greater than the number of items in the tool used. Given that our draft version of the scale had 67 items and our sample included 801 valid responses, then the abovementioned conditions were met by our study.

4.2 | Item pool construction

While constructing the item pool, various methods may be used: focus group discussions, compositions that answer open-ended questions, use of similar scales in the literature, clinical observations, and examination of the related literature. We adopted the latter, reviewing the literature to develop the item pool in this study (Bodur & Kaya, 2017b; Turkish Futurism Association, 2015; World Economic Forum, 2016). Some expressions represented topic titles,

TABLE 1 Perceived Global Future Scale average scores and item correlations ($N = 801$)

Items	Mean	SD	Item correlations (Level I)	Item correlations (Level II)	Item correlations (Level III)	Item correlations (Level IV)
1. I think the elderly population will increase in the future	3.48	1.18	0.362	0.368	0.366	0.351
2. I think that global economic problems will increase in the future	4.00	1.01	0.522	0.550	0.575	0.587
3. I think people will become more alienated in the future	4.11	1.03	0.556	0.588	0.611	0.624
4. I think people seeking their rights will increase in the future	3.43	1.10	0.210	0.204	**0.182**	
5. I think that conscious consumption will increase in the future	2.95	1.18	0.176	**0.123**		
6. I think technology addiction will increase in the future	4.35	0.99	0.504	0.523	0.530	0.536
7. I think that social values will change in the future	3.98	0.99	0.469	0.484	0.487	0.487
8. I think the wars will increase in the future	3.87	1.06	0.242	0.476	0.505	0.519
9. I think the propensity for violence will decrease in the future	2.29	1.16	**−0.028**			
10. I think that movement of migration will increase in the future	3.74	0.99	0.453	0.466	0.481	0.519
11. I think that individuals with strong political aspects will increase in the future	3.31	1.08	0.291	0.240	**0.196**	.
12. I think the importance of the family will increase in the future	2.82	1.18	**0.004**		.	
13. I think human life will be extended in the future	3.03	1.26	0.260	0.236	**0.203**	
14. I think the fertility rate will decrease in the future	3.60	1.14	0.425	0.424	0.411	0.400
15. I think that the genetic structure of people will change in the future	3.68	1.08	0.491	0.506	0.516	0.512
16. I think water resources will run out in the future	3.82	1.02	0.463	0.485	0.513	0.530
17. I think that more biological weapons will be used in the future	4.03	1.00	0.582	0.615	0.641	0.660
18. I think energy problems will increase in the future	4.02	1.00	0.574	0.604	0.628	0.644
19. I think that global climate change will have negative consequences in the future	4.08	1.02	0.513	0.539	0.565	0.577
20. I think that shock events (terror and war etc.) will decrease in the future	2.21	1.15	−0.149	−0.086	**−0.052**	
21. I think that urbanization will increase in the future	3.90	1.07	0.408	0.418	0.424	0.429
22. I think that environmental awareness will increase in the future	2.75	1.13	0.127	**0.063**	-	
23. I think that natural resources will be protected in the future	2.48	1.11	**0.036**			
24. I think organic farming activities will increase in the future	2.81	1.19	0.134	**0.081**	-	
25. I think that ethnic conflicts will increase in the future	3.46	1.11	0.442	0.445	0.435	0.426
26. I think that religious conflicts will increase in the future	3.77	1.10	0.460	0.486	0.511	0.524

(Continues)

TABLE 1 (Continued)

Items	Mean	SD	Item correlations (Level I)	Item correlations (Level II)	Item correlations (Level III)	Item correlations (Level IV)
27. I think technology will make people's life easier in the future	3.71	1.09	0.426	0.416	0.394	0.388
28. I think that people's thoughts can be read in the future	2.96	1.19	0.338	0.332	0.328	0.317
29. I think that the mentoring and counselling needs for career plans will increase in the future	3.64	1.00	0.513	0.504	0.492	0.483
30. I think that global education programs will increase in the future	3.59	0.97	0.511	0.497	0.475	0.457
31. I think mobile applications will increase in educational institution in the future	3.99	0.88	0.584	0.598	0.600	0.600
32. I think health services will be expensive in the future	3.75	1.06	0.413	0.435	0.455	0.466
33. I think that stem cell and gene studies will increase in the future	4.12	0.91	0.601	0.624	0.641	0.645
34. I think that chronic diseases will increase in the future	3.93	0.95	0.506	0.532	0.556	0.569
35. I think that different disease types will emerge in the future	4.12	0.95	0.587	0.617	0.647	0.658
36. I think infectious diseases will increase in the future	3.79	1.09	0.469	0.490	0.515	0.531
37. I think that people's mental problems will increase in the future	4.22	0.97	0.530	0.561	0.588	0.607
38. I think technology will affect humanity positively in the future	3.46	1.02	0.381	0.362	0.334	0.319
39. I think that bio-robots will replace people in the future	3.39	1.13	0.416	0.416	0.417	0.417
40. I believe that artificial intelligence studies will increase in the future	3.94	0.99	0.567	0.589	0.602	0.606
41. I think technology in health care will be decisive in the future	4.00	0.91	0.559	0.575	0.582	0.587
42. I think that metabolic diseases will increase in the future	3.86	0.93	0.552	0.579	0.600	0.612
43. I think 3D (three-dimensional) printed biological organs will be produced in the future	3.45	1.18	0.423	0.427	0.432	0.429
44. I think that treatment of diseases with technology will be possible in the future	3.83	0.98	0.446	0.446	0.443	0.435
45. I think brain-based artificial organs will be produced in the future	3.31	1.09	0.383	0.375	0.366	0.354
46. I think global epidemics will increase in the future	3.85	1.01	0.531	0.562	0.590	0.604

Note: The bold written items are the ones which have been removed from the scale because of low correlation values.

TABLE 2 Psychometric properties of the scale ($N = 801$)

Item number	Content validity index	Corrected item-total correlation	Factor/ factor loadings	Item number	Content validity index	Corrected item-total correlation	Factor/ factor loadings
1	0.64	0.351	6/0.640	29	0.64	0.483	2/0.605
2	1	0.587	4/0.512	30	0.64	0.457	2/0.687
3	1	0.624	4/0.597	31	1	0.600	2/0.518
6	1	0.536	4/0.656	32	1	0.466	1/0.612
7	1	0.487	4/0.601	33	1	0.645	1/0.647
8	0.82	0.519	4/0.358	34	1	0.569	1/0.764
10	0.82	0.519	4/0.230	35	1	0.658	1/0.805
14	1	0.400	6/0.687	36	1	0.531	1/0.758
15	0.82	0.512	1/0.481	37	1	0.607	1/0.717
16	0.82	0.530	5/0.583	38	1	0.319	2/0.556
17	1	0.660	5/0.535	39	1	0.417	3/0.598
18	1	0.644	5/0.505	40	1	0.606	1/0.510
19	1	0.577	5/0.588	41	1	0.587	1/0.542
21	1	0.429	5/0.242	42	0.82	0.612	1/0.724
25	1	0.426	7/0.627	43	1	0.429	3/0.664
26	1	0.524	7/0.516	44	1	0.435	2/0.407
27	1	0.388	2/0.592	45	1	0.354	3/0.749
28	1	0.317	3/0.617	46	1	0.604	1/0.725

which dealt with future studies and identified as having the potential to cause changes that would affect the big picture, were elaborated.

4.3 | Content validity

After the test for content validity, we removed 21 items from the scale. These items were evaluated as expressions emphasizing individual and vocational future perceptions. As the sample group was a young population, there is a possibility of results being influenced. The scale was also found to focus more on the perceived global future rather than the individual one. Moreover, expressions related to personal future tended to obtain lower content validity scores owing to the participants interpreting the future from a broad perspective.

4.4 | Calculation of item analysis and total correlation marks

To assess the scale's internal consistency, we evaluated the correlation between the scale items and the scale's total scores. High correlation coefficients indicated the items' appropriateness for the theoretical framework. Because keeping items with a low correlation score in the scale would decrease the coefficient of the internal consistency score, only items scoring 0.300 and over are advised to be retained (Wongpakaran & Wongpakaran, 2013). Thus, after the item analysis, we only retained items that met this threshold correlation coefficient. Ten items with lower coefficients were removed. These items were mainly related to politics, terror, violence, and law. Their low coefficients might be related to the period when the study was performed, at the time of a state of emergency; the participants might have felt afraid of or might have abstained from expressing their thoughts on political topics. Moreover, the fact that Turkey is not a technology provider country but a consumer, might have affected the participants' perception of the future by making them unable to foresee the related items' role on global future perception.

4.5 | Construct validity

In validity and reliability analyses, factor analysis is the most used method to test a scale's construct validity. Explanatory factor analysis is used if there is no structured construct (Buyukozturk et al., 2010; Polit & Beck, 2012). Therefore, we implemented an explanatory analysis. The first factor, called *Future of Health*, consisted of 11 items (Table 3), expressing the changes that would be experienced in healthcare service. The second factor, *Future of Education and Technology*, consisted of six items on the effects of technology on people's lives and their use in various situations. The third factor, *Future of*

TABLE 3 The internal consistency coefficients of the scale and subscales ($N = 801$)

Factor	Factor name	Items	*n*	% of variance	Cronbach's alpha
F1	Future of Health	15, 32, 33, 34, 35, 36, 37, 40, 41, 42, 46	11	25.18	.62
F2	Future of Education and Technology	27, 29, 30, 31, 38, 44	6	7.52	.82
F3	Future of Biotechnology	28, 39, 43, 45	4	6.47	.81
F4	Future of Society's Life	2, 3, 6, 7, 8, 10	6	5.19	.87
F5	Future of Environment	16, 17, 18, 19, 21	5	4.35	.72
F6	Future of Demographics	1, 14	2	3.87	.72
F7	Cultural Conflict and Future	25, 26	2	3.57	.66
Total			36	56.14	.93

Biotechnology, consisted of four items related to the possible changes that would be caused by biotechnology. The fourth factor, *Future of Society's Life*, consisted of six items that expressed how individuals' lives will change with the cultural and social changes in global terms. The fifth factor, *Future of Environment*, consisted of five items that expressed the effects of future environmental changes. The sixth factor, *Future of Demographics*, consisted of two items on fertility and old age. Lastly, the seventh factor, called *Cultural Conflict and Future*, consisted of two items on the possible changes in ethnic and religious clashes in cultural terms.

4.6 | Internal consistency analysis

In studies concerning scale development, items' internal consistency in the scale needs to be determined (Polit & Beck, 2012). Cronbach's alpha analysis is used to evaluate the internal consistency for Likert-type scales. The acceptable value ranges between .50 and 1, but a value between .90 and 1 shows perfect internal consistency (Taber, 2017). In our study, the Cronbach's alpha reliability index of the scale was .93 (Table 2).

4.7 | Analysis of test–retest reliability

In this study, no significant difference occurred in terms of statistics, and the test–retest index was 0.88. Thus, the tool remained stable with time (Polit & Beck, 2012).

4.8 | Limitations

The validity and reliability findings were limited to this sample only. The scale we developed may be tested on different samples. As the concept of a future includes a broad perspective, we cannot claim that all the related dimensions had been included.

4.9 | Conclusion

The analyses results showed that the Global Future Perception Scale, consisting of 36 items and seven dimensions, was valid and reliable. It is a practical tool that has features covering all areas that affect the future.

4.10 | Implications for psychiatric nursing practice

Perceptions of the future of people and different societies will be necessary for the health care, technology, and environment sectors, and for all of humanity's future. The demographic changes occurring worldwide, rapid population growth, globalization, and environmental degradation will directly impact individuals. Infectious diseases and pandemics directly affect countries, individuals, and societies in a psycho-social manner, leading to the perception of an uncertain future. Futuristic technologies, such as advances in genetics, social media, nanotechnology, and robotics, carry global-wide changes, including environmental destruction, expansion of the older population, and the emergence of new diseases. These changes prod the scientific community to ask, "What kind of a world and a future?" Developing a measurement tool that exposes individuals' and society's perceptions of the future may help individuals, professionals, professions, communities, and countries establish systematic thinking strategies to manage the future.

Furthermore, policymakers have begun to use foresight techniques for guidance when addressing the wide array of problems and challenges arising in their work. The tool developed in our study may also provide data for them. Studies on the future should be included as a required competency component in policy and programs for the

professional development of health sciences faculty. Health policymakers and health education professionals should build research projects and include courses that will increase student awareness of future issues, and facilitate futurists, healthcare and nurse managers, psychiatric nurses, and policymakers in their research on the future of the world and their own.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

AUTHOR CONTRIBUTIONS

Study conception/design: Gonul Bodur. *Data collection/analysis, drafting of the manuscript, and critical revisions for important intellectual content*: Gonul Bodur and Arzu K. Harmanci Seren.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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