SF-6Dv2 Valuation Study in South Korea: Addressing Level Inconsistencies and Next Steps for Research

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Abstract

❑ Objectives

This study aimed to derive value sets for SF-6Dv2 health states using discrete choice experiment (DCE) in the South Korean general population, and to examine issues that emerged during this process.

❑ Methods

A web-based discrete choice experiment including duration (DCE) was conducted, following international protocols. The survey included 304 choice sets with 4 duration levels, blocked into 38 groups. A total of 3,800 respondents aged 18 or older were recruited using quota sampling for gender, age, and region. Conditional logit regression models were used to analyze choice results.

❑ Results

The survey was conducted from March 27 to April 23, 2024. While demographic distributions largely reflected the general population, there was an overrepresentation of higher education levels(80% college or above). The average response time was 23.4 minutes. Pain, social functioning, mental health, and survival duration showed expected trends, with pain emerging as the most important dimension. However, physical functioning and vitality exhibited disordering between levels 1 and 2.Notably, role limitation presented a unique challenge, demonstrating unexpected patterns across multiple levels, indicating a need for further investigation into how levels in this dimension were interpreted by respondents..

❑ Conclusion

This study revealed disordering issues in several dimensions of the SF-6Dv2. Potential factors contributing to these issues include ambiguities arising from double-negative phrasing, respondents' reluctance to trade survival time for minor functional decrements, and, particularly for role limitation, an apparent misinterpretation of level directionality. The findings highlight the need for further investigation into respondents' interpretation of function levels and potential improvements in survey design for future studies.

Objectives

- To derive value sets for SF-6Dv2 health states for the general population in South Korea
- To review the consistency of health state utility values derived through the application of DCE.

Methods

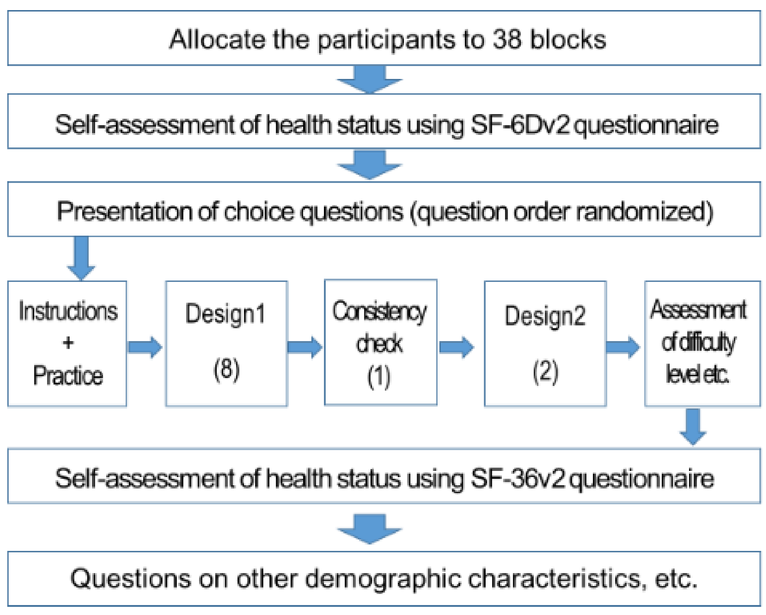
❑ Study Sample

- 3,800 adults (aged 19 or older) representing the general population of South Korea.
- Recruitment quotas were used for age, sex, and region.
- Survey duration: Mar 27, 2024 – April 23, 2024.

❑ Discrete Choice Experiment Design

- To enable international comparison, the survey was designed following a protocol developed in the UK and recently implemented in the US.
- In addition to six health dimensions, the design included a time attribute with four levels (1,4,7,10 years).
  - The SF-6Dv2 is composed of six dimensions: physical functioning (5), role limitation (5), pain (6), vitality (5), social functioning (5), mental health (5)
- Respondents were presented with a total of 304 choice sets, which were grouped into 38 blocks
- Design 1: Each respondents was randomly assigned to a block and responded to 9 choice tasks, including a task for consistency check.
- Design 2: Two additional triple-choice tasks were presented, including “immediate death” as a third option. Respondents were required to select the best and worst options.

Figure. Survey procedure



❑ Quality control

- Set the minimum display time on the screen to 5 seconds for each choice task.
- Consider responses irrational or insincere in the following cases:
  - Respondents consistently select only the left or right option.
  - Respondent choose a clearly inferior option
  - Respondent make inconsistent choices on the same choice task.
- Conducted sensitivity analysis with and without the inclusion of irrational respondents.

❑ IRB Approval

- This study was approved by the IRB of Gyeongsang National University (No. GIRB-A24-NY-0088)

❑ Analysis

- In the DCE model, the utility of individual i for profile j is represented as follows:

$$\mu_{ij} = \beta_1 t_{ij} + \beta'_2 \mathbf{x}_{ij} \cdot t_{ij} + \varepsilon_{ik}$$

$$\hat{V}_j^{DCE} = \frac{t}{10} = 1 + \frac{\hat{\beta}'_2}{\hat{\beta}_1} \mathbf{x}_j$$

- Respondents were analyzed using a conditional logit model
  - Model 1: included survival time and interaction terms between each health domain and survival time
  - Model 2: used a dummy variable for “WORST” when any domain included the lowest health level, incorporating interactions between “WORST” and survival time

Results

❑ Participants

Table 1. Demographic characteristic of respondents (n=3,800, %)

Categories	n	%	Ref (%)	Categories	n	%
Sex				Monthly income (KW million)		
Male	1,900	50.00	50.0	Less than 2.0	312	8.21
Female	1,900	50.00	50.0	2.0-3.5	821	21.61
Age				3.5-5.0	943	24.82
20-29	570	15.00	14.8	5.0-7.5	903	23.76
30-39	570	15.00	15.1	7.5 and more	753	19.82
40-49	760	20.00	17.8	No responses	68	1.79
50-59	760	20.00	18.9	Occupation		
60+	1,140	30.00	33.5	Regular wage worker	1,818	47.84
Education				Non-regular wage worker	574	15.11
No education	2	0.05	17.7	Self-employed without employees	237	6.24
Elementary school	4	0.11		Self-employed with employees	98	2.58
Middle school	30	0.79	8.4	Unpaid family worker	305	8.03
High school	709	18.66	32.9	Unemployed	768	20.21
College and above	3,039	79.97	41.0			
No response	16	0.42				

❑ Parameter estimates

Table 2. Results from conditional logit model

	Total		Excluding irrational respondents		Total		Excluding irrational respondents	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
PF2 x LY	0.011*	0.005	0.007	0.007	0.012*	0.005	0.007	0.007
PF3 x LY	-0.005	0.005	-0.009	0.006	-0.005	0.005	-0.009	0.006
PF4 x LY	-0.069***	0.005	-0.077***	0.006	-0.069***	0.005	-0.078***	0.006
PF5 x LY	-0.196***	0.005	-0.204***	0.007	-0.195***	0.006	-0.203***	0.007
RL2 x LY	0.031***	0.005	0.031***	0.006	0.032***	0.005	0.031***	0.006
RL3 x LY	0.002	0.005	0.006	0.006	0.002	0.005	0.006	0.006
RL4 x LY	-0.021***	0.005	-0.019**	0.006	-0.021***	0.005	-0.019**	0.006
RL5 x LY	0.004	0.005	0.008	0.006	0.006	0.005	0.01	0.006
PA2 x LY	-0.015**	0.005	-0.014*	0.006	-0.014**	0.005	-0.014*	0.006
PA3 x LY	-0.016**	0.005	-0.016*	0.007	-0.015**	0.005	-0.016*	0.007
PA4 x LY	-0.039***	0.005	-0.044***	0.006	-0.039***	0.005	-0.044***	0.006
PA5 x LY	-0.174***	0.005	-0.197***	0.006	-0.174***	0.005	-0.196***	0.006
PA6 x LY	-0.191***	0.008	-0.214***	0.009	-0.190***	0.008	-0.212***	0.01
VT2 x LY	0.019***	0.005	0.017**	0.006	0.020***	0.005	0.018**	0.006
VT3 x LY	-0.011*	0.005	-0.009	0.006	-0.011*	0.005	-0.008	0.006
VT4 x LY	-0.026***	0.005	-0.029***	0.006	-0.025***	0.005	-0.028***	0.006
VT5 x LY	-0.034***	0.005	-0.037***	0.006	-0.032***	0.006	-0.035***	0.007
SF2 x LY	-0.025***	0.005	-0.019**	0.006	-0.025***	0.005	-0.019**	0.006
SF3 x LY	-0.047***	0.005	-0.046***	0.006	-0.047***	0.005	-0.045***	0.006
SF4 x LY	-0.077***	0.005	-0.072***	0.006	-0.078***	0.005	-0.072***	0.006
SF5 x LY	-0.110***	0.005	-0.108***	0.006	-0.108***	0.005	-0.107***	0.006
MH2 x LY	-0.021***	0.005	-0.024***	0.006	-0.022***	0.005	-0.025***	0.006
MH3 x LY	-0.052***	0.005	-0.063***	0.006	-0.052***	0.005	-0.062***	0.006
MH4 x LY	-0.116***	0.005	-0.118***	0.006	-0.116***	0.005	-0.118***	0.006
MH5 x LY	-0.156***	0.005	-0.157***	0.006	-0.154***	0.006	-0.155***	0.007
DURATION	0.317***	0.009	0.335***	0.011	0.318***	0.009	0.336***	0.011
WORST x LY					-0.006	0.005	-0.004	0.007
Log-Likelihood	17390.000		11587.000		17389.000		11586.000	
AIC	34831.000		23225.000		34832.000		23227.000	
BIC	35065.000		23449.000		35075.000		23460.000	

❑ Main results

- Although there were a significant number of responses indicating consistency issues, these did not have a major impact on the analysis results.
- Three dimensions - pain, social functioning, mental health - showed consistent coefficient directions.
- Disorder was observed in the dimensions of physical functioning, vitality, and role limitation.
- In the role limitation dimension, disordering issues were identified across multiple levels.

Conclusion & Discussion

❑ Disordering between level 1 and level 2

- This may reflect a tendency to avoid trading off minor decreases in quality of life for survival duration, or
- The description of Level 1 might cause confusion due to its double-negative expression, although it hasn’t been an issue in previous studies.

❑ Issues with role limitation

- Misunderstandings may arise from the condensed SF-6Dv2 descriptions in the DCE scenarios, which also ties into the translation issues presented below.
- The English phrase "accomplished less" translates to the Korean phrase “일을 적게 하는 것” ("doing less work"), often interpreted as being livelihood-related, which can lead to varied perceptions. Interviews with a convenience sample reveal differences in understanding role limitations, influenced by personal attitudes and work experience.

❑ Next steps

- Plan to conduct a re-survey after addressing the issues identified above.

❑ Related studies

- Mulhern B, et al. Valuing the SF-6Dv2 classification system in the United Kingdom using a discrete-choice experiment. Medical Care 2020;58(6):566-573.
- Mulhern B, et al. Valuing SF.6Dv2 in Australia Using an International Protocol. PharmacoEconomics. 2021;39:1151-1162.
- Wu J, et al. Valuation of SF.6Dv2 Health States in China Using Time Trade-off and Discrete.Choice Experiment with a Duration Dimension. Pharmacoeconomics. 2021;39(5):521-535.