Maths in Health

PCR106

Merging Adolescent and Adult Preference Data into a Potential Latent Scale EQ-5D-Y-3L Value Set: A Latent Class Approach to Analyze Contribution of Each Group to Preference Weights

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Background

United States-based stakeholders advised combining adolescent and adult preferences into a US EQ-5D-Y-3L value set (Nazari et al, 2023), which is a step towards greater acknowledgement of children informing values for decision-making.

Arguably, informed preferences are thoughtful and can signal an internally consistent system of values when elicited as stated preferences (Karimi et al, 20217). However, less informed or weaker preferences contribute to more ”noisy” data with lesser contribution to a value set.

Aims

This study aimed to assess Latent Class Analysis as one methodological approach to examine the relative contribution of adolescent and adult preferences in estimating a combined US EQ-5D-Y-3L value set.

Methods

Discrete choice experiment (DCE) data collected from the US valuation of the EQ-5D-Y-3L were used, which included an online sample of approximately 1,500 adults and 700 adolescents 11-17 years of age.

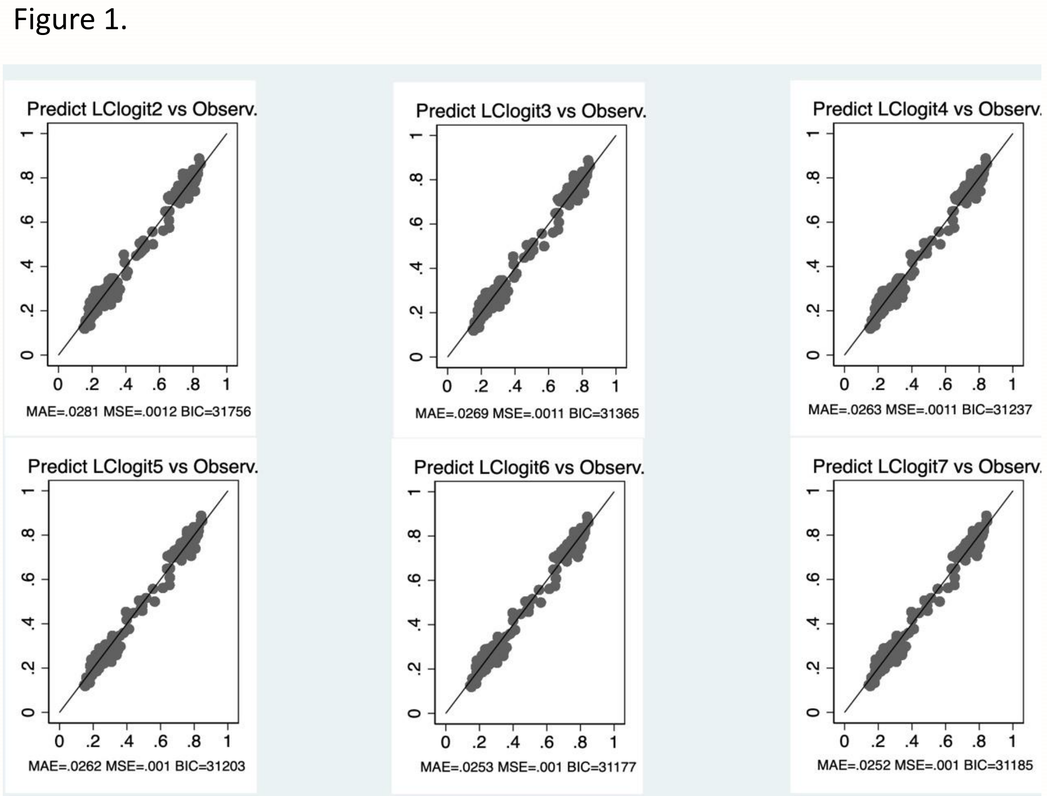
Each respondent completed 15 experimental DCE tasks. Using pre-specified quality control criteria, valid DCE responses were analysed by fitting a range of latent class models that specified between 2-7 fixed classes.

Within the best-fitting model, the contribution of each class to estimate value set coefficients was determined by the ‘scale-adjusted class share’ (SACS): a metric that combines the class’s proportion of respondents (class share) adjusted for the sum of coefficients (within-class scale), such that more indifferent preferences (lower scale magnitude) were weighted less, as shown below:

$$SACSclass_i = (\text{within-class scale}_i / \text{sum of all within-class scale}_i) \times \text{class share}_i$$

Additionally, the specific contribution of adults and adolescents to each of the SACS were calculated by accounting for both the proportion of adults and adolescents within each class and their individual contribution to the within-class scale.

Figure 1.



** MO, Mobility; SC, Looking after myself; UA, Doing usual activities; PD, Having pain or discomfort; AD, Feeling worried, sad, or unhappy*

Results

Table 1. Respondent Characteristics

		ADOLESCENTS (N=714)	ADULTS (N=1529)
BACKGROUND			
Age	Mean (SD)	15.0 (1.8)	53.4 (16.9)
	(min,max)	(11,17)	(18,93)
Age Category	11-14	325 (45.5)	-
	15-17	389 (54.5)	-
	18-34	-	234 (15.4)
	35-64	-	781 (51.1)
	≥65	-	514 (33.6)
Gender	Female	283 (39.6)	828 (54.2)
	Male	430 (60.2)	698 (45.7)
	Other	1 (0.1)	3 (0.2)
Race	White	621 (87.0)	1252 (81.9)
	Black	54 (7.6))	168 (11.0)
	Asian	27 (3.8)	56 (3.7)
	Other	12 (1.7))	53 (3.5)
Ethnicity	Hispanic or Latino	76 (10.6)	150 (9.8)

The analytic DCE dataset consisted of 714 adolescents and 1,529 adults (Table 1). The latent class model with 6 classes was selected as the best fitting model (Figure 1). Weighting class-share by within-class scales resulted in SACS of: Class 4 (54.5%), Class 6 (22.0%), Class 3 (9.7%), Class 2 (7.4%), Class 1 (3.6%), and Class 5 (2.9%) (Table 2)

Adults contributed more highly to SACS of all classes except Class 1, accounting for 78.7% of the total value set contribution compared to 21.3% for adolescents. Adjusting for the unequal sample size of adolescent and adult respondents, adults would contribute 65.0% and adolescents would contribute 35.0% towards a value set.

Table 2. Latent Class Model

		Coefficients (Incremental Dummy)						
Dimension*	Response Level Transition	Class1	Class2	Class3	Class4	Class5	Class6	
MO	Level 1 to 2	-3.01	-0.67	-0.11	-0.76	-0.25	-0.96	
	Level 2 to 3	-2.51	-0.89	-0.83	-1.06	-0.27	-2.51	
SC	Level 1 to 2	-0.92	-0.10	-0.55	-0.54	-0.09	-0.24	
	Level 2 to 3	-0.41	-0.44	-1.30	-1.66	-0.08	-1.28	
UA	Level 1 to 2	-0.20	-0.17	-0.70	-1.09	-0.05	-0.73	
	Level 2 to 3	0.09	-0.31	-0.98	-1.56	-0.05	-1.84	
PD	Level 1 to 2	0.17	-0.25	-0.72	-2.34	0.02	-1.62	
	Level 2 to 3	-0.05	-0.78	-1.05	-2.66	-0.20	-3.58	
AD	Level 1 to 2	-0.50	-0.99	-0.51	-1.66	0.06	-0.47	
	Level 2 to 3	0.03	-2.16	-0.86	-3.33	-0.13	-1.92	
								Total
Sum of Coefficients (Within-Class Scale)		-7.32	-6.77	-7.61	-16.66	-1.06	-15.16	-54.57
Class Share		4.8%	10.6%	12.4%	31.7%	26.5%	14.1%	100%
Scale-Adjusted Class Share (SACS)		**3.6%**	**7.4%**	**9.7%**	**54.4%**	**2.9%**	**22.0%**	**100%**

Table 3. Scale Adjusted Class Share

		Class1	Class2	Class3	Class4	Class5	Class6	Total
Scale-Contribution								
	Adult	-7.18	-6.88	-7.82	-17.14	-1.50	-15.40	
	Adolescent	-7.44	-6.62	-7.28	-14.62	-0.65	-14.69	
Class-Share Contribution								
	Adult	45%	61%	66%	85%	50%	75%	
	Adolescent	55%	39%	34%	15%	50%	25%	
Scale-Adjusted Class Share (SACS) Contribution		**3.6%**	**7.4%**	**9.7%**	**54.4%**	**2.9%**	**22.0%**	**100%**
	Adult	**1.6%**	**4.6%**	**6.6%**	**47.1%**	**2.0%**	**16.8%**	**78.7%**
	Adolescent	**2.0%**	**2.8%**	**3.1%**	**7.3%**	**0.9%**	**5.2%**	**21.3%**

To reach a 50% contribution per group, sample size for adolescents would need to be 4.1 times that of adults.

Conclusions

Adolescents tended to contribute more indifferent - or less informative –preferences, reflected in their lower contribution to an estimated value set.

This evidence should be considered for sample size purposes when designing EQ-5D-Y valuation studies where both adolescents and adults' respondents are desired.

References

1. Nazari JL, Pickard AS, Gu NY. Findings from a Roundtable Discussion with US Stakeholders on Valuation of the EQ-5D-Y-3L. *Pharmacoeconomics*. 2022;40(Suppl 2):139-146. doi:10.1007/s40273-022-01222-x

2. Karimi M, Brazier J, Paisley S. Are preferences over health states informed?. *Health Qual Life Outcomes*. 2017;15(1):105. Published 2017 May 18. doi:10.1186/s12955-017-0678-9

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