

Supplementary Online Content

Leske DA, Holmes JM, Melia BM; Pediatric Eye Disease Investigator Group. Evaluation of the intermittent exotropia questionnaire using Rasch analysis. *JAMA Ophthalmol*. Published online January 29, 2015. doi:10.1001/jamaophthalmol.2014.5622.

eMethods

eResults

eReferences

eTable 1. Subject Demographics

eTable 2. Dimensionality Analysis of the Original Child/Proxy Intermittent Exotropia Questionnaire (IXTQ), Removing Item 12 for High Ceiling Effects Across All 3 Questionnaires Before Any Additional Removal of Items (From the 11 Remaining Items) and Combination of Response Options

eTable 3. Dimensionality Analysis of All 17 Items of the Original Parent Intermittent Exotropia Questionnaire (IXTQ)

eTable 4. Dimensionality Analysis of the Original 3 Subscales Identified Within the Parent Intermittent Exotropia Questionnaire (IXTQ) Before Elimination of Items

eTable 5. Local Dependence Analysis of the Child and Proxy Intermittent Exotropia Questionnaire (IXTQ) (Top) and the Parent IXTQ Psychosocial and Function Subscales (Bottom), Showing Largest Standardized Residual Correlations

eTable 6. Infit and Outfit Errors of the Child and Proxy Intermittent Exotropia Questionnaire (IXTQ)

eTable 7. Infit and Outfit Errors of the Parent Intermittent Exotropia Questionnaire (IXTQ) Subscales, Removing Item 17

eTable 8. Confirmatory Dimensionality Analysis of the 5- to 7-Year-Old Child Intermittent Exotropia Questionnaire (IXTQ), 8- to 17-Year-Old Child IXTQ, and Proxy IXTQ in a Second Cohort of 379 parents and their Children with Intermittent Exotropia Following Item Elimination and Combination of Response Options (11 Items, 3 Response Options)

eTable 9. Confirmatory Dimensionality Analysis of the Original 3 Subscales Identified Within the Parent Intermittent Exotropia Questionnaire in a Second Cohort of 379 Parents of Children with Intermittent Exotropia Following Item Elimination Within the Psychosocial Subscale

eFigure 1. Intermittent Exotropia Questionnaire (IXTQ) Response Ordering: Child and Proxy IXTQ

eFigure 2. Intermittent Exotropia Questionnaire (IXTQ) Response Ordering: Parent IXTQ

This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods

Pre-Rasch Item Reduction

Prior to Rasch analysis, items with 80% or more of responses as ‘Never’ / ‘Not at all’ (ceiling effect) or ‘Almost always’ / ‘A lot’ (floor effect) on the 5- to 7-year-old Child IXTQ, 8- to 17-year-old Child IXTQ, and Proxy IXTQ were eliminated, as these items would not be expected to add additional useful information to the instrument. In a similar manner, items with 80% or more of responses as ‘Never’ or ‘Always’ on the Parent IXTQ were eliminated.

Rasch Analysis

Rasch analysis was performed on each of the four IXTQ questionnaires independently; however, because the 12 items for the 5- to 7-year-old Child IXTQ, 8- to 17-year-old Child IXTQ, and Proxy IXTQ are parallel across questionnaires, removal of items was considered only after evaluation of item performance for each of these three questionnaires. All analysis was performed using Winsteps software (version 3.72.2, available at www.winsteps.com, accessed 11-6-2014).

Using the steps of Rasch analytic methods that we have applied previously,¹ dimensionality was first analyzed by principal component analysis to determine whether more than one dimension was present, with the goal of avoiding any scoring of unrelated dimensions together. Response ordering was then assessed to determine whether response options were utilized and interpreted correctly. Local dependence was evaluated to determine whether items functioned independently, or whether a response on an item was dependent on the response to another item. Inter-item standardized residual correlations of >0.7 were considered to show high local dependence (indicating that 50% or more of the variance in the residuals is common between items),² and items showing levels above this threshold were considered for combining or removal. Infit and outfit errors were assessed, where infit errors give a measure of how well a item targets the ability of a person (i.e., how well difficult items target high ability persons and vice versa), and outfit errors give a measure of unexpected responses to an item (i.e. high ability persons responding as low ability and vice versa). Items with mean square infit or outfit values <0.60 or >1.40 were considered for removal. The standardized z-score was not considered for removal of items. The person separation index and reliability coefficient were evaluated, with a desired person separation index ≥ 2.0 and reliability coefficient ≥ 0.8 .³ Differential item functioning (DIF; the differential performance on an item based on an attribute) was assessed for sex of the child and age (≤ 4 years, 5 to 7 years, and 8 to 17 years) using the following criteria: a DIF contrast <0.5 logits defined as small or absent, 0.50 to 1.0 as minimal (inconsequential), and >1.0 as notable.⁴ Targeting (how well the questionnaire difficulty matches the ability of the cohort being tested) was assessed to determine whether level of item difficulty appropriately matched the severity of the disease (person ability) with desired difference between mean person and item measures within 1.0 logits.⁵ Finally, unidimensionality in the revised subscales was confirmed to ensure that the subscales remain unidimensional.

eResults

Pre-Rasch Item Reduction

When response frequencies to items on the 5- to 7-year-old Child IXTQ, 8- to 17-year-old Child IXTQ, and Proxy IXTQ were analyzed, item 12 (“My eyes make it hard for me to make friends”) was found to have strong ceiling effects across the three questionnaires (Table 1 in manuscript). Item 12 was therefore removed for subsequent Rasch analysis. No strong floor effects were observed across the 5- to 7-year-old Child IXTQ, 8- to 17-year-old Child IXTQ, and Proxy IXTQ. No items were found to have strong ceiling or floor effects within the Parent IXTQ (Table 2 in manuscript).

Dimensionality

Analyzing the remaining 11 items of the 5- to 7-year-old Child IXTQ, 8- to 17-year-old Child IXTQ, and Proxy IXTQ for dimensionality, 30%, 39%, and 47%, respectively of the raw variance was explained by the measures (eTable 2). Regarding the remaining unexplained variance, 9% of the overall variance (Eigen value of 1.5) was explained by the first contrast for the 5- to 7-year-old Child IXTQ, 11% (Eigen value of 2.0) for the 8- to 17-year-old Child IXTQ, and 12% (Eigen value of 2.4) for the Proxy IXTQ. Although there was an indication of potential for more than one dimension in the Proxy IXTQ, there was no clear pattern across the three questionnaires, and therefore the two Child IXTQ and Proxy IXTQ were analyzed as unidimensional.

Analyzing the 17 items of the Parent IXTQ for dimensionality without any a priori assumption of existing subscales, 59% of the raw variance was explained by the measures (eTable 3). Regarding the remaining unexplained variance, 9% of the overall variance (Eigen value of 3.5) was explained by the first contrast suggesting more than 1 dimension. Further analysis revealed 3 potential dimensions that corresponded to previously identified subscales, with items 5, 8, 10, 11, 12, 13, and 17 relating to psychosocial concerns (Parent psychosocial), items 1, 2, 3, 4, 6, 9, 14, and 15 relating to function concerns (Parent Function), and items 7 and 16 relating to worry about surgery (Parent Surgery). Separate Rasch analyses were then performed on the three identified subscales for the Parent IXTQ.

Analyzing the 7 items of the Parent psychosocial subscale for dimensionality, 71% of the raw variance was explained by the measures, with 7% of the overall variance explained by the first contrast (Eigen value of 1.6, eTable 4). For the 8 items of the Parent function subscale, 65% of the raw variance was explained by the measures, with 8% of the overall variance explained by the first contrast (Eigen value of 1.7). Finally, for the 2 items of the Surgery subscale, 77% of the raw variance was explained by the measures (contrast not applicable).

Response ordering

Responses to each of the items in the 5- to 7-year-old Child IXTQ were properly oriented (eFigure 1A), indicating proper use and interpretation of each response category. When analyzing the probability of utilizing response categories for the 8- to 17-year-old Child IXTQ, it was evident that both the ‘Almost never’ and ‘Often’ response options were underutilized and showed insufficient separation with adjacent response options (eFigure 1B). Exploring all reasonable combinations of response options, best person separation was achieved by combining the ‘Almost never’ response option with the ‘Never’ response option and the ‘Often’ response option with the ‘Sometimes’ response option, resulting in proper response option utilization and good separation between categories (eFigure 1C). When analyzing the Proxy IXTQ, it was evident that the ‘Almost never’ response option was underutilized and the ‘Often’ response was not strongly utilized (eFigure 1D). Best person separation when exploring all reasonable combinations of response options was achieved by combining the ‘Almost never’ response option with ‘Never’ and the ‘Often’ response option with the ‘Sometimes’ response option. The utilization and ordering of the resultant 3 response options was appropriate with good separation between categories (eFigure 1E). Response ordering and utilization was appropriate for the Parent Psychosocial, Parent Function, and Parent Surgery subscales (eFigure 2).

Local dependence

There were no high levels of local dependence between items (all inter-item correlations of standardized residuals were <0.7) for any of the IXTQ questionnaires and subscales (eTable 5).

Analysis of infit and outfit

No large infit or outfit errors were found within the 5- to 7-year-old Child IXTQ, as all mean square infit and outfit values were within the acceptable range of 0.60 to 1.40 (eTable 6). The person separation index was 1.08 with a reliability coefficient of 0.54. For the 8- to 17-year-old Child IXTQ, no large infit or outfit errors were found (eTable 6), and the person separation index was 1.40 with a reliability coefficient of 0.66. For the Proxy IXTQ, there was borderline misfit observed for items 7 (“It bothers my child because he/she has to shut one eye when it is sunny”), 8 (“My child feels different from other kids because of his/her eyes”), and 10 (“My child finds it hard to look people in the eye”) (eTable 6) but since no large misfit was observed for the parallel items on the child reported IXTQ for any age, these items were not removed. The person separation index was 1.68 with a reliability coefficient of 0.74.

Analyzing the Parent Psychosocial subscale, there was large misfit for item 17 (infit mnsq = 1.42, outfit mnsq = 1.56, “I worry about my child’s ability to make friends”) and this item was removed, resulting in a person separation index of 2.74 with a reliability index of 0.88. There were no large infit or outfit errors observed for either the Parent Function or Parent Surgery subscales (eTable 7), with person separation indices of 2.68 and 2.06 and reliability coefficients of 0.88 and 0.81 respectively.

Differential item functioning

When assessing DIF for sex on the 8- to 17-year-old Child IXTQ, contrast difference of 1.10 logits (notable DIF) for item 7 and 1.26 logits (notable DIF) for item 9 was observed between boys and girls, indicating that the boys reported these 2 items to have more of a negative impact on HRQOL. There was no notable DIF observed for sex on either the 5- to 7-year-old Child IXTQ or the Proxy, and therefore items 7 and 9 were retained on the 8- to 17-year-old Child IXTQ. Regarding age, there was some DIF observed on the Proxy IXTQ for item 7 (contrast difference of 1.39 logits, children <5 years with less impact than children 8 to 17 years) and for item 9 (contrast difference 1.17 logits, children 8 to 17 years with less impact than children < 5 years) however, no DIF was observed for any item when data from both the Child IXTQ instruments were analyzed together; therefore these items were retained on the Proxy IXTQ. There was no notable DIF on any of the Parent IXTQ subscales for sex or age.

Targeting

Analysis of targeting for the 5- to 7-year-old Child IXTQ indicated that the mean discrimination (difficulty) of the items was relatively poorly matched to the mean severity (ability) of the condition (1.60 ± 1.31 logits for mean person vs 0.00 ± 0.54 logits for mean item). For the 8- to 17-year-old Child IXTQ, targeting was again relatively poor (1.61 ± 1.45 logits for mean person vs 0.00 ± 0.62 logits for mean item). As with both Child IXTQ questionnaires, the Proxy IXTQ had poor targeting (2.72 ± 2.12 logits for mean person vs 0.00 ± 0.78 logits for mean item).

Analysis of targeting for the Parent Psychosocial subscale indicated that the mean severity discrimination of the items appropriately matched the mean severity of the condition (1.26 ± 2.76 logits for mean person vs 0.00 ± 0.65 logits for mean item). For the Parent Function subscale, again the mean severity discrimination appropriately targeted the mean severity (0.59 ± 1.76 logits for mean person vs 0.00 ± 1.04 logits for mean item). The targeting of the Parent Surgery subscale was also appropriate (0.55 ± 5.29 logits for mean person vs 0.00 ± 0.19 logits for mean item).

Confirmation of Rasch modifications on performance and structure

Performance and structure of the IXTQ instruments was evaluated in a second cohort of patients following removal of item #12 from both versions of the Child IXTQ and Proxy IXTQ, collapsing response categories for the 8- to 17-year-old IXTQ and the Proxy IXTQ, and removal of item #17 from the Parent IXTQ. Demographics of the additional 379 children with intermittent exotropia were similar to the initial cohort of children, with 61% female, 73% reporting their race as ‘white’, and 80% reporting their ethnicity as non-Hispanic. Responses from the additional 379 parents and their children confirmed unidimensionality of each Child version, Proxy, Parent Function, Parent Psychosocial, and Parent Surgery IXTQ questionnaires (eTables 8 and 9). Category response options were correctly ordered for all questionnaires, misfit was similar in magnitude to that observed in the original cohort of patients, and there was no notable DIF (data not shown). Targeting was again relatively poor for the 5- to 7-year-old Child IXTQ, 8- to 17-year Child IXTQ, and the Proxy IXTQ (data not shown). Targeting for the 3

subscales of the Parent IXTQ was appropriate. Person separation and reliability was relatively poor for the 5- to 7-year-old Child IXTQ (separation index of 1.17, reliability coefficient of 0.58) and slightly better for the 8- to 17-year Child IXTQ and Proxy IXTQ (separation indices of 1.75 and 1.80, reliability coefficients of 0.75 and 0.76 respectively). Person separation and reliability was good for the Parent Psychosocial, Function, and Surgery subscales (separation indices of 2.50 and 2.49, and 1.96, reliability coefficients of 0.86, 0.86, and 0.79 respectively).

eReferences

1. Leske DA, Hatt SR, Liebermann L, Holmes JM. Evaluation of the Adult Strabismus-20 (AS-20) Questionnaire using Rasch analysis. *Invest Ophthalmol Vis Sci* 2012;53:2630-2639.
2. Linacre JM. *Winsteps Rasch Measurement Computer Program User's Guide*. Beaverton, OR: Winsteps.com; 2011.
3. Pesudovs K, Burr JM, Harley C, Elliott DB. The development, assessment, and selection of questionnaires. *Optom Vis Sci* 2007;84:663-674.
4. Gothwal VK, Wright TA, Lamoureux EL, Pesudovs K. Rasch analysis of the quality of life and vision function questionnaire. *Optom Vis Sci* 2009;86:E836-844.
5. Pesudovs K, Gothwal VK, Wright T, Lamoureux EL. Remediating serious flaws in the National Eye Institute Visual Function Questionnaire. *J Cataract Refract Surg* 2010;36:718-732.

eTable 1. Subject Demographics			
	Initial Rasch Study Cohort (N=575 subjects)	Confirmatory Rasch Study Cohort (N=379 subjects)	
	N (%)	N (%)	
Gender: Female	347 (60%)	233 (61%)	
Race			
White	448 (78%)	275 (73%)	
American Indian / Alaskan Native	2 (0.4%)	4 (1%)	
Asian	24 (4%)	9 (2%)	
Black / African American	59 (10%)	64 (17%)	
More than one race	18 (3%)	13 (3%)	
Native Hawaiian / Other Pacific Islander	2 (0.4%)	1 (0.3%)	
Unknown / not reported	22 (4%)	13 (3%)	
Ethnicity			
Hispanic or Latino	76 (13%)	72 (19%)	
Not Hispanic or Latino	488 (85%)	304 (80%)	
Unknown/not reported	11 (2%)	3 (1%)	
Age group			
<5 years	280 (49%)	193 (51%)	
5 to 7 years	192 (33%)	127 (34%)	
8 to 16 years	103 (18%)	59 (16%)	
Current spectacle correction	121 (21%)	77 (20%)	
Who completed the Parent / Proxy questionnaires			
Mother	485 (84%)	315 (83%)	
Father	79 (14%)	51 (13%)	
Other Guardian (including both mother and father)	11 (2%)	13 (3%)	

eTable 2. Dimensionality Analysis of the Original Child/Proxy Intermittent Exotropa Questionnaire (IXTQ), Removing Item 12 for High Ceiling Effects Across All 3 Questionnaires Before Any Additional Removal of Items (From the 11 Remaining Items) and Combination of Response Options

	5- to 7-year-old Child IXTQ		8- to 17-year-old Child IXTQ		Proxy IXTQ	
	Eigen	%	Eigen	%	Eigen	%
Total raw variance	15.7	100	18.0	100	20.7	100
Explained by measures	4.7	30	7.0	39	9.7	47
Explained by persons	2.3	15	3.3	19	5.4	26
Explained by items	2.4	15	3.7	20	4.3	21
Total unexplained	11.0	70	11.0	61	11.0	53
1st contrast	1.5	9	2.0	11	2.4	12
2nd contrast	1.5	9	1.5	8	1.5	7
3rd contrast	1.4	9	1.4	8	1.3	6
4th contrast	1.2	8	1.3	7	1.1	5
5th contrast	1.1	7	1.0	6	1.1	5
	Item Number	1st Contrast Loading	Item Number	1st Contrast Loading	Item Number	1st Contrast Loading
	1	0.10	1	-0.30	1	0.05
	2	-0.59	2	0.23	2	-0.60
	3	0.35	3	-0.37	3	0.41
	4	-0.16	4	0.34	4	-0.33
	5	-0.17	5	0.51	5	-0.51
	6	0.04	6	0.56	6	-0.49
	7	0.61	7	-0.18	7	0.51
	8	-0.46	8	0.26	8	-0.54
	9	-0.54	9	0.63	9	-0.49
	10	0.20	10	-0.41	10	0.32
	11	0.15	11	-0.61	11	0.61

eTable 3. Dimensionality Analysis of All 17 Items of the Original Parent Intermittent Exotropia Questionnaire (IXTQ)

	Eigen	%
Total raw variance	41.2	100
Explained by measures	24.2	59
Explained by persons	12.2	30
Explained by items	12.0	29
Total unexplained	17.0	41
1st contrast	3.5	9
2nd contrast	1.9	5
3rd contrast	1.4	4
4th contrast	1.4	3
5th contrast	1.0	3
	Item Number	1st Contrast Loading
	1	-0.29
	2	-0.03
	3	-0.18
	4	-0.57
	5	0.63
	6	-0.32
	7	-0.32
	8	0.53
	9	-0.40
	10	0.70
	11	0.62
	12	0.47
	13	0.56
	14	-0.48
	15	-0.49
	16	-0.31
	17	0.23

eTable 4. Dimensionality Analysis of the Original 3 Subscales Identified Within the Parent Intermittent Exotropia Questionnaire (IXTQ) Before Elimination of Items

	Psychosocial Subscale (7 items)		Function Subscale (8 items)		Surgery Subscale (2 items)	
	Eigen	%	Eigen	%	Eigen	%
Total raw variance	23.9	100	22.6	100	8.7	100
Explained by measures	16.9	71	14.6	65	6.7	77
Explained by persons	11.2	47	7.6	34	6.7	77
Explained by items	5.7	24	7.0	31	0.0	0.2
Total unexplained	7.0	29	8.0	35	2.0	23
1st contrast	1.6	7	1.7	8	NA	NA
2nd contrast	1.4	6	1.6	7		
3rd contrast	1.2	5	1.2	5		
4th contrast	1.1	4	1.1	5		
5th contrast	1.0	4	0.9	4		
	Item Number	1 st Contrast Loading	Item Number	1 st Contrast Loading	Item Number	1 st Contrast Loading
	5	-0.07	1	0.55	7	NA
	8	0.45	2	0.44	16	NA
	10	0.75	3	0.71		
	11	0.34	4	-0.36		
	12	-0.57	6	-0.13		
	13	-0.53	9	-0.52		
	17	-0.33	14	0.02		
			15	-0.55		

NA = not applicable

eTable 5. Local Dependence Analysis of the Child and Proxy Intermittent Exotropia Questionnaire (IXTQ) (Top) and the Parent IXTQ Psychosocial and Function Subscales (Bottom), Showing Largest Standardized Residual Correlations*

5- to 7-year-old Child			8- to 17-year-old Child			Proxy		
Correlation	Item	Item	Correlation	Item	Item	Correlation	Item	Item
-0.18	5	10	0.25	6	9	0.33	5	6
-0.18	6	8	-0.23	3	8	0.30	8	9
-0.19	3	4	-0.23	7	8	-0.23	5	7
-0.19	5	7	-0.23	3	6	-0.23	6	7
-0.19	6	11	-0.24	3	9	-0.23	7	8
-0.20	2	11	-0.25	5	11	-0.23	5	11
-0.21	3	11	-0.26	9	10	-0.24	3	9
-0.21	1	10	-0.28	1	4	-0.25	6	11
-0.22	2	10	-0.35	2	7	-0.29	2	7
-0.24	7	9	-0.46	9	11	-0.36	2	11
Parent IXTQ Psychosocial subscale			Parent IXTQ Function subscale					
Correlation	Item	Item	Correlation	Item	Item			
-0.18	11	12	-0.19	3	4			
-0.20	11	13	-0.21	1	15			
-0.21	8	12	-0.25	1	6			
-0.22	8	17	-0.26	2	4			
-0.23	10	17	-0.26	2	14			
-0.24	8	13	-0.29	1	9			
-0.26	8	11	-0.32	3	9			
-0.27	5	11	-0.33	2	15			
-0.29	10	13	-0.33	6	14			
-0.32	10	12	-0.33	3	15			

*Local dependence is not evaluated for the two-item surgery subscale of the Parent IXTQ.

eTable 6. Infit and Outfit Errors of the Child and Proxy Intermittent Exotropia Questionnaire (IXTQ)

Item	5- to 7-year-old Child				8- to 17-year-old Child				Proxy			
	Infit		Outfit		Infit		Outfit		Infit		Outfit	
	Mean Square	Standard Z-score	Mean Square	Standard Z-score	Mean Square	Standard Z-score	Mean Square	Standard Z-score	Mean Square	Standard Z-score	Mean Square	Standard Z-score
1	1.14	1.4	1.26	2.0	0.92	-0.6	0.99	0.0	0.87	-2.4	0.88	-2.0
2	1.05	0.5	1.00	0.0	0.85	-1.1	0.84	-1.0	0.82	-2.9	0.74	-3.3
3	0.93	-0.7	1.00	0.0	1.14	1.0	1.07	0.4	1.08	1.2	1.05	0.6
4	1.13	0.9	0.97	-0.1	0.90	-0.5	1.00	0.1	0.94	-0.7	1.10	0.7
5	1.11	0.8	1.05	0.4	0.92	-0.4	1.30	1.2	0.80	-3.2	0.76	-2.9
6	1.02	0.2	1.18	1.0	1.06	0.4	0.92	-0.2	0.90	-1.6	0.85	-1.9
7	1.11	1.2	1.16	1.5	1.18	1.4	1.19	1.3	1.64	9.3	1.69	9.5
8	0.88	-1.0	0.77	-1.5	1.20	1.2	0.96	-0.1	0.64	-5.5	0.52	-4.6
9	0.90	-0.6	0.71	-1.4	0.89	-0.6	0.67	-1.4	0.70	-4.4	0.60	-3.7
10	0.91	-0.8	0.88	-0.8	0.85	-1.0	0.76	-1.3	1.38	5.3	1.41	4.5
11	0.96	-0.3	0.92	-0.6	1.17	1.3	1.09	0.6	1.02	0.3	1.02	0.4

Bold values indicate high misfit

eTable 7. Infit and Outfit Errors of the Parent Intermittent Exotropia Questionnaire (IXTQ) Subscales, Removing Item 17

Item	Psychosocial Subscale				Function Subscale				Surgery Subscale			
	Infit		Outfit		Infit		Outfit		Infit		Outfit	
	Mean Square	Standard Z-score	Mean Square	Standard Z-score	Mean Square	Standard Z-score	Mean Square	Standard Z-score	Mean Square	Standard Z-score	Mean Square	Standard Z-score
1	-	-	-	-	0.76	-4.3	0.79	-3.5	-	-	-	-
2	-	-	-	-	1.23	3.5	1.07	0.8	-	-	-	-
3	-	-	-	-	0.93	-1.2	0.93	-1.2	-	-	-	-
4	-	-	-	-	0.88	-2.1	0.87	-2.2	-	-	-	-
5	0.83	-2.9	0.84	-2.6	-	-	-	-	-	-	-	-
6	-	-	-	-	1.07	1.1	0.97	-0.3	-	-	-	-
7	-	-	-	-	-	-	-	-	0.98	-0.2	0.89	-1.1
8	0.98	-0.3	0.99	-0.1	-	-	-	-	-	-	-	-
9	-	-	-	-	1.17	2.9	1.17	2.6	-	-	-	-
10	0.83	-3.0	0.84	-2.5	-	-	-	-	-	-	-	-
11	1.13	2.1	1.12	1.5	-	-	-	-	-	-	-	-
12	1.14	2.2	1.21	2.4	-	-	-	-	-	-	-	-
13	1.06	1.0	1.04	0.6	-	-	-	-	-	-	-	-
14	-	-	-	-	0.77	-4.1	0.80	-3.4	-	-	-	-
15	-	-	-	-	1.18	3.0	1.17	2.6	-	-	-	-
16	-	-	-	-	-	-	-	-	0.98	-0.3	0.88	-1.1

eTable 8. Confirmatory Dimensionality Analysis of the 5- to 7-Year-Old Child Intermittent Exotropia Questionnaire (IXTQ), 8- to 17-Year-Old Child IXTQ, and Proxy IXTQ in a Second Cohort of 379 parents and their Children with Intermittent Exotropia Following Item Elimination and Combination of Response Options (11 Items, 3 Response Options)

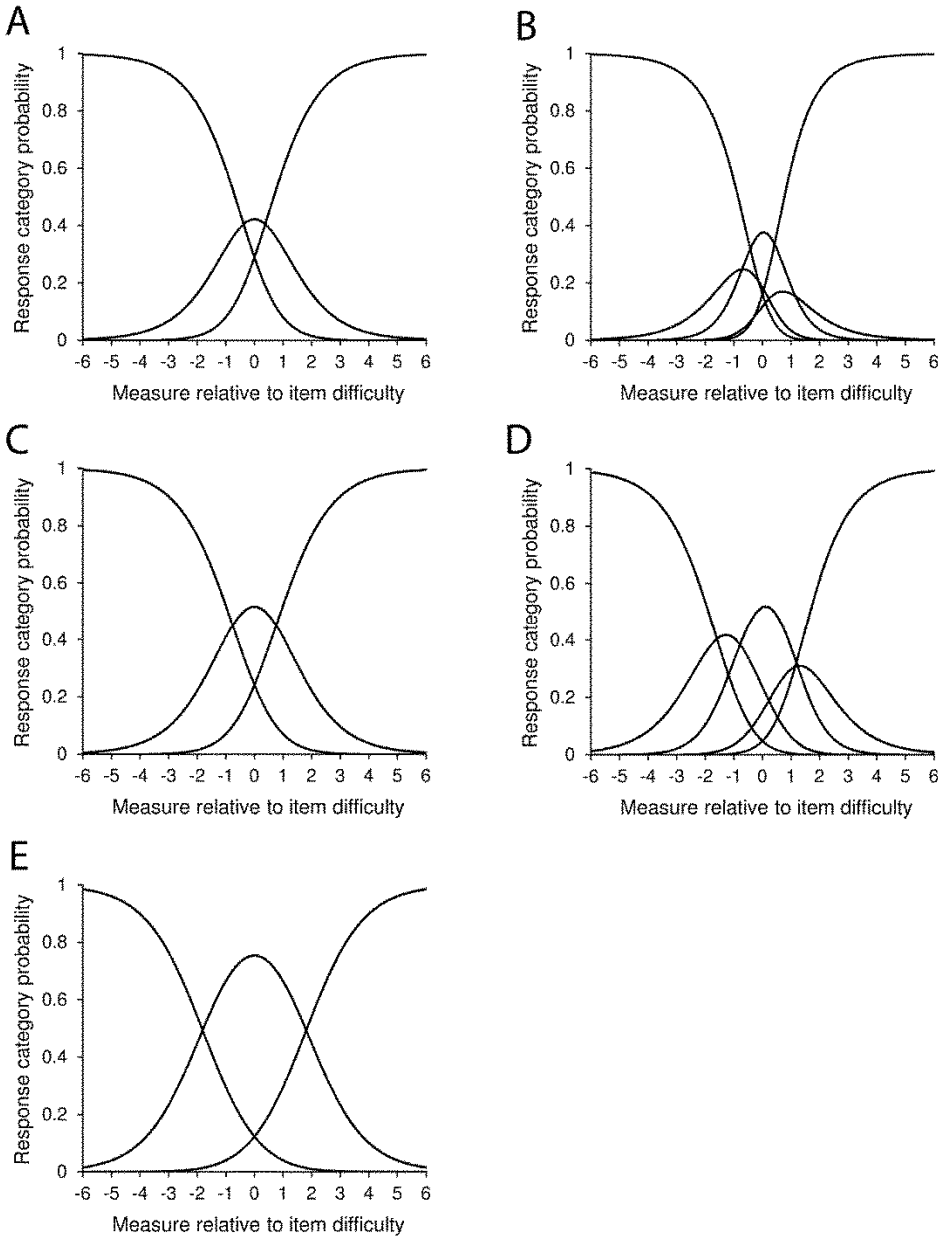
	5- to 7-year-old Child IXTQ		8- to 17-year-old Child IXTQ		Proxy IXTQ	
	Eigen	%	Eigen	%	Eigen	%
Total raw variance	15.8	100	18.5	100	20.3	100
Explained by measures	4.8	30	7.5	41	9.3	46
Explained by persons	2.4	15	4.0	22	5.9	29
Explained by items	2.4	15	3.5	19	3.4	17
Total unexplained	11.0	70	11.0	59	11.0	54
1st contrast	1.6	10	2.3	12	2.0	10
2nd contrast	1.5	10	1.8	10	1.5	8
3rd contrast	1.3	8	1.3	7	1.4	7
4th contrast	1.3	8	1.3	7	1.2	6
5th contrast	1.1	7	1.1	6	1.1	6
	Item Number	1 st Contrast Loading	Item Number	1 st Contrast Loading	Item Number	1 st Contrast Loading
	1	0.26	1	0.10	1	0.08
	2	0.65	2	-0.54	2	-0.45
	3	-0.10	3	0.48	3	0.41
	4	-0.12	4	-0.39	4	-0.20
	5	0.25	5	0.66	5	-0.50
	6	-0.35	6	0.64	6	-0.26
	7	0.39	7	-0.23	7	0.62
	8	-0.42	8	-0.59	8	-0.52
	9	0.04	9	-0.52	9	-0.61
	10	-0.49	10	0.00	10	0.30
	11	-0.54	11	0.24	11	0.39

eTable 9. Confirmatory Dimensionality Analysis of the Original 3 Subscales Identified Within the Parent Intermittent Exotropia Questionnaire in a Second Cohort of 379 Parents of Children with Intermittent Exotropia Following Item Elimination Within the Psychosocial Subscale

	Psychosocial Subscale (6 items)		Function Subscale (8 items)		Surgery Subscale (2 items)	
	Eigen	%	Eigen	%	Eigen	%
Total raw variance	17.2	100	21.3	100	6.6	100
Explained by measures	11.2	65	13.3	62	4.6	70
Explained by persons	7.5	43	6.7	31	4.4	68
Explained by items	3.8	22	6.6	31	0.1	2.1
Total unexplained	6.0	35	8.0	38	2.0	30
1st contrast	1.7	10	1.7	8	NA	NA
2nd contrast	1.4	8	1.6	8		
3rd contrast	1.1	7	1.2	6		
4th contrast	1.0	6	1.1	5		
5th contrast	0.8	5	1.0	5		
	Item Number	1st Contrast Loading	Item Number	1st Contrast Loading	Item Number	1st Contrast Loading
	5	-0.03	1	0.55	7	NA
	8	0.47	2	-0.39	16	NA
	10	0.70	3	0.56		
	11	0.30	4	-0.31		
	12	-0.69	6	-0.48		
	13	-0.64	9	-0.50		
			14	0.60		
			15	0.19		

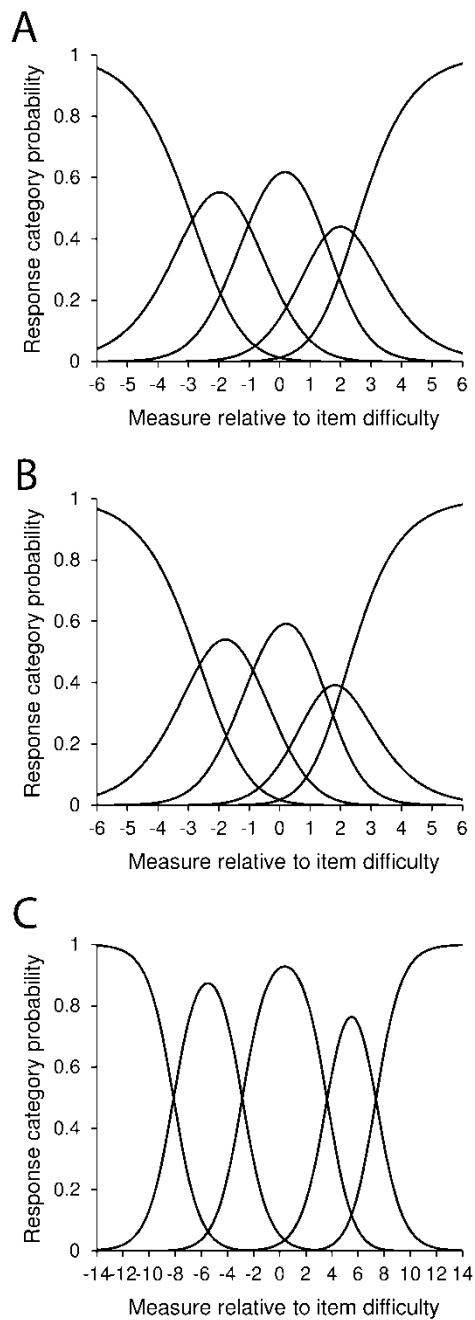
NA = not applicable

eFigure 1. Intermittent Exotropia Questionnaire (IXTQ) Response Ordering: Child and Proxy IXTQ



Intermittent Exotropia Questionnaire (IXTQ) response ordering for A) the 3-response IXTQ for 5- to 7-year-old children (representative item #1), B) 5-response IXTQ for 8- to 17-year-old children (representative item #1), C) 3-response IXTQ for 8- to 17-year children, D) 5-response Proxy IXTQ (representative item #1), and E) 3-response Proxy IXTQ. Response categories were properly oriented for the 5- to 7-year-old Child IXTQ (A), but it was evident that both the “Almost never” and “Often” response options were underutilized for the 8- to 17-year-old Child IXTQ (B). The “Almost never” response option was combined with the “Sometimes” option, and the “Often” response option was combined with the “Almost always” response option, resulting in proper response ordering (C). For the Proxy IXTQ, the “Almost never” response option was underutilized (D) so the “Almost never” response option was combined with the “Sometimes” option, and the “Often” response option was combined with the “Almost always” response option, resulting in proper response ordering (E).

eFigure 2. Intermittent Exotropia Questionnaire (IXTQ) Response Ordering: Parent IXTQ



Intermittent Exotropia Questionnaire (IXTQ) response ordering for A) 5-response Psychosocial subscale of the Parent IXTQ (representative item #5), B) 5-response Function subscale of the Parent IXTQ (representative item #1), and C) 5-response Surgery subscale of the Parent IXTQ (representative item #7). Response categories were properly oriented for all subscales of the Parent IXTQ.