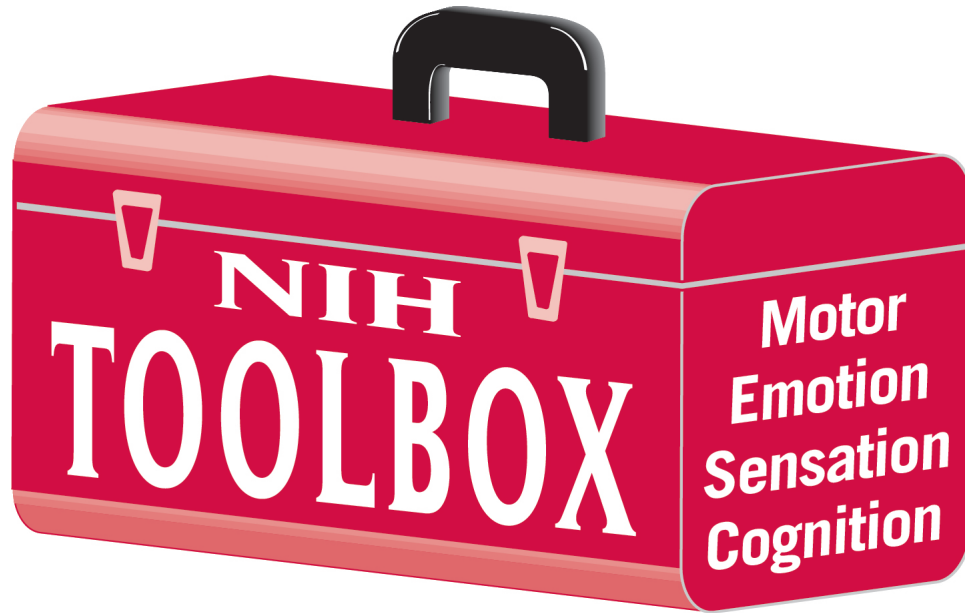


NIH Toolbox



Technical Manual

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NIH Toolbox Technical Manual

Domain:

MOTOR

Subdomain:

BALANCE

Measure:

NIH Toolbox Standing Balance Test

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This Technical Manual contains the following informational sections:

Section 1: Introduction to NIH Toolbox

Section 2: Validation

Section 3: Norming

**Section 4: NIH Toolbox and the National Children's
Study (NCS)**

Section 5: Domain Definition

Section 6: Subdomain Definition

Section 7: Measure Description

**Section 8: Post-Validation/Post-Norming Changes to
the Measure**

Section 9: The Measure's Scoring Model

Section 10: Measure Norms

Section 1: Introduction to NIH Toolbox

NIH Toolbox is a multidimensional set of brief measures assessing cognitive, emotional, motor, and sensory function from ages 3-85. This suite of on-line and royalty-free measures can be administered to study participants 3 to 85 years of age in two hours or less, across diverse study designs and settings.

What is the NIH Toolbox?

The NIH Toolbox provides a standard set of royalty-free, brief, and comprehensive assessment tools that can be used by researchers and clinicians in a variety of settings, with a particular emphasis on measuring outcomes in longitudinal epidemiologic studies and prevention or intervention trials across the lifespan (ages 3-85). The battery ensures that assessment methods and results can be used for comparisons across existing and future studies and provides a “common currency” for the study of neurological research that promotes economies of scale and enhanced efficiency in measurement. The NIH Toolbox can be used to monitor neurological and behavioral function over time and measure key constructs across developmental stages. This facilitates the study of functional changes across the lifespan, including evaluating intervention and treatment effectiveness.

The NIH Toolbox Batteries

The basic NIH Toolbox can be administered within two hours and divides tests into four domain batteries: Cognition, Emotion, Motor, and Sensation. In addition, within some domains, there are supplemental measures that are available to be administered.

Selection of the NIH Toolbox Domains and Subdomains

Four domains were selected for the NIH Toolbox: Cognition, Emotion, Motor, and Sensation. Subdomain selection was based upon literature reviews, expert interviews, and multiple formal Requests for Information (RFI) of NIH-funded researchers. Initial literature and database reviews and an RFI identified the subdomains for inclusion in the NIH Toolbox, existing measures relevant to the project goals, and criteria for instrument selection. NIH Project Team members, external content experts, and contract scientists met at a follow-up consensus meeting to discuss potential subdomains along with the criteria affecting instrument selection, creation, and norming. Additional expert interviews were undertaken to gather more detailed information from clinical and scientific experts to help further refine the list of possible subdomains. A second consensus group meeting was held and results directed the decision for the final NIH Toolbox to assess four core domain areas (cognitive, emotional, motor, and sensory health and function).

Selection of Measures for the NIH Toolbox

More than 1,400 existing measures were identified and evaluated for potential inclusion in the NIH Toolbox. The selection criteria included a measure's applicability across the life span,

psychometric soundness, brevity, ease of use, applicability in diverse settings and with different groups, and lack of intellectual property constraints. There was also a preference for instruments that were already validated and normed for use with individuals between 3 and 85 years old. Results of the instrument selection process yielded draft development plans established for the NIH Toolbox measures.

Early Childhood Use

NIH Toolbox measure development focused special attention on assessing young children, to ensure that all tests given are developmentally appropriate for ages 3-7. A special team of early childhood assessment consultants was engaged to provide testing guidelines for the very young, to offer input on measure development, and to review all NIH Toolbox measures to ensure they fit the needs of young children. Advanced statistical methods were used to emphasize continuity of measurement, allowing Toolbox users to confidently conduct longitudinal measurement from age 3 through the life span while assessing the same domain constructs.

Section 2: Validation

Validation studies were conducted for all NIH Toolbox Motor domain measures, to assure that these important tools for research met rigorous psychometric standards. Studies were

conducted across the entire age range and were statistically compared against “gold standard” measures wherever available.

For specifics regarding Motor domain measure validation, see: Reuben et al., Motor Assessment Using the NIH Toolbox, *Neurology*, in press; Rine et al., Vestibular Function Assessment Using the NIH Toolbox, *Neurology*, in press. These manuscripts describe measure development studies undertaken (e.g., expert panels for content development and validation; cognitive interviews; small and large-scale pilot testing) and psychometric characteristics (e.g., internal consistency and test-retest reliability; convergent and divergent validity).

Section 3: Norming

NIH Toolbox conducted a large national standardization study in both English and Spanish languages to allow for normative comparisons on each assessment. A sample of 4,859 participants, ages 3-85 – representative of the U.S. population based on gender, ethnicity, race, and socioeconomic status – was administered all of the NIH Toolbox measures at sites around the country (n = 2,917 English-speaking children, ages 3-17; n = 496 Spanish-speaking children, ages 3-7; n = 1,038 English-speaking adults, ages 18-85; n = 408 Spanish-speaking adults, ages 18-85). NIH Toolbox normative scores are now available for each year of age from 3 through 17, as well as for age ranges 18-29, 30-39, 40-49, 50-59, 60-69, and 70-85, allowing for targeted and accurate comparisons to the U.S. population.

Specifics regarding NIH Toolbox norming sampling methods (e.g., stratification by age, gender, and language preference; sampling a minimum of 25-100 individuals per targeted demographic and language subgroup) and norming analytic methods (e.g., post-stratification adjustment using iterative proportional fitting, i.e., “raking”) can be found in the following publication: Beaumont et al., Norming Plans for the NIH Toolbox, *Neurology*, in press.

Section 4: NIH Toolbox and the National Children’s Study (NCS)

In collaboration with NIH Toolbox scientists, NCS investigators selected measures from PROMIS and NIH Toolbox for a Maternal Health Profile, the Maternal Self-Reported Health Battery. This profile assesses Physical Health (Physical function, Fatigue, Sleep disturbance, Sleep-related impairment), Mental Health (Anger, Anxiety, Depression, Positive affect, Perceived stress, Self-efficacy), and Social Health (Social support and companionship, Social isolation). The Maternal Self-Reported Health Battery was field tested in fall 2011, using an online sample of 1000 women (200 pre-conception, 150 pregnant women (50 per trimester), and 650 mothers with a child between 0-36 months of age). In addition, NIH Toolbox norming was jointly sponsored by the NCS and included: 3,413 children in single-year age bands (from 3-17 years); 1,446 adults in seven age bands, including the mothers of children also being tested; and 105 pregnant

women. The NIH Toolbox sampling plan matched distributions of race/ethnicity and level of education for each age band.

Section 5: Domain Definition

Domain: MOTOR

Motor function involves complex physiological processes and requires the integration of multiple systems, including neuromuscular, musculoskeletal, cardiopulmonary, and neural motor and sensory-perceptual systems. Motor functional status is indicative of current physical health status, burden of disease, and long-term health outcomes, and is integrally related to daily functioning and quality of life. Given its importance to overall neurological health and function, motor function was identified as a key domain for inclusion in the NIH Toolbox. The Motor domain includes measures of:

DEXTERITY

Measured by:

NIH Toolbox 9-Hole Pegboard Dexterity Test

STRENGTH

Measured by:

NIH Toolbox Grip Strength Test

BALANCE

Measured by:

NIH Toolbox Standing Balance Test

LOCOMOTION

Measured by:

NIH Toolbox 4-Meter Walk Gait Speed Test

ENDURANCE

Measured by:

NIH Toolbox 2-Minute Walk Endurance Test

MOTOR Batteries

The NIH Toolbox Motor Battery for ages 7-85 includes all five core measures described above.

For ages 3-6, the NIH Toolbox Early Childhood Motor Battery includes four core tests, while excluding the 4-Meter Walk Gait Speed Test. There are individual scores provided for each measure, as described below, but there are no composite scores provided for the Motor Battery.

Section 6: Subdomain Definition

Subdomain: BALANCE

Balance refers to the ability to orient the body in space, maintain an upright posture under both static and dynamic conditions, and move and walk without falling. This ability to respond to internal and external disturbance, to realign body segments, as well as to protect oneself from falling is essential and inherent in everyday tasks. In NIH Toolbox, Balance is measured by:

NIH Toolbox Standing Balance Test

Section 7: Measure Description

MOTOR Core Measure

The NIH Toolbox Standing Balance Test is a measure developed to assess static standing balance for ages 3-85 years. It involves the participant assuming and maintaining up to five poses for 50 seconds each. The sequence of poses is: eyes open on a solid surface, eyes closed on solid surface, eyes open on foam surface, eyes closed on foam surface, and eyes open in tandem stance on solid surface. Detailed stopping rules are in place to ensure participant safety with these progressively demanding poses. Postural sway is recorded for each pose using an accelerometer that the participant wears at waist level. This test takes approximately seven minutes to administer and is recommended for ages 3-85.

Section 8: Post-Validation/Post-Norming Changes to the Measure

In addition to those changes previously reported on during the measure's development and validation phases (Rine et al., Vestibular Function Assessment Using the NIH Toolbox, *Neurology*, in press), the following changes have been made to this measure:

Item exclusions: Testing Condition 6 (tandem stance on a flat surface with eyes closed) was eliminated from the test protocol.

Test scoring changes: Test scores are based on IRT's Graded Response Model item calibration and score estimation processes. The normalized path length scores from the continuous anterior-posterior (AP) sway values are recoded into a 5-point ordinal scale, with higher values representing better balance and less sway (i.e., AP sway 0-.005 = 5, > .005-.015 = 4, > .015-.025 = 3, > .025-.045 = 2, > .045 = 1). A second trial per condition is administered if the first trial is failed (e.g., an examinee could not hold the testing position for the required length of testing time). Failed trials and conditions and subsequent skipped conditions are given an ordinal rating of 1, representing the lowest possible balance performance.

Section 9: The Measure's Scoring Model

Measurement theory applied for scoring:

Rasch/Item Response Theory (IRT)

Rasch/IRT model employed:

Graded Response Model

Measure length:

Fixed (five conditions, ages 7-85; four conditions, ages 3-6)

Response data:

Continuous (anterior-posterior postural sway data)

Data conversion/coding:

Normalized path length scores are first calculated from the anterior-posterior postural sway data as follows:

$$\text{Normalized Path Length} = \frac{1}{t} \sum_{j=1}^{N-1} |p_{j+1} - p_j|$$

where t is the time duration, N is the number of time samples, and p_j is accelerometer data at time sample j .

The normalized path length scores from the continuous anterior-posterior (AP) sway data are then recoded into a 5-point ordinal scale, with higher values representing better balance and less sway (i.e., AP sway 0-.005 = 5, > .005-.015 = 4, > .015-.025 = 3, > .025-.045 = 2, > .045 = 1).

Treatment of failed or skipped trials or conditions:

A second trial per condition is administered if the first trial is failed (e.g., examinee could not hold the testing position for the required length of time). Failed trials and conditions are given a score of 1, representing the lowest possible balance performance.

Testing discontinuation formula:

If condition 1 is failed, end test; if condition 2 is failed, do not give condition 4 but DO give condition 3 (and 5 if 3 is passed); if condition 3 is failed, do not give condition 4, but DO give condition 5.

Scores computed/available*:

Rasch/IRT Theta Score

Age-Adjusted Scale Score (mean=100, standard deviation=15)

Fully Adjusted Scale Score (mean=100, standard deviation=15)

Unadjusted Scale Score (mean=100, standard deviation=15)

National Percentile Rank (corresponds to the Age-Adjusted Scale Score)

Computed Score (converted from Theta score; range from 200 to 800)

2/1 Ratio Score (compares performance on balance position 2 to position 1)

4/1 Ratio Score (compares performance on balance position 4 to position 1)

*Details on these scores and their interpretations are available in the NIH Toolbox Scoring and Interpretation Guide.

Section 10: Measure Norms

The following Tables and Figure present NIH Toolbox normative data associated with this measure:

- Table 1.** Measure Raw/Computed Score, Unadjusted Scale Score, and Fully Adjusted Scale Score Summary (N, Mean, Standard Deviation) by Age Group (3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18-29, 30-39, 40-49, 50-59, 60-69, 70-85, All)
- Table 2.** Measure Raw/Computed Score Statistics (N, Mean, Standard Deviation, Minimum/Maximum Observed, 25th/50th/75th Percentile) per Age Group (3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18-29, 30-39, 40-49, 50-59, 60-69, 70-85, All)
- Figure 1.** Measure Mean Unadjusted Scale Scores across All Age Groups (3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18-29, 30-39, 40-49, 50-59, 60-69, 70-85)

Table 1. NIH Toolbox Standing Balance Test by Age Group	Standing Balance Test (theta)			Balance Unadjusted Scale Score			Balance Fully Adjusted Scale Score		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Age Group									
3	96	-1.50	0.31	96	75.41	5.05	84	100.17	8.29
4	174	-1.27	0.30	174	79.20	4.84	162	99.59	7.98
5	185	-1.08	0.28	185	82.22	4.52	167	99.90	7.60
6	185	-0.86	0.29	185	85.75	4.54	168	100.14	7.47
7	224	-0.67	0.31	224	88.60	4.97	200	99.48	7.40
8	188	-0.55	0.32	188	90.39	5.05	180	100.00	7.92
9	200	-0.22	0.31	200	95.52	4.75	188	99.91	7.72
10	215	-0.19	0.30	215	96.01	4.62	198	99.70	7.77
11	204	0.03	0.32	204	99.31	5.01	192	99.66	8.06
12	203	0.26	0.34	203	103.03	5.61	193	99.90	8.58
13	208	0.46	0.31	208	106.42	5.50	201	100.13	8.08
14	222	0.52	0.33	222	107.58	5.89	214	100.37	8.33
15	205	0.57	0.35	205	108.54	6.24	199	100.30	8.84
16	204	0.65	0.35	204	109.83	6.27	195	99.80	8.63
17	195	0.76	0.34	195	111.80	6.13	189	100.22	8.33
18 - 29	182	0.78	1.15	182	112.32	21.04	181	100.28	28.15
30 - 39	199	0.70	0.98	199	110.96	17.22	188	100.48	23.20
40 - 49	179	0.79	1.02	179	112.44	18.80	170	100.14	25.02
50 - 59	147	0.61	1.16	147	109.15	20.76	136	99.91	27.47
60 - 69	101	0.31	1.16	101	104.25	19.55	95	100.30	29.58
70 - 85	148	-0.12	0.95	148	97.15	15.11	133	100.41	20.21
All	3864	0.43	0.77	3864	106.35	13.15	3633	100.16	14.51

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 3		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	16	24	40	29	27	56	45	51	96
	Mean	-1.44	-1.52	-1.48	-1.56	-1.51	-1.54	-1.49	-1.52	-1.50
	Standard Deviation	0.55	0.34	0.43	0.20	0.16	0.18	0.36	0.26	0.31
	Minimum Observed	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24
	25th Percentile	-2.24	-1.85	-2.24	-1.83	-1.83	-1.83	-2.24	-1.83	-1.85
	50th Percentile (Median)	-1.51	-1.51	-1.51	-1.51	-1.51	-1.51	-1.51	-1.51	-1.51
	75th Percentile	-0.87	-1.08	-0.88	-1.22	-1.30	-1.22	-0.87	-1.08	-1.07
	Maximum Observed	-0.28	0.02	0.02	-0.50	-0.43	-0.43	-0.28	0.02	0.02

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 4		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	41	52	93	39	42	81	80	94	174
	Mean	-1.37	-1.15	-1.27	-1.33	-1.19	-1.27	-1.36	-1.15	-1.27
	Standard Deviation	0.41	0.34	0.38	0.20	0.18	0.19	0.32	0.28	0.30
	Minimum Observed	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24
	25th Percentile	-1.83	-1.51	-1.61	-1.83	-1.51	-1.70	-1.83	-1.51	-1.61
	50th Percentile (Median)	-1.25	-1.25	-1.25	-1.51	-1.10	-1.22	-1.25	-1.22	-1.25
	75th Percentile	-0.91	-0.87	-0.88	-0.87	-0.77	-0.87	-0.88	-0.87	-0.88
	Maximum Observed	-0.28	0.50	0.50	-0.25	0.02	0.02	-0.25	0.50	0.50

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 5		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	51	58	109	36	40	76	87	98	185
	Mean	-1.18	-0.96	-1.09	-1.02	-1.05	-1.03	-1.16	-0.98	-1.08
	Standard Deviation	0.32	0.34	0.34	0.18	0.20	0.19	0.27	0.29	0.28
	Minimum Observed	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24	-2.24
	25th Percentile	-1.51	-1.22	-1.38	-1.22	-1.44	-1.30	-1.47	-1.25	-1.33
	50th Percentile (Median)	-1.08	-0.88	-1.08	-1.08	-1.07	-1.08	-1.08	-0.91	-1.08
	75th Percentile	-0.72	-0.68	-0.72	-0.68	-0.72	-0.68	-0.72	-0.68	-0.72
	Maximum Observed	-0.43	0.50	0.50	0.02	0.50	0.50	0.02	0.50	0.50

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 6		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	47	56	103	33	49	82	80	105	185
	Mean	-0.98	-0.71	-0.86	-0.88	-0.79	-0.84	-0.96	-0.73	-0.86
	Standard Deviation	0.38	0.30	0.35	0.19	0.20	0.20	0.31	0.26	0.29
	Minimum Observed	-2.24	-1.83	-2.24	-1.61	-2.24	-2.24	-2.24	-2.24	-2.24
	25th Percentile	-1.25	-1.08	-1.10	-1.22	-1.07	-1.08	-1.25	-1.08	-1.10
	50th Percentile (Median)	-0.87	-0.68	-0.87	-0.91	-0.72	-0.84	-0.87	-0.68	-0.87
	75th Percentile	-0.66	-0.28	-0.50	-0.65	-0.43	-0.50	-0.65	-0.28	-0.50
	Maximum Observed	-0.28	0.50	0.50	0.88	0.50	0.88	0.88	0.50	0.88

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 7		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	73	71	144	39	41	80	112	112	224
	Mean	-0.84	-0.35	-0.66	-0.75	-0.67	-0.72	-0.83	-0.40	-0.67
	Standard Deviation	0.33	0.35	0.37	0.19	0.12	0.16	0.29	0.29	0.31
	Minimum Observed	-2.26	-1.35	-2.26	-2.26	-1.73	-2.26	-2.26	-1.73	-2.26
	25th Percentile	-1.13	-0.64	-1.00	-1.13	-0.96	-1.11	-1.13	-0.79	-1.00
	50th Percentile (Median)	-0.82	-0.42	-0.72	-0.70	-0.62	-0.70	-0.81	-0.42	-0.71
	75th Percentile	-0.60	-0.23	-0.35	-0.36	-0.36	-0.36	-0.59	-0.23	-0.35
	Maximum Observed	0.55	3.12	3.12	0.17	0.02	0.17	0.55	3.12	3.12

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 8		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	94	94	188	0	0	0	94	94	188
	Mean	-0.64	-0.42	-0.55				-0.64	-0.42	-0.55
	Standard Deviation	0.29	0.33	0.32				0.29	0.33	0.32
	Minimum Observed	-1.81	-2.26	-2.26				-1.81	-2.26	-2.26
	25th Percentile	-0.95	-0.93	-0.94				-0.95	-0.93	-0.94
	50th Percentile (Median)	-0.64	-0.46	-0.56				-0.64	-0.46	-0.56
	75th Percentile	-0.34	-0.11	-0.23				-0.34	-0.11	-0.23
	Maximum Observed	0.63	0.93	0.93				0.63	0.93	0.93

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 9		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	101	99	200	0	0	0	101	99	200
	Mean	-0.29	-0.12	-0.22				-0.29	-0.12	-0.22
	Standard Deviation	0.32	0.28	0.31				0.32	0.28	0.31
	Minimum Observed	-1.53	-1.48	-1.53				-1.53	-1.48	-1.53
	25th Percentile	-0.64	-0.51	-0.62				-0.64	-0.51	-0.62
	50th Percentile (Median)	-0.23	-0.19	-0.23				-0.23	-0.19	-0.23
	75th Percentile	0.02	0.21	0.15				0.02	0.21	0.15
	Maximum Observed	0.99	1.42	1.42				0.99	1.42	1.42

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 10		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	107	108	215	0	0	0	107	108	215
	Mean	-0.24	-0.10	-0.19				-0.24	-0.10	-0.19
	Standard Deviation	0.33	0.27	0.30				0.33	0.27	0.30
	Minimum Observed	-1.64	-1.37	-1.64				-1.64	-1.37	-1.64
	25th Percentile	-0.64	-0.43	-0.57				-0.64	-0.43	-0.57
	50th Percentile (Median)	-0.34	-0.13	-0.23				-0.34	-0.13	-0.23
	75th Percentile	0.04	0.33	0.20				0.04	0.33	0.20
	Maximum Observed	1.42	1.42	1.42				1.42	1.42	1.42

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 11		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	101	103	204	0	0	0	101	103	204
	Mean	-0.10	0.22	0.03				-0.10	0.22	0.03
	Standard Deviation	0.33	0.28	0.32				0.33	0.28	0.32
	Minimum Observed	-1.36	-2.26	-2.26				-1.36	-2.26	-2.26
	25th Percentile	-0.51	-0.11	-0.36				-0.51	-0.11	-0.36
	50th Percentile (Median)	-0.11	0.33	0.02				-0.11	0.33	0.02
	75th Percentile	0.33	0.55	0.44				0.33	0.55	0.44
	Maximum Observed	0.93	1.77	1.77				0.93	1.77	1.77

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 12		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	94	109	203	0	0	0	94	109	203
	Mean	0.19	0.33	0.26				0.19	0.33	0.26
	Standard Deviation	0.32	0.35	0.34				0.32	0.35	0.34
	Minimum Observed	-1.07	-1.47	-1.47				-1.07	-1.47	-1.47
	25th Percentile	-0.23	-0.10	-0.18				-0.23	-0.10	-0.18
	50th Percentile (Median)	0.21	0.33	0.24				0.21	0.33	0.24
	75th Percentile	0.63	0.63	0.63				0.63	0.63	0.63
	Maximum Observed	1.19	3.12	3.12				1.19	3.12	3.12

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 13		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	111	97	208	0	0	0	111	97	208
	Mean	0.48	0.41	0.46				0.48	0.41	0.46
	Standard Deviation	0.36	0.25	0.31				0.36	0.25	0.31
	Minimum Observed	-1.13	-0.99	-1.13				-1.13	-0.99	-1.13
	25th Percentile	0.14	0.00	0.03				0.14	0.00	0.03
	50th Percentile (Median)	0.55	0.55	0.55				0.55	0.55	0.55
	75th Percentile	0.93	0.72	0.93				0.93	0.72	0.93
	Maximum Observed	2.52	1.58	2.52				2.52	1.58	2.52

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 14		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	108	114	222	0	0	0	108	114	222
	Mean	0.47	0.58	0.52				0.47	0.58	0.52
	Standard Deviation	0.35	0.31	0.33				0.35	0.31	0.33
	Minimum Observed	-1.51	-1.73	-1.73				-1.51	-1.73	-1.73
	25th Percentile	0.03	0.17	0.14				0.03	0.17	0.14
	50th Percentile (Median)	0.55	0.63	0.55				0.55	0.63	0.55
	75th Percentile	0.93	0.93	0.93				0.93	0.93	0.93
	Maximum Observed	2.16	2.32	2.32				2.16	2.32	2.32

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 15		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	102	103	205	0	0	0	102	103	205
	Mean	0.55	0.60	0.57				0.55	0.60	0.57
	Standard Deviation	0.36	0.35	0.35				0.36	0.35	0.35
	Minimum Observed	-0.94	-1.51	-1.51				-0.94	-1.51	-1.51
	25th Percentile	0.17	0.33	0.17				0.17	0.33	0.17
	50th Percentile (Median)	0.63	0.72	0.63				0.63	0.72	0.63
	75th Percentile	0.93	0.93	0.93				0.93	0.93	0.93
	Maximum Observed	2.12	2.12	2.12				2.12	2.12	2.12

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 16		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	100	104	204	0	0	0	100	104	204
	Mean	0.69	0.59	0.65				0.69	0.59	0.65
	Standard Deviation	0.34	0.35	0.35				0.34	0.35	0.35
	Minimum Observed	-0.51	-1.73	-1.73				-0.51	-1.73	-1.73
	25th Percentile	0.33	0.15	0.33				0.33	0.15	0.33
	50th Percentile (Median)	0.63	0.63	0.63				0.63	0.63	0.63
	75th Percentile	0.93	0.93	0.93				0.93	0.93	0.93
	Maximum Observed	3.12	2.16	3.12				3.12	2.16	3.12

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 17		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	92	103	195	0	0	0	92	103	195
	Mean	0.82	0.65	0.76				0.82	0.65	0.76
	Standard Deviation	0.37	0.30	0.34				0.37	0.30	0.34
	Minimum Observed	-1.33	-1.46	-1.46				-1.33	-1.46	-1.46
	25th Percentile	0.63	0.33	0.46				0.63	0.33	0.46
	50th Percentile (Median)	0.93	0.63	0.93				0.93	0.63	0.93
	75th Percentile	0.93	0.93	0.93				0.93	0.93	0.93
	Maximum Observed	2.83	2.52	2.83				2.83	2.52	2.83

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 18-29		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	49	77	126	18	38	56	67	115	182
	Mean	0.74	0.79	0.76	1.12	0.77	0.92	0.77	0.79	0.78
	Standard Deviation	1.50	1.16	1.30	0.83	0.63	0.72	1.37	1.01	1.15
	Minimum Observed	-0.93	-0.51	-0.93	-0.23	-0.39	-0.39	-0.93	-0.51	-0.93
	25th Percentile	0.46	0.39	0.46	0.93	0.41	0.63	0.55	0.39	0.46
	50th Percentile (Median)	0.63	0.93	0.93	0.93	0.93	0.93	0.63	0.93	0.93
	75th Percentile	0.93	1.19	1.12	1.42	0.93	1.42	0.93	1.19	1.12
	Maximum Observed	3.12	2.16	3.12	2.39	2.16	2.39	3.12	2.16	3.12

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 30-39		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	40	93	133	20	46	66	60	139	199
	Mean	0.63	0.71	0.68	1.02	0.71	0.84	0.69	0.71	0.70
	Standard Deviation	1.33	1.00	1.11	0.69	0.57	0.62	1.18	0.88	0.98
	Minimum Observed	-1.51	-1.48	-1.51	-0.47	-1.49	-1.49	-1.51	-1.49	-1.51
	25th Percentile	0.55	0.41	0.46	0.63	0.46	0.55	0.55	0.41	0.46
	50th Percentile (Median)	0.93	0.68	0.91	1.12	0.93	0.93	0.93	0.91	0.93
	75th Percentile	0.93	0.93	0.93	1.42	0.93	1.19	0.93	0.93	0.93
	Maximum Observed	1.42	2.23	2.23	2.12	2.43	2.43	2.12	2.43	2.43

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 40-49		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	42	89	131	21	27	48	63	116	179
	Mean	0.83	0.73	0.77	1.01	0.81	0.92	0.85	0.74	0.79
	Standard Deviation	1.17	1.10	1.12	0.64	0.64	0.64	1.02	1.01	1.02
	Minimum Observed	-0.79	-1.04	-1.04	-0.12	-0.92	-0.92	-0.79	-1.04	-1.04
	25th Percentile	0.50	0.46	0.49	0.63	0.46	0.63	0.63	0.46	0.50
	50th Percentile (Median)	0.93	0.63	0.93	0.93	0.93	0.93	0.93	0.63	0.93
	75th Percentile	1.12	0.93	0.93	1.42	1.12	1.42	1.12	0.93	1.12
	Maximum Observed	2.16	2.43	2.43	2.12	2.60	2.60	2.16	2.60	2.60

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 50-59		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	43	69	112	19	16	35	62	85	147
	Mean	0.60	0.61	0.60	0.80	0.65	0.75	0.62	0.61	0.61
	Standard Deviation	1.18	1.33	1.27	0.74	0.74	0.73	1.07	1.24	1.16
	Minimum Observed	-0.86	-1.27	-1.27	-0.13	-1.48	-1.48	-0.86	-1.48	-1.48
	25th Percentile	0.33	0.33	0.33	0.46	0.46	0.46	0.33	0.33	0.33
	50th Percentile (Median)	0.63	0.63	0.63	0.93	0.93	0.93	0.63	0.63	0.63
	75th Percentile	0.93	0.93	0.93	1.19	0.93	0.93	0.93	0.93	0.93
	Maximum Observed	1.79	2.39	2.39	1.95	1.79	1.95	1.95	2.39	2.39

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 60-69		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	30	46	76	15	10	25	45	56	101
	Mean	0.31	0.32	0.32	0.39	-0.01	0.27	0.32	0.30	0.31
	Standard Deviation	1.35	1.29	1.30	0.45	0.52	0.51	1.13	1.19	1.16
	Minimum Observed	-1.27	-1.44	-1.44	-0.35	-0.79	-0.79	-1.27	-1.44	-1.44
	25th Percentile	-0.03	-0.03	-0.03	0.15	-0.45	-0.03	-0.03	-0.12	-0.03
	50th Percentile (Median)	0.33	0.46	0.37	0.39	-0.08	0.21	0.33	0.44	0.37
	75th Percentile	0.93	0.93	0.93	0.93	0.46	0.63	0.93	0.93	0.93
	Maximum Observed	1.42	1.71	1.71	0.99	0.93	0.99	1.42	1.71	1.71

Table 2. NIH Toolbox Standing Balance Test (theta) – Age 70-85		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	62	65	127	13	8	21	75	73	148
	Mean	-0.09	-0.17	-0.12	0.12	-0.47	-0.05	-0.08	-0.18	-0.12
	Standard Deviation	1.17	0.82	1.00	0.52	0.44	0.51	1.09	0.79	0.95
	Minimum Observed	-1.64	-1.64	-1.64	-1.51	-1.51	-1.51	-1.64	-1.64	-1.64
	25th Percentile	-0.57	-0.57	-0.57	-0.23	-0.79	-0.70	-0.35	-0.70	-0.57
	50th Percentile (Median)	0.02	-0.13	-0.03	0.21	-0.68	-0.03	0.02	-0.13	-0.03
	75th Percentile	0.46	0.39	0.41	0.63	-0.35	0.63	0.46	0.39	0.41
	Maximum Observed	1.51	1.42	1.51	0.93	0.99	0.99	1.51	1.42	1.51

Table 2. NIH Toolbox Standing Balance Test (theta) – NCS Sample of Mothers		English	Spanish	All
	N	66	29	95
	Mean	0.80	0.63	0.75
	Standard Deviation	0.53	0.76	0.61
	Minimum Observed	-1.18	-1.49	-1.49
	25th Percentile	0.55	0.41	0.55
	50th Percentile (Median)	0.93	0.78	0.93
	75th Percentile	0.93	1.12	0.93
	Maximum Observed	1.90	1.56	1.90

Table 2. NIH Toolbox Standing Balance Test (theta) – NCS Sample of Pregnant Women		English	Spanish	All
	N	16	8	24
	Mean	0.68	0.70	0.69
	Standard Deviation	0.57	0.89	0.67
	Minimum Observed	-0.42	-0.39	-0.42
	25th Percentile	0.37	0.18	0.33
	50th Percentile (Median)	0.78	0.44	0.63
	75th Percentile	0.93	1.18	0.93
	Maximum Observed	1.70	2.43	2.43

Figure 1
Least Squares Means

