

Recent Growth
Grade 9/Year 10
Fast Track Project Technical Report
Cynthia Rains
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SAS scoring program

Citation

Instrument

Petersen, A.C., Crockett, L., Richards, M. & Boyer, A. (1988). A self-report measure of pubertal status: Reliability, validity, and initial norms. *Journal of Youth and Adolescence*, 17, 117-133.

Reports

Rains, C. (2003). *Recent Growth* (Fast Track Project Technical Report). [On-line]. Available: <http://www.fasttrackproject.org/>

Nix, R.L. (2001). *Recent Growth* (Fast Track Project Technical Report). [On-line]. Available: <http://www.fasttrackproject.org/>

Jones, D. (1998). *Recent Growth* (Fast Track Project Technical Report). Nashville, TN: Vanderbilt University.

Data Sources

Raw: C10S

Scored: RGR10

I. Scale Description

The Recent Growth measure was adapted from the Pubertal Development Scale (Petersen et al., 1988). In year 10 of this study, Recent Growth is a 16-item scale that assesses children's physical development. There are three items – one each about growth spurts, body hair, and skin changes, such as acne – that both boys and girls answered. There are five items – one each about voice changes, facial hair, leg hair, shaving, and depth of voice – that only boys answered, and six items – two about breast development, two about the onset of menstruation, one about leg hair, and one about hip width – that only girls answered. In addition, both boys and girls were asked one final question comparing their development to other boys or girls at their school. Thus, each boy answers a total of 9 questions and each girl answers a total of 10 questions.

Unlike other scales that assess puberty timing through physicians' direct examinations or with the aid of figure drawings or photographs, Recent Growth relies on children's self-reports. In a large, longitudinal study of children from upper-middle income families, the authors of this scale have demonstrated that the pattern of means among items falls in the expected order; there is satisfactory internal consistency in children's responses; there are few instances in which children report being less well-developed in an area than they have reported previously; observer's global ratings of children's development were

reasonably highly correlated with children's responses; and, direct measures of children's peak height velocity showed the appropriate pattern of correlations with children's self-reports.

II. Report Sample

These exploratory analyses were conducted on the first cohort on the high-risk control sample (N = 155) and the normative sample (N = 387, 463 with overlap) from the tenth year of the study. 105 records were missing the complete measure. 34 records were missing from the control sample (4 from Durham, 13 from Nashville, 8 from Pennsylvania, and 9 from Washington) and 91 records were missing from the normative sample (14 from Durham, 33 from Nashville, 23 from Pennsylvania, and 21 from Washington). These numbers may reflect some overlap between the two samples.

In breaking down the numbers by sex, there were a total of 209 females and 254 males in the first cohort for year 10 of the study. For the males, 63 were missing the complete measure. 28 records were missing from the control sample (3 from Durham, 11 from Nashville, 6 from Pennsylvania, and 8 from Washington) and 51 records were missing from the normative sample (7 from Durham, 20 from Nashville, 11 from Pennsylvania, and 13 from Washington). These numbers may reflect some overlap between the two samples.

For the females, 42 were missing the complete measure. 6 were from the control sample (1 from Durham, 2 from Nashville, 2 from Pennsylvania, and 1 from Washington) and 40 were from the normative sample (7 from Durham, 13 from Nashville, 12 from Pennsylvania, and 8 from Washington). These numbers may reflect some overlap between the two samples.

III. Scaling

The scales for scoring the items on the Recent Growth measure vary with the question being asked. A number of the items for this measure are scored on a scale of 1 to 5, with a low score representing less physical development and a high score representing greater physical development. For several questions in year 8 of the study (as in earlier years), 5 is an "I don't know" option; these questions include growth spurt, body hair, skin changes, breast development for girls, and voice changes and facial hair for boys. Note that in later years (9 and 10) the "I don't know" option was dropped from the computer-administered version of the measure and interviewers administering the interview could use the options of "don't know," "refuse to answer," or "not applicable" to clarify a child's responses.

The measure starts out with three general questions for the child about growth in height, body hair, and skin changes. These are the same questions for both boys and girls. After these questions, the questions become sex specific: a male child has 6 additional questions to answer while a female child has 7 additional questions. For males, the topics include how deep their voices are, whether they have hair on their face, whether they have hair on their legs, how often they shave, whether their voice is lower than when they were in grade school, and how their development compares to other boys in their school. For females, the topics include whether their breasts have started to grow, whether they have begun to menstruate, at what age they began to menstruate, whether they have hair on their legs, whether their breasts are bigger than when they were younger, whether their hips are bigger than when they were younger, and how their development compares to other girls in their school.

All of the items were standardized before scale creation, with a mean of 0.0 and standard deviations of 1.0 due to the variety of scales involved for the items. Summing across the items in the instrument by sex then creates one subscale. For females, item 5 (menstruation onset) was reversed before it was standardized. Subjects were given a missing value on any score in which half or more of the items making up the score were missing. If fewer than half were missing, the missing items were replaced with the mean of the non-missing items.

The second scale was created to be able to compare data across the years. For *Puberty Scales*, the items were not standardized but were rescaled for consistency, so that “0” represents less physical development and a “5” represents greater physical development. The items were then summed to create the scales. Again, for females on both of these scores, item 5 (menstruation onset) was reversed before it was rescaled. As with the first score, subjects were given a missing value on any score in which half or more of the items making up the score were missing. If fewer than half were missing, the missing items were replaced with the mean of the non-missing items.

Cronbach’s alphas were calculated for each score by sex and can be seen in the following table:

Subscales	Cronbach’s Alpha	
	Control Sample	Normative Sample
Puberty Scale Standardized for Males (RGR10PB1)	.75	.80
Puberty Scale Standardized for Females (RGR10PB1)	.64	.68
Puberty Scale for Males (RGR10PB2)	.75	.80
Puberty Scale for Females (RGR10PB2)	.61	.67

Both of the scales showed an adequate level of internal reliability. The reliabilities are slightly higher for males than for females.

IV. Differences between Groups

A series of t-tests comparing the high-risk control sample and the normative sample (including the overlap) indicated no significant differences for any of the subscales.

Recent Growth—Subscale for Females

Variable	Normative Sample		Control Sample		DF	t Value	Pr > t
	Mean	Std Dev	Mean	Std Dev			
Puberty Scale Standardized (RGR10PB1)	0.10	0.55	0.03	0.50	165	-0.68	0.4976
Puberty Scale (RGR10PB2)	3.65	0.58	3.56	0.56	165	-0.83	0.4081

Recent Growth—Subscale for Males

Variable	Normative Sample		Control Sample		DF	t Value	Pr > t
	Mean	Std Dev	Mean	Std Dev			
Puberty Scale Standardized (RGR10PB1)	-0.05	0.64	-0.03	0.58	189	0.23	0.8207
Puberty Scale (RGR10PB2)	2.72	0.83	2.73	0.75	189	0.09	0.9320

Recent Growth—Item for Females

Variable	Normative Sample		Control Sample		DF	t Value	Pr > t
	Mean	Std Dev	Mean	Std Dev			
Age when menstruation started (C10SG6)	12.05	1.51	12.52	1.03	158	1.74	0.0832

V. Recommendations for Use

Analysts should note that the subscale was normally distributed for the normative males and females and for the control males and females.

Analysts should select the subscales that they want to use carefully. If an analysis of gender differences is desired, then analysts should use the first subscale with the standardized items. If an analysis of pubertal growth over a number of years is desired, then analysts should use the second scale with a rescaling of the variables to make the values consistent.

VI. Item and Scale Means and SDs

Recent Growth Items Normative Sample for Females Year 10

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
C10Sa1	Growth Spurt	150	3.047	0.789	1.000	4.000
C10Sa2	Body Hair	150	3.387	0.600	1.000	4.000
C10Sa3	Skin Changes	150	3.080	0.747	1.000	4.000
C10Sg4	Breast Development	150	3.167	0.523	2.000	4.000
C10Sg5	Menstruation Onset	150	3.940	0.421	1.000	4.000
C10Sg6	Age of Menstruation (Years)	143	12.078	1.462	8.083	16.083
C10Sg7	Leg Hair	150	3.440	1.167	1.000	5.000
C10Sg8	Description of Breast Development	150	4.087	0.867	1.000	5.000
C10Sg9	Description of Hip Width	150	3.660	0.826	1.000	5.000
C10Sg10	Development compared - other girls	150	3.413	0.899	1.000	5.000

Recent Growth Items Control Sample for Females Year 10

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
C10Sa1	Growth Spurt	36	3.000	0.586	2.000	4.000
C10Sa2	Body Hair	36	3.278	0.615	2.000	4.000
C10Sa3	Skin Changes	36	2.944	0.826	1.000	4.000
C10Sg4	Breast Development	36	3.083	0.500	2.000	4.000
C10Sg5	Menstruation Onset	36	4.000	0.000	4.000	4.000
C10Sg6	Age of Menstruation (Years)	35	12.519	1.032	9.250	14.583
C10Sg7	Leg Hair	36	3.306	1.390	1.000	5.000
C10Sg8	Description of Breast Development	36	4.194	0.822	1.000	5.000
C10Sg9	Description of Hip Width	36	3.694	0.822	2.000	5.000
C10Sg10	Development compared - other girls	36	3.333	1.121	1.000	5.000

Recent Growth Subscale Normative Sample for Females Year 10

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
RGR10PB1	Puberty Scale Standardized - w/miss Y10	150	0.080	0.547	-2.157	1.310
RGR10PB2	Puberty Scale - w/miss Y10	150	3.624	0.586	1.620	5.000

Recent Growth Subscale Control Sample for Females Year 10

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
RGR10PB1	Puberty Scale Standardized - w/miss Y10	36	0.027	0.498	-1.153	1.022
RGR10PB2	Puberty Scale - w/miss Y10	36	3.556	0.562	2.269	4.676

Recent Growth Items Normative Sample for Males Year 10

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
C10Sa1	Growth Spurt	146	2.774	0.630	1.000	4.000
C10Sa2	Body Hair	146	2.979	0.447	2.000	4.000
C10Sa3	Skin Changes	146	2.719	0.619	1.000	4.000
C10Sb4	Voice Change	146	2.815	0.675	1.000	4.000
C10Sb5	Facial Hair	146	2.370	0.752	1.000	4.000
C10Sb6	Leg Hair	146	3.630	1.004	1.000	5.000
C10Sb7	Shaving	146	2.301	1.577	1.000	6.000
C10Sb8	Voice lower?	146	3.041	1.374	1.000	5.000
C10Sb9	Development compared - other boys	146	3.233	1.064	1.000	5.000

Recent Growth Items Control Sample for Males Year 10

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
C10Sa1	Growth Spurt	85	2.788	0.709	1.000	4.000
C10Sa2	Body Hair	85	3.035	0.522	2.000	4.000
C10Sa3	Skin Changes	85	2.729	0.730	1.000	4.000
C10Sb4	Voice Change	85	2.906	0.648	1.000	4.000
C10Sb5	Facial Hair	85	2.388	0.757	1.000	4.000
C10Sb6	Leg Hair	85	3.706	0.986	1.000	5.000
C10Sb7	Shaving	85	2.188	1.547	1.000	6.000
C10Sb8	Voice lower?	85	3.082	1.311	1.000	5.000
C10Sb9	Development compared - other boys	85	3.129	1.203	1.000	5.000

Recent Growth Subscale Normative Sample for Males Year 10

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
RGR10PB1	Puberty Scale Standardized - w/miss Y10	146	-0.058	0.599	-1.779	1.560
RGR10PB2	Puberty Scale - w/miss Y10	146	2.707	0.778	0.556	4.750

Recent Growth Subscale Control Sample for Males Year 10

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
RGR10PB1	Puberty Scale Standardized - w/miss Y10	85	-0.032	0.584	-1.241	1.504
RGR10PB2	Puberty Scale - w/miss Y10	85	2.731	0.751	1.204	4.676

VII. Item and Scale Correlations

Recent Growth Items Report Sample for Females Year 10

Pearson Correlation Coefficients Prob > r under H0: Rho=0 Number of Observations										
	C10Sa1	C10Sa2	C10Sa3	C10Sg4	C10Sg5	C10Sg6	C10Sg7	C10Sg8	C10Sg9	C10Sg10
C10Sa1 Growth Spurt	1.00000 0.0001 167	0.38791 <.0001 167	0.18580 0.0162 167	0.43763 <.0001 167	0.06669 0.3918 167	-0.17579 0.0262 160	-0.05547 0.4765 167	0.17861 0.0209 167	0.08035 0.3020 167	0.24358 0.0015 167
C10Sa2 Body Hair	0.38791 <.0001 167	1.00000 167	0.35064 <.0001 167	0.39727 <.0001 167	0.31277 <.0001 167	-0.05924 0.4568 160	0.18911 0.0144 167	0.27522 0.0003 167	0.14466 0.0621 167	0.22750 0.0031 167
C10Sa3 Skin Changes	0.18580 0.0162 167	0.35064 <.0001 167	1.00000 167	0.31045 <.0001 167	0.19877 0.0100 167	-0.23663 0.0026 160	0.12901 0.0966 167	0.03343 0.6680 167	0.20515 0.0078 167	0.16495 0.0332 167
C10Sg4 Breast Development	0.43763 <.0001 167	0.39727 <.0001 167	0.31045 <.0001 167	1.00000 167	0.12550 0.1061 167	-0.17735 0.0249 160	0.09336 0.2301 167	0.26190 0.0006 167	0.23240 0.0025 167	0.27445 0.0003 167
C10Sg5 Menstruation Onset	0.06669 0.3918 167	0.31277 <.0001 167	0.19877 0.0100 167	0.12550 0.1061 167	1.00000 167	. 0.4929 160	0.05343 0.4929 167	-0.08915 0.2519 167	-0.05689 0.4652 167	0.10941 0.1593 167
C10Sg6 Age of Menstruation (Years)	-0.17579 0.0262 160	-0.05924 0.4568 160	-0.23663 0.0026 160	-0.17735 0.0249 160	. . 160	1.00000 160	0.06110 0.4428 160	-0.09549 0.2297 160	-0.17026 0.0314 160	-0.24658 0.0017 160
C10Sg7 Leg Hair	-0.05547 0.4765 167	0.18911 0.0144 167	0.12901 0.0966 167	0.09336 0.2301 167	0.05343 0.4929 167	0.06110 0.4428 160	1.00000 167	0.16156 0.0370 167	0.23451 0.0023 167	0.11635 0.1343 167
C10Sg8 Description of Breast Development	0.17861 0.0209 167	0.27522 0.0003 167	0.03343 0.6680 167	0.26190 0.0006 167	-0.08915 0.2519 167	-0.09549 0.2297 160	0.16156 0.0370 167	1.00000 167	0.36993 <.0001 167	0.27377 0.0003 167
C10Sg9 Description of Hip Width	0.08035 0.3020 167	0.14466 0.0621 167	0.20515 0.0078 167	0.23240 0.0025 167	-0.05689 0.4652 167	-0.17026 0.0314 160	0.23451 0.0023 167	0.36993 <.0001 167	1.00000 167	0.26034 0.0007 167
C10Sg10 Development compared - other girls	0.24358 0.0015 167	0.22750 0.0031 167	0.16495 0.0332 167	0.27445 0.0003 167	0.10941 0.1593 167	-0.24658 0.0017 160	0.11635 0.1343 167	0.27377 0.0003 167	0.26034 0.0007 167	1.00000 167

Recent Growth Items Report Sample for Males Year 10

Pearson Correlation Coefficients, N = 191 Prob > r under H0: Rho=0									
	C10Sa1	C10Sa2	C10Sa3	C10Sb4	C10Sb5	C10Sb6	C10Sb7	C10Sb8	C10Sb9
C10Sa1 Growth Spurt	1.00000 0.0029	0.21456 0.0029	0.18459 0.0106	0.23477 0.0011	0.28039 <.0001	0.18411 0.0108	0.22544 0.0017	0.17845 0.0135	0.39460 <.0001
C10Sa2 Body Hair	0.21456 0.0029	1.00000	0.27824 <.0001	0.23867 0.0009	0.28854 <.0001	0.29211 <.0001	0.14898 0.0397	0.18370 0.0110	0.26222 0.0002
C10Sa3 Skin Changes	0.18459 0.0106	0.27824 <.0001	1.00000	0.38854 <.0001	0.31010 <.0001	0.26700 0.0002	0.21892 0.0023	0.29604 <.0001	0.23982 0.0008
C10Sb4 Voice Change	0.23477 0.0011	0.23867 0.0009	0.38854 <.0001	1.00000	0.41166 <.0001	0.39348 <.0001	0.28872 <.0001	0.30989 <.0001	0.42037 <.0001
C10Sb5 Facial Hair	0.28039 <.0001	0.28854 <.0001	0.31010 <.0001	0.41166 <.0001	1.00000	0.44573 <.0001	0.50689 <.0001	0.32592 <.0001	0.45401 <.0001
C10Sb6 Leg Hair	0.18411 0.0108	0.29211 <.0001	0.26700 0.0002	0.39348 <.0001	0.44573 <.0001	1.00000	0.39886 <.0001	0.42432 <.0001	0.32199 <.0001
C10Sb7 Shaving	0.22544 0.0017	0.14898 0.0397	0.21892 0.0023	0.28872 <.0001	0.50689 <.0001	0.39886 <.0001	1.00000	0.45480 <.0001	0.37109 <.0001
C10Sb8 Voice lower?	0.17845 0.0135	0.18370 0.0110	0.29604 <.0001	0.30989 <.0001	0.32592 <.0001	0.42432 <.0001	0.45480 <.0001	1.00000	0.31357 <.0001
C10Sb9 Development compared - other boys	0.39460 <.0001	0.26222 0.0002	0.23982 0.0008	0.42037 <.0001	0.45401 <.0001	0.32199 <.0001	0.37109 <.0001	0.31357 <.0001	1.00000

Recent Growth Subscales Report Sample for Females Year 10

Pearson Correlation Coefficients, N = 167 Prob > r under H0: Rho=0		
	RGR10PB1	RGR10PB2
RGR10PB1 Puberty Scale Standardized - w/miss Y10	1.00000	0.99178 <.0001
RGR10PB2 Puberty Scale - w/miss Y10	0.99178 <.0001	1.00000

Recent Growth Subscales Report Sample for Males Year 10

Pearson Correlation Coefficients, N = 191 Prob > r under H0: Rho=0		
	RGR10PB1	RGR10PB2
RGR10PB1 Puberty Scale Standardized - w/miss Y10	1.00000	0.99700 <.0001
RGR10PB2 Puberty Scale - w/miss Y10	0.99700 <.0001	1.00000