

Recent Growth
Grade 4/Year 5
Fast Track Project Technical Report
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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: C5S

Scored: RGR5

I. Scale Description

The Recent Growth measure was adapted from the Pubertal Development Scale (Petersen et al., 1988). Recent Growth is a self-reported scale that assesses children's physical development that was given to Fast Track participants in years 5 through 10 of the study. For the first two years of the administration of this measure, there are a total of 7 items on the scale. There are three items – one each about growth spurts, body hair, and skin changes, such as acne – that both boys and girls answer. There are two items – one each about voice changes and facial hair– that only boys answered, and two items – one about breast development and one about the onset of menstruation– that only girls answered. Thus, each boy and girl answers a total of 5 questions in years 5 and 6 of the study.

In year 7 of the study, additional gender-specific items were added to the measure: three additional items—one each about leg hair, shaving, and depth of voice – that only boys answered, and four items – another question about breast development, one about the age of 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 in years 7, 8, 9, and 10 of the study.

In year 7, cohort 1 and 3 received the shorter version of the measure and cohort 2 received the longer version of the measure.

II. Report Sample

These 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 fifth year of the study. Fifty-six records were missing the complete measure. Nineteen records were missing from the control sample (7 from Durham, 1 from Nashville, 7 from Pennsylvania, and 4 from Washington) and 47 records were missing from the normative sample (11 from Durham, 10 from Nashville, 16 from Pennsylvania, and 10 from Washington).

In breaking down the numbers by sex, there were a total of 209 females and 254 males in the normative and control samples of the first cohort of the study. For the males, 34 were missing the complete measure. Fourteen records were missing from the control sample (4 from Durham, 6 from Pennsylvania, and 4 from Washington) and 27 records were missing from the normative sample (6 from Durham, 5 from Nashville, 9 from Pennsylvania, and 7 from Washington).

For the females, 22 were missing the complete measure. Five were from the control sample (3 from Durham, 1 from Nashville, and 1 from Pennsylvania) and 20 were from the normative sample (5 from Durham, 5 from Nashville, 7 from Pennsylvania, and 3 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 5 through 8 of the study, response option "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. An "I don't know" option was included in the measure since it was self-administered, because this measure was first administered as a paper and pencil measure and it was unclear if a child was refusing to answer the question, didn't know the answer, or considered the question not applicable. In years 9 and 10, the "I don't know" option was dropped from 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. In years 5 through 8, these "I don't know" responses are recoded to either missing or to "didn't start" depending upon the scale involved in the scoring program.

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 gender-specific.

For the first two scales, in order to do gender comparisons, 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. The two scores (*Puberty Scale-Standardized (don't know=didn't start)* and *Puberty Scale-Standardized (don't know=missing)*) are differentiated by the way the "I don't know" response was coded for the scale. For the first score, items were standardized and summed after recoding "I don't know" to indicate "growth not yet started" (i.e. recoded "5" to be "1"). For the second score, "I don't know" was first recoded to be missing, and then the responses were standardized and summed. The coding for this second score reduced the number of missing values for some items and the score was somewhat more reliable than the first score.

Two other scales were created to be able to compare data across the years. For the other two scales, *Puberty Scale (don't know=didn't start)* and *Puberty Scale (don't know=missing)*, the items were not

standardized but were rescaled for consistency, so that “0” represents less physical development and a “5” represents greater physical development.

For females on all of these scores, item 5 (menstruation onset) was rescaled. All scales are created by taking the mean of the items in the scales. 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 (don’t know=didn’t start)-Males (RGR5PBa)	.38	.35
Puberty Scale-Standardized (don’t know=didn’t start)-Females (RGR5PBa)	.64	.55
Puberty Scale-Standardized (don’t know=missing)-Males (RGR5PBb)	.65	.52
Puberty Scale-Standardized (don’t know=missing)-Females (RGR5PBb)	.73	.53
Puberty Scale (don’t know=didn’t start)-Males (RGR5PBc)	.36	.34
Puberty Scale (don’t know=didn’t start)-Females (RGR5PBc)	.64	.55
Puberty Scale (don’t know=missing)-Males (RGR5PBd)	.64	.52
Puberty Scale (don’t know=missing)-Females (RGR5PBd)	.73	.52

While most of the scales showed an adequate level of internal reliability, the control samples for *Puberty Scale Standardized (don’t know=didn’t start) for males* and for *Puberty Scale (don’t know=didn’t start) for males* showed a low level of internal consistency. The reliabilities were higher for those scores that converted “I don’t know” to missing as opposed to converting them to “growth not yet started.” The scores for females were also higher than those for males.

IV. Differences between Groups

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

Comparison of Means for Normative and Control for RGR Y5--females								
Variable	Label	Normative		Control		DF	t Value	Pr > t
		Mean	Std Dev	Mean	Std Dev			
RGR5PBa	Puberty Scale Standardized - don’t know=didn’t start RGR Y5	0.01	0.65	-0.10	0.59	185	-0.96	0.3371
RGR5PBb	Puberty Scale Standardized - don’t know=. RGR Y5	0.02	0.70	-0.07	0.62	171	-0.61	0.5438
RGR5PBc	Puberty Scale - don’t know=didn’t start RGR Y5	0.69	0.57	0.58	0.51	185	-1.00	0.3180
RGR5PBd	Puberty Scale - don’t know=. RGR Y5	0.82	0.63	0.74	0.54	171	-0.65	0.5156

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

Comparison of Means for Normative and Control for RGR Y5--males

Variable	Label	Normative		Control		DF	t Value	Pr > t
		Mean	Std Dev	Mean	Std Dev			
RGR5PBa	Puberty Scale Standardized - don't know=didn't start RGR Y5	0.04	0.53	-0.05	0.53	218	-1.25	0.2133
RGR5PBb	Puberty Scale Standardized - don't know=. RGR Y5	0.03	0.62	-0.08	0.59	193	-1.26	0.2074
RGR5PBc	Puberty Scale - don't know=didn't start RGR Y5	0.66	0.43	0.59	0.43	218	-1.20	0.2330
RGR5PBd	Puberty Scale - don't know=. RGR Y5	0.81	0.51	0.72	0.50	193	-1.22	0.2242

V. Recommendations for Use

Analysts should note that the subscales were 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 two subscales with the standardized items. If an analysis of pubertal growth over a number of years is desired, then analysts should use the second two scales with a rescaling of the variables to make the values consistent.

Analysts who use this version of the measure might also want to consider recoding the “I don’t know” responses to missing. The reliabilities for the scales using this method were adequate compared to the coding of these variable responses to “growth not yet started.”

VI. Item and Scale Means and SDs

Recent Growth Items Normative Sample for Females Year 5

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
C5SA1r1	Growth Spurt - don't know = didn't start	170	1.653	0.858	1.000	4.000
C5SA2r1	Body Hair - don't know = didn't start	170	1.747	0.884	1.000	4.000
C5SA3r1	Skin Changes - don't know = didn't start	169	1.657	0.824	1.000	4.000
C5SG4r1	Breast Development - don't know = didn't start	166	1.928	0.843	1.000	4.000
c5sG5x	Rescaled - Menstruation Onset	167	0.377	0.998	0.000	3.000
C5SA1r2	Growth Spurt - don't know = missing	99	2.121	0.860	1.000	4.000
C5SA2r2	Body Hair - don't know = missing	146	1.870	0.896	1.000	4.000
C5SA3r2	Skin Changes - don't know = missing	146	1.760	0.841	1.000	4.000
C5SG4r2	Breast Development - don't know = missing	142	2.085	0.812	1.000	4.000

Recent Growth Items Control Sample for Females Year 5

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
C5SA1r1	Growth Spurt - don't know = didn't start	37	1.568	0.899	1.000	4.000
C5SA2r1	Body Hair - don't know = didn't start	37	1.865	0.887	1.000	4.000
C5SA3r1	Skin Changes - don't know = didn't start	37	1.351	0.676	1.000	4.000
C5SG4r1	Breast Development - don't know = didn't start	36	1.944	0.860	1.000	4.000
c5sG5x	Rescaled - Menstruation Onset	36	0.167	0.697	0.000	3.000
C5SA1r2	Growth Spurt - don't know = missing	18	2.167	0.985	1.000	4.000
C5SA2r2	Body Hair - don't know = missing	32	2.000	0.880	1.000	4.000
C5SA3r2	Skin Changes - don't know = missing	25	1.520	0.770	1.000	4.000
C5SG4r2	Breast Development - don't know = missing	32	2.063	0.840	1.000	4.000

Recent Growth Subscales Normative Sample for Females Year 5

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
RGR5PBa	Puberty Scale Standardized - don't know=didn't start RGR Y5	170	-0.006	0.641	-0.790	1.945
RGR5PBb	Puberty Scale Standardized - don't know=. RGR Y5	157	0.004	0.693	-1.048	2.235
RGR5PBc	Puberty Scale - don't know=didn't start RGR Y5	170	0.674	0.564	0.000	2.400
RGR5PBd	Puberty Scale - don't know=. RGR Y5	157	0.808	0.617	0.000	2.750

Recent Growth Subscales Control Sample for Females Year 5

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
RGR5PBa	Puberty Scale Standardized - don't know=didn't start RGR Y5	37	-0.104	0.585	-0.790	1.565
RGR5PBb	Puberty Scale Standardized - don't know=. RGR Y5	33	-0.066	0.617	-0.993	1.406
RGR5PBc	Puberty Scale - don't know=didn't start RGR Y5	37	0.584	0.509	0.000	2.000
RGR5PBd	Puberty Scale - don't know=. RGR Y5	33	0.739	0.542	0.000	2.000

Recent Growth Items Normative Sample for Males Year 5

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
C5SA1r1	Growth Spurt - don't know = didn't start	170	1.888	0.932	1.000	4.000
C5SA2r1	Body Hair - don't know = didn't start	170	1.776	0.882	1.000	4.000
C5SA3r1	Skin Changes - don't know = didn't start	170	1.524	0.918	1.000	4.000
C5SB4r1	Voice Change - don't know = didn't start	169	1.663	0.778	1.000	4.000
C5SB5r1	Facial Hair - don't know = didn't start	169	1.414	0.711	1.000	4.000
C5SA1r2	Growth Spurt - don't know = missing	121	2.248	0.878	1.000	4.000
C5SA2r2	Body Hair - don't know = missing	145	1.910	0.889	1.000	4.000
C5SA3r2	Skin Changes - don't know = missing	141	1.631	0.974	1.000	4.000
C5SB4r2	Voice Change - don't know = missing	140	1.800	0.788	1.000	4.000
C5SB5r2	Facial Hair - don't know = missing	146	1.479	0.745	1.000	4.000

Recent Growth Items Control Sample for Males Year 5

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
C5SA1r1	Growth Spurt - don't know = didn't start	98	1.878	0.900	1.000	4.000
C5SA2r1	Body Hair - don't know = didn't start	98	1.633	0.854	1.000	4.000
C5SA3r1	Skin Changes - don't know = didn't start	99	1.505	0.885	1.000	4.000
C5SB4r1	Voice Change - don't know = didn't start	99	1.636	0.775	1.000	4.000
C5SB5r1	Facial Hair - don't know = didn't start	99	1.283	0.640	1.000	4.000
C5SA1r2	Growth Spurt - don't know = missing	66	2.303	0.803	1.000	4.000
C5SA2r2	Body Hair - don't know = missing	79	1.785	0.887	1.000	4.000
C5SA3r2	Skin Changes - don't know = missing	84	1.595	0.933	1.000	4.000
C5SB4r2	Voice Change - don't know = missing	85	1.741	0.789	1.000	4.000
C5SB5r2	Facial Hair - don't know = missing	78	1.359	0.702	1.000	4.000

Recent Growth Subscales Normative Sample for Males Year 5

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
RGR5PBa	Puberty Scale Standardized - don't know=didn't start RGR Y5	170	0.038	0.548	-0.754	2.007
RGR5PBb	Puberty Scale Standardized - don't know=. RGR Y5	149	0.020	0.631	-0.950	2.949
RGR5PBc	Puberty Scale - don't know=didn't start RGR Y5	170	0.654	0.445	0.000	2.200
RGR5PBd	Puberty Scale - don't know=. RGR Y5	149	0.796	0.518	0.000	3.000

Recent Growth Subscales Control Sample for Males Year 5

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
RGR5PBa	Puberty Scale Standardized - don't know=didn't start RGR Y5	99	-0.049	0.531	-0.754	2.007
RGR5PBb	Puberty Scale Standardized - don't know=. RGR Y5	86	-0.078	0.591	-0.950	1.761
RGR5PBc	Puberty Scale - don't know=didn't start RGR Y5	99	0.587	0.430	0.000	2.200
RGR5PBd	Puberty Scale - don't know=. RGR Y5	86	0.717	0.495	0.000	2.200

VII. Item and Subscale Correlations

Recent Growth Items Report Sample for Females with Missing Year 5

Pearson Correlation Coefficients Prob > r under H0: Rho=0 Number of Observations					
	C5SA1r2	C5SA2r2	C5SA3r2	C5SG4r2	c5sG5x
C5SA1r2 Growth Spurt - don't know = missing	1.000 106	0.212 0.038 96	0.042 0.691 91	0.251 0.014 95	0.097 0.332 103
C5SA2r2 Body Hair - don't know = missing	0.212 0.038 96	1.000 161	0.246 0.003 139	0.506 0.000 144	0.268 0.001 159
C5SA3r2 Skin Changes - don't know = missing	0.042 0.691 91	0.246 0.003 139	1.000 157	0.218 0.012 134	0.456 0.000 154
C5SG4r2 Breast Development - don't know = missing	0.251 0.014 95	0.506 0.000 144	0.218 0.012 134	1.000 157	0.350 0.000 156
c5sG5x Rescaled - Menstruation Onset	0.097 0.332 103	0.268 0.001 159	0.456 0.000 154	0.350 0.000 156	1.000 184

Recent Growth Items Report Sample for Females with No Missing Year 5

Pearson Correlation Coefficients Prob > r under H0: Rho=0 Number of Observations					
	C5SA1r1	C5SA2r1	C5SA3r1	C5SG4r1	c5sG5x
C5SA1r1 Growth Spurt - don't know = didn't start	1.000 187	0.232 0.001 187	0.089 0.229 186	0.186 0.012 182	0.024 0.744 184
C5SA2r1 Body Hair - don't know = didn't start	0.232 0.001 187	1.000 187	0.263 0.000 186	0.494 0.000 182	0.299 0.000 184
C5SA3r1 Skin Changes - don't know = didn't start	0.089 0.229 186	0.263 0.000 186	1.000 186	0.207 0.005 181	0.430 0.000 183
C5SG4r1 Breast Development - don't know = didn't start	0.186 0.012 182	0.494 0.000 182	0.207 0.005 181	1.000 182	0.348 0.000 181
c5sG5x Rescaled - Menstruation Onset	0.024 0.744 184	0.299 0.000 184	0.430 0.000 183	0.348 0.000 181	1.000 184

Recent Growth Items Report Sample for Males with Missing Year 5

Pearson Correlation Coefficients Prob > r under H0: Rho=0 Number of Observations					
	C5SA1r2	C5SA2r2	C5SA3r2	C5SB4r2	C5SB5r2
C5SA1r2 Growth Spurt - don't know = missing	1.000 152	0.226 0.009 134	0.061 0.490 132	0.158 0.069 133	0.084 0.333 135
C5SA2r2 Body Hair - don't know = missing	0.226 0.009 134	1.000 185	0.156 0.048 161	0.308 0.000 156	0.330 0.000 163
C5SA3r2 Skin Changes - don't know = missing	0.061 0.490 132	0.156 0.048 161	1.000 186	-0.028 0.730 156	0.009 0.905 164
C5SB4r2 Voice Change - don't know = missing	0.158 0.069 133	0.308 0.000 156	-0.028 0.730 156	1.000 183	0.257 0.001 160
C5SB5r2 Facial Hair - don't know = missing	0.084 0.333 135	0.330 0.000 163	0.009 0.905 164	0.257 0.001 160	1.000 185

Recent Growth Items Report Sample for Males with No Missing Year 5

Pearson Correlation Coefficients Prob > r under H0: Rho=0 Number of Observations					
	C5SA1r1	C5SA2r1	C5SA3r1	C5SB4r1	C5SB5r1
C5SA1r1 Growth Spurt - don't know = didn't start	1.000 219	0.107 0.114 219	0.006 0.932 219	0.106 0.117 218	0.085 0.210 218
C5SA2r1 Body Hair - don't know = didn't start	0.107 0.114 219	1.000 219	0.018 0.787 219	0.191 0.005 218	0.277 0.000 218
C5SA3r1 Skin Changes - don't know = didn't start	0.006 0.932 219	0.018 0.787 219	1.000 220	-0.051 0.457 219	-0.002 0.978 219
C5SB4r1 Voice Change - don't know = didn't start	0.106 0.117 218	0.191 0.005 218	-0.051 0.457 219	1.000 219	0.183 0.007 219
C5SB5r1 Facial Hair - don't know = didn't start	0.085 0.210 218	0.277 0.000 218	-0.002 0.978 219	0.183 0.007 219	1.000 219

Recent Growth Subscales Report Sample for Females Year 5

Pearson Correlation Coefficients Prob > r under H0: Rho=0 Number of Observations				
	RGR5PBa	RGR5PBb	RGR5PBc	RGR5PBd
RGR5PBa Puberty Scale Standardized - don't know=didn't start RGR Y5	1.000 187	0.957 0.000 173	0.999 0.000 187	0.973 0.000 173
RGR5PBb Puberty Scale Standardized - don't know=. RGR Y5	0.957 0.000 173	1.000 173	0.956 0.000 173	0.993 0.000 173
RGR5PBc Puberty Scale - don't know=didn't start RGR Y5	0.999 0.000 187	0.956 0.000 173	1.000 187	0.975 0.000 173
RGR5PBd Puberty Scale - don't know=. RGR Y5	0.973 0.000 173	0.993 0.000 173	0.975 0.000 173	1.000 173

Recent Growth Subscales Report Sample for Males Year 5

Pearson Correlation Coefficients Prob > r under H0: Rho=0 Number of Observations				
	RGR5PBa	RGR5PBb	RGR5PBc	RGR5PBd
RGR5PBa Puberty Scale Standardized - don't know=didn't start RGR Y5	1.000 220	0.935 0.000 195	0.997 0.000 220	0.943 0.000 195
RGR5PBb Puberty Scale Standardized - don't know=. RGR Y5	0.935 0.000 195	1.000 195	0.926 0.000 195	0.991 0.000 195
RGR5PBc Puberty Scale - don't know=didn't start RGR Y5	0.997 0.000 220	0.926 0.000 195	1.000 220	0.942 0.000 195
RGR5PBd Puberty Scale - don't know=. RGR Y5	0.943 0.000 195	0.991 0.000 195	0.942 0.000 195	1.000 195