

**Super Why Summer Camp Assessment Findings**

**Summer 2008**

**Report Prepared by Dr. Beth M. Phillips  
Florida Center for Reading Research  
Florida State University**

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## **Descriptive Report on Camp Participants**

During the summer of 2008, children participated in the week-long Super Why Summer Camp in 33 different locations, in 17 States, and representing 19 Ready to Learn PBS Member Stations (See Appendix A for a list of sites). The largest percentage of the sample was associated with WNED in Buffalo, New York, which hosted seven of the camps. The second largest percentage was associated with WPSU in Lewiston, Pennsylvania which hosted three camps. All other stations hosted 1-2 camps only. The number of child participants in each camp location varied widely, from just 5 to 21. The average number of camp participants was approximately 14 children.

Across the 33 sites there were a total of 454 camp participants with at least partial assessment data. For each variable, including demographic characteristics, a small percentage of data is missing. All subsequent reporting of percentages and other statistics are with respect to the available valid data. Within the full sample, 54.2% were boys, 45.8% girls. A wide range of ethnic backgrounds were represented (but note that 22.5% of the sample did not have ethnicity data available). The overall sample with available data included 25.9% Caucasian, 44% African American, 24.4% Hispanic, 1.7% Middle Eastern, 0.6% South Asian, and 3.4% of mixed ethnicity.

The sample included children ranging in age from 3 to 7 years old. Of the full sample, 0.9% were 3, 33.1% were 4, 56.2% were 5, 9.6% were 6, and 0.2% were 7. The median age was 5 years old. Mean age and the associated standard deviation cannot be meaningfully computed because all ages are reported as truncated integers, rather than by years and months.

Data reported in Table 1 reflect the ethnic background, gender, and typical age for each of the 33 camp sites. Empty cells in the table reflect sites for which data were available for less than 50% of the participants.

**Table 1. Demographic Data on Camp Participants, By Camp Site**

<b>Camp Site</b>	<b>% 5 years old or older</b>	<b>% Female</b>	<b>% Caucasian, % African American, % All Others</b>		
APT- Alabama	78%	56%	11%	89%	0%
KAET-Phoenix	56%	--	0%	0%	100%
KPBS - Calexico	65%	50%	0%	0%	100%
KPBS - National City	67%	44%	0%	0%	100%
KQED - Oakland	33%	17%	0%	67%	33%
WFSU-Tallahassee 1	84%	58%	0%	100%	0%
WFSU-Tallahassee 2	94%	62%	0%	100%	0%
IPTV - Perry	65%	53%	47%	0%	53%
WSIU - Carbondale	61%	33%	89%	0%	11%
LPB – Baton Rouge	75%	50%	0%	100%	0%
MPT-Baltimore 1	83%	46%	0%	100%	0%
MPT- Baltimore 2	11%	44%	0%	100%	0%
MPB - Jackson 1	50%	21%	69%	23%	8%
MPB - Jackson 2	36%	29%	64%	29%	7%
WNED - UB South	60%	60%	0%	100%	0%
WNED - Westminster	50%	42%	0%	100%	0%
WNED - Langfield	20%	67%	0%	100%	0%
WNED - Jefferson	DNR	80%		Data not reported	
WNED - Westminster	60%	54%	0%	100%	0%
WNED - GKA 1	71%	14%		Data not reported	
WNED - GKA 2	46%	36%		Data not reported	
WGTE- Toledo	83%	46%	50%	25%	25%
WPSU - Lewiston 1	100%	50%	67%	0%	33%
WPSU - Lewiston 2	100%	36%	92%	0%	8%
WPSU - Lewiston 3	100%	67%	100%	0%	0%
WLJT - Martin 1	56%	38%	15%	85%	0%
WLJT - Martin 2	69%	54%	39%	54%	7%
WNPT - Nashville	86%	15%	17%	0%	83%
KLRN - San Antonio	60%	60%	0%	0%	100%
WHRO - Norfolk	25%	42%	8%	50%	42%
WVPT - McDowell	60%	80%	100%	0%	0%
WHUT - DC 1	61%	6%	22%	17%	61%
WHUT - DC 2	100%	60%	0%	100%	0%

## Summary Description of Assessment Measures

### *Procedures*

All assessments were conducted in one-on-one sessions with individual children. For all measures, the pretest was conducted prior to the initiation of any camp activities. Then, each posttest measure was completed on the day that the specific skill became the focus of the intervention activities across the first four days of the camp. Specifically, Letter Naming and Letter Pointing were completed after the intervention on Day 1, Decoding was assessed on Day 2, Encoding was completed on Day 3, and finally Reading was assessed on Day 4. All measures were identical at pre-and posttest and all were administered with the same standardized procedure.

### *Measures*

**Letter Naming (expressive).** Children were asked to name 10 letters shown on individual cards. These 10 letters included P, W, I, L, B, T, A, O, F, G.

**Letter Identification (receptive-pointing).** Children were shown an array of letter of the alphabet on a card and were told the name of 10 letters (the same letters, different order) and asked to point to the letter in the visual array.

**Decoding.** Children were shown six CVC words in the –ALL rime family presented in all capital letters (i.e., WALL, TALL, BALL, FALL, HALL, CALL). Children were given a point for each word read, either in onset-rime form (e.g., W-ALL) or fluently.

**Letter Sounds.** Children were told to name the letter that makes each of 11 presented sounds (e.g., “what letter makes the /l/ sound as in ladder?”).

**Encoding.** Children were asked to orally spell two words in the –IG rime family (i.e., BIG, PIG). Partial credit was given for each correct letter, regardless of order, and additional points were given for spelling the word in the correct order.

**Reading sight words/identifying opposites.** Children were shown two cards with three lower case words arrayed vertically. For each card, children were presented with a question that asked them to name or point to the word that was the opposite of a spoken word (e.g., “Which word is the opposite of big, is it small, red, or good?”). Children were then asked to point to the same word on the card (e.g., “Which is the word small?”). If children did not initially respond correctly to the word-identification query, they were given a second opportunity to respond to the question with a first letter prompt (e.g., “Which one is the word good, I think it starts with the letter g?”). Children earned a point for each opposite correctly named (2), and for each sight word correctly identified on the card (2).

### Pretest Sample Characteristics

Pretest data are reported first for the full composite sample, and then by each camp site. Across the six assessment measures between 3.7 and 6.8% of the pretest data were missing. Means and standard deviations for each of the six pretest variables are presented in Table 2. Notably, the scores for each measure spanned the full range, indicating wide variability in performance at pretest. One other way to conceptualize these data is to determine what percentage of the sample received zeros on each measure, and what percentage likewise received perfect scores. These percentages are included in Table 2. These figures indicate the range of difficulty of the various measures, spanning the simpler letter identification tasks to the much more sophisticated decoding and encoding tasks. These percentages also highlight the potential challenge to showing significant growth across the pre- to posttest time span for the letter naming tasks that are skewed toward ceiling.

**Table 2. Descriptive Data for Pretest Measures, Full Sample**

Measure	Maximum Possible	Mean	SD	Range	% scoring zero	% scoring at ceiling
Letters - Naming	10	7.80	3.07	0 – 10	3.1%	49.1%
Letters – Pointing	10	7.76	3.12	0 – 10	3.6%	50.5%
Decoding	6	1.13	2.01	0 – 6	68.0%	9.8%
Letter Sound	11	5.94	3.64	0 – 11	12.4%	10.4%
Encoding	8	2.14	2.62	0 – 8	41.3%	10.0%
Reading	4	2.40	1.25	0 – 4	8.2%	26.0%

Note. *N* ranges from 438 to 452.

Analyses indicated that there were minimal differences within the full sample by gender. For only one measure at pretest, Letter Pointing, was there a significant difference (i.e.,  $F = 10.28$ ,  $p < .01$ ), such that girls scored approximately one point higher, on average. Given the minimal differences, boys and girls were combined for all subsequent analyses.

Given the wide age range represented in the full sample, data are also reported separately in Table 3 for children ages 3 - 4 ( $N = 150$ ) and those ages 5 - 7 ( $N = 295$ ). At pretest, one-way ANOVA indicated that the two age group subsamples differed significantly on all six measures (i.e., all  $p$ 's  $< .02$ ).

**Table 3. Descriptive Statistics for Pretest Measures, by age group**

Measure	Maximum Possible	Mean	SD	Range	% scoring zero	% scoring at ceiling
<b>Younger Sample (Ages 3- 4 years, N =142-150)</b>						
Letters - Naming	10	7.13	3.23	0 – 10	3.3%	35.3%
Letters – Pointing	10	7.01	3.43	0 – 10	7.0%	39.4%
Decoding	6	0.79	1.66	0 – 6	73.3%	6.0%
Letter Sound	11	5.03	3.65	0 – 11	17.3%	8.7%
Encoding	8	1.57	2.22	0 – 8	47.3%	4.7%
Reading	4	2.10	1.25	0 – 4	12.4%	18.6%
<b>Older Sample (Ages 5- 7 years, N =287-295)</b>						
Letters - Naming	10	8.14	2.93	0 – 10	2.7%	55.9%
Letters – Pointing	10	8.17	2.88	0 – 10	2.1%	56.7%
Decoding	6	1.30	2.14	0 – 6	65.2%	11.6%
Letter Sound	11	6.44	3.54	0 – 11	9.5%	11.5%
Encoding	8	2.44	2.75	0 – 8	37.5%	12.6%
Reading	4	2.54	1.22	0 – 4	6.3%	29.3%

### Posttest Sample Characteristics

Full sample posttest data are presented in Table 4. As with the pretest data, the percentages of the sample scoring at floor or ceiling values also are presented. As at pretest, the full range of possible scores is represented for each measure. Data are presented separately for the younger and older subsamples in Table 5. One-way ANOVA again indicated that the two subsamples differed significantly on all six measures at posttest (i.e., all  $p$ 's <.05).

**Table 4. Descriptive Data for Posttest Measures, Full Sample**

Measure	Maximum Possible	Mean	SD	Range	% scoring zero	% scoring at ceiling
Letters - Naming	10	8.21	2.91	0 – 10	2.1%	59.9%
Letters – Pointing	10	8.08	2.95	0 – 10	1.9%	56.9%
Decoding	6	2.70	2.39	0 – 6	28.5%	24.9%
Letter Sound	11	7.01	3.60	0 – 11	6.4%	19.7%
Encoding	8	3.94	3.21	0 – 8	23.7%	30.1%
Reading	4	3.10	1.08	0 – 4	2.6%	49.0%

Note. N ranges from 418 to 429.

Analyses of the posttest data also indicated that there were minimal differences within the full sample by gender. As at pretest for only one measure, Letter Pointing, was there a significant difference (i.e.,  $F = 8.41$ ,  $p < .01$ ), such that girls scored approximately .75 points higher, on average.

**Table 5. Descriptive Statistics for Posttest Measures, by age group**

<b>Measure</b>	<b>Maximum Possible</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>% scoring zero</b>	<b>% scoring at ceiling</b>
<b>Younger Sample (Ages 3- 4 years, N =138-141)</b>						
Letters - Naming	10	7.56	3.14	0 – 10	2.9%	46%
Letters – Pointing	10	7.42	3.28	0 – 10	3.6%	47.1%
Decoding	6	2.30	2.23	0 – 6	30.4%	18.8%
Letter Sound	11	5.91	3.63	0 – 11	8.6%	12.1%
Encoding	8	3.13	2.99	0 – 8	29.1%	18.4%
Reading	4	2.77	1.10	0 – 4	3.6%	31.2%
<b>Older Sample (Ages 5- 7 years, N =273-285)</b>						
Letters - Naming	10	8.54	2.72	0 – 10	1.8%	66.5%
Letters – Pointing	10	8.40	2.73	0 – 10	1.1%	62.1%
Decoding	6	2.92	2.43	0 – 6	26.8%	28.3%
Letter Sound	11	7.60	3.45	0 – 11	5.1%	24.1%
Encoding	8	4.40	3.23	0 – 8	20.1%	36.5%
Reading	4	3.25	1.04	0 – 4	2.2%	57.5%

### By Camp

For descriptive purposes only, pretest and posttest means and standard deviations are presented in Table 6 separately for each sample. Great caution should be exercised in evaluating these data, given the very small sample sizes in virtually all sites. Sample sizes at all sites are too small to conduct meaningful individual analyses of gains from pretest to posttest. That is, the very small sample sizes would yield results that are not significant because of minimal statistical power, unreliable because of the small sample size, or both.

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**Table 6. Pretest and Posttest Average Scores and Standard Deviations (*italics*) by Camp Site.**

Station	Camp Site	Name- Pre	Name - Post	Point - Pre	Point - Post	Decode -Pre	Decode - Post	Letter Sounds - Pre	Letter Sounds - Post	Encode - Pre	Encode -Post	Reading - Pre	Reading - Post
APT	Alabama	7.89	9.13	7.11	7.88	1.00	3.57	6.00	7.78	2.44	5.11	2.38	3.13
		<i>3.33</i>	<i>1.13</i>	<i>3.37</i>	<i>2.53</i>	<i>2.00</i>	<i>2.82</i>	<i>3.54</i>	<i>3.56</i>	<i>2.40</i>	<i>3.33</i>	<i>1.30</i>	<i>1.36</i>
KAET	Phoenix	6.56	7.13	6.88	6.94	0.56	1.93	4.94	5.83	1.06	2.62	1.81	2.36
		<i>3.86</i>	<i>3.86</i>	<i>4.01</i>	<i>4.06</i>	<i>1.50</i>	<i>1.39</i>	<i>3.36</i>	<i>4.91</i>	<i>2.05</i>	<i>2.93</i>	<i>1.11</i>	<i>1.09</i>
KPBS	Calexico	7.33	8.14	6.90	7.33	3.38	4.50	6.90	8.00	4.45	5.30	2.48	3.43
		<i>3.07</i>	<i>2.33</i>	<i>3.02</i>	<i>2.63</i>	<i>2.01</i>	<i>1.73</i>	<i>2.65</i>	<i>2.68</i>	<i>2.87</i>	<i>3.23</i>	<i>0.98</i>	<i>0.93</i>
KPBS	National City	8.37	8.37	8.47	8.58	2.26	3.00	6.00	7.05	1.58	2.47	2.68	3.42
		<i>3.27</i>	<i>3.00</i>	<i>2.99</i>	<i>3.02</i>	<i>2.58</i>	<i>2.36</i>	<i>3.22</i>	<i>3.33</i>	<i>2.22</i>	<i>2.52</i>	<i>1.49</i>	<i>0.84</i>
KQED	Oakland	6.50	6.67	6.17	7.00	2.20	1.17	2.67	5.83	1.67	1.33	1.67	1.67
		<i>2.88</i>	<i>2.42</i>	<i>3.92</i>	<i>2.50</i>	<i>2.49</i>	<i>1.17</i>	<i>2.58</i>	<i>3.82</i>	<i>1.51</i>	<i>1.97</i>	<i>0.82</i>	<i>1.03</i>
WFSU	Tallahassee 1	8.58	9.39	8.21	8.61	0.84	2.33	6.16	7.06	2.63	3.89	2.16	2.44
		<i>2.59</i>	<i>1.46</i>	<i>2.62</i>	<i>1.98</i>	<i>1.80</i>	<i>2.81</i>	<i>3.53</i>	<i>3.44</i>	<i>2.91</i>	<i>3.01</i>	<i>1.07</i>	<i>1.15</i>
WFSU	Tallahassee 2	9.13	9.13	9.06	8.63	1.44	3.50	8.31	8.33	4.00	4.80	2.63	2.79
		<i>1.96</i>	<i>2.33</i>	<i>2.24</i>	<i>2.45</i>	<i>2.58</i>	<i>2.71</i>	<i>3.52</i>	<i>3.35</i>	<i>3.33</i>	<i>3.39</i>	<i>1.41</i>	<i>1.63</i>
IPTV	Perry	8.06	8.59	8.12	8.06	0.47	2.13	6.06	8.12	0.82	5.47	2.65	3.24
		<i>2.56</i>	<i>2.43</i>	<i>2.34</i>	<i>2.73</i>	<i>1.50</i>	<i>1.54</i>	<i>3.36</i>	<i>3.24</i>	<i>1.24</i>	<i>3.34</i>	<i>1.17</i>	<i>1.03</i>
WSIU	Carbondale	6.83	6.89	5.67	7.22	0.33	2.71	4.61	4.75	1.50	3.13	1.94	3.13
		<i>3.59</i>	<i>3.66</i>	<i>3.99</i>	<i>3.08</i>	<i>0.97</i>	<i>2.34</i>	<i>3.62</i>	<i>3.72</i>	<i>1.69</i>	<i>3.38</i>	<i>1.16</i>	<i>0.99</i>
LPB	Baton Rouge	8.25	8.68	8.16	8.68	1.58	3.74	4.80	7.75	2.50	5.60	2.21	3.55
		<i>3.19</i>	<i>2.98</i>	<i>3.29</i>	<i>3.16</i>	<i>2.29</i>	<i>2.56</i>	<i>4.57</i>	<i>4.09</i>	<i>3.09</i>	<i>3.53</i>	<i>1.44</i>	<i>1.05</i>
MPT	Baltimore 1	8.67	8.83	8.67	8.83	0.83	2.83	6.67	6.92	2.58	5.08	2.50	3.17
		<i>2.57</i>	<i>2.86</i>	<i>2.84</i>	<i>2.37</i>	<i>1.85</i>	<i>2.41</i>	<i>3.94</i>	<i>3.45</i>	<i>2.27</i>	<i>3.20</i>	<i>1.45</i>	<i>0.83</i>
MPT	Baltimore 2	8.33	8.75	8.11	8.63	0.00	2.67	6.22	7.57	1.11	3.86	2.00	2.57
		<i>2.83</i>	<i>2.77</i>	<i>2.62</i>	<i>2.72</i>	<i>0.00</i>	<i>2.73</i>	<i>3.42</i>	<i>2.37</i>	<i>1.45</i>	<i>2.34</i>	<i>0.50</i>	<i>0.98</i>
MPB	Jackson 1	8.64	9.07	8.57	8.79	2.57	4.29	7.79	8.54	2.21	5.23	3.00	3.07
		<i>2.53</i>	<i>1.94</i>	<i>2.87</i>	<i>2.89</i>	<i>2.79</i>	<i>2.05</i>	<i>3.51</i>	<i>2.57</i>	<i>2.33</i>	<i>2.98</i>	<i>0.88</i>	<i>1.21</i>
MPB	Jackson 2	8.86	9.36	8.71	9.14	1.64	3.36	7.36	6.93	1.64	4.00	2.86	2.92
		<i>1.46</i>	<i>1.22</i>	<i>1.90</i>	<i>1.70</i>	<i>2.31</i>	<i>2.02</i>	<i>2.44</i>	<i>2.89</i>	<i>2.79</i>	<i>3.23</i>	<i>1.29</i>	<i>1.19</i>
WNED	Buffalo - UB South	9.40	9.60	9.40	9.90	0.00	0.70	7.30	8.40	3.00	2.60	2.60	3.00
		<i>1.07</i>	<i>0.97</i>	<i>1.26</i>	<i>0.32</i>	<i>0.00</i>	<i>0.67</i>	<i>2.00</i>	<i>1.51</i>	<i>2.00</i>	<i>2.22</i>	<i>0.97</i>	<i>1.05</i>

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Station	Camp Site	Name- Pre	Name - Post	Point - Pre	Point - Post	Decode -Pre	Decode - Post	Letter Sounds - Pre	Letter Sounds - Post	Encode - Pre	Encode -Post	Reading - Pre	Reading - Post
WNED	Buffalo - Westminster	6.83	7.42	7.00	7.33	1.42	4.73	5.42	7.75	1.92	3.63	2.73	3.63
		3.66	3.58	4.11	3.92	2.57	2.20	3.60	4.06	2.39	2.94	0.91	0.74
WNED	Buffalo - Langfield	8.40	8.92	8.33	8.67	1.47	2.31	6.67	7.23	2.47	4.31	2.08	3.08
		2.32	2.54	2.61	2.90	2.36	2.66	2.38	2.71	2.20	2.78	1.00	1.08
WNED	Buffalo - Jefferson	7.60	6.75	7.80	8.25	0.80	1.20	5.00	6.40	1.20	1.60	3.40	4.00
		3.36	3.95	1.30	2.06	1.79	2.17	3.67	2.61	1.79	1.67	0.89	0.00
WNED	Buffalo - Westminster	7.53	7.38	7.27	7.38	0.00	1.00	5.73	6.57	0.13	1.79	1.60	2.30
		3.11	3.55	3.49	3.71	0.00	0.88	2.99	2.93	0.52	2.19	0.91	1.25
WNED	Buffalo - GKA 1	9.29	9.57	9.29	8.71	0.00	0.29	8.00	8.00	1.86	2.67	2.14	2.86
		0.76	1.13	1.11	1.60	0.00	0.76	1.91	1.79	0.38	2.81	1.07	0.69
WNED	Buffalo - GKA 2	6.90	8.57	7.80	7.86	0.40	2.00	6.60	7.70	1.20	2.90	1.40	3.30
		3.18	2.44	3.01	3.53	0.97	2.45	4.12	3.47	2.53	2.51	0.97	0.68
WGTE	Toledo	8.08	8.54	7.38	8.46	1.00	1.77	4.77	5.54	0.31	3.54	2.00	3.23
		2.99	3.38	3.57	3.36	2.08	2.49	3.42	2.85	0.48	3.18	1.10	0.83
WPSU	Lewiston 1	5.00	5.38	5.71	5.54	0.07	1.50	3.71	4.00	0.14	1.77	2.42	3.43
		4.13	3.89	3.69	3.21	0.27	1.99	3.79	3.63	0.36	3.00	1.17	0.76
WPSU	Lewiston 2	6.83	7.58	6.67	7.50	0.33	1.78	3.67	6.60	1.83	3.70	2.08	3.42
		3.30	3.20	3.47	3.55	1.15	1.64	2.90	2.84	1.85	3.77	1.16	1.00
WPSU	Lewiston 3	7.17	7.83	6.92	7.83	1.42	2.27	4.75	5.92	1.08	3.00	2.67	3.17
		2.89	3.24	3.06	3.43	1.51	2.23	3.60	4.08	1.08	3.16	1.15	1.19
WLJT	Martin 1	6.33	6.80	7.44	7.87	1.06	1.38	5.06	5.14	1.27	2.64	2.19	2.93
		3.20	2.91	2.53	2.97	1.12	1.45	2.59	3.42	1.39	2.44	1.11	0.96
WLJT	Martin 2	5.08	4.92	4.85	4.92	0.00	1.00	2.69	3.33	0.31	2.08	1.85	2.42
		4.03	3.75	4.08	3.87	0.00	1.00	2.84	3.26	0.63	2.91	1.21	0.79
WNPT	Nashville	8.36	8.85	7.64	8.31	1.79	3.08	5.43	6.77	2.29	3.15	2.29	3.00
		2.90	2.61	3.13	2.90	2.55	2.25	4.72	4.17	2.02	3.24	1.49	1.23
KLRN	San Antonio	7.40	7.73	7.55	7.27	0.45	0.92	4.55	4.89	0.55	3.00	2.67	2.72
		3.55	3.06	3.47	3.04	1.19	1.75	3.68	4.28	1.43	2.85	1.03	0.90
WHRO	Norfolk	6.33	7.50	NA	8.42	0.00	2.50	3.42	7.00	1.83	3.92	1.00	2.92
		3.20	2.78	NA	2.35	0.00	2.02	2.81	3.30	2.52	2.54	1.28	1.38
WVPT	McDowell County	8.20	8.00	8.10	7.44	3.00	3.22	5.80	7.22	3.56	4.00	3.29	3.29
		2.90	3.35	2.85	3.50	2.91	2.68	4.42	4.58	3.68	3.32	1.50	1.50
WHUT	Ross Elementary	9.83	9.94	10.00	9.89	1.22	4.83	10.44	11.00	6.44	8.00	3.83	3.88
		0.38	0.24	0.00	0.32	2.26	1.79	0.92	0.00	1.89	0.00	0.51	0.50
WHUT	Howard Rd. Academy	10.00	10.00	10.00	9.93	2.07	5.20	9.87	10.57	6.20	7.86	3.67	3.93
		0.00	0.00	0.00	0.27	2.31	2.11	1.06	0.65	2.43	0.54	0.72	0.27

Figure 1. Change From Pretest to Posttest, Full Sample

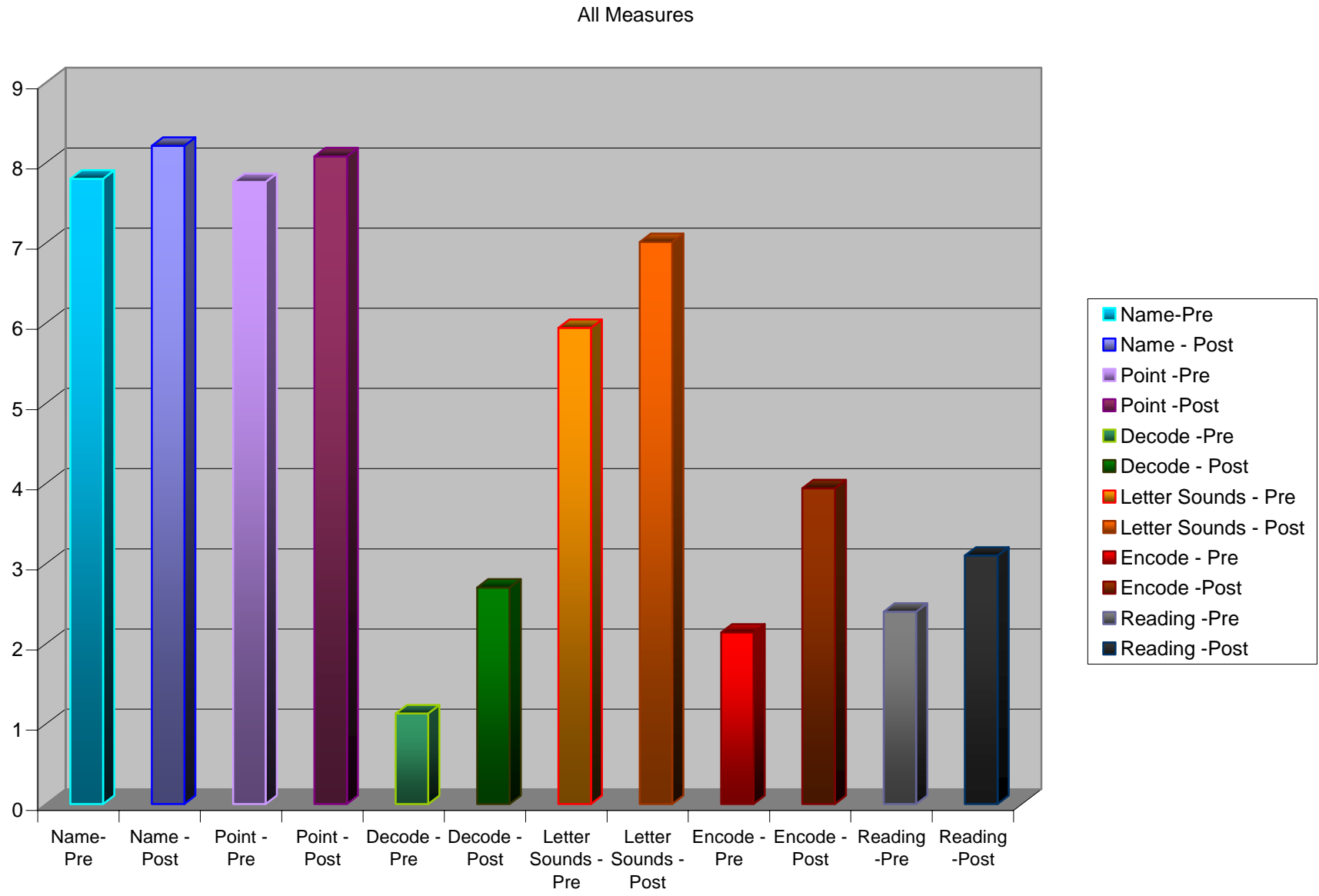


Figure 2. Change From Pretest to Posttest, Younger Sample

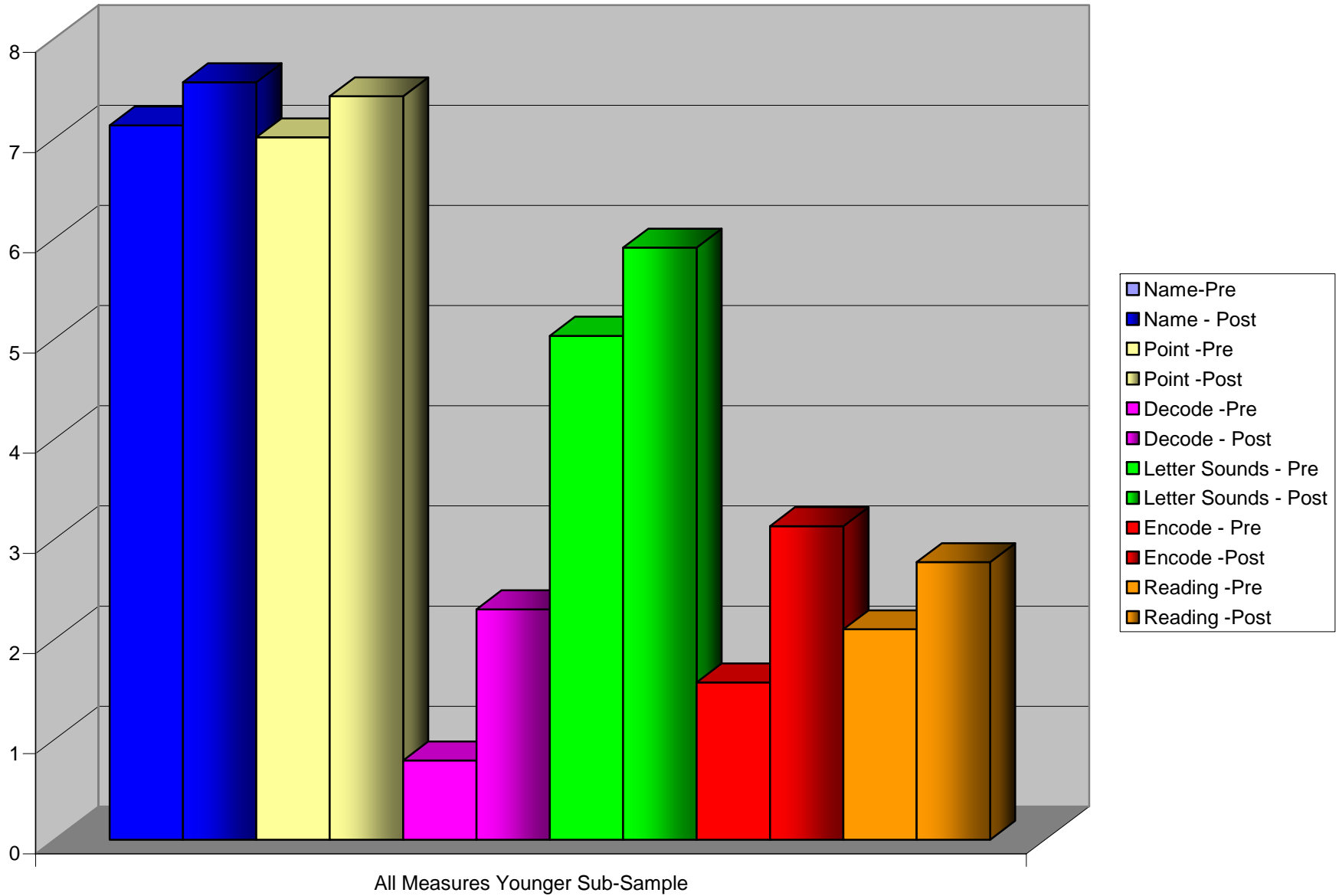
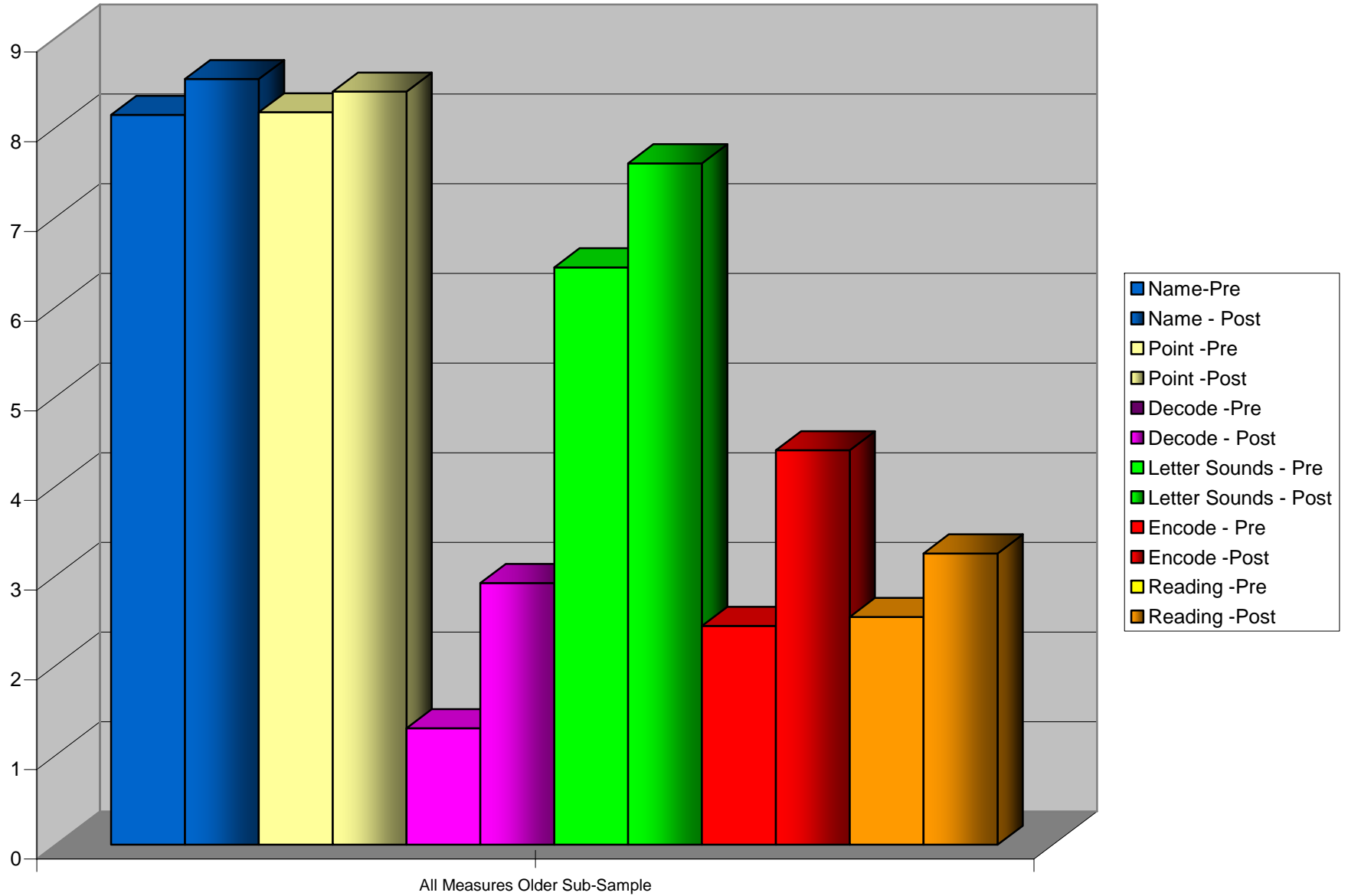


Figure 3. Change From Pretest to Posttest, Older Sample



### Change from Pre- to Posttest

A series of repeated-measure ANOVAs were conducted on the six measures to explore whether there was significant growth in the pre- to posttest interval. All analyses were conducted in SPSS using Type 3 sums of squares. Analyses were first conducted on the full sample. For Letter Naming, the change was significant ( $F = 47.33, p < .001$ ). For Letter Pointing, the change was significant ( $F = 12.05, p < .01$ ). For Decoding, the change was significant ( $F = 207.78, p < .001$ ). For Letter Sounds, the change was significant ( $F = 82.55, p < .001$ ). For Encoding, the change was significant ( $F = 179.18, p < .001$ ). For Reading sight words, the change was significant ( $F = 121.66, p < .001$ ). Thus, for the full sample, all measures showed evidence of significant increase between pre- and posttest assessment waves.

Given the significant differences at both pretest and posttest between the scores of the younger and older samples, the analyses were repeated for each subgroup separately. For the younger group, the change across time was significant for Letter Naming ( $F = 29.33, p < .001$ ), Letter Pointing ( $F = 6.26, p < .05$ ), Decoding, ( $F = 57.62, p < .001$ ), Letter Sounds ( $F = 25.60, p < .001$ ), Encoding ( $F = 52.2, p < .001$ ), and Reading sight words ( $F = 33.31, p < .001$ ).

For the older group, the change across time was significant for Letter Naming ( $F = 21.85, p < .001$ ), Letter Pointing ( $F = 4.60, p < .05$ ), Decoding, ( $F = 151.06, p < .001$ ), Letter Sounds ( $F = 54.92, p < .001$ ), Encoding ( $F = 127.59, p < .001$ ), and Reading sight words ( $F = 87.13, p < .001$ ). Therefore, the significant gains from pretest to posttest were replicated across both age groups.

## Summary & Conclusions

Overall, across both younger and older age groups, results indicate that scores on six different early literacy tasks demonstrated evidence of reliable growth from the pretest to the post-test. Improved performance on these six tasks was significantly greater than what would have been expected by chance fluctuations alone. These six tasks were created to measure early literacy skills that were taught through camp intervention activities and that were featured in the Super Why episode undergirding the camps. While we are unable to conclusively argue that camp participation caused preschoolers' early literacy skills to change favorably, these results do indicate that preschoolers' early literacy skills significantly improved from pretest to post-test and that camp participation is one plausible explanation for this growth.

While demonstrating learning from pretest to posttest that can be causally linked to camp participation is essential, in order for this project to succeed long-term, it is important that children like the program and the camp activities; that teachers be able to implement the lesson plans easily and effectively; and that assessment procedures designed to monitor preschoolers' progress be efficient, understandable, and scalable. Anecdotal observations of the campers provided evidence of their engagement with and liking of the program, its characters, and related camp activities. Teachers were able to use the provided instructional materials with little difficulty as well as to administer assessments and interpret results easily and effectively. The preschoolers' percentage gains combined with teachers' favorable impressions of the camps support the efficacy of this type of intervention model.

Next steps including using experimental frameworks to affirmatively demonstrate that the intervention was a cause of the score increase. The length of the pretest to posttest intervals varied across camps, and across measures. Whereas all pretest data were collected across one or more days prior to the beginning of the Camp, posttest data were collected on the specific target day for that instructional focus. Thus, the pre-to posttest interval for the letter naming measures may have been as little as a single day. For this reason, and because of the lack of a control group, the data should be interpreted with caution.

While the results of these camps suggest that they can be an effective tool in jump-starting children's acquisition of early literacy skills, there are several limitations that warrant caution. Most significantly, the design used to test the

effectiveness of the reading camps involved a one-group, pretest/posttest design. The absence of a control group invalidates any causal claims; that is, we cannot conclusively say that improvements were due to the activities and viewing that children did while at the camp. There may be any number of other explanations for the significant gains found from pretest to posttest (e.g., maturation: normal developmental growth from the start to the end of the intervention period; testing: the pretest provided practice on the format and content that may have inflated post-test scores).

Another caution concerns the tasks used to measure content-specific literacy skills. There are no psychometric data available to establish the reliability and validity of the six tasks used to measure learning as a result of participation in the camps. While the items have face validity (i.e., they appear to measure early literacy skills), no other psychometric indicators are available.

Care should be taken not to overstate these findings. The data generated from each of these camps can be considered as multiple independent replications that establish the feasibility of the instructional model, the methods of data collection, and the potential benefits of participation in these reading camps. Now that the materials and the feasibility of the camps have been established, future studies must include appropriate features (i.e., control groups) that help establish causality. To date, an experimental study has causally linked preschoolers' viewing of Super Why with their acquisition of early literacy skills (Linebarger, McMnamin, & Wainwright, 2009). Another study has documented increases in literacy skills as a function of multiple repetitions of the same episode of Super Why (Rosenburg, Sansanelli, Cami, & Brown-O'Gorman, 2009). All of these studies paint a similar picture of the efficacy of Super Why as a tool to support preschoolers' early literacy skills.

## REFERENCES

Linebarger, D. L., McMenamin, K., & Wainwright, D. K. (2009). *Summative evaluation of Super Why: Outcomes, does, and appeal*. A final report prepared for Corporation for Public Broadcasting. Philadelphia, PA: Annenberg School for Communication, University of Pennsylvania.

Rosenburg, A. J., Sansanelli, R. A., Cami, A., & Brown-O'Gorman, J. (2009, April). Super Why! = super reading: The effects of viewing the PBS program Super Why! on preschoolers' literacy development. Poster presented at the biennial meeting of the Society for Research in Child Development. Denver, CO.

## Appendix A

**Table A. List of Camps by State and Member Station**

Camp	State	Camp Number	Station	City	Number of Campers Assessed
1	AL	1	APT	Unknown	9
2	AZ	1	KAET	Phoenix	16
3	CA	1	KPBS	Calexico	21
4	CA	2	KPBS	National City	19
5	CA	1	KQED	Oakland	6
6	FL	1	WFSU	Leon County	19
7	FL	2	WFSU	Leon County	16
8	IA	1	IPTV	Perry	17
9	IL	1	WSIU	Carbondale	18
10	LA	1	LPB	Baton Rouge	20
11	MD	1	MPT	Baltimore	12
12	MD	2	MPT	Baltimore	9
13	MS	1	MPB	Jackson	14
14	MS	2	MPB	Jackson	14
15	NY	1	WNED	Buffalo - UB South	10
16	NY	2	WNED	Buffalo - Westminster	12
17	NY	3	WNED	Buffalo - Langfield	15
18	NY	4	WNED	Buffalo - Jefferson	5
19	NY	5	WNED	Buffalo - Westminster	15
20	NY	6	WNED	Buffalo - GKA	7
21	NY	7	WNED	Buffalo - GKA	11
22	OH	1	WGTE	Toledo	13
23	PA	1	WPSU	Lewiston	14
24	PA	2	WPSU	Lewiston	12
25	PA	3	WPSU	Lewiston	12
26	TN	1	WLJT	Martin	16
27	TN	2	WLJT	Martin	13
28	TN	3	WNPT	Nashville	14
29	TX	1	KLRN	San Antonio	20
30	VA	1	WHRO	Norfolk	10
31	WV	1	WVPT	McDowell County	12
32	DC	1	WHUT	Ross Elementary Howard Road	18
33	DC	2	WHUT	Academy	15