

HOW BEGINNING, DEVELOPING AND INDEPENDENT READERS
IN A WHOLE LANGUAGE SECOND GRADE CLASSROOM CORRELATE
WITH A KNOWLEDGE OF PHONICS.

THESIS

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Chapter I

Statement of the Problem

In a whole language program phonics is taught on a need to know basis. Reading is taught as an interaction of reader and text in an effort to generate meaning from the text. Phonics or the recognition of symbol/sound relationships is taught as one strategy for helping to access meaning from text. (Holdaway, 1979; Weaver, 1988) A book is taught whole to part, and phonics is usually taught as the smallest part.

In an atomistic or traditional skills based classroom, reading is often taught as a conglomeration of skills. It is basically accepted that once you can sound out the words, you can read. The sounds that are associated with each symbol are considered of key importance and are often taught with worksheets separately from text. Basal readers are used that limit the vocabulary and sounds to vocabulary and sound/symbol relationships that have been taught. They are often uninteresting and unnatural. Although meaning is discussed, basically decoding is emphasized

as the key to reading or worse yet, thought of as reading.

There has been considerable research that backs up each paradigm, but very little research that adequately compares one with the other. The purpose of this research was to establish the connection between a knowledge of phonics and reading ability at the end of second grade. A heterogeneous western New York district that adheres to the whole language paradigm was the sampling population considered.

Questions to be Answered

1. Does a knowledge of symbol/sound relationships imply that this knowledge is used when reading?
2. How does a knowledge of phonics group around beginning, developing and independent second grade readers?

Need for the Study

Whole language is often misunderstood to mean that phonics need not be taught. Because it is only

one of many strategies to be used in gaining meaning from text, it is taught on a need to know basis. The proponents of the code emphasis approach believe that a child will not learn to read well without a systematic teaching of phonics. Studies have been conducted which show that overemphasis on phonics and an atomistic approach can often produce children who can decode beautifully and accurately and yet who gain no meaning from the text. There has not yet been a great deal of research that compares one approach with the other. Few studies have been conducted to compare a knowledge of phonics with ability to read and understand text in children whose district adheres to a whole language paradigm.

Definition of Terms

Phonics - symbol/sound relationships, an understanding of the human speech sounds which letters represent.

Reading - an interaction with the text by a reader to generate meaning from the text via various strategies.

Decoding - Applying knowledge of symbol/sound relationships to text without necessarily attempting to gain meaning from the text.

Knowledge of phonics - a knowledge of symbol/sound relationships as determined by the El Paso Phonics Elements Test.

Beginning reader - a reader who measures at an instructional level between 30 and 39 DRP on a record of reading behavior.

Developing reader - a reader who scores at an instructional level between 40 and a 45 DRP on a record of reading behavior. Students who score between 45 and 50 are determined as developing or independent readers by the examiner's assessment of the strategies they use, their self correction rate, their fluency and their comprehension.

Independent reader - a reader who scores at an instructional level 49 DRP or greater on a record of reading behavior.

Instructional level on a DRP - Achieving an accuracy level of 90% - 95% on a DRP with a self correction

rate of 1:4 or better and having a retelling that indicates adequate comprehension of the story.

Miscue Analysis - An analysis of the differences between expected and observed responses during oral reading for the purpose of determining the reader's strategies, error rate, self-correction rate, and reading level on a record of reading behavior.

Record of Reading Behavior - An effective technique for observing and recording a student's oral reading behavior in a procedure similar to an informal reading inventory.

DRP - A Degree of Reading Power. A number assigned to a reading passage that indicates the degree of difficulty of that passage.

Limitations of the Study

This study used a small sampling of students. A larger sample of students would have been preferred. Comprehension was checked subjectively by the examiner as being either poor, partial, full or full and detailed.

The first grade experience of these students has not been analyzed. This is not an oversight. Although the district these students attend adheres to a whole language paradigm and mandates instruction in the form of inservice courses in whole language to all of its teachers, the purpose of this research was not to see if children undergoing instruction in a whole language paradigm know their phonics or can read. That is the subject of another study. The purpose of this study was simply to see how a knowledge of phonics (no matter how it is acquired) correlates with ability to read at the end of second grade. The El Paso Phonics Survey tells us only which phonic elements the child can accurately read on the day s/he took the test. It does not tell us how these phonic elements were learned or when. It is possible, for instance, that the phonic elements were learned as a result of reading rather than prior to reading.

Testing was done over a 52 day period from April 28 to June 19. If all subjects had been tested in a one week period in the end of June, results may have been slightly different. Those subjects who were tested in the end of April may have grown some by the end of June.

In the original plan for this study, the students were only going to be grouped as beginning, developing or independent readers. Thus when a student achieved an instructional DRP of 49 or above and was classified as an independent learner, the subject was not always tested to obtain an instructional DRP. If instructional level had been obtained on these subjects, the r^2 , already significant at 47%, would have been greater.

Chapter II

Review of the Literature

The debate over the best method of teaching reading is centuries old. According to Holdaway (1979), every generation had its favorite methodology that achieved success for some but left out those with behavior problems or those who were considered dull, poor or otherwise unteachable. "The swinging pendulum became an all too accurate symbol of educational thinking and an indictment on the common sense of a people and a profession." (p. 25)

Most methodologies offered a valuable insight into one small piece of the reading puzzle but did not construct the whole puzzle. One reason for this was that these methodologies were based on an atomistic or skill building approach that was easily assessed. Each methodology addressed an important piece of the puzzle, but only a piece. In the late 1950's after the failure of the look-say approach, the pendulum swung again; and the teaching of phonics was offered as the answer to the question: "Why can't Johnny read?" Jeanne Chall (1963) in her very influential

book, The Great Debate, attempted to summarize the current research of the day and came to the conclusion that Johnny couldn't read because he didn't know his phonics. The pendulum swung and America put much educational effort into emphasizing an atomistic skills building approach to teaching reading throughout the 1960's and 1970's.

Anderson, Hiebert, Scott, and Wilkinson, (1984) in Becoming a Nation of Readers: The Report of the Commission on Reading, which relied heavily on Chall's research synthesis, decided that it is not a matter of "whether children should be taught phonics. The issues now are specific ones of just how it should be done" (p.36). It should be noted here that both paradigms agree on this point, however they hold widely disparate views as to how phonics should be taught. Although she does not recommend ignoring reading for meaning, Chall recommends code emphasis as a beginning reading method. In support of her contention she cites much of the research of her day. The Report of the Commission on Reading (op.cit.) goes on to say that "Classroom research [referenced to Chall's book, The Great Debate] shows that on average, children who are taught phonics get off to a better

start in learning to read than children who are not taught phonics" (p. 37). Historically, teachers who used basal readers taught phonics and then gave children practice selections with which to practice the lesson taught. The selections had limited word vocabularies and unnatural language.

In some post 1984 research the systematic teaching of phonics is supported. Ehri (1987) found that cypher readers who look at symbol/sound relationships had an ultimate advantage over cue readers who look at configuration. In a study of the causal relationships between phonics, reading comprehension, vocabulary and reading achievement in second grade students Eldredge, Quinn, and Butterfield (1990) found that "phonics knowledge was a cause of higher scores on reading comprehension and vocabulary tests, the findings indicate that reading comprehension causes growth in general vocabulary knowledge" (p. 207-208). While Eldredge et al. (1990) also indicated that they were not advocating phonics instruction without instruction in the other cueing systems, they were attempting to prove the assumption that phonics and blending knowledge improved word recognition which improved comprehension

(p.210). They also found that "phonics knowledge positively affects sight word recognition, which positively affects reading fluency, which positively affects reading comprehension which positively affects vocabulary growth" (p.212). They concluded that,

The findings indicate that phonics knowledge has a causal impact on both reading comprehension and vocabulary gains...and...that phonics instruction designed to help students recognize the consistent graphophonemic patterns in the English language should be emphasized in early elementary grade reading instruction. (p.212)

Chall (1989) quotes Diedrich (1973) as saying, "One of the few conclusions of reading research in which we can have a high degree of confidence is that earlier and more systematic instruction in phonics is essential." (p.527) Stanovich (1987) reports that "phonological awareness measures administered in kindergarten or earlier are superior to IQ tests as predictors of future reading achievement." Students at risk of reading failure have long been thought to be deficient in phonological processing. Chall (1989) in The Great Debate, 20 Years Later quotes Liberman (1979), "The results of research have...I think...justified our assumption providing evidence that deficits of phonological processing do, indeed, underlie

many of the difficulties that poor readers and spellers have" (p. 1). Chall's premise was that a systematic teaching of phonics was necessary in grades one and two "to facilitate word recognition and fluency which in turn facilitate reading comprehension which in turn opens the world of books to children" (p. 528).

According to Carbo (1988) Chall's research analysis in The Great Debate had a great influence on television shows such as "Sesame Street" and "The Electric Company" which emphasize an atomistic approach and legitimized it for parents and teachers.

It should be noted that most of the evidence in favor of teaching systematic phonics does not delineate whether or not the reader is understanding what has been read or is simply decoding. The basic understanding of the definition of reading is that reading is an effort to gain meaning from text by decoding.

Although there is much evidence in favor of the teaching of systematic phonics, there is also much research evidence against it. Many children who were taught to read using the systematic phonic approach can decode without getting any meaning from the text. Their concept of reading is one of decoding rather than of interacting with text in a meaningful way. Some students were successful, but many were

not. The eighties brought new questions. Johnny still couldn't read as well as the children of other nations. The United States ranked 49th of the 159 nations in the United Nations (Carbo, 1989). This was a poor showing for one of the richest nations in the world. New Zealand was first. New Zealand uses a holistic, whole to part meaning based emphasis rather than an atomistic approach to teaching reading. According to Anderson, et al. (1984) in the Report of the Commission on Reading, reading is defined as "a process of extracting meaning from written text" (p.4). Since then, other experts have defined reading as a sociopsycholinguistic process in which readers interact with text in order to gain meaning from text. (Weaver, 1988; May, 1986) There is an important distinction to be made between "extracting meaning" from a text and "interacting with a text." The former implies that the meaning is there for anyone to decode, the latter definition notes that the reader must bring his experience to the text in order for the text to have any meaning. Learning to read in a holistic paradigm is now tied inextricably with writing, speaking and listening.

Studies by Goodman, Harste, and Woodward (1981,1983) saw literacy not as series of stages but rather "in terms of four specific language strategies - text intent,

negotiability, risk-taking, and fine tuning language with language." (Newman, 1985). As to whether or not phonics is taught in a whole language program, Shapiro and Gunderson (1988) found that "Whole language programs result in acquisition of phonic skills and the application of these skills in spelling." (p.45)

The whole language philosophy of learning sees literacy and the learning of reading as inseparable from the learning of writing, speaking and listening. (Sampson, 1986)

According to Weaver (1988) there are several problems with teaching a code emphasis approach:

(1) since vowels are relatively unimportant in identifying words, it seems unnecessary to teach numerous vowel rules, as many phonics programs do; (2) spelling/sound correspondences are often very complex and not easily reduceable to rules that can or should be taught; (3) only a few of the frequently taught rules are both consistent and comprehensive--that is, applicable to a considerable number of words, and (4) even most of these rules do not need to be explicitly taught to whole classes of children, since most children can and will internalize spelling/sound patterns just by reading and writing a lot, and or with minimal guidance. The most crucial problem with phonics instruction may be this... [it] encourages readers to rely on one language cue system, the graphophonemic. And sole reliance on one system makes the task of reading inordinately difficult, if not impossible. (p. 101)

Weaver (1988) supports the belief that the optimum amount of phonics to be taught should be the least amount of phonics taught for a child to become an independent reader. Weaver also points out that Chall's idea of a meaning based approach lumped a sight word approach with a language experience approach. Many prior research conclusions are comparing different aspects of the atomistic approach rather than comparing an atomistic (phonics) approach to a holistic (whole language) approach.

The new paradigm of the eighties looks at the way literacy develops as parallel to the way speech develops. (Holdaway, 1983; Sampson, 1986; Weaver, 1988). Thus according to Sampson (1986) by the time formal instruction begins in first grade, much literacy learning has already taken place.

Weaver (1988) concludes that there are several reasons why the old atomistic paradigm must be replaced by the new holistic paradigm. She lists 6 points: 1) phonics learning and analysis requires an analytical learning style that according to Piaget is inappropriate for the development of first graders; 2) natural observations of how children learn to speak; 3) the model of proficient readers; 4) problems with the unpredictability of phonics rules; 5) observations of how children learn naturally-- those who

learn to read before they get to school; 6) success of the whole language approach (p. 101).

Marie Carbo (1989) cites,

"In a study of 18,216 students, the Portland public schools reported significantly higher reading achievement after one year of implementing a whole language program, compared to achievement during the previous five years when the Houghton Mifflin basal series and Economy's Key Text basal series were used. Results were significantly higher for all groups: Native Americans, Asians, blacks, Hispanics and whites. (p.240)

According to Weaver (1988) both camps, atomistic and holistic, will agree that there are no research studies that adequately compare the two paradigms or that conclusively decide the issue.

Chapter III

Design of the Study

Purpose

The purpose of this research was to determine how a knowledge of phonics correlates with beginning, developing and independent readers in a second grade classroom. It is this researcher's belief that subjects who do well on the phonics analysis test will not center around any particular group of readers.

Subjects

The subjects of this study were a heterogeneous group of 23 second grade students from a suburban Western New York School District. There were 11 girls and 12 boys. Three children were diagnosed as having an Attention Deficit Disorder. Two of those children were labeled Learning Disabled and attend Learning Center for language arts instruction. One of these two has other serious learning disabilities. A fourth child was diagnosed during the year as being dyslexic. This child was far behind his peers at

the beginning of the year in reading. A fifth child was diagnosed in the spring as having memory problems. This child's reading was highly overpredictive. She had difficulties in all areas of learning including reading.

Method

The El Paso Phonics Survey was administered individually to each child. Each child was told that s/he would be reading nonsense words. When presented with the task of reading the El Paso Phonics Survey, one child with learning disabilities insisted he could not do it. The researcher asked him how much he thought he could do in one day. The child indicated he thought he could read the first 40 elements and that he could do the rest on the next day. This was done in this way for this child. All the other students took the test in one sitting with one researcher. The test was given and scored according to the instructions in the El Paso Phonics Survey.

A Record of Reading Behavior was also administered individually to each student during the student's classroom quiet reading time by the researcher. Each subject was asked to read the passage silently. The subject was then asked to retell the story. Comments on the subject's

comprehension were written on each report. The subject was then asked to read the passage orally. Each error and self correction was recorded.

All subjects took the test during regular classroom time between 8:30 a.m. and 3:00 p.m. in April, May and June of 1992. Two research assistants were utilized. One was a reading teacher who administered five of the Records of Reading Behavior to the students whom she saw regularly that were a part of the study. The other was a resource person who was trained by the researcher to administer the El Paso Phonics Elements Test according to the instructions included in the test. This person administered all of the Phonics Elements Tests except one. That one was administered by the author of the study to the boy who felt overwhelmed by the length of the test and was given the option to complete it in two sittings.

Materials

The El Paso Phonics Elements Test was used to determine each child's knowledge of phonic elements. The test presents the child with 90 nonsense syllables to decode. These 90 syllables cover initial consonant sounds, ending

consonant x, initial consonant clusters, vowels, vowel teams, and special letter combinations.

Records of Reading Behavior were used to determine reading level. They consist of many 200 word passages taken from reading material which has been assigned a Degrees of Reading Power (DRP) number that indicates the degree of difficulty of the passage. The passages used were the ones appropriate to define beginning, developing and independent readers at an end of second grade level. These included passages labeled DRP 30 to DRP 62. Anyone reading below DRP 30 was considered a beginning second grade reader. Anyone reading above a 49 DRP was considered to be an independent second grade reader. Anyone in the range between 45 and 48 DRP was either a developing reader or an independent reader depending on the strategies used and the discretion of the examiner.

Chapter IV

Statistical Analysis

Scoring

Students were given as many record of reading behavior passages as were necessary to determine the subject's instructional level. The instructional level is determined by the number of miscues made by each student. In a 200 word passage, 10-20 errors are considered instructional level. If a subject had less than 10 errors and good comprehension, the piece was determined to be at the subject's independent level, and a more difficult passage was selected. If the subject made more than 20 errors and comprehension was poor, the piece was determined to be at the subject's frustration level and an easier piece was selected. Determination of comprehension was based on the subjects retelling of the passage and was rated by the researchers as full and detailed, partial, or poor. The nature of the errors (that is whether or not meaning was affected) and the nature of the students comprehension was an influence in determining instructional level.

The criteria used to determine instructional level are different at each grade level. Because these subjects were at the end of second grade, a beginning reader is one who reads a record of reading behavior with a rating of from 30 - 39; a developing reader is one who reads a record of reading behavior with a rating of from 40 - 45, and independent reader is one who reads a record of reading behavior with a rating of 49 or more. Students who score between 46 and 48 are determined to be developmental or independent readers based on other factors such as range of strategies used and self correction rate. Only one subject fell into this range, number 16. She read a passage with a DRP of 49 with 21 miscues. Due to her inability to use other strategies sufficiently well, her low self correction rate and her retelling, she was determined to be a developing reader.

Results

The Record of Reading Behavior scores ranged from 32 to 62 with a mean of about 49 (49.57) and an average variation around the mean of about 7 (6.63). The total scores on the El Paso Phonics Survey ranged from 2 to 86 out of a possible

90. The mean was about 52 (52.09) with an average variation around the mean of about 27 (27.08).

In this study it was found that knowing the score on the El Paso Phonics Survey explained 47% of the observed variation in the Record of Reading Behavior DRP scores. Fifty three percent of the variation remains unexplained.

As the score on the El Paso Phonics Survey increased by one point on the average Record of Reading Behavior DRP scores increased by .17 DRP.

For 100 persons who were not in the original study who all had a score of 8 on the El Paso Phonics Survey, the regression equation predicts that the mean DRP score on a Record of Reading Behavior would be about 42 (42.27) which would fall in the range of a developing reader at the end of second grade. Furthermore, we predict that 95 out of 100 will have Record of Reading Behavior DRP scores of between 47 and 51 at the 95% confidence level.

For 100 persons who were not in the original study who all scored 52 on the El Paso Phonics Survey we would expect a mean score of about 50 DRP on the Records of Reading Behavior.

For 100 persons who were not in the original study who all scored 87 on the El Paso Phonics Survey we would expect

a mean score of about 55 (55.34) DRP on the Record of Reading Behavior.

The scatter plot graph (Appendix D) shows a positive relationship with a r^2 correlation coefficient of +.47. Since the plot of the residuals (Appendix F) does not show any pattern, we conclude that a straight line is the best fit for this set of data. The plotted pairs on the scatter plot show an average deviation of their residuals from their regression line of about 5 (4.96) points.

An s.e.c. (Standard Error of the Conditional Mean) of 1.04 gives an allowance of 2.19 or almost 2 DRP on the Record of Reading Behavior. This is not an acceptable range for using the scores on the El Paso Phonics Survey as a predictor of reading ability. For any single individual who was not in the original sample and who has a score of 8 on the El Paso Phonics Survey, with a 95% confidence level we can predict his/her DRP on the Record of Reading Behavior will be between 31 and 53. Although there is a general relationship between the two scores, it is not strong enough to be used as a predictor of reading success. This range of 22 points is the prediction interval for an El Paso score of 8. In addition, a prediction interval of 22 points DRP is not sufficient for us to use as a predictor for success in reading as measured by the Record of Reading Behavior DRP

because the range of DRP on the Record of Reading Behavior is only 13 DRP from a beginning to an independent reader.

Chapter V

Conclusions and Implications

Discussion

As a matter of secondary learning from this research however, it is significant to note that most of the students without a good working knowledge of phonics were those with neurological problems. It was interesting to see how much phonics knowledge these particular students have (Appendix A). All of the beginning and developing readers scored below the mean (52) on the El Paso Phonics Survey.

In this study it was found that knowing the score on the El Paso Phonics Survey explained 47% of the observed variation in the Record of Reading Behavior Scores. This indicates a significant correlation between the two tests. We would assume therefore, that a knowledge of phonics correlates highly with an ability to read.

If one looks at the lowest score on the El Paso Phonics Survey, it can be found that this is the score of the subject who was diagnosed with memory problems. These memory problems have affected learning in all areas and have left her a beginning reader. This subject, number 8,

achieved a score of two phonic elements or approximately 2%. If this score is eliminated from the calculations, the correlation coefficient drops to 37% ($r^2 = +.37$). Although this still indicates a very favorable relationship, it still leaves 63% of the variation unexplained.

If one looks at the other low scores on the El Paso, one finds that one of these readers had learning disabilities, but all of them achieved at least the status of developing reader by the end of second grade.

For 8 of the subjects, the ability to decode exceeded their ability to understand the passage on the Record of Reading Behavior. These students were held at instructional level despite a 95% or better accuracy in reading the passage because of a poor or insufficient retelling. Their scores ranged from 14 (16%) to 86 (96%) on the El Paso. Notice that subject #20 got a score of 21 (23%) correct on the El Paso, yet could read at a DRP of 53 on the Record of Reading Behavior. Nearly all of these subjects were on the high end of the DRP scale and were reading passages that were beyond their experience and vocabulary level. Their DRP scores were 43, 49, 50, 51, 53, 56, 59, and 59. All but one of these readers reads at an independent level, despite quite a variation in their Phonics Survey scores.

Another possible explanation for this ability to decode beyond the ability to comprehend could be that for some second graders the ability to recall totally what they have read may be developmentally too difficult for them.

Of the 23 subjects 15 were independent readers scoring above 49 DRP on the Record of Reading Behavior. Scores on the El Paso Phonics Survey for these readers ranged from 21 to 86 with a mean of about 66 (65.56) and a standard deviation around the mean of about 18 (18.27). The r^2 correlation coefficient in this subgroup of 70% of the subjects is only .11 or 11%. Thus amongst the best readers in this study, the correlation between the two scores is not statistically significant.

Among the six subjects who were developing readers, the $r^2 = +.17$. This is a stronger correlation than is indicated in the independent readers, but is still not as strong as the correlation coefficient for the group as a whole.

Subject # 16 was the only subject who achieved a score of 49 on the DRP but was still designated as a developing reader. This was because this subject had 21 miscues and was not quite instructional.

Several students scored at an independent level on the DRP they were recorded at. This indicates that their instructional level is yet higher than their score. The

original intent of this research was to analyze the results only in broad categories of beginning, developing and independent readers. Since they had achieved the category of independent readers, testing was ceased. Each one of these scores could have been higher.

It is possible that knowledge of the phonic elements is a RESULT of learning to read and that the child has related each nonsense syllable to a word s/he has read with the same configuration.

Implications for Research

It would be of interest to repeat this study at the end of kindergarten and at the end of first grade to see if the correlation changes significantly with less accomplished readers. A second study of this nature would be more valuable with a greater number of subjects from a variety of school districts. It would also be interesting to know if the knowledge of phonic elements was learned before learning to read and thus the cause of learning to read or if is the result of learning to read. It is my suspicion that it is both and that it would be extremely difficult to determine which is cause and which is effect. The author of

such a study would be making a valuable contribution to our body of knowledge.

Implications for Instruction

Although there does seem to be a strong correlation (47%) between the two test scores, there is no indication of which came first, the knowledge of phonics or the ability to read. It is clear that there was a stronger correlation between the knowledge of phonics and the developing readers. It is possible and other research supports this, that a knowledge of phonics is more important in the early stages of learning to read than it is by the end of second grade. With 53% of the variation unexplained and indeed 63% unexplained when you remove the subject with memory problems, there is a lot of room for the utilization of other strategies in reading instruction. That some students ability to decode exceeds their ability to comprehend what they decode also indicates the need for instruction to emphasize the need to interact with text and for readers to rely more heavily on meaning in the text to decode unknown words.

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Statistical Analysis
of El Paso Phonics
Survey Analysis

Colated with Record of Reading Behavior Results
and Beginning, Developing, and Independent
Reader Classification

Student # (Potential)	ICS	ECX	V, Vt,		TC	TS%	TE	TE%	RRB DRP#	BDI RANK
			ICC	SLC						
	22	1	35	32	90	100	90	100	62	
LA 1 G	21	1	32	19	73	81	17	19	49 **	I
TA 2 G	20	1	22	19	62	69	28	31	56 **	I
NB 3 B	16	0	18	11	45	50	45	50	49	I
JC 4 B	22	1	34	29	86	96	4	4	51	I
DD 5 B	22	1	32	26	81	90	9	10	56	I
TD 6 B	20	1	32	17	70	71	20	29	59	I
KD 7 B *	20	0	24	7	51	57	39	43	40	D
CG 8 G *	1	0	0	1	2	2	88	98	32	B
JH 9 B	17	1	24	18	60	67	30	33	51	I
CH 10 G	19	1	31	24	75	83	15	17	49	I
BK 11 B *	7	1	2	3	13	14	77	86	43	D
SM 12 G	7	0	5	2	14	16	76	84	43 **	D
MM 13 G	22	1	35	28	86	96	4	4	59 **	I
MM 14 B	17	1	20	11	49	54	41	46	49	I
KN 15 G	20	1	33	24	78	87	12	13	50 **	I
AN 16 G *	7	1	8	4	20	29	70	71	49	D
SP 17 B	21	1	32	26	80	89	10	11	62	I
MR 18 B	17	1	32	18	68	76	22	24	52	I
KS 19 B	16	0	14	11	41	46	49	54	49	I
BS 20 G	8	1	8	4	21	23	69	77	53 **	I
LS 21 G	21	1	32	20	74	82	16	18	49 **	D
TT 22 B	17	1	14	9	41	46	49	54	45	D
JW 23 G	7	1	0	0	8	9	82	91	45	D

* = Students with diagnosed neurological problems.

** = Accuracy was over 95%, instructional level is due to retelling being partial.

KEY:

Number labled (Potential) is the Maximum Possible Score

ICS = Initial Consonant Sounds

ECX = Ending Consonant X

ICC = Initial Consonant Clusters

V, Vt, SLC = Vowels, Vowel Teams and Special Letter Combinations.

TC = Total Correct

TS% = Total Correct Expressed as a Percent.

TE = Total Errors

RRB DRP # = Record of Reading Behavior Degree of Reading Power Number

BDI Rank = Indication of rank as a Beginning, Developing or Independent Reader.

RESIDUALS

subject	x	y	y'	Residuals	
1		73	49	53.03	-4.03
2		62	56	51.21	4.79
3		45	49	48.39	.61
4		86	51	55.18	-4.18
5		81	56	54.35	1.65
6		70	59	52.53	6.47
7		51	40	49.39	9.39
8		2	32	41.27	-9.27
9		60	51	50.88	.12
10		75	49	53.36	-4.36
11		13	43	43.1	-.1
12		14	43	43.26	-.26
13		86	59	55.18	3.82
14		49	49	49.05	-.05
15		78	50	53.85	-3.85
16		20	49	44.25	4.75
17		80	62	54.19	7.81
18		68	52	52.2	-.2
19		41	49	47.73	1.27
20		21	53	44.42	8.58
21		74	49	53.19	-4.19
22		41	45	47.73	-2.73
23		8	45	42.27	2.73

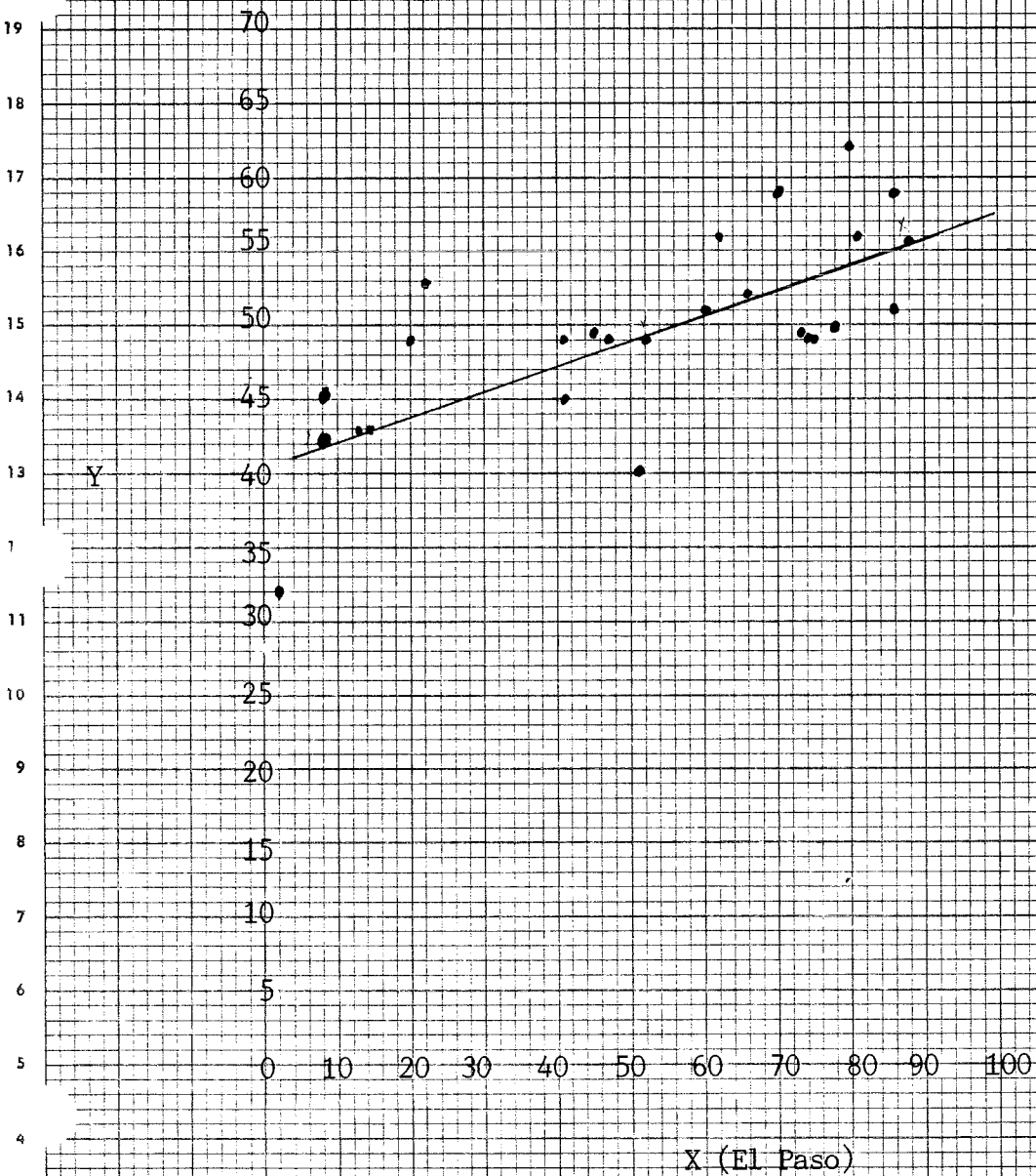
Residual Statistical Calculations.

n=23	n=23	a=40.94
\bar{x} =52.09	y=49.57	b=.17
Sx=27.38	Sy=6.63	r=.68
σ_x =26.78	σ_y =6.49	r^2 =.47
Skx=-0.87	Sky=.26	$t_{.05}$ =2.101
x=60.	y=49	Sdr=4.96
Ex=1198	Ey=1140	sec=1.04
Ex^2 =78,898	Ey^2 =57,472	sei=5.06
Exy=62,110		

when	when	when
x=8	x=52.10	x=87
y'=42.27	y'=49.57	y'=55.34
sec=1.99	sec=1.03	sec=1.70
$t_{.05}$ =2.101	$t_{.05}$ =2.101	$t_{.05}$ =2.101
allow=4.18, sec	allow=2.16	allow=3.57
min=38.09	min=47.41	min=51.77
max=46.45	max=51.73	max=58.91
pi=8.36	pi=4.32	pi=7.14

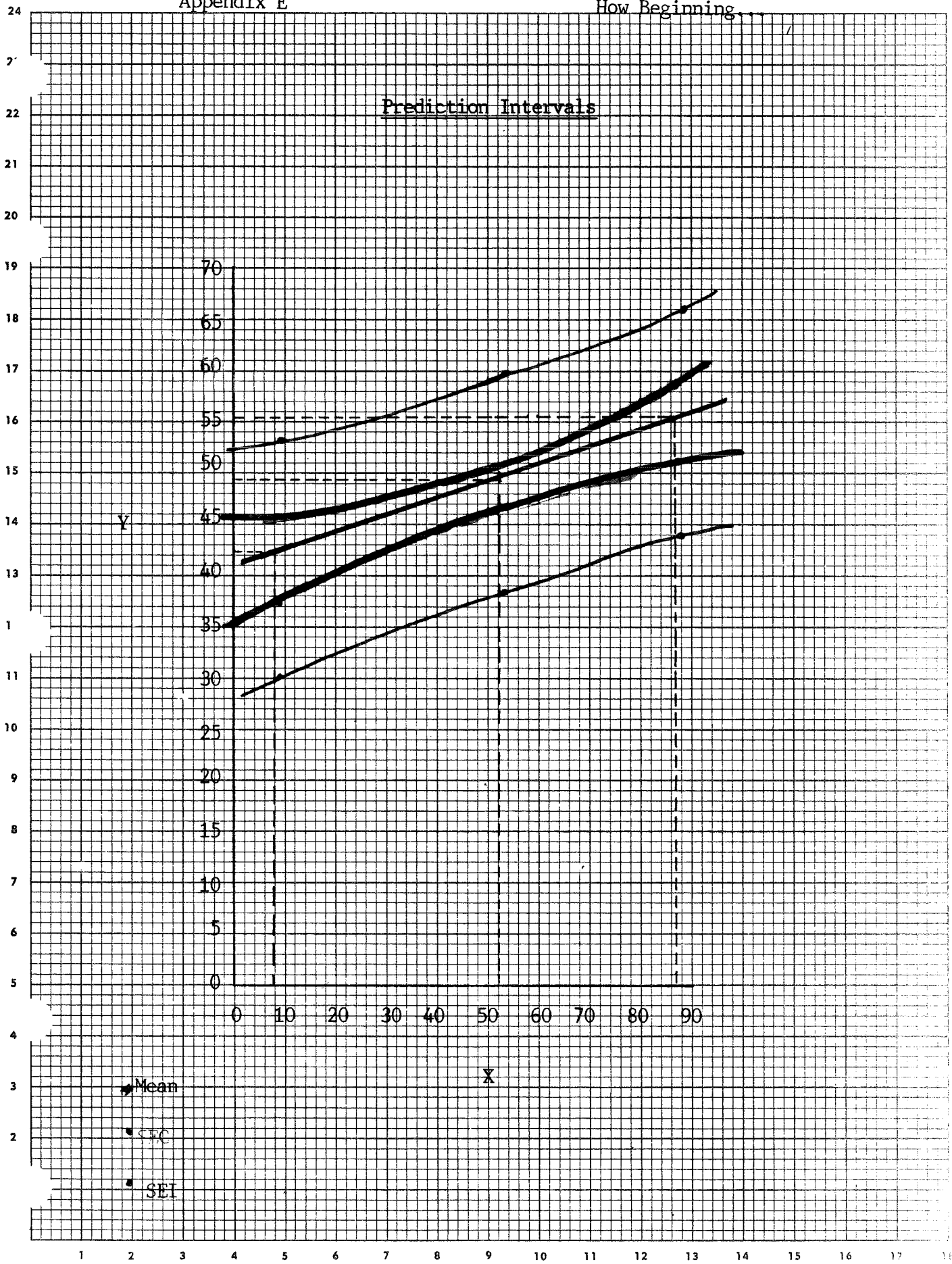
sei=5.34	sei=5.06	sei=5.24
$t_{.05}$ =2.101	$t_{.05}$ =2.101	$t_{.05}$ =2.101
allow=11.22	allow=10.63	allow=11.01
min=31.05	min=38.94	min=44.33
max=53.49	max=60.20	max=66.35
pi=22.44	pi=21.26	pi=22.02

Relationship Between Scores on the El Paso Phonics Elements Test and the DRP Score on the Record of Reading Behavior at the end of Grade Two.

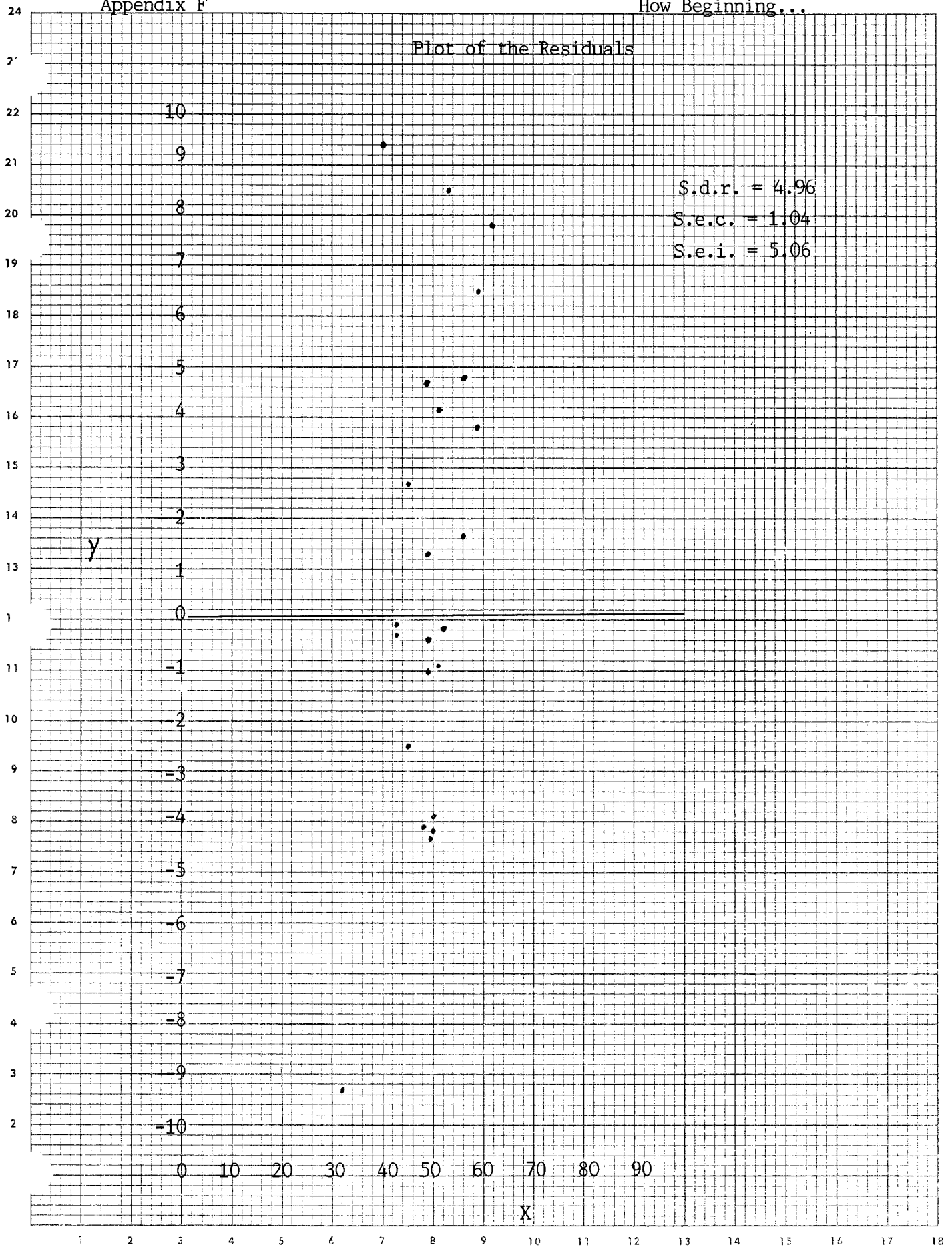


$8x - y'' = 42.27$
 $52x - y' = 49.55$
 $87x - y' = 55.34$

Prediction Intervals



Plot of the Residuals



Statistical Calculations for Developing Readers

Subject #	X Raw Score El Paso	Percent Correct El Paso	Y DRP On RRB
23	8	9	45
11	13	14	43
12	14	16	43
16	20	29	49
22	41	46	45
7	51	57	40

Calculations for X

$n = 6$
 $\bar{X} = 24.50$
 $S_x = 17.38$
 $\sigma_x = 15.86$
 $E_x = 147$
 $E_x^2 = 5111$

Calculations for Y

$n = 6$
 $\bar{Y} = 44.17$
 $S_y = 2.99$
 $\sigma_y = 2.73$
 $E_y = 265$
 $E_y^2 = 11,749$

Other Calculations

$r = -0.41$
 $r^2 = 0.17$
 $a = 45.90$
 $b = -0.07$
 $t_{.05} = 2.776$

Statistical Calculations for Independent Readers

Subject	Raw Score	Correct %	DRP on RRB
20	21	23	53
19	41	46	49
3	45	50	49
14	49	54	49
9	60	67	51
2	62	69	56
18	68	76	52
6	70	71	59
1	73	81	49
21	74	82	49
10	75	83	49
15	78	87	50
17	80	89	62
5	81	90	56
4	86	96	51
13	86	96	59

$n=16$	$n=16$	$a=47.57$
$\bar{X}=65.56$	$\bar{Y}=52.69$	$b=.08$
$S_x=18.27$	$S_y=4.35$	$r=.33$
$\sigma_x=17.69$	$\sigma_y=4.21$	$r^2=.11$
$\Sigma X=1049$	$\Sigma Y=843$	$t_{.05}=2.145$
$\Sigma X^2=73,783$	$\Sigma Y^2=44,699$	
	$\Sigma XY=55,660$	

If $X=8$, then $s.e.c.=4.22$, and $s.e.i. = 6.51$

If $X=52.10$, then $s.e.c.=1.56$, and $s.e.i. = 5.19$

If $X=87$ then $s.e.c.=1.95$, and $s.e.i. = 5.32$

If $X=87$, Then $Y'=54.36$