

IS PHONEMIC AWARENESS DIRECTLY RELATED TO READING  
ACHIEVEMENT IN FOURTH GRADE STUDENTS?

THESIS

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by Fredericka E. Schaefer

State University of New York  
College at Brockport  
Brockport, New York  
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SUBMITTED BY:

Fredericka E. Schaefer 4-30-98  
Fredericka E. Schaefer Date

APPROVED BY:

Susan L. Pegg 5/5/98  
Thesis Advisor Date

Arthur Edmund 5/5/98  
Second Reader Date

Kenneth E. Baker 5/5/98  
Director, Graduate Studies Date

## Abstract

This study looked at the relationship between phonemic awareness and reading achievement in fourth grade students. The study involved 26 fourth graders from the same class at a suburban school in western New York State.

The question addressed was: Can phonemic awareness be used as a predictor of reading achievement with fourth grade students?

The data were collected using the word recognition and passage comprehension sections of the Woodcock Reading Mastery Test and the Yopp-Singer Test of Phoneme Segmentation. The Pearson product-moment coefficient of correlation was calculated to determine to what extent reading ability and phonemic awareness are related.

This study doesn't point to a strong relationship between phonemic awareness and reading ability in fourth grade students. This finding conflicts with similar research conducted with younger students. Some possible explanations are given for this discrepancy.

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## CHAPTER I

### Introduction

Few topics are as capable of generating intense discussions as those involving the reading achievement of American schoolchildren. All too frequently, headlines lament the stagnation or decline of testing scores. Despite our best efforts, true reading proficiency remains an elusive goal for most of our nation's students.

As reading scores have languished, researchers have probed for the causes of reading failure, especially among students possessing average cognitive functioning. The evidence suggests the problem is multidimensional (Spector, 1995). Reading is a complex skill requiring the assimilation of many subskills. A breakdown can occur along any of several paths. Even though a single cause of reading failure seems unlikely, that does not "preclude the existence of patterns or subtypes of reading disability" (Spector, 1995, p. 37).

One area under scrutiny because of its relationship to reading ability is that of phonemic awareness. Nitttrouer (1996) reports a robust connection between phonemic awareness and reading ability (p. 1066). Badian (1993) asserts that "the accumulated evidence leaves little room to doubt that phonological skills are closely related to reading, and that phonological deficits underlie most cases of dyslexia" (p. 89).

Phonemic awareness is defined as the ability to hear and segment the individual sounds in words. Ball and Blachman (1991) clarify phonological awareness, phonemic analysis, and phoneme segmentation

by referring to them as synonymous terms. Research in the area of phoneme awareness has helped to unlock the mystery surrounding the discrepancy between the "apparent ease with which most children acquire spoken language and the difficulty many of these same children have in learning to read" (Ball & Blachman, 1991, p. 51).

#### Purpose

The purpose of this study was to determine if there was a statistically significant correlation between phonemic awareness and reading achievement in fourth grade students.

#### Question to be Answered

Can phonemic awareness be used as a predictor of reading achievement with fourth grade students?

### Need for the Study

The elementary school years are filled with firsts. This is where children conduct their first science experiments, write their first stories, solve their first problems, draw their first maps, and of course, read their first books. These milestones are critical steps in the formation of positive attitudes towards learning. However, one first rises above all others in importance. Reading. Reading proficiency is necessary for success in all other endeavors. It is the cornerstone upon which all school learning is built.

Despite near universal agreement regarding the importance of reading, the attainment of competence by all students seems like an elusive dream. Some students are locked in a pattern of failure and appear unable to help themselves as educational opportunities slip further from their grasp. The sparks of enthusiasm carried by entering kindergartners must not be allowed to burn out lest they become impossible to rekindle.

The reading proficiency of American schoolchildren is a priority goal on many districts' agendas. Schools across the nation have stepped up their efforts to identify at-risk students and provide preventative services as early as possible. Despite these efforts, capable students are still finding themselves struggling as nonreaders after four years in school. More research must be directed at helping to prevent this pattern of failure.



There is clear evidence that phonemic awareness is linked to reading success. Spelling and writing also benefit from an enhanced understanding of the connection between the sounds in words and the letters used to represent those sounds. However, most studies have looked at phonemic awareness as a predictor of early reading success in kindergarten and first grade students. There is a need to look at older elementary students who seem caught in repeating patterns of failure. If these students have not yet developed phonemic awareness, it would seem reasonable to conclude that reading proficiency will continue to elude them.

## CHAPTER II

### Review of the Literature

#### The Importance of Phonemic Awareness

The near universal agreement on the importance of reading proficiency adds urgency to the search for answers. The area of phonemic awareness appears to be a logical starting point. The evidence overwhelmingly supports a strong connection between phonemic awareness and beginning reading and writing (Richgels, Poremba, and McGee, 1996; Spector, 1992; Vellutino and Scanlon, 1987; Weiner, 1994; Williams, 1980; Williams, 1984.). As a result of their research, Ehri and Sweet (1991) declared that phonemic segmentation is a "critical skill enabling beginners to learn to fingerpoint-read memorized text and to remember how to read individual words in the text" (p. 456). Morris (1993) states that there is "a strong relationship between children's early phonological awareness and their achievement in reading" (p. 133). Griffith and Olson (1992) concur. They declare phonemic awareness "to be a very powerful predictor of later reading achievement. In fact, . . . a better predictor than more global measures such as IQ or general language proficiency" (p. 518). According to Ball and Blachman (1991),

the beginning reader must make use of the alphabetic code. Thus, the student must come to realize that words can be broken into syllables and phonemes, and that the phoneme

is the unit in the speech stream represented by the symbols in an alphabetic script (p. 51).

This ability to manipulate language outside of a meaningful context is a complex task despite the fact that phonological awareness is linked to prereading skills. Yopp says "performing phonemic awareness tasks is not easy. Some tasks require that children treat speech as an object and that they shift their attention away from the content of speech to the form of speech" (1992, p. 696). Segmenting words into smaller units is difficult because of the abstract nature of phonemes. They convey no meaning by themselves and are often impossible to produce in isolation (Griffith and Olson, 1992). Ball and Blachman (1991) noted the impossibility of segmenting pure tones and likened segmentation to an ability to *abstract* sounds rather than discriminate them.

Even with such difficulties, there is much agreement concerning the importance of developing phonemic awareness. However, there are differing views both on the degree of importance and on the optimum time for its acquisition. Phonemic awareness could be thought of as a prerequisite for reading. If it is a prerequisite, children would not learn to read without it. Tunmer and Nesdale (1985) lend support to this theory as a result of their research. Their study evaluated the connection between phonemic segmentation ability and reading achievement. These researchers elected to use phonemic segmentation as their measure of phonemic awareness because of their belief that it most effectively limits extraneous variables. While other tasks may be influenced by related

tasks, tapping the number of phonemes heard in words was felt to be the purest test of phonemic awareness. Tunmer and Nesdale stated that "phonological awareness is a necessary, but not sufficient, condition for learning to read" (p. 417).

Agreeing with Tunmer and Nesdale are Lundberg, Frost, and Petersen (1988). As with Tunmer and Nesdale, Lundberg et al. conducted their research outside of the United States. Although Tunmer and Nesdale used subjects in Australia and Lundberg et al. worked with Danish children, both had similar reasons for their choices of subjects. In both cases, children begin reading instruction later than in the United States. In Australia, children begin school at 6 years (first grade), but do not begin formal reading instruction until well along in the year. Likewise in Denmark, not only are children seven years old when they begin school, due to different traditions, extremely few have begun reading. Therefore, in both situations, researchers worked with mostly nonreading subjects who were at a "more advanced stage of general cognitive development" (Lundberg et al., p. 266).

Lundberg et al. summarized their results by suggesting that phonemic awareness can be developed before and independently of reading. However, phonemic awareness *facilitates* the development of reading ability.

Yopp (1992) attempts to clarify the relationship by stating that "phonemic awareness is both a prerequisite for and a consequence of learning to read" (p. 697). Perfetti, Beck, Bell, and Hughes (1987) concur

and "conclude that phonemic knowledge and learning to read develop in mutual support" (p. 317).

### Benefits of Phonemic Awareness

Research on phonemic awareness has established a connection between it and early writing ability. Chapman (1996) maintains that phonemic awareness develops naturally as young children are immersed in natural reading and writing activities. Her work consisted of a case study documenting the progress of one first grader as he develops phonemic awareness through teacher directed discussions encouraging invented spelling. Eldredge and Baird (1996) however, found that appropriate awareness *training*, coupled with instruction of letter-sound correspondence, enhances the written work of youngsters. The children in their study were given explicit instruction in how to segment the sounds in words (phonemic awareness) and how to match those sounds with letters (phonics). They theorized that the young children given this treatment had superior writings because they did not feel constrained by their spelling levels. The children felt the freedom to use invented spellings to express their thoughts and therefore included a wider variety of words, and words across a broader range of levels.

Griffith, in her study, also attributed superior spelling achievement to greater phonemic awareness (1991). First graders with superior phonemic awareness outperformed the low phonemic awareness group on a test of spelling assessment. Similar results were obtained with third

graders except that the group of superior phonemically aware students also obtained higher scores on the spellings of irregularly spelled words. These irregular words required the additional use of "word-specific information for a correct spelling to be produced" (1991, p. 219). Thus, Griffith credited high phonemic awareness with helping third graders remember irregular spellings.

The strong connection between phonemic awareness and phonics led Freebody and Byrne to examine the strategies employed by second and third grade readers (1988). They theorized that delayed development in the area of phonemic awareness hinders the cracking of the sound-letter code necessary for reading mastery. This delay sparks a synergistic effect, ignited by the combination of poor skills and poor achievement, that sends students into a downward spiral.

Freebody and Byrne (1988) were particularly interested in those students whose reading strategies included adequate sight vocabulary, but lacking decoding skills. These readers were termed Chinese readers. The Chinese readers were compared with a group termed the Phoenicians. The Phoenicians had adequate decoding ability, but poor sight or irregular word mastery. The Phoenicians were the students that Freebody and Byrne claim are frequently known as the "plodders" because of their excessive dependence on decoding skills. In the beginning stages of learning to read, the plodding interferes with reading comprehension. However, as early as third grade, Freebody and Byrne found that the Phoenicians had begun to make significant progress in

reading comprehension. The reverse was true of the Chinese readers. Initially their sight vocabulary was capable of sustaining adequate reading comprehension. By third grade however, the lack of decoding skills had begun to affect their reading comprehension.

### Tests of Phonemic Awareness

Many tests are available for use in determining phonemic awareness competency. In her 1988 study, Yopp examined a variety of phonemic awareness tests to determine the number of factors involved in each test, the reliability of each test, the predictive validity of each test for the initial steps in reading acquisition, and to determine the phonemic test(s) that best predicts initial steps in reading acquisition.

Comparison of phonemic awareness tests is difficult. An examination of several tests yields a variety of tasks. Some tests require rhyming. Others ask students to count or tap the number of phonemes in words. Sound to sound or word to word matching is another possibility. Still other tests require students to delete or substitute a particular sound in a given word. Additionally, some of these tasks can be directed to real or nonsense words, and others can focus on beginning, middle, or ending sounds. With all of these variables, Yopp (1988, p. 160) states, "Tasks which on the surface appear to be measuring the same phenomenon may in fact require different degrees of linguistic awareness, or may differ in their cognitive requirements."

As part of her work, Yopp calculated the reliability of each test using Cronbach's alpha. Although several of the tests had high internal consistency, the Roswell-Chall phoneme blending test had the highest reliability at .96, followed closely by the Yopp-Singer phoneme segmentation test at .95. She also found that "the tests of phonemic awareness were highly interrelated, indicating that they were tapping a similar construct and thus lending construct validity to the concept of phonemic awareness" (p. 172). Additionally, all of the tests were significantly related to the initial steps of reading acquisition, supporting the theory of a link between phonemic awareness and beginning reading.

Overall, Yopp (1988) recommends the Yopp-Singer phoneme segmentation test as the preferred test for measuring simple phonemic awareness.

### Phonemic Awareness Training

As Morris (1993) points out, "We should teach children to perceive individual phonemes within spoken words *before* introducing reading instruction" (p. 149). Considering the connection between performance on phoneme segmentation tasks and early reading ability, it is not surprising that educators have searched for the most effective training method.

A Russian researcher, Elkonian, developed one of the earliest techniques to teach children how to isolate and identify the sounds in words (Ball and Blachman, 1991). He attempted to make the



discrimination of phonemes more concrete by using a visual model consisting of a series of connected squares, which represented the phonemes in a word. Children were instructed to move tokens into the squares as they slowly said the word. The tokens, which were initially used to count each phoneme, were eventually replaced by the appropriate letters.

Williams (1980) also studied the effects of phonemic awareness training. She evaluated a program designed to be used in addition to the regular reading program, mainly for remedial instruction. The training was called the ABD's of reading, with each letter describing an aspect of the training. A stood for the analysis of syllables and short words into phonemes. B represented the blending of phonemes into syllables and words. The D was taken from decoding, which occurred as letters were introduced, but only following mastery of A (analysis) and B (blending).

Several other suggestions were also offered by Williams for children who are struggling to break the reading code. She emphasizes that learners "are likely to do better with a structured approach in which there is a sequence of specific tasks for which the child is given explicit instructions and opportunities for extensive practice" (1980, p. 2).

Lewkowicz (1980) assembled a list of ten tasks that have been used in classrooms to test or teach phonemic awareness skills. Of these ten, she determined that the tasks of blending and oral phonemic segmentation are most closely associated with reading. "Because even an easy task can be made difficult by poor teaching" (p. 693), she

includes some suggestions for teaching segmentation and blending. The teaching of segmentation "requires very slow, 'stretched' pronunciation of the word to be segmented, so that the child can perceive the separate sounds " (p. 693). Furthermore, it "requires attention to articulatory clues as well as auditory clues; thus the *child* must do the slow pronouncing" (p. 693). For blending, Lewkowitz theorizes that the most effective method may be through segmentation. She supports her idea by comparing segmentation and blending to the discovery method of learning. Sometimes the easiest way to learn how to assemble alarm clocks is by taking them apart first!

Yopp(1995) has also developed an annotated bibliography of read-aloud books to assist parents and teachers in developing phonemic awareness. Books were selected for inclusion on the basis of age-appropriateness, playfulness of language, and the use of alliteration, rhyme, assonance, phoneme substitution, or segmentation. Examples include well-known favorites such as P. Cameron's "I Can't," Said the Ant, More Bugs in Boxes by David Carter, and Dr. Seuss' ABC, There's a Wocket in My Pocket, and Fox in Socks. Less well known suggestions are Shoes by Elizabeth Winthrop, Down by the Bay by Raffi, and Hawkins' and Hawkins' Tog the Dog.

Parents and teachers who wish to develop phonemic awareness are encouraged to read and reread these stories. Yopp (1995, p. 538) suggests reading them aloud several times "simply for the pure joy of reading and sharing."

## CHAPTER III

### Research Design

#### Purpose

The purpose of this study was to determine if there was a statistically significant correlation between phonemic awareness and reading achievement in fourth grade students.

#### Question

Can phonemic awareness be used as a predictor of reading achievement with fourth grade students?

#### Methodology

##### Subjects

The subjects were 26 fourth grade students from the same class at a suburban school in western New York State. They ranged in age from 9-2 to 10-7. Their reading levels went from a grade equivalent of 1.2 to 6.2. Nine of the students were classified as Special Education and had Individual Education Plans. Three more students were ESL (English as a Second Language) students and two had Instructional Support Plans. Three special education students in the class were excluded from this study. Two of those excluded were mentally retarded and the other was multiply handicapped.

### Materials

Students' reading levels were determined using a composite reading score derived from the word recognition and passage comprehension sections of the Woodcock Reading Mastery Test - Test H.

The Yopp-Singer Test of Phoneme Segmentation was also utilized to assess students' competency in phonemic awareness.

### Procedures

Students' reading levels were assessed using the Woodcock Reading Mastery Test. An independent researcher, another graduate student in the Masters of Science in Reading program, individually administered the word recognition and passage comprehension sections to 17 of the students. The rest of the students were individually assessed by this researcher as part of their annual reviews for their Individual Education Plans.

The researcher also individually assessed all 26 students for phonemic awareness on another day using the Yopp-Singer Test of Phoneme Segmentation.

### Analysis of Data

The Pearson product-moment coefficient of correlation was calculated to determine to what extent reading ability and phonemic awareness are related.

## CHAPTER IV

### Analysis of the Data

#### Purpose

The purpose of this study was to determine if there was a statistically significant correlation between phonemic awareness and reading achievement in fourth grade students.

#### Findings and Interpretations

The Pearson product-moment coefficient of correlation was calculated to determine to what extent reading ability and phonemic awareness are related. The coefficient of correlation was determined to be +0.26.

Although some relationship does exist between these scores, it is very weak. For a stronger relationship to be found between these scores, those students with lower reading scores should have also obtained lower scores on the Yopp-Singer Test of Phoneme Segmentation. With the exception of student number 16, who scored 13/22 or 59%, all the other students met the competency score of at least 15.

There are some possible explanations for the low correlation. All of the students in this classroom have received some instruction which may have resulted in increased phonemic awareness. The special education students with the lower reading scores have received instruction in a

program that builds phonemic awareness as it strengthens reading skills. Additionally, the entire class participated in a phonics building decoding program for several weeks.

In addition to the phonemic awareness scores being higher than expected, some of the special education students' reading scores may be reported as lower than the true score. This is because the independent researcher was only able to test the 17 regular education students using the Woodcock Reading Mastery Test. The rest of the reading scores were obtained from the annual reviews of the students. These annual reviews may have taken place from several months up to almost a year before the other testing took place. Students with Individual Education Plans can only be tested using the Woodcock Reading Mastery Test once a year, and even then alternate versions of the test are used so that the exact test is only being used every other year.

## CHAPTER V

### Conclusions and Implications

#### Purpose

The purpose of this study was to determine if there was a statistically significant correlation between phonemic awareness and reading achievement in fourth grade students.

#### Conclusions

The results of this study do not point to a strong relationship between phonemic awareness and reading ability in fourth grade students. This finding conflicts with similar research conducted with younger students. There are several possible explanations for this discrepancy.

The relationship between phonemic awareness and reading ability may not be as critical by the time students have reached fourth grade. As Yopp (1992, p. 697) points out, "Phonemic awareness is both a prerequisite for and a consequence of learning to read." Most of the students in this study have begun to unlock the reading code. In the case of older students, it may in fact be the reading process that is facilitating the acquisition of phonemic awareness. In other words, phonemic awareness may be critical to the initial cracking of the reading code, but it may not necessarily prove to have a direct relationship with

reading ability such that as phonemic awareness improves, so does reading ability.

Another possible reason for the weak relationship between phonemic awareness and reading ability is the fact that some Woodcock Reading Mastery Test scores were obtained at different times. Another researcher evaluated the reading ability of most of the regular education students during December 1997. Some of the special education students' testing was completed in early 1997, or almost a year earlier. It is probable that if it had been possible to reassess those students more recently, their reading scores would have been higher.

Another testing snafu may have occurred because of the date of the Yopp-Singer Test of Phoneme Segmentation testing. While the reading scores of some special education students were almost a year old, their Yopp-Singer phonemic awareness scores were fairly recent. These students have been receiving instruction in a systematic phonetic-based word decoding program since the beginning of the school year. It could be presumed that this would have positively affected their phonemic awareness since they have begun to learn to read and reading increases phonemic awareness. It is not unreasonable to suggest that the combination of understated reading scores and enhanced or improved phonemic awareness scores may have influenced the results of this research.



### Implications for Future Research

The research overwhelmingly points to a strong connection between phonological awareness and reading ability in younger students. There is still a need for more information about the causes of reading failure in older students. Because of the difficulties encountered in obtaining these data, future researchers might wish to repeat the study with certain changes. First of all, it would be advantageous to include more subjects in the research. With more students, the low or high scores of a few students wouldn't alter the outcome as significantly. Second, all students should be tested as close together as practical. This change would eliminate some of the variables introduced into the present study.

One other change that might prove advantageous would be to use a more comprehensive test of phonemic awareness. Even though previous research affirmed the validity of the Yopp-Singer Test of Phoneme Segmentation, that research was also completed with younger students. It would seem reasonable to assess older students using a more sophisticated and comprehensive test of phonemic awareness.

### Classroom Implications

Despite the weak correlation obtained in this study, previous research clearly indicates that phonemic awareness and beginning reading ability are codependent. Certainly, teachers of primary students will want to continue to use that knowledge to ensure reading success for

all their students. Teachers of intermediate level students may wish to assess and remediate weak areas of phonemic awareness with students who are not making acceptable progress.

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## Appendix A

## Yopp-Singer Test of Phoneme Segmentation

Student's name \_\_\_\_\_ Date \_\_\_\_\_

Score (number correct) \_\_\_\_\_

Directions: Today we're going to play a word game. I'm going to say a word and I want you to break the word apart. You are going to tell me each sound in the word in order. For example, if I say "old," you should say /o/-/l/-/d/. (Administrator: Be sure to say the sounds, not the letters, in the word.) Let's try a few together.

Practice items: (Assist the child in segmenting these items as necessary.) ride, go, man

Test items: (Circle those items that the student correctly segments; incorrect responses may be recorded on the blank line following the item.)

- |               |                 |
|---------------|-----------------|
| 1. dog _____  | 12. lay _____   |
| 2. keep _____ | 13. race _____  |
| 3. fine _____ | 14. zoo _____   |
| 4. no _____   | 15. three _____ |
| 5. she _____  | 16. job _____   |
| 6. wave _____ | 17. in _____    |
| 7. grew _____ | 18. ice _____   |
| 8. that _____ | 19. at _____    |
| 9. red _____  | 20. top _____   |
| 10. me _____  | 21. by _____    |
| 11. sat _____ | 22. do _____    |

The author, Hallie Kay Yopp, California State University, Fullerton, grants permission for this test to be reproduced. The author acknowledges the contribution of the late Harry Singer to the development of this test.

	X equals	Y equals		x equals		y equals			
Student	Reading	Phoneme	X mean	diff. betw.	Y mean	diff. betw.	(x) squared	(y) squared	x times y
Number	Score	Score		X & mean		Y & mean			
1	6.2	19	3.63	2.57	19.27	-0.27	6.58	0.07	-0.69
2	1.7	20	3.63	-1.93	19.27	0.73	3.74	0.53	-1.41
3	2.8	18	3.63	-0.83	19.27	-1.27	0.70	1.61	1.06
4	3.8	19	3.63	0.17	19.27	-0.27	0.03	0.07	-0.04
5	5.4	21	3.63	1.77	19.27	1.73	3.12	3.00	3.06
6	4.6	22	3.63	0.97	19.27	2.73	0.93	7.46	2.64
7	3.9	21	3.63	0.27	19.27	1.73	0.07	3.00	0.46
8	4.8	21	3.63	1.17	19.27	1.73	1.36	3.00	2.02
9	3.4	21	3.63	-0.23	19.27	1.73	0.06	3.00	-0.41
10	1.8	19	3.63	-1.83	19.27	-0.27	3.37	0.07	0.49
11	5.7	21	3.63	2.07	19.27	1.73	4.27	3.00	3.57
12	3.8	19	3.63	0.17	19.27	-0.27	0.03	0.07	-0.04
13	4.6	21	3.63	0.97	19.27	1.73	0.93	3.00	1.67
14	2.6	17	3.63	-1.03	19.27	-2.27	1.07	5.15	2.35
15	2	15	3.63	-1.63	19.27	-4.27	2.67	18.23	6.98
16	3.9	13	3.63	0.27	19.27	-6.27	0.07	39.30	-1.66
17	3.3	17	3.63	-0.33	19.27	-2.27	0.11	5.15	0.76
18	1.2	19	3.63	-2.43	19.27	-0.27	5.93	0.07	0.66
19	3.2	21	3.63	-0.43	19.27	1.73	0.19	3.00	-0.75
20	4.2	19	3.63	0.57	19.27	-0.27	0.32	0.07	-0.15
21	4.4	17	3.63	0.77	19.27	-2.27	0.59	5.15	-1.74
22	2.9	17	3.63	-0.73	19.27	-2.27	0.54	5.15	1.67
23	2.1	22	3.63	-1.53	19.27	2.73	2.36	7.46	-4.19
24	4	21	3.63	0.37	19.27	1.73	0.13	3.00	0.63
25	4.2	21	3.63	0.57	19.27	1.73	0.32	3.00	0.98
26	4	20	3.63	0.37	19.27	0.73	0.13	0.53	0.27
Sum	94.5	501		0.00		0.00	39.60	123.12	18.16
Mean	3.63	19.27							

Appendix B