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ABSTRACT

This study examined Minnesota school superintendents' knowledge and attitudes regarding universal school breakfast programs. A total of 51 percent of 267 district superintendents responded to a mail survey. Findings indicated that 58 percent of the superintendents were aware of a universal school breakfast pilot program in Minnesota and 85 percent were interested in receiving more information about the pilot project as the experiment progressed. The majority of superintendents recognized the connection between nutrition and learning and agreed that nutrition enhanced retention, learning ability, and concentration. To a lesser degree, superintendents agreed that there is a connection between classroom behavior and nutrition. Superintendents with school breakfast experience were more likely to view a breakfast program as the natural extension of school lunch program, as an important part of school image, and were less concerned about additional costs, less likely to worry about breakfast cutting into the school day, and less likely to view school breakfast as intended for low income students alone than were superintendents with no school breakfast experience. The superintendents agreed about the potential barriers in expanding the pilot school breakfast program, the need for solid evidence that such programs contribute to improved classroom experience, the concern for the program's cost, and the need for community support. (KDFB)

Minnesota School Superintendents and Universal School Breakfast: Perspectives and Opinions

prepared for

Minnesota Department of Education
Food and Nutrition Service

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Executive Summary

Minnesota School Superintendents have heard about the Universal School Breakfast program and they are aware the a pilot of the program is under way. Superintendents acknowledge that there is a connection between nutrition and learning. They recognize that breakfast is an important meal, but they know of several reasons why students might skip breakfast. At the same time, they are not completely won over to the idea that schools should be responsible for breakfast.

These are the key findings of a survey of superintendents conducted recently at the request of the Minnesota Department of Education Food and Nutrition Service. Every superintendent in the state was mailed a questionnaire to be completed and returned to an independent research group, ***Team Three Research***. Those who failed to respond to the first mailing received a second request. A total of 267 districts, out of 362, completed the questionnaire. Of those, 186 were actually completed by the superintendent. This resulted in a usage rate of 51%. All the contact took place between April 28 and May 22, 1995.

Awareness of the pilot was measured at 58%. Of those superintendents, 76% said that they had learned of the pilot through MDE publications. Many respondents indicated that they had learned of the project from multiple sources. 85% of those responding were interested in getting more information about the pilot project as the experiment progressed.

The majority of superintendents recognize that there is a connection between nutrition and learning. There was overall agreement that nutrition enhanced retention, learning ability, and concentration. To a lesser degree, superintendents agree that there is also a connection between classroom behavior and nutrition.

The research found strong differences between superintendents on issues related to expanding the pilot across the state. Specifically, two sub-groups, superintendents with school breakfast experience and superintendents without this experience had some significant disagreements. For example, those with school breakfast experience are more likely to view a breakfast program as the natural extension of school lunch programs. They are more likely to see breakfast programs as an important part of school image. At the same time, they are less concerned about additional costs; less inclined to worry about breakfast cutting into the school day; and less likely to view school breakfast as intended for low income students alone.

In general, the superintendents do agree about the barriers that MDE will face if it attempts to expand the pilot. All agree that there will have to be solid evidence that the breakfast program leads to improved classroom experience. Even those who believe that it does indicate that the case needs to be made. All are concerned with costs to some degree. These include staff costs, facility costs, and the costs of expanding the subsidy to all students. Finally, all agree that community support will be important.

Team Three Research recommends that MDE develop a communication program designed to share information gained in the pilot programs. Superintendents and other education professionals need more solid data before they will become advocates of expansion. Additional research is needed to identify the level of agreement the other education professionals have with the superintendents.

A. Introduction

A. 1. Background

Educators and education researchers have long known of a linkage between nutrition and classroom performance. School lunch programs have been an accepted part of the school day across the United States since the end of World War II. In most communities, school lunch is subsidized in part through the use of surplus commodities provided by the United States Department of Agriculture (USDA).

School breakfast programs have been around for nearly as long, but they are less well established and less well accepted than the school lunch program. In Minnesota, the majority of, but not all, schools provide a breakfast option. It is usual for such programs to come with a subsidy arrangement for low income families. Only a small portion of the total number of students enrolled in schools offering a breakfast program participate in it.

The lack of full participation by schools may be explained by several factors. Breakfast programs add costs to school operations. They require physical space, although they can be accommodated in existing lunch rooms. They require additional staff in food service, or the same staff working longer hours. They require additional staff in a supervisory role. There are some critics of the breakfast concept who argue that time taken for breakfast is time taken away from classroom activities. Others, people who might have to serve in the supervisory role like teachers, argue that such duties are not part of their professional responsibilities.

Behavioral and social issues complicate the acceptance of school breakfast by students. In the U.S., breakfast is the least taken meal despite evidence of, and promotion about, its importance. Skipping breakfast may be a habit acquired early in life. There is also a debate over who has the primary responsibility for breakfast. Some suggest that the responsibility rests with the family. Some say that school breakfast is a natural extension of school lunch, that nutrition and school are properly linked. Others offer that breakfast may be a family responsibility that is unmet, especially in low income households, shifting the burden of nutrition to the schools. Still others suggest that full participation is not possible as long as the school breakfast program carries a stigma, an association of school breakfast with low income family status.

In an effort to demonstrate the importance of school breakfast, and to try to break the stigma, the Minnesota Legislature, in 1994, authorized and funded a "universal school breakfast" pilot project. The "universal" project is designed to provide breakfast to all students at no charge. The meal, therefore, is not dependent upon family income as it is in standard school food service programs. The cost of the breakfast program is subsidized by the State with additional support from the USDA surplus commodities program.

The Minnesota Department of Education (MDE) Food and Nutrition Service (Service) contracted for this research project to gain insight into the attitudes and opinions of school executives on school breakfast programs as the pilot program began. (Six elementary schools, drawn from a base of more than 800 elementary schools, are currently participating in the pilot.) Service officials are interested in knowing about the level of support for a "universal" program that might already exist, and about prospects for expanding the program beyond the pilot stage. Research on the actual pilot project is being conducted separately.

A. 2. Research Objectives

The initial challenge to *Team Three Research* reads:

> "To design and conduct a survey research project that will determine 1) the level of understanding of School Breakfast Program benefits, and 2) the level of support for the provision of no-charge breakfasts for all public elementary school students in Minnesota among legislators, teachers, school board members, superintendents and other policy makers."

Initial discussions between the research team and the Service resulted in a narrower project. It was determined that, given time and resource constraints, only superintendents would be contacted at this time. Four specific research objectives were agreed to (Appendix I). They are:

1. Determine the level of awareness of the pilot program among school superintendents.
2. Learn about school superintendents' perceptions of:
    a. the link between nutrition and classroom performance.
    b. the link between school breakfast and classroom performance.
3. Determine the level of support for expanding school breakfast programs.
4. Learn about school superintendents' perceptions of any barriers to expansion.

The Service intends to use the results of this research to target educational and promotional activities. Further, it intends to share the results with the Minnesota Education Association, the Minnesota School Food Service Association, the PTA, and others.

B. Methodology

B. 1. Research Design

After discussion and consultation, *Team Three Research* proposed a descriptive research approach employing a multi-part questionnaire mailed to a primary source, each of Minnesota's school superintendents. It was decided that sampling, that is, selecting a subset of the population, would be inappropriate because there were only 362 superintendents in the state (once we removed the duplicates that occur because some individuals serve as superintendent of several small school districts at the same time). A goal of obtaining a 40% response rate from the universe of superintendents was set. Surveying an entire population, a census, presents a different set of problems from those that arise with sampling. These problems are discussed in **C. 2. Limitations**.

Collecting data by mail is less expensive than collecting it in person or by telephone, but it does tend to result in lower response rates. To overcome this problem the questionnaire was mailed twice. A simple number code was used to identify superintendents on a matched set of mail labels provided by MDE. The first set of questionnaires was mailed on April 28, 1995. Each envelope contained a letter of introduction, a questionnaire, and a postage pre-paid return envelope (See: Appendix II). As responses were received, the label with the matching number code was removed from the second label set.

On May 10, 1995, a second mailing was sent to all superintendents who had not responded. This mailing contained a different letter of introduction (Appendix II). All usable responses received by May 22, 1995 became the data base used in this report.

The outside envelope for both mailings identified the source as MDE. It was expected that the Department's stationery would attract more attention in a superintendent's mailbox than a letter from strangers. The return envelope, however, was addressed to *Team Three Research* to insure the confidentiality of responses.

B. 2. Questionnaire Design

The questionnaire was divided into six sections. The first section served as an icebreaker. It asked basic questions about awareness and interest. The sixth section was used to collect demographic information. The other four sections (2,3,4,5) were designed to generate data to answer the questions raised by the **Research Objectives (A. 2.** above). Item content came from a review of materials provided by MDE as well as from client interviews.

These four sections employed a close-ended Likert scale, a design strategy that is especially effective in drawing out attitudes and opinions. With the Likert scale, respondents are given a statement to read and then asked to express their agreement or disagreement, or their sense of the importance of the view expressed. Scales with from five to nine options are usual. The choices given the respondent range from "disagree strongly" to "agree strongly." The statements selected are usually strong opinions to encourage respondents to clearly support or object to the main idea.

In this project, an introductory statement was added to each of the sections. This served two purposes. First, it notified the respondent of the intent of the following items and helped focus their attention. Second, it made it clear that the statements were not necessarily the views of MDE, the Service, or *Team Three Research*.

The scales employed ranged from seven choices to five choices. There is no strong theory behind the scale choice decision, although there is a belief that experts, like school superintendents, prefer more choices when dealing with their area of professional competence. In addition, the direction of the statements (e.g. increases, decreases) was changed randomly. Both techniques, changing choice levels and changing logical direction, are used to prevent affirmation bias, that is, the tendency of respondents to fall into a patterned response agreeing or disagreeing at the same level on every statement.

B. 3. Development and Pretest

The first draft of the questionnaire was reviewed and critiqued by Glenn Strid, school breakfast program manager, representing the Service. A second draft was previewed by a convenience sample of graduate students at the Carlson School of Management, University of Minnesota. A third draft was pretested by a dozen employees of the Service.

The objectives for each review were to simplify the items, clear up any ambiguity, remove misstatements of fact, and check for compound or confusing items. The process appears to have worked. Only one returned questionnaire contained an indication that the respondent found an item unclear. Plus, not a single returned questionnaire contained spelling or grammar corrections. Given an audience of educators, *Team Three* is pleased with this outcome.

A copy of the questionnaire in its final form is included in Appendix II. The forms that were mailed differ only in that they were printed on a single page and folded magazine style.

C. Response

C. 1. Response Rate

A total of 362 school superintendents received the first mailing. A second mailing went to 165 superintendents who had not responded before May 10, 1995.

The data in this report is based on a total of 267 returned questionnaires. The contact rate was 100%, only one envelope was returned for an address correction. The correction was made and the survey re-sent. Upon examination, 81 forms were rejected as not appropriate. This results in a response rate of 74%, well beyond the initial goal of 40%.

Reasons for rejecting forms were: Not completed by a superintendent (= 78), and: Too many skipped items (= 3). Questionnaires with more than four missing responses were rejected.

Among those questionnaire that were "not completed by a superintendent" were 44 questionnaires completed by individuals who identified themselves as "Food Service Managers" or some variant of that title. This provided the research team with a sufficient number of responses to suggest a comparative group to the superintendents. The analysis of this comparison is contained in section **E. 6**.

C. 2. Data Limitations

The lack of response by some superintendents raises the prospect that some views are more represented in the data than they might be in the entire population of superintendents. It is possible that the respondents are primarily superintendents who feel strongly about school breakfast programs. Non-respondents may not have been as highly motivated to complete the survey and, as a result, their attitudes and opinions will not be included. The size of the response, however, suggests that this is not a problem.

This is a descriptive analysis of a population. To the extent that the respondents are representative, their attitudes and opinions can be taken as the attitudes and opinions of the entire population of school superintendents in Minnesota. No inferences to other groups should be made.

The actual analysis separates school superintendents into five sub-groups, two based on school breakfast program experience and three based on self-reported time on the job. The time on the job data might be interpreted as total experience as a school superintendent, but the question limited respondents to reporting on "Years in current position." A superintendent reporting 3 years or less, therefore, might be referring to total experience as a superintendent, or might simply be reporting years in the current office.

Finally, superintendents turned out to be a fairly homogeneous group as shown by their tendency to agree on most issues, and by the group demographics. They were asked multiple questions on the same broad topic. This raises the specter of what statisticians call "familywise error." Simply put, this means that an analysis of multiple items might result in a finding of statistically significant difference just by chance. To reduce the potential for this, only differences in the range of $p < .05$ or $p < .01$ were reported.

D. Data Analysis

D. 1. Data Entry

The collected data was entered into Minitab® Release 8, a desktop statistical software program. The first step after data entry was data cleaning. Each items was checked for consistency and appropriateness of response. That is, if item's scores should range between 1 and 7, any other score, 9, say, or 0, was rechecked and corrected.

Tallies were then generated for each item, yielding mean scores, median scores, standard deviations, quartiles, counts and cumulative scores. The mean scores are reported in the next section of this report, **The Findings**. More detailed data information is contained in Appendix III.

D. 2. Hypotheses

Background research and interviews led the research team to believe that there would be some differences in the attitudes and opinions of school superintendents based upon individual experience with breakfast programs or based upon years on the job.

The questionnaire, therefore, included items allowing the respondents to be divided into smaller sub-groups representing superintendents whose schools serve breakfast and those whose schools don't. A second set of subgroups was created by dividing the respondents into three groups representing levels of time on the job.

Following the practice in statistics, it was hypothesized that there would be no differences between the attitudes and opinions of the five subset groups on any item. This may be familiar as the null hypothesis. It means that the mean scores for each item are assumed to be the same, or very similar, across sub-groups. This assumption is then tested by the computer program and scores that are significantly different from each other are reported.

D. 3. Analysis

Using the Minitab software, the hypothesis was tested for each item in the questionnaire. The results are reported in the following section, **E. The Findings**.

To compare scores between superintendents with breakfast programs and those without breakfast programs, a TWOSAMPLE *t* test was used. "two sample" refers to the analysis of scores between two different groups. To compare among the three levels of experience, the AOVONEWAY test was used, this translates as Analysis Of Variance One Way, a test that permits an analysis similar to TWOSAMPLE only with three or more groups. Both tests were at a 95% confidence level. The report identifies those items where there was a statistically significant difference between the groups at either $p < .05$ or $p < .01$.

In ordinary language, the analysis starts with an assumption that a set of scores from the same item will be the same, or nearly the same, across the sub-groups of the population. Consider an example dealing with boxes of jellybeans. If boxes contain an average of 100 jellybeans each, one buyer might find 95 jellybeans and another 105. They could both come from the same packing

machine, one averaging 100 jellybeans per box +/- 5. The jellybean manufacturer is only concerned with those times when the machine gets out of whack. When, say, it begins to cheat customers by giving them only 88 jellybeans, or when it begins to cheat the company by giving away 111. These would be statistically significant differences.

In a similar way, the research team looked at two, or three mean scores analyzing the data for those cases where there is a statistical different. Two scores, 5.15 and 4.97, say, might look like they are very different but still be part of the same distribution. Researchers are most interested in those scores far enough apart to suggest that there is truly something different between the groups. The statistical tests used for this research are conservative. Therefore, only the most significant differences are identified.

The way to read "$p < .05$ and $p < .01$" is this. There is less than a 5% chance, or less than a 1% chance, that this difference is not statistically significant. As mentioned above, maintaining a conservative limit also reduces the potential for familywise error.

D. 4. Demographics

All respondents identified themselves as school superintendents. 93% were males. 74% worked in districts that offered both a lunch and a breakfast program. 38% reported that they had been in their current post for three years or less; 34% claimed between 4 and 10 years services; and, 28% listed 11 years or more as school superintendent.

E. The Findings

E. 1. Objective One: Awareness

The first objective of this project was to determine the level of awareness of the pilot project among Minnesota school superintendents. The result is: **58%** of superintendents say that they are aware of the pilot.

Within this group, **76%** report that they learned of the pilot project through MDE publications. There were other sources of information. Many cited Association of School Administrators publications. Information from the School Food Service Association was mentioned, as was the local press. Several named professional conferences as a source. Many superintendents cited several sources.

When asked if they wanted to be kept informed, **85%** of all respondents said that they were interested in reading the final report. A surprising **69%** were even interested in reading interim reports. Surprising, that is, in the context of the daily information overload a school executive faces.

E. 2. Objective Two: Perspectives On Nutrition and Classroom Performance

Superintendents were asked to agree or disagree with statements that were identified as coming from education researchers. The preamble indicated that the experts made the connection between nourishing breakfasts and improvements in classroom behavior and performance. For the most part, as Table 1 shows, the superintendents agree with the experts.

Table 1
Agreeing With The Experts

Opinion On Breakfast	Ranked Agreement Score (mean scores)	Percent Positive[1]
Increases concentration.	5.79	89%
Increases learning ability.	5.69	85%
Increases retention.	5.42	80%
Improves problem solving.	5.09	72%
Decreases illness.	4.94	63%
Decreases absenteeism.	4.64	52%
Reduces disruptive behavior.	2.90[2]	38%[2]

1. Summing all the scores (5.6.7) that are positive in relation to neutral on a seven point scale where 1 = disagree strongly and 7 = agree strongly.
2. Note that for this item a low score would be consistent with expert opinion.

Ranking the agreement scores reveals a simple pattern. The three items attracting the strongest agreement, "increases concentration," "increases learning ability," and "increases information retention," are all items related to the learning process. Not only did they gain strong agreement, by examining the actual scoring for each item, it is clear that superintendents selected positive choices more than 80% of the time for each item.

The second part of the pattern is shows less strength in agreement. Three of the four items, those dealing with disruptive behavior, reports of illness, and absenteeism, might be called behavioral items. On all three the superintendents agreed with the experts but at lower levels. And, on all behavioral items, the choice of clearly positive responses fell to 63% or less.

It may be that American culture has, through repeated social and commercial messages about the value of breakfast, enhanced the perception of a linkage between breakfast and performance. The superintendents may be reporting agreement with cultural values as much as they are reporting professional observation. The social and commercial messages are less direct about a connection between nutrition and behavior.

There is no significant disagreement between the different sub-groups of superintendents on these items. Whether the sub-groups under analysis are those with different levels of food service experience, or those with a different period of time on the job, Table 2 shows that the overall agreement scores are not significantly different.

Table 2
Nutrition and Classroom Performance
Agreement with Researchers About the Linkage
(Disagree Strongly = 1 Agree Strongly = 7)
(Mean Scores)

Question	Overall	Food Service Exp.		Years at Current Post		
		No Breakfast	Breakfast	3 or less	4 - 10	11 +
A nourishing breakfast... ...increases student learning ability...	5.69 N = 186	5.74 N= 49	5.68 N = 136	5.74 N = 70	5.63 N = 64	5.69 N = 52
...increases student information retention...	5.42 N = 186	5.39 N = 49	5.44 N = 136	5.61 N = 70	5.28 N = 64	5.33 N = 52
...increases student concentration in the classroom...	5.79 N = 186	5.65 N = 49	5.82 N = 136	5.81 N = 70	5.80 N = 64	5.67 N = 52
...decreases student absenteeism...	4.64 N = 186	4.69 N = 49	4.63 N = 136	4.74 N = 70	4.61 N = 64	4.54 N = 52
...decreases student disruptive behavior...[1]	5.10 N = 185	5.08 N = 49	5.11 N = 135	5.07 N = 69	5.41 N = 64	4.75 N = 52
...improves student problem solving ability...	5.09 N = 186	5.10 N = 49	5.09 N = 136	5.20 N = 70	5.09 N = 64	4.92 N = 52
...decreases reports of student illness...	4.94 N = 185	4.83 N = 49	4.98 N = 136	5.06 N = 69	4.81 N = 64	4.92 N = 52

1. This item was reversed in the questionnaire to serve as a guard against and test for affirmation bias.

The implication, in terms of the objectives of this study, is that the Service need not spend much time and effort persuading superintendents that a nourishing breakfast makes an important contribution to the learning experience. It might, on the other hand, be worthwhile sharing any research on the linkage between breakfast and behavior.

E. 3. Objective Two: Perspectives on Students and Breakfast

Superintendents were asked about their own experience as to the reasons why students missed breakfast. As in the earlier set of questions, they were offered a series of statements drawn from experts about the reasons why breakfast was skipped. In this case, however, respondents were asked, on a 6 category scale, whether they "disagree" or "agree" with each of six items.

As Table 3 shows, superintendents registered the greatest degree of agreement with statements that connected missing breakfast to the home. Both hectic morning schedules and a lack of supervision at home in the morning were cited by the superintendents as related to missed breakfasts.

Table 3

Students and Breakfast
Reasons Why Students Miss Breakfast
(Disagree Strongly = 1 Agree Strongly = 6)
(mean scores)

Reason	Overall	Food Service Exp.		Years at Current Post		
		No Breakfast	Breakfast	3 or less	4 - 10	11 +
Some students are not hungry when they wake up.	4.08 N = 186	4.10 N = 49	4.07 N = 136	3.84 N = 70	4.13 N = 64	4.33 N = 52
Parents make food available, but students don't like to eat breakfast.	3.67 N = 185	3.67 N = 48	3.67 N = 136	3.64 N = 70	3.55 N = 64	3.86 N = 51
There is no food in the home for breakfast.	3.38 N = 186	2.98 N = 49	3.53 * N = 136	3.37 N = 70	3.41 N = 64	3.35 N = 52
Hectic morning schedules at home leave students with no time for breakfast.	4.71 N = 186	4.76 N = 49	4.71 N = 136	4.64 N = 70	4.78 N = 64	4.71 N = 52
Students are without supervision at home in the morning.	4.48 N = 186	4.51 N = 49	4.48 N = 136	4.44 N = 70	4.63 N = 64	4.35 N = 52
Students eat an early breakfast, but still arrive at school hungry.	3.22 N = 186	3.00 N = 49	3.31 N = 136	3.30 N = 70	3.22 N = 64	3.12 N = 52

* Significant at p = .01

Note that there is one significant disagreement here. Given the statement, "There is no food in the home for breakfast," superintendents from schools offering a breakfast program agreed with it for a mean score of 3.53. Superintendents from schools with no breakfast program actually disagreed

with the statement. Their mean score was 2.98. Looking more closely at the actual responses reveals that the 'no breakfast' superintendents selected disagreement choices (1.2.3) at a 64% rate while the 'breakfast' superintendents disagreed only 49%.

There are several possible reasons for such difference of opinion. Superintendents with breakfast programs may be more aware of home life issues. It is possible that they have more opportunities to meet with and talk to students during breakfast. On the other hand, talking with students who are enjoying a school breakfast may over-sensitize a superintendent to the problem.

Those superintendents who don't think food at home is part of the problem may be accurately reflecting their district. It is possible that some districts have differences in their communities that mitigate against a need for school breakfast. At the same time, it may be that superintendents who do not offer a school breakfast program are not aware of any problems because they have not observed any problems. This survey did not probe this topic. It may be an area worth exploring in greater depth in future research by the Service.

E. 4. Objective Three: Support for Expanding the Pilot

In an effort to discover whether there is support for expanding the universal school breakfast pilot project, school superintendents were next asked to agree or disagree with a series of statements that get to the heart of the public policy debate. For the first time, genuine disagreement appears to exist on many items. On seven of nine statements there are statistically significant differences between the sub-groups, primarily between the sub-group representing superintendents with breakfast programs and the sub-group representing those without.

The findings here begin with a question asked of respondents early in the questionnaire. The third question asked superintendents if they were interested in offering a "no charge" universal program in their school or district. Only **17%** said "**No**." **37%** said "**yes**," while **46%** indicated that they were "**Uncertain**." Additional comments made by respondents, Appendix IV, indicate that one factor leading to uncertainty is funding. A number of the respondents admitted to being interested only if they could be certain of continued funding. Here are some examples of the comments:

> "Breakfast is a great idea. Paying for it is a problem. Do we get seed money to start then lose the funding?"
>
> "Great idea—Fund it!"
>
> "It is fairly simple. Yes, it is a program American students need, but will American taxpayers swing for the bill? I doubt it."

Overall, 44 superintendents offered additional comments, which were encouraged at the end of the questionnaire. Their remarks seem to break down into positive (23%), skeptical (34%), and negative (43%). (See Appendix IV for the complete comments.) Admittedly, some of the placements into categories were judgment calls. The point is, additional comments tended not to be supportive.

Table 4 presents the statements from the questionnaire collecting the strongest opinions positive and negative. Seventy-five percent of the respondents indicated strong agreement with the

statement, " The linkage between breakfast and positive classroom performance is too important to ignore." And seventy percent agreed with the statement, "Breakfast is a family responsibility."

This may not be as contradictory as it seems at first. It is perfectly logical for a superintendent, or any school official for that matter, to believe strongly in the linkage between breakfast and performance while, at the same time, believing that providing breakfast is a family, and not a school, responsibility. One critical stumbling block is the issue of school breakfast not breakfast alone.

It may surprise some, but there is no difference among the various subgroups on either of these two questions (Table 5). The agreement is strong and broad. Perhaps some insight can be gained by quoting from one superintendent who wrote,

"I really think parents should feed their children at home. But our breakfast program meets a real need for some children."

Table 4

Strong Opinions

Opinion	Percent Agreeing[1]
The linkage between breakfast and positive classroom performance is too important to ignore.	75%
Breakfast is a family responsibility.	70%
School breakfast is a natural extension of the school lunch program.	55%
	Percent Disagreeing[2]
The school breakfast program is intended for low income students only.	65%

1. Summing all the scores (5,6,7) that are positive in relation to neutral on a seven point scale where 1 = disagree strongly and 7 = agree strongly.
2. Summing all the scores (1,2,3) that are negative on the same scale.

There are major disagreements on other items between superintendents whose schools offer breakfast and those whose schools do not. For example, although 65% of all respondents disagreed with the statement, "The school breakfast program is intended for low income students only," those superintendents with no breakfast experience, as well as those who have been on the job longer, had significantly less disagreement with the statement. At the same time, those with school breakfast programs not only disagreed strongly, they gave one of the most extreme disagreement scores in the data.

There is solid evidence that experience with school breakfast programs creates a better program supporter (Table 5). On the statement suggesting school breakfast is a "natural extension of school lunch," all respondents agreed, but superintendents with program experience gave a significantly more positive response. To the suggestion that a universal breakfast program would "cost ... more than it brings in," the overall response was modestly in agreement, but experienced superintendents were significantly less certain that such would be the case.

When asked whether school breakfast was "important for school image in the community," the overall response indicated that it was not important, but the 'no breakfast' superintendents scored a significantly greater level of disagreement.

Table 5

Agreement with Frequently Expressed Opinions
(Disagree Strongly = 1 Agree Strongly = 7)
(mean score)

Opinion	Overall	Food Service Exp.		Years at Current Post		
		No Breakfast	Breakfast	3 or less	4 - 10	11 +
...intended for low income only...	3.07 N = 186	3.61 N = 49	2.87 * N = 136	2.74 N = 70	3.03 N = 64	3.56 * N = 52
...important for school image...	3.55 N = 186	2.99 N = 49	3.80 ** N = 136	3.80 N = 70	3.53 N = 64	3.23 N = 52
...a family responsibility...	5.25 N = 186	5.43 N = 49	5.17 N = 136	5.11 N = 70	5.11 N = 64	5.60 N = 52
...will cost more...	4.39 N = 176	4.76 N = 49	4.25 * N = 126	4.29 N = 65	4.21 N = 61	4.72 N = 50
...too important to ignore...	5.35 N = 186	5.10 N = 49	5.47 N = 136	5.43 N = 70	5.39 N = 64	5.19 N = 52
...avoid because of stigmatization...	3.93 N = 185	4.40 N = 48	3.76* N = 136	4.07 N = 70	3.98 N = 64	3.67 N = 51
...a natural extension of lunch program...	4.59 N = 186	4.06 N = 49	4.81 ** N = 136	4.83 N = 70	4.69 N = 64	4.15 N = 52
..cuts into school day...	3.63 N = 186	4.27 N = 49	3.38 ** N = 136	3.54 N = 70	3.69 N = 64	3.67 N = 52
...usurps parents responsibility...	4.13 N = 184	4.43 N = 49	4.00 N = 134	3.71 N = 70	4.20 N = 63	4.61 * N = 51

* Significant at p = .05
** Significant at p = .01

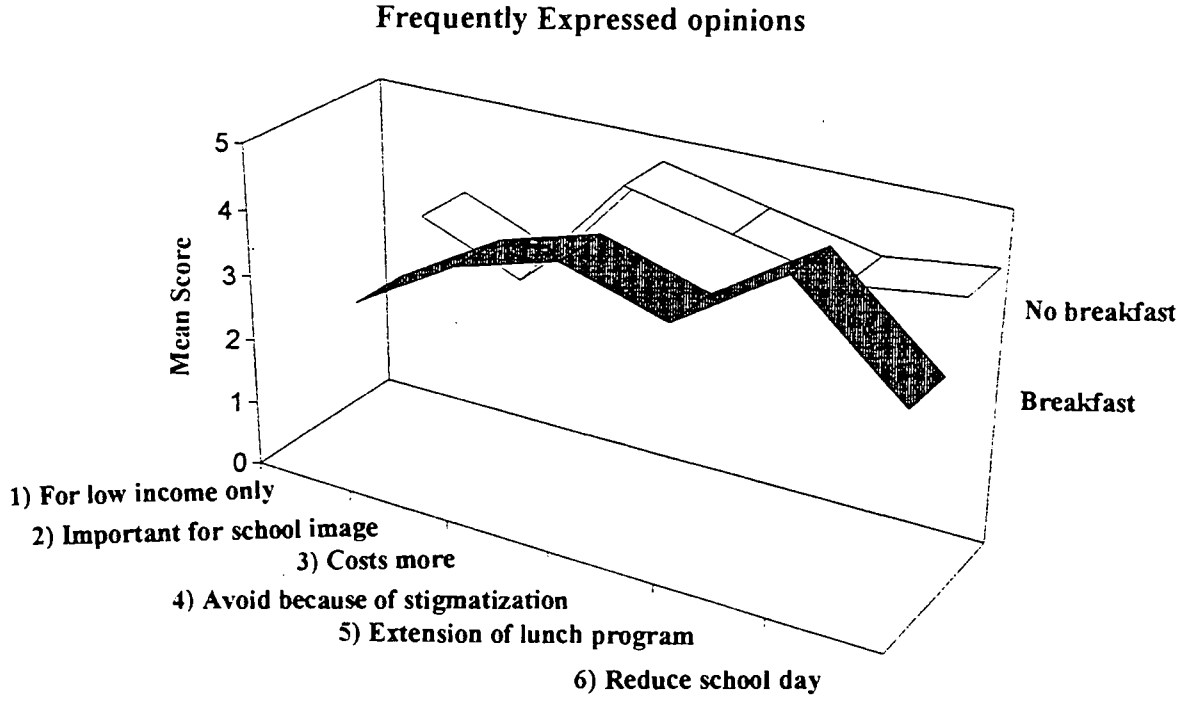
Confronted with the statement, "The breakfast program is stigmatized causing many eligible students to avoid using it," the two different experience groups fall on either side of neutral. The overall mean score is right on the line. It is 3.93, where 4.00 would be neutral. Superintendents

with breakfast programs disagree with the statement, scoring 3.76, while those without programs agree with it, scoring 4.40. The differences between the groups are, again, statistically significant. It appears that experience with the program reduces the perception of a stigma

In a similar fashion, the two groups fall on either side of neutral on the question of whether school breakfast programs, "cut into the school day and reduce teaching time." Superintendents with experience disagree, those without experience agree.

The amount of agreement and disagreement is graphically depicted on Chart 1.

Chart 1



Finally, time on the job appears to account for another significant difference. Superintendents with 11 years or more on the job felt strongly, scoring 4.61, that a universal breakfast program usurped parental responsibility, while those with three years or less disagreed with the statement, scoring 3.71. On the same statement superintendents with school breakfast program experience were neutral, 4.00, while those without breakfast experience were not, 4.43. This, however, was not statistically significant.

E. 5. Objective Four: Barriers to Expanding the Pilot

To assess what issues the Service would need to address before the pilot project could be expanded in Minnesota, superintendents were presented with statements reflecting eleven factors frequently raised in debates about the universal breakfast program. They were asked to give their opinions

about the importance of each factor using a five point scale. with 1 = "not at all important" and 5 = "extremely important."

They were asked for their opinion on how the factors would impact "the ultimate acceptance or defeat of a universal school breakfast program." Therefore. responses should indicate an individual's opinion about how important the factor is to the debate rather than how important it is to the respondent.

Nine factors earned an endorsement from half or more of the respondents. Table 6 ranks them in descending order.

Table 6

The Public Policy Debate

The Issue	Percent Saying It's Important[1]
Evidence linking breakfast and improved performance.	76%
Staffing costs.	72%
Community support.	72%
Subsidizing all student breakfasts.	68%
Proving that the benefits outweigh the costs.	65%
Conflict with transportation schedules.	61%
Costs for facilities.	59%
Other school issues with higher priority.	53%
Time taken from class activities.	50%

1. Percent choosing scores 4 or 5 on the five point scale.

Four of the nine factors are related to costs. "Staffing costs for a universal breakfast program," was acknowledged by 72% of the superintendents. "Expanded subsidies for all students," was picked by 68%. "Research showing benefits that outweigh the costs." was important to 65%. And "The cost for expanding food service facilities." was noted by 59% of the respondents.

On public policy issues. as was the case in frequently expressed opinions earlier. there were statistically significant differences between the sub-groups. Superintendents with school breakfast experience disagreed with their peers who lack breakfast experience on six of the eleven points.

Table 7

Public Policy Issues

Opinions About the Relative Importance of Issues

(Not at all Important = 1 Extremely Important = 5)

(mean scores)

Opinion	Overall	Food Service Exp.		Years at Current Post		
		No Breakfast	Breakfast	3 or less	4 - 10	11 +
The cost for expanded facilities.	3.62 N = 186	3.69 N = 49	3.60 N = 136	3.73 N = 70	3.42 N = 64	3.69 N = 52
Time taken from class activities.	3.31 N = 186	3.61 N = 49	3.19 * N = 136	3.34 N = 70	3.16 N = 64	3.44 N = 52
School Board resistance.	2.95 N = 186	3.31 N = 49	2.82 ** N = 136	3.07 N = 70	2.83 N = 64	2.94 N = 52
Persuasive evidence linking breakfast to improved performance.	4.08 N = 186	3.82 N = 49	4.18 ** N = 136	4.06 N = 70	4.23 N = 64	3.90 N = 52
Subsidies for all students.	3.83 N = 186	3.59 N = 49	3.93 * N = 136	3.86 N = 70	3.78 N = 64	3.85 N = 52
Staffing costs.	3.92 N = 186	4.04 N = 49	3.88 N = 136	3.99 N = 70	3.94 N = 64	3.81 N = 52
School vs. family conflict.	3.21 N = 186	3.55 N = 49	3.08 ** N = 136	3.09 N = 70	3.25 N = 64	3.33 N = 52
Conflict with transportation schedules.	3.63 N = 186	3.84 N = 49	3.54 N = 136	3.56 N = 70	3.66 N = 64	3.69 N = 52
Issues with a higher priority.	3.53 N = 186	3.69 N = 49	3.47 N = 136	3.37 N = 70	3.76 N = 64	3.46 N = 52
Evidence that benefits outweigh costs.	3.77 N = 186	3.55 N = 49	3.85 * N = 136	3.69 N = 70	3.88 N = 64	3.75 N = 52
Community support.	3.91 N = 186	3.67 N = 49	3.99 N = 136	3.91 N = 70	3.86 N = 64	3.96 N = 52

* Significant at $p < .05$

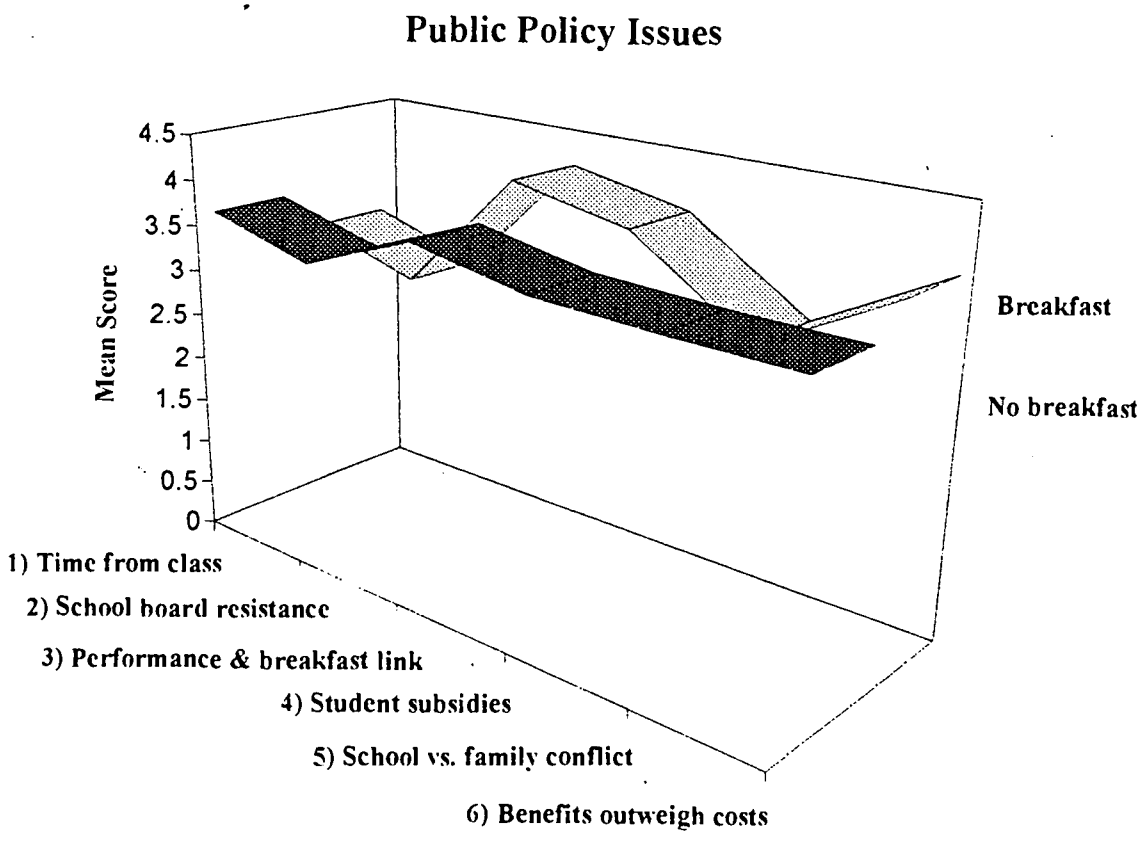
** Significant at $p < .01$

Initially, finding that 76% of the superintendents felt that it was important to present, "Persuasive evidence linking breakfast to improved performance," raised some questions for the research team.

These same superintendents had earlier indicated some of the strongest personal agreement with statements linking breakfast and performance (**E. 2.** above). With agreement scores above 80%, the superintendents said that a nourishing breakfast increases student learning ability, information retention, and concentration. Yet, here were these same superintendents saying that the linkage needed to be proven in the public policy debate.

Understanding this seeming contradiction may begin by observing the statistically significant difference on this issue between those with breakfast program experience and those without it. Data, reported in Table 7, shows that school superintendents with experience are more likely to believe that evidence of the linkage is an important public policy issue. Similarly, this same sub-group has a stronger belief that cost/benefit evidence will be important in the debate. Chart 2 displays the strength of these beliefs and shows a shift in the position of the two sub-groups from the earlier chart.

Chart 2



If superintendents with experience feel strongly that the cases linking breakfast and performance, and the cases showing benefits outweighing the cost, have to be made in the public policy debate, then there are two possible explanations. Either these superintendents believe that their own experience will not support these points, or they have experienced problems making their case to skeptics. The other data seems to support the latter explanation.

For example, experienced superintendents are less likely to believe that the School Board is an issue. Obviously, if a breakfast program is already operating, the Board has approved it. Those superintendents who don't have a breakfast program see the Board as a more serious obstacle.

Experienced superintendents are also significantly less likely to believe that lost classroom time will be an issue, or that the school/family responsibility issue will have a great impact. On the other hand, they are more likely to be concerned with expanding the subsidy to all students.

It is possible that real time experience gives some superintendents an empirical understanding of what a school breakfast program costs and what benefits result. They may, also, be fully aware of how difficult it is to prove the case to peers who don't have or don't want school breakfast on their menu.

E. 6. Other Findings

Earlier, it was noted that the return mail had produced a separate sub-group of respondents, Food Service Directors (FSD), who apparently were given the assignment of completing the questionnaire by their superintendents. The data were recorded and an analysis of the differences between the overall superintendent mean scores and the FSD mean scores was done. The results were interesting enough to warrant reproducing them here.

Table 8

Comparisons: Superintendents vs. Food Service Directors

(From Table 2)			(From Table 3)		
A nourishing breakfast... increases student learning ability.	5.69 N = 186	6.52 ** N = 44	Some students are not hungry when they wake up.	4.08 N = 186	5.23 ** N = 44
increases student information retention.	5.42 N = 186	6.39 ** N = 44	Parents make food available, but students don't like to eat breakfast.	3.67 N = 185	4.52 ** N = 44
increases student concentration in the classroom.	5.79 N = 186	6.66 ** N = 44	There is no food in the home for breakfast.	3.38 N = 186	4.41 ** N = 44
decreases student absenteeism.	4.64 N = 186	5.89 ** N = 44	Hectic morning schedules at home leave students with no time for breakfast.	4.71 N = 186	5.25 ** N = 44
decreases student disruptive behavior. (reversed scored)	5.10 N = 185	4.09 * N = 44	Students are without supervision at home in the morning.	4.48 N = 186	5.07 ** N = 44
improves student problem solving ability.	5.09 N = 186	6.11 ** N = 44	Students eat an early breakfast, but still arrive at school hungry.	3.22 N = 186	4.05 ** N = 44
decreases reports of student illness.	4.94 N = 185	6.05 ** N = 44			

* $p < .01$
** $p < .001$

Table 8 represents the comparative scores for FSD against the scores reported earlier on Table 2 and Table 3. Note that the differences are all statistically significant, most to an extreme degree.

Researchers expect to find significant differences when the respondent groups are, in fact, truly different. Obviously, superintendents and Food Service Directors are different in many ways. They are likely to have different backgrounds and training; different relationships with the classroom and teaching; and different professional foci.

Recall that the questionnaire was addressed to school executives and intended for completion by superintendents. Part Two: Nutrition and Classroom Performance, asked for agreement or disagreement with education researchers. Part Three: Students and Breakfast, asked for agreement or disagreement with nutrition experts.

It is likely that FSDs did not feel comfortable challenging "experts" outside their own profession. A closer look at the data reveals some affirmation bias. That is, over twenty percent of the FSD respondents gave patterned responses on these two parts of the questionnaire. The patterns followed were ones where all the marks were 7, or 6, or 7 and 6. Overall, FSDs were in greater agreement with the experts than were the superintendents. Eleven of the thirteen items reveal this trend. On only two items, those dealing with disruptive behavior and reports of illness, did the FSDs disagree with the experts. Both, as it turns out, would require classroom experience of student behavior, experience that FSDs lack.

It would be natural to ask why these patterned responses were not simply dropped from the data. The answer will become obvious once Table 9 is presented. Table 9 contains the comparisons for Table 5 and Table 6. These are two parts of the questionnaire that call for personal opinions rather than agreement with experts. And the comparisons are less extreme.

Now there are significant differences on only nine of twenty items, and only two of those at the more conservative (.001) level.

Generally, FSDs are more supportive of the school breakfast concept than the superintendents, though both groups are positively inclined. The two, however, are in nearly complete agreement about the issues that are important in the public policy debate. Indeed, the FSDs do not disagree with the opinions of superintendents much at all. Their significant differences were in the direction of stronger beliefs about and stronger support for school breakfast programs.

One note of caution. Though the FSD data is interesting, and provides some evidence of the reliability of the questionnaire, this is by no means a random sample of FSDs. Rather, it is a convenience sample, an interesting sidebar to the discussion of superintendents and school breakfast programs.

Table 9

Comparisons: Superintendents vs. Food Service Directors

(From Table 5)			(From Table 6)		
...intended for low income only...	3.07 N = 186	2.63 N = 43	The cost for expanded facilities.	3.62 N = 186	3.44 N = 44
...important for school image...	3.55 N = 186	4.41 * N = 44	Time taken from class activities.	3.31 N = 186	3.57 N = 44
...a family responsibility...	5.25 N = 186	4.00 ** N = 43	School Board resistance.	2.95 N = 186	3.30 N = 43
...will cost more...	4.39 N = 176	3.86 N = 42	Persuasive evidence linking breakfast to improved performance.	4.08 N = 186	4.45 * N = 44
...too important to ignore...	5.35 N = 186	6.05 * N = 44	Subsidies for all students.	3.83 N = 186	4.25 * N = 44
...avoid because of stigmatization	3.93 N = 185	4.57 N = 44	Staffing costs.	3.92 N = 186	4.11 N = 44
...a natural extension of lunch program...	4.59 N = 186	5.50 ** N = 44	School vs. family conflict.	3.21 N = 186	3.09 N = 44
..cuts into school day...	3.63 N = 186	2.66 * N = 44	Conflict with transportation schedules.	3.63 N = 186	4.16 * N = 44
...usurps parents responsibility...	4.13 N = 184	3.18 * N = 44	Issues with a higher priority.	3.53 N = 186	3.63 N = 43
			Evidence that benefits outweigh costs.	3.77 N = 186	4.11 N = 44
			Community support.	3.91 N = 186	4.11 N = 44

* $p < .01$
** $p < .001$

F. Conclusions

1. A majority of Minnesota School Superintendents are aware of the universal school breakfast pilot project, but a sizable group, over forty percent of the respondents, could not identify the project.

2. Superintendents are aware of a connection between nutrition and performance. They indicated strong levels of agreement with experts on classroom performance issues and more modest agreement with them on behavioral issues.

3. Superintendents are aware that home based issues complicate breakfast for students. They acknowledge that family schedules and a lack of supervision may cause students to skip the meal.

4. Superintendents recognize the connection between breakfast and classroom performance but are almost equally convinced that the meal is a family responsibility. The subtle distinction here appears to be the shading of difference between the need for breakfast and the need for a school provided breakfast. At the same time, they accept the idea that breakfast might be considered a natural extension of the school lunch program.

5. The three top issues that need to be addressed before a successful pilot can be expanded are, according to the superintendents: persuasive evidence of the benefits of the program; costs, and community support.

G. Recommendations

Communications: The Service will need to report the results of the pilot program extensively. We recommend that a regular progress report be initiated. The Service might consider a "special" report format with regular updates from the pilot sites. The report should concentrate on classroom results and behavioral improvements. It should cover the cost/benefit issue. And it should relate the school program to the community.

1. Create a special report on School Breakfast. Key topics: Information, results, community support, behavioral changes, costs, independent evidence.

2. Create special exhibits for conferences. Emphasize the key topics.

3. Develop a speaker program. Use peer to peer strategy to spread the message.

Niche Marketing: Superintendents serving schools without a breakfast program are a distinct group and should be treated as such. As evidenced in their responses, they are either less persuaded on the subject or more resistant to new information. It might be worthwhile researching the differences more deeply. Focus groups, for example, would allow for more intensive probing of the differences. With more information, the Service can address this group as a special market requiring special information. It might be possible to attract partners to this effort. Commodity group representatives may bring additional resources to a niche strategy.

1. Conduct follow-up research on this niche.

2. Develop an information program in joint venture with you allies.

3. Communicate differently with this group. Special bulletins. Special workshops. "Invitation Only" events.

Outreach: Other education professionals, classroom teachers and school principals, for example, will also be part of the debate. Publications besides those coming from MDE appear to be sources of news and information that superintendents receive. Although MDE is an important source of information, that news reaches a bit more than half the superintendents. Meanwhile, most respondents said that they had other information sources (See page 4 above). The communication effort needs to reach to these other channels. Not only because superintendents use them, but because other education professionals use them too.

1. Develop press kits for other publications.

2. Identify internal "experts" available for other publications to interview and quote.

Research: Data should be collected from random samples of these other professional groups to discover how and to what degree they agree with the perspectives and opinions collected here. This research can help to identify building level issues that superintendents might not be alert to. It can show areas of opinion agreement. And it can add to the overall understanding of critical issues.

Team Three Research
P.O. Box 580856 Minneapolis, MN 55458

April 14, 1995

Glenn Strid
School Breakfast Program
Minnesota Department of Education
550 Cedar Street
St. Paul, MN 55101

Dear Mr. Strid:

With the information you provided as background, and given your comments on our observations about the project, what follows is a formal proposal to conduct a research project on your behalf.

Background

The school breakfast program in Minnesota reaches only a small part of the total number of students enrolled despite considerable research showing the positive impact of a nutritional breakfast on the classroom environment. Low participation may be explained by several factors. Breakfast programs increase a school's costs; they may take time away from class schedules; they may be unappealing to some students because of a belief that breakfast is intended for students from low income families; and, a particular school may not have facilities to offer meal programs.

In an effort to demonstrate the benefits of a breakfast program, the Minnesota Legislature, in 1994, authorized and funded a pilot project designed to expand participation to all students regardless of family economic status. The pilot is also intended to demonstrate the cost effectiveness of a universal breakfast program.

The Department of Education Food and Nutrition Service is interested in learning how school district executives value the school breakfast program and what level of support exists for expanding the full participation program beyond the pilot stage. Strong support will enhance DOE efforts to gain full funding in the future.

The Specific Research Objectives Are:

1. Determine the level of awareness of the pilot program.
2. Learn about school executives' perceptions of:
    a. the link between nutrition and classroom performance,
    b. the link between breakfast and classroom performance.
3. Determine the level of support for expanding school breakfast programs.
4. Learn about school executives' perceptions of any barriers to expansion that might exist.

Findings will inform the Food and Nutrition Service about its success, or lack of success, in promoting school breakfast. The Service will also discover the amount and level of support that exists for expanding the pilot, or creating a statewide universal breakfast program.

Approach

A questionnaire will be mailed to all school superintendents in Minnesota (N = 450). A cover letter and a return envelope will be included with the questionnaire. All will be inserted in an outside envelope bearing the return address of the Department of Education School Breakfast Program.

The cover letter will explain that the research is being conducted by a graduate research team on behalf of the DOE. It will guarantee confidentiality to the respondents. The return envelope will be addressed to our post office box as a further assurance of confidentiality.

Two weeks after the first mailing is sent, a second mailing, labeled "Reminder," will be mailed to those superintendents who have not responded. This second mailing is intended to increase the total participation to approximately 40% of all superintendents.

A draft of the questionnaire is attached. The questionnaire is designed to collect data from the superintendents on (1) their level of knowledge and awareness of school breakfast programs, (2) their attitudes and opinions regarding nutrition and classroom performance, and (3) their sense of what barriers an expanded program might face.

The questionnaire will be pre-tested among DOE staff to remove ambiguity and mis-statements.

Purpose of Research

It is our understanding that the results of this research will contribute to the DOE's understanding of the awareness of and support for an expanded school breakfast program. This information will inform the continuing public policy debate over federal and state support for such a program.

Estimated Budget

Issue Research	*
Questionnaire Design	*
Printing	
800 x four page, one color, double-sided, trimmed and folded	$ 154.41
800 #10 Outside envelopes, return address imprinted	65.56
800 #9 Reply envelopes, imprinted	65.41
450 First Cover Letters, one color, one side	36.62
350 Second Letters, one color, one side	31.26
Outgoing Postage (.32 x 800)	256.00
Return Postage (.32 x 800)	256.00
Subtotal	$ 865.26
Data Entry	*
Final Report Printing and Presentation	$ 137.19
Project Total Cost	$1,002.45

* Because this is a graduate course requirement, costs for these items will not be assessed.

Project Schedule

A complete schedule is attached. The plan calls for final approvals and delivery of the mailing labels on or before April 21, 1995. The first mailing would be sent out on April 25, 1995. A second round would be sent out on May 5, 1995. The final report will be due to DOE on June 2, 1995.

Principle Researchers

Zuyang Wang received his MD in 1985, graduating from the First Medical University in the People's Republic of China. From 1986 to 1992 he served as an Assistant to the President of the First Medical University. He is currently a MPH Candidate in Public Health Administration at the Division of Health Management and Policy, School of Public Health, University of Minnesota.

Wiehai Tjioe received his B.S. in Mechanical Engineering from Loyola Marymount University in 1991. After graduation, he worked in Indonesia as a Mechanical Engineer at an air conditioner manufacturing firm. He obtained a M.S. in Industrial Engineering from the University of Minnesota in 1994 and is currently pursuing an MBA in Marketing and MIS at the Carlson School of Management, University of Minnesota.

Kevin Upton received his MBA from the Executive Program at the Carlson School in 1994. Earlier studies earned a B.A. in Political Science and Economics from Indiana University at South Bend, and a M.A. in Political Science from the University of Wisconsin-Madison. He is president of FMG, Inc. a marketing communications strategy firm headquartered in Minneapolis.

DOE Deliverables

Before proceeding with the project, we need the following from the Department of Education.

1. Approval of the proposal.

2. Approval of the budget and authorization to spend the amounts detailed above.

3. Two complete sets of Minnesota School Superintendent mailing labels. [1]

4. Participation in the questionnaire pre-test. (Twelve DOE employees are to be given copies of the draft questionnaire, asked to complete them within one hour, and return them to you, Glenn.)

Let us know if this proposal meets your expectations. We are eager to begin work on your behalf as soon as we have your approval.

Zuyang Wang
Wiehai Tjioe
Kevin Upton

cc: Barbara Loken

[1] In the event that you are unable to obtain the Superintendent labels, Glenn, we will change the design to survey a sample of the 800 elementary school principals in the state.

Team Three Research
P.O. Box 850856 Minneapolis, MN 55458

April 28, 1995

Dear Minnesota School Superintendent:

How would you like to play a **key role** in shaping public policy? The questionnaire enclosed is designed to collect the opinions of Minnesota school executives on the subject of universal school breakfast programs. We are a team of graduate students at the University of Minnesota working on behalf of the Department of Education Food and Nutrition Service. The information we collect from this questionnaire will be used to communicate your views to policy makers.

A stratified sample of school executives have been selected to complete this task. That makes **your response** especially important. As you know, when a sample is small, the views of each participant can **greatly effect** the results. Please keep this in mind as you answer the questions. We estimate that it will only take you a few minutes to finish the task.

Be assured that your responses will be **completely anonymous**. The three digit code you see on the questionnaire and envelope are strictly to help us keep track of responses and to avoid entering duplicate replies. This code will not be shared with anyone in the Department of Education. The final report will contain only aggregate data. Incidentally, if you do not wish to answer a question, feel free to skip it.

A pre-addressed and stamped envelope is included for your convenience. Please use it to return your questionnaire to our office. To insure a timely report, we ask that you **complete** and **return** the questionnaire by **May 5, 1995**.

If you have questions or concerns about this research project, call Kevin Upton, team leader, at (612) 376-0638. This line is supported with an answering machine in case he is not available when you call. Messages are returned within one day.

Thank you,

Team Three Research

enc. questionnaire and return envelope

Team Three Research
P.O. Box 580856 Minneapolis, MN 55458

May 10, 1995

Dear Superintendent:

Recently we sent you a questionnaire on the school breakfast program. This is a reminder that your opinions are important and it is a request that you complete the form and return it to us today.

In case you have misplaced the original, a copy of the questionnaire and a postage paid return envelope are included for your convenience.

This survey is being conducted on behalf of the Minnesota Department of Education Food and Nutrition Service. Information collected will be used to communicate your views to policy makers. Your individual responses, however, will be completely anonymous. MDE officials will never see the individual forms and will not know the names of those who responded to our request.

Team Three Research is a group of graduate students contributing their time to MDE. We are using the code numbers on your questionnaire to improve response rates and to avoid recording duplicate data. If you have questions about the survey, contact team leader Kevin Upton at 612-376-0638.

We appreciate your participation. Your opinions are important. To be certain that they will be included, please return the completed questionnaire before May 15, 1995.

Thank you,

Team Three Research

P.S. If your completed response has crossed this letter in the mail, you may ignore this request.

Minnesota School Breakfast Program Survey

April 25, 1995

Dear Minnesota School Executive:

Thank you for your participation. Information gathered from this questionnaire will be used to collect data on and learn opinions about school breakfast programs in Minnesota. All individual responses will be kept confidential. Questionnaires will not be returned to the Department of Education.

Part One: Pilot Project

1. Are you aware of the "no charge" Universal Breakfast Pilot Project in Minnesota schools?

☐ Yes →→→ if Yes, then →
☐ No (--skip to question 3) ↓↓↓

2. How did you become aware of the project? (check all that apply.)

☐ Minnesota Department of Education publications
☐ MN Association of School Administrators publications
☐ MN School Food Service Association
☐ Other professional organization publications
☐ Local press
☐ Public Officials
☐ Other (Please identify _____)

3. Would your school/district be interested in offering a "no charge " universal breakfast program?

☐ Yes
☐ No
☐ Uncertain

4. Would you be interested in reading interim reports on the Universal Breakfast Pilot Project?

☐ Yes
☐ No

5. Would you be interested in reading the final report on the project?

☐ Yes
☐ No

Part Two: Nutrition and Classroom Performance

Education researchers have identified a connection between nutrition and classroom performance. They suggest that a nourishing breakfast may be linked to improvements in behavior, academic performance as measured by standardized tests, and cognitive development. In the questions that follow, we are interested in the extent to which you agree or disagree with these reports.

A nourishing breakfast.....

	Disagree Strongly							Agree Strongly
1. ...increases student learning ability.	1	2	3	4	5	6	7	
2. ...increases student information retention.	1	2	3	4	5	6	7	
3. ...increases student concentration in the classroom.	1	2	3	4	5	6	7	
4. ...decreases student absenteeism.	1	2	3	4	5	6	7	
5. ...increases student disruptive behavior.	1	2	3	4	5	6	7	
6. ...improves student problem solving ability.	1	2	3	4	5	6	7	
7. ...decreases reports of student illness.	1	2	3	4	5	6	7	

Part Three: Students and Breakfast

Educators and nutrition experts have suggested that there are a variety of reasons why students do not eat breakfast. In the section that follows, you will find some frequently cited reasons for missing breakfast. Please indicate your level of agreement/disagreement based upon your experience in your current position.

Reason	Disagree					Agree
1. Some students are not hungry when they wake up.	☐	☐	☐	☐	☐	☐
2. Parents make food available, but students don't like to eat breakfast	☐	☐	☐	☐	☐	☐
3. There is no food in the home for breakfast.	☐	☐	☐	☐	☐	☐
4. Hectic morning schedules at home leave students with no time for breakfast.	☐	☐	☐	☐	☐	☐
5. Students are without supervision at home in the morning.	☐	☐	☐	☐	☐	☐
6. Students eat an early breakfast, but still arrive at school hungry.	☐	☐	☐	☐	☐	☐

Part Four: Frequently Expressed Opinions

In the section that follows, you will find opinions about school breakfast programs that have been frequently expressed in school administration literature and in public policy debates. Please indicate the extent to which you agree or disagree with each statement.

Statement	Disagree Strongly	1	2	3	4	5	6	7	Agree Strongly
1. The school breakfast program is intended for low income students only.		1	2	3	4	5	6	7	
2. Offering a breakfast program is important for school image in the community.		1	2	3	4	5	6	7	
3. Breakfast is a family responsibility.		1	2	3	4	5	6	7	
4. A universal breakfast program will cost the school more than it brings in.		1	2	3	4	5	6	7	
5. The linkage between breakfast and positive classroom performance is too important to ignore.		1	2	3	4	5	6	7	
6. The breakfast program is stigmatized causing many eligible students to avoid using it.		1	2	3	4	5	6	7	
7. School breakfast is a natural extension of the school lunch program.		1	2	3	4	5	6	7	
8. Breakfast programs would cut into the school day and reduce teaching time.		1	2	3	4	5	6	7	
9. Universal breakfast programs put the school in the position of usurping parental responsibility.		1	2	3	4	5	6	7	

Part Five: Public Policy Issues

In your opinion, how important will each of the following factors be in the ultimate acceptance or defeat of a universal school breakfast program in Minnesota.

Factor	Not At All Important	1	2	3	4	5	Extremely Important
1. The cost for expanding food service facilities.		1	2	3	4	5	
2. The time breakfast takes from class activities.		1	2	3	4	5	
3. School Board resistance to expanding programs.		1	2	3	4	5	
4. Persuasive evidence linking breakfast to improved performance.		1	2	3	4	5	
5. Expanded subsidies for all students.		1	2	3	4	5	

	Not At All Important	1	2	3	4	5 Extremely Important
6. Staffing costs for a universal breakfast program.		1	2	3	4	5
7. Conflict between school services and family duties.		1	2	3	4	5
8. Conflict between transportation schedules and breakfast.		1	2	3	4	5
9. Issues with a higher priority than breakfast programs.		1	2	3	4	5
10. Research showing benefits that outweigh the costs.		1	2	3	4	5
11. Community support for school breakfast programs		1	2	3	4	5

Part Six: Tell us a bit about yourself.

1. Your Position: ☐ Superintendent ☐ Principal ☐ Teacher ☐ Other (Describe _____.)

2. Your School/District Participation in Food Service: (In multi-building districts, please indicate the level of service for the majority of students.)

☐ Only School Lunch Offered ☐ Only School Breakfast Offered

☐ No Food Service Offered ☐ School Breakfast and Lunch Offered

3. Gender: ☐ Female ☐ Male

4. Years in current position: ☐ 3 years or less ☐ 4 - 6 years ☐ 7 - 10 years ☐ 11-14 years ☐ 15 +

Part Seven: Additional Comments (Use the back of the page, if you wish.)

_____

_____

_____

_____

Thank you for your time and valuable input!

Please use the envelope provided and return the completed questionnaire immediately to:

Team Three Research
c/o FMG Inc.
P.O. Box 850856
Minneapolis, MN 55401

Appendix IV

Additional Comments

Positive

1. My uneducated immigrant mother knew the importance of breakfast! Her admonition still rings in my 63 year old memory's ear. " Eat your breakfast, it's the most important meal of the day!!!" If she knew this I would hope educated politicians and educators should have as much sense!!!

2. About 63% of our students qualify for free or reduced meals. In our in-school survey recently, students noted the most frequent reason for not eating breakfast here at school was due to lack of time. We have proposed a change in schedule to remedy this. Currently, we serve 130-150 breakfasts per day our of 625 possible.

3. I support a universal breakfast program. The major obstacle is the cost. School districts would be hard pressed to find supporting funds.

4. I always have free food for all (peanut butter, jelly, butter and bread)—no questions asked! No kid is hungry in this school! Our school is home to TOO many KIDS. What ever happened to the parents? DAMN THEM ANYWAY!

5. The Breakfast Program is a good, cost effective program.

6. We perhaps need a breakfast (brunch) break around 10:00 a.m. not necessarily have breakfast served at 7:00 or 8:00 for secondary students! Elementary students need breakfast at 7-8 a.m.

7. Our high school breakfast program, begun last fall, has become a "Breakfast Club" where students socialize before school.

8. While I believe class time will be lost with a universal breakfast program, I also believe the time lost is more than compensated for by students ready to learn.

9. We think it is a very good program. We need help promoting more students to use it.

10. Great idea—Fund it!

Negative

1. Schools were established to be an educational agency—schools cannot give up any more instructional time to social corrective activities—we need all the time (and more) to do the job we were established to do!

2. Supervision of students and space taken when other students cannot play outside...cafeteria & gyms are often needed...are both issues needing to be addressed.

3. Most parents in our district feel breakfast is their responsibility and did not participate when we offered the program.

4. This is a conservative community. Their concern is preserving the family structure and many see the breakfast program as the elimination of a family responsibility, thus further deterioration of the family.

5. Personal experience in another Minnesota school district indicated that elementary teachers have negative attitudes toward breakfast programs. Right Wing Christian groups who see school breakfast as usurping family responsibility were the biggest deterrent to program.

6. We have surveyed the community and received a negative response. We then attempted to educate the community and surveyed the following year and again received a negative response. I also operate a breakfast program in a neighboring school district and there the community response to the program is also very negative.

7. I oppose a universal breakfast because after being in a regular program for several years I think it works well and is cost effective. The majority of our participants receive subsidies so we appear to be reaching the most "at risk" kids. Also, reports from the pilot sites appear to be unrealistically slanted to the positive and really in evaluated in a valid way.

8. I don't believe we can really afford to feed all students at school or that we should.

9. Supervision of students is also an issue. Teacher master agreements are quite specific about duty times. With many students in our schools earlier in the day, who supervises?

10. We are a school not a social service agency. Breakfast is a parental responsibility.

11. Parent surveys indicate a lack of support for breakfast programs.

12. Community is adamantly opposed to such a program based on surveys taken.

13. A breakfast program was initiated at the start of the 1994/95 school year, but due to poor usage it was discontinued.

14. Did community survey—No interest.

15. There is strong resistance from food service employees and principals. Cooks feel it interferes with preparations for lunch (limited space).

16. If it takes money from general education this would be wrong. I have 2 children at home and 2 in graduate school. None ate breakfast (by choice). All were or are top students academically. Breakfast is important but not necessarily a requirement for performance for all.

17. Financial resources for schools are at an all time "low priority." Those who can afford a breakfast should pay. Added money should go to educational services.

18. Breakfast programs should remain an option for each community.

19. We surveyed all parents. Only 5 responded they would like a breakfast program.

Skeptical

1. If you can fund it entirely and not charge anyone it may seem feasible. Don't fund it for a few years and then expect the districts to fund it or drop it as has happened with many programs.

2. Breakfast program successful in Grades K-6, but very poor participation in Grades 7-12.

3. For some I think it helps, BUT many people (young and adult) aren't much for eating breakfast. Perhaps a poverty situation which finds the school meals (breakfast and lunch) as the ONLY nutritious source of food would put a different light on the picture.

4. Universal breakfast and lunch programs would seem fair to all families! We have way too many free-loaders (families with plenty of income, but qualify due to allowed deductions!) They live in expensive homes, drive new cars and pick-ups, travel, cruise, buy! The average person pays for FOOD!!!

5. It is fairly simple, yes it is a program American students need, but will American taxpayers swing for the bill? I doubt it. I am not interested in a pilot that won't receive full funding later. There is no free lunch, someone must pay. Even with the positive research we can't proceed till the financial resources are in place.

6. It is difficult to make blanket statements on any of these issues. School Board resistance and cost are the big issues here even though we have breakfast in all buildings.

7. Good luck. "A hungry child cannot learn!"

8. I really think parents should feed their children at home. But our breakfast program meets a real need for some children.

9. The goal of universal breakfast is commendable, but probably lofty. People don't want a socialized program.

10. So, there's a correlation between eating breakfast and getting good grades. There's also a correlation between the rise in teacher salaries and the increase in liquor sales. Is there any indication that providing school breakfast increases learning? Maybe the relationship is that good homes value both good grades and good breakfasts!

11. It is very tough to get public or staff support when you are cutting teachers and increasing class size.

12. It is important for the state and federal legislatures to come up with a consistent program. They have a tendency to make too many changes.

13. Currently, we cannot overcome peer pressure for grades 7-12 not to eat. Eating breakfast is not the "in" thing to do.

14. I think funding will be the key. I don't see schools opposed to doing these kinds of things, but without the dollars to provide the services, we just can't add anymore.

15. Breakfast is a great idea. Paying for it is a concern. Do we get seed money to start then lose the funding? I wasn't always a cynic. It's just that I've seen a lot of programs over the past 25 years go bust.

P2Q5	COUNT	CUMCNT	PERCENT	CUMPCT
1	45	45	24.32	24.32
2	44	89	23.78	48.11
3	26	115	14.05	62.16
4	40	155	21.62	83.78
5	19	174	10.27	94.05
6	6	180	3.24	97.30
7	5	185	2.70	100.00
N=	185			
*=	1			

P2Q6	COUNT	CUMCNT	PERCENT	CUMPCT
1	2	2	1.08	1.08
2	4	6	2.15	3.23
3	5	11	2.69	5.91
4	42	53	22.58	28.49
5	68	121	36.56	65.05
6	42	163	22.58	87.63
7	23	186	12.37	100.00
N=	186			

P2Q7	COUNT	CUMCNT	PERCENT	CUMPCT
1	3	3	1.62	1.62
2	8	11	4.32	5.95
3	10	21	5.41	11.35
4	47	68	25.41	36.76
5	53	121	28.65	65.41
6	37	158	20.00	85.41
7	27	185	14.59	100.00
N=	185			
*=	1			

```
MTB > tally c13-c19;
SUBC> all.
```

P2Q7	COUNT	CUMCNT	PERCENT	CUMPCT
1	3	3	1.62	1.62
2	8	11	4.32	5.95
3	10	21	5.41	11.35
4	47	68	25.41	36.76
5	53	121	28.65	65.41
6	37	158	20.00	85.41
7	27	185	14.59	100.00
N=	185			
*=	1			

P3Q1	COUNT	CUMCNT	PERCENT	CUMPCT
1	10	10	5.38	5.38
2	21	31	11.29	16.67
3	23	54	12.37	29.03
4	48	102	25.81	54.84
5	59	161	31.72	86.56
6	25	186	13.44	100.00
N=	186			

P3Q2	COUNT	CUMCNT	PERCENT	CUMPCT
1	7	7	3.78	3.78
2	21	28	11.35	15.14
3	48	76	25.95	41.08
4	68	144	36.76	77.84
5	32	176	17.30	95.14
6	9	185	4.86	100.00
N=	185			
*=	1			

P3Q3	COUNT	CUMCNT	PERCENT	CUMPCT
1	8	8	4.30	4.30
2	48	56	25.81	30.11
3	45	101	24.19	54.30
4	46	147	24.73	79.03
5	29	176	15.59	94.62
6	10	186	5.38	100.00
N=	186			

P3Q4	COUNT	CUMCNT	PERCENT	CUMPCT
2	11	11	5.91	5.91
3	14	25	7.53	13.44
4	32	57	17.20	30.65
5	90	147	48.39	79.03
6	39	186	20.97	100.00
N=	186			

P3Q5	COUNT	CUMCNT	PERCENT	CUMPCT
1	1	1	0.54	0.54
2	11	12	5.91	6.45
3	16	28	8.60	15.05
4	53	81	28.49	43.55
5	80	161	43.01	86.56
6	25	186	13.44	100.00
N=	186			

P3Q6	COUNT	CUMCNT	PERCENT	CUMPCT
1	15	15	8.06	8.06
2	49	64	26.34	34.41
3	43	107	23.12	57.53
4	44	151	23.66	81.18
5	29	180	15.59	96.77
6	6	186	3.23	100.00
N=	186			

```
MTB > tally c20-c28;
SUBC> all.
```

P4Q1	COUNT	CUMCNT	PERCENT	CUMPCT
1	39	39	20.97	20.97
2	47	86	25.27	46.24
3	36	122	19.35	65.59
4	23	145	12.37	77.96
5	19	164	10.22	88.17
6	11	175	5.91	94.09
7	11	186	5.91	100.00
N=	186			

P4Q2	COUNT	CUMCNT	PERCENT	CUMPCT
1	27	27	14.52	14.52
2	25	52	13.44	27.96
3	33	85	17.74	45.70
4	50	135	26.88	72.58
5	26	161	13.98	86.56
6	21	182	11.29	97.85
7	4	186	2.15	100.00
N=	186			

P4Q3	COUNT	CUMCNT	PERCENT	CUMPCT
1	3	3	1.61	1.61
2	10	13	5.38	6.99
3	8	21	4.30	11.29
4	35	56	18.82	30.11
5	38	94	20.43	50.54
6	45	139	24.19	74.73
7	47	186	25.27	100.00
N=	186			

P4Q4	COUNT	CUMCNT	PERCENT	CUMPCT
1	9	9	5.11	5.11
2	12	21	6.82	11.93
3	16	37	9.09	21.02
4	62	99	35.23	56.25
5	36	135	20.45	76.70
6	24	159	13.64	90.34
7	17	176	9.66	100.00
N=	176			
*=	10			

P4Q5	COUNT	CUMCNT	PERCENT	CUMPCT
1	1	1	0.54	0.54
2	6	7	3.23	3.76
3	7	14	3.76	7.53
4	32	46	17.20	24.73
5	42	88	22.58	47.31
6	63	151	33.87	81.18
7	35	186	18.82	100.00
N=	186			

P4Q6	COUNT	CUMCNT	PERCENT	CUMPCT
1	14	14	7.57	7.57
2	30	44	16.22	23.78
3	32	76	17.30	41.08
4	34	110	18.38	59.46
5	41	151	22.16	81.62
6	22	173	11.89	93.51
7	12	185	6.49	100.00
N=	185			
*=	1			

P4Q7	COUNT	CUMCNT	PERCENT	CUMPCT
1	10	10	5.38	5.38
2	11	21	5.91	11.29
3	31	52	16.67	27.96
4	31	83	16.67	44.62
5	39	122	20.97	65.59
6	38	160	20.43	86.02
7	26	186	13.98	100.00
N=	186			

P4Q8	COUNT	CUMCNT	PERCENT	CUMPCT
1	30	30	16.13	16.13
2	27	57	14.52	30.65
3	32	89	17.20	47.85
4	28	117	15.05	62.90
5	39	156	20.97	83.87
6	22	178	11.83	95.70
7	8	186	4.30	100.00
N=	186			

P4Q9	COUNT	CUMCNT	PERCENT	CUMPCT
1	18	18	9.78	9.78
2	23	41	12.50	22.28
3	29	70	15.76	38.04
4	25	95	13.59	51.63
5	41	136	22.28	73.91
6	32	168	17.39	91.30
7	16	184	8.70	100.00
N=	184			
*=	2			

```
MTB > tally c29-c39;
SUBC> all
 * Subcommand does not end in . or ;
SUBC> all.
```

P5Q1	COUNT	CUMCNT	PERCENT	CUMPCT
1	15	15	8.06	8.06
2	25	40	13.44	21.51
3	36	76	19.35	40.86
4	50	126	26.88	67.74
5	60	186	32.26	100.00
N=	186			

P5Q2	COUNT	CUMCNT	PERCENT	CUMPCT
1	17	17	9.14	9.14
2	35	52	18.82	27.96
3	41	93	22.04	50.00
4	60	153	32.26	82.26
5	33	186	17.74	100.00
N=	186			

P5Q3	COUNT	CUMCNT	PERCENT	CUMPCT
1	22	22	11.83	11.83
2	38	60	20.43	32.26
3	67	127	36.02	68.28
4	45	172	24.19	92.47
5	14	186	7.53	100.00
N=	186			

P5Q4	COUNT	CUMCNT	PERCENT	CUMPCT
2	5	5	2.69	2.69
3	39	44	20.97	23.66
4	79	123	42.47	66.13
5	63	186	33.87	100.00
N=	186			

P5Q5	COUNT	CUMCNT	PERCENT	CUMPCT
1	2	2	1.08	1.08
2	12	14	6.45	7.53
3	45	59	24.19	31.72
4	84	143	45.16	76.88
5	43	186	23.12	100.00
N=	186			

P5Q6	COUNT	CUMCNT	PERCENT	CUMPCT
1	4	4	2.15	2.15
2	14	18	7.53	9.68
3	35	53	18.82	28.49
4	73	126	39.25	67.74
5	60	186	32.26	100.00
N=	186			

P5Q7	COUNT	CUMCNT	PERCENT	CUMPCT
1	8	8	4.30	4.30
2	37	45	19.89	24.19
3	70	115	37.63	61.83
4	50	165	26.88	88.71
5	21	186	11.29	100.00
N=	186			

P5Q8	COUNT	CUMCNT	PERCENT	CUMPCT
1	11	11	5.91	5.91
2	22	33	11.83	17.74
3	39	72	20.97	38.71
4	67	139	36.02	74.73
5	47	186	25.27	100.00
N=	186			

P5Q9	COUNT	CUMCNT	PERCENT	CUMPCT
1	8	8	4.30	4.30
2	19	27	10.22	14.52
3	61	88	32.80	47.31
4	62	150	33.33	80.65
5	36	186	19.35	100.00
N=	186			

P5Q10	COUNT	CUMCNT	PERCENT	CUMPCT
2	14	14	7.53	7.53
3	51	65	27.42	34.95
4	85	150	45.70	80.65
5	36	186	19.35	100.00
N=	186			

P5Q11	COUNT	CUMCNT	PERCENT	CUMPCT
1	1	1	0.54	0.54
2	9	10	4.84	5.38
3	43	53	23.12	28.49
4	86	139	46.24	74.73
5	47	186	25.27	100.00
N=	186			

```
MTB > NOTE Awareness of Project and Interest in Continuing Reports
MTB > tally c2-c6
```

aware	COUNT
1	107
2	79
N=	186

MDE	COUNT
1	81
2	104
N=	185
*=	1

intrst	COUNT
1	65
2	30
3	82
N=	177
*=	9

interim	COUNT
0	57
1	126
N=	183
*=	3

final	COUNT
0	28
1	156
N=	184
*=	2

```
MTB > NOTE Responses to Part Two: Nutrition and Classroom Performance
MTB > Describe c7-c13
```

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
P2Q1	186	0	5.6882	6.0000	5.7679	1.1623	0.0852
P2Q2	186	0	5.4194	5.0000	5.4702	1.1562	0.0848
P2Q3	186	0	5.7688	6.0000	5.8631	1.1320	0.0830
P2Q4	186	0	4.640	5.000	4.685	1.446	0.106
P2Q5	185	1	2.903	3.000	2.808	1.602	0.118
P2Q6	186	0	5.0860	5.0000	5.1429	1.1915	0.0874
P2Q7	185	1	4.935	5.000	5.000	1.382	0.102

	MIN	MAX	Q1	Q3
P2Q1	1.0000	7.0000	5.0000	7.0000
P2Q2	1.0000	7.0000	5.0000	6.0000
P2Q3	1.0000	7.0000	5.0000	7.0000
P2Q4	1.000	7.000	4.000	6.000
P2Q5	1.000	7.000	2.000	4.000
P2Q6	1.0000	7.0000	4.0000	6.0000
P2Q7	1.000	7.000	4.000	6.000

```
MTB > nopaper
```

```
MTB > NOTE Responses to Part Three: Students and Breakfast
MTB > Describe c13-c19
```

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
P2Q7	185	1	4.935	5.000	5.000	1.382	0.102
P3Q1	186	0	4.075	4.000	4.137	1.385	0.102
P3Q2	185	1	3.6703	4.0000	3.6766	1.1489	0.0845
P3Q3	186	0	3.3763	3.0000	3.3571	1.2854	0.0942
P3Q4	186	0	4.7097	5.0000	4.7857	1.0662	0.0782
P3Q5	186	0	4.4785	5.0000	4.5357	1.0563	0.0775
P3Q6	186	0	3.2204	3.0000	3.2083	1.3027	0.0955

	MIN	MAX	Q1	Q3
P2Q7	1.000	7.000	4.000	6.000
P3Q1	1.000	6.000	3.000	5.000
P3Q2	1.0000	6.0000	3.0000	4.0000
P3Q3	1.0000	6.0000	2.0000	4.0000
P3Q4	2.0000	6.0000	4.0000	5.0000
P3Q5	1.0000	6.0000	4.0000	5.0000
P3Q6	1.0000	6.0000	2.0000	4.0000

```
MTB > NOTE Responses to Part Four: Frequently Expressed Opinions
MTB > Describe c20-c28
```

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
P4Q1	186	0	3.070	3.000	2.970	1.765	0.129
P4Q2	186	0	3.548	4.000	3.530	1.618	0.119
P4Q3	186	0	5.247	5.000	5.345	1.519	0.111
P4Q4	176	10	4.386	4.000	4.430	1.519	0.114
P4Q5	186	0	5.3495	6.0000	5.4345	1.2951	0.0950
P4Q6	185	1	3.930	4.000	3.922	1.672	0.123
P4Q7	186	0	4.591	5.000	4.655	1.685	0.124
P4Q8	186	0	3.629	4.000	3.595	1.776	0.130
P4Q9	184	2	4.130	4.000	4.145	1.800	0.133

	MIN	MAX	Q1	Q3
P4Q1	1.000	7.000	2.000	4.000
P4Q2	1.000	7.000	2.000	5.000
P4Q3	1.000	7.000	4.000	7.000
P4Q4	1.000	7.000	4.000	5.000
P4Q5	1.0000	7.0000	4.7500	6.0000
P4Q6	1.000	7.000	3.000	5.000
P4Q7	1.000	7.000	3.000	6.000
P4Q8	1.000	7.000	2.000	5.000
P4Q9	1.000	7.000	3.000	6.000

```
MTB > nopaper
```

```
MTB > NOTE Part Five: Public Policy Issues
MTB > Describe c29-c39

               N      MEAN    MEDIAN    TRMEAN     STDEV    SEMEAN
P5Q1         186    3.6183    4.0000    3.6845    1.2817    0.0940
P5Q2         186    3.3065    3.5000    3.3393    1.2248    0.0898
P5Q3         186    2.9516    3.0000    2.9464    1.1066    0.0811
P5Q4         186    4.0753    4.0000    4.1131    0.8086    0.0593
P5Q5         186    3.8280    4.0000    3.8750    0.8959    0.0657
P5Q6         186    3.9194    4.0000    3.9881    1.0021    0.0735
P5Q7         186    3.2097    3.0000    3.2262    1.0262    0.0752
P5Q8         186    3.6290    4.0000    3.6964    1.1564    0.0848
P5Q9         186    3.5323    4.0000    3.5833    1.0509    0.0771
P5Q10        186    3.7688    4.0000    3.7976    0.8481    0.0622
P5Q11        186    3.9086    4.0000    3.9583    0.8493    0.0623

               MIN       MAX        Q1        Q3
P5Q1        1.0000    5.0000    3.0000    5.0000
P5Q2        1.0000    5.0000    2.0000    4.0000
P5Q3        1.0000    5.0000    2.0000    4.0000
P5Q4        2.0000    5.0000    4.0000    5.0000
P5Q5        1.0000    5.0000    3.0000    4.0000
P5Q6        1.0000    5.0000    3.0000    5.0000
P5Q7        1.0000    5.0000    3.0000    4.0000
P5Q8        1.0000    5.0000    3.0000    5.0000
P5Q9        1.0000    5.0000    3.0000    4.0000
P5Q10       2.0000    5.0000    3.0000    4.0000
P5Q11       1.0000    5.0000    3.0000    5.0000

MTB > NOTE Demographics: No Breakfast Program = 1  Breakfast Program = 2
MTB > Tally c-44
* ERROR * Argument is a constant or matrix, but a column was expected

MTB > tally c44

    BnoB  COUNT
       1     49
       2    136
     N=     185
     *=       1

MTB > NOTE Demographics: Time At This Position (0-3 = 1 4-10 = 2 11+ = 3)
MTB > Tally c45

Time/Job  COUNT
       1     70
       2     64
       3     52
     N=     186

MTB > nopaper
```

```
MTB > NOTE TTests for significant difference between breakfast and no breakf
MTB > twosample c46 c53

TWOSAMPLE T FOR C46 VS C53
        N      MEAN      STDEV   SE MEAN
C46    49      5.73       1.17      0.17
C53   136      5.68       1.16     0.099

95 PCT CI FOR MU C46 - MU C53: (-0.34, 0.437)

TTEST MU C46 = MU C53 (VS NE): T= 0.26  P=0.79  DF=  84

MTB > twosample c47 c54

TWOSAMPLE T FOR C47 VS C54
        N      MEAN      STDEV   SE MEAN
C47    49      5.39       1.13      0.16
C54   136      5.44       1.17      0.10

95 PCT CI FOR MU C47 - MU C54: (-0.43, 0.32)

TTEST MU C47 = MU C54 (VS NE): T= -0.28  P=0.78  DF=  87

MTB > twosample c48 c55

TWOSAMPLE T FOR C48 VS C55
        N      MEAN      STDEV   SE MEAN
C48    49      5.65       1.09      0.16
C55   136      5.82       1.14     0.098

95 PCT CI FOR MU C48 - MU C55: (-0.54, 0.195)

TTEST MU C48 = MU C55 (VS NE): T= -0.93  P=0.36  DF=  88

MTB > twosample c48 c55

TWOSAMPLE T FOR C48 VS C55
        N      MEAN      STDEV   SE MEAN
C48    49      5.65       1.09      0.16
C55   136      5.82       1.14     0.098

95 PCT CI FOR MU C48 - MU C55: (-0.54, 0.195)

TTEST MU C48 = MU C55 (VS NE): T= -0.93  P=0.36  DF=  88

MTB > twosample c49 c56

TWOSAMPLE T FOR C49 VS C56
        N      MEAN      STDEV   SE MEAN
C49    49      4.69       1.28      0.18
C56   136      4.62       1.51      0.13

95 PCT CI FOR MU C49 - MU C56: (-0.38, 0.51)

TTEST MU C49 = MU C56 (VS NE): T= 0.31  P=0.76  DF=  99
```

```
MTB > twosample c50 c57

TWOSAMPLE T FOR C50 VS C57
        N      MEAN      STDEV   SE MEAN
C50    49      2.92       1.50      0.21
C57   135      2.89       1.65      0.14

95 PCT CI FOR MU C50 - MU C57: (-0.48, 0.54)

TTEST MU C50 = MU C57 (VS NE): T= 0.11  P=0.91  DF=  92

MTB > twosample c51 c58

TWOSAMPLE T FOR C51 VS C58
        N      MEAN      STDEV   SE MEAN
C51    49      5.10       1.16      0.17
C58   136      5.09       1.21      0.10

95 PCT CI FOR MU C51 - MU C58: (-0.37, 0.40)

TTEST MU C51 = MU C58 (VS NE): T= 0.07  P=0.94  DF=  88

MTB > twosample c52 c59

TWOSAMPLE T FOR C52 VS C59
        N      MEAN      STDEV   SE MEAN
C52    48      4.83       1.24      0.18
C59   136      4.98       1.43      0.12

95 PCT CI FOR MU C52 - MU C59: (-0.58, 0.29)

TTEST MU C52 = MU C59 (VS NE): T= -0.66  P=0.51  DF=  94

MTB > describe c46-c53

                 N        N*      MEAN    MEDIAN    TRMEAN     STDEV    SEMEAN
C46             49         0     5.735     6.000     5.800     1.169     0.167
C47             49         0     5.388     6.000     5.422     1.133     0.162
C48             49         0     5.653     6.000     5.733     1.091     0.156
C49             49         0     4.694     5.000     4.756     1.278     0.183
C50             49         0     2.918     3.000     2.867     1.498     0.214
C51             49         0     5.102     5.000     5.133     1.159     0.166
C52             48         1     4.833     5.000     4.886     1.243     0.179
C53            136         0    5.6838    6.0000    5.7623    1.1592    0.0994

                MIN       MAX        Q1        Q3
C46           3.000     7.000     5.000     7.000
C47           3.000     7.000     5.000     6.000
C48           2.000     7.000     5.000     6.000
C49           1.000     7.000     4.000     6.000
C50           1.000     6.000     2.000     4.000
C51           2.000     7.000     4.000     6.000
C52           1.000     7.000     4.000     6.000
C53          1.0000    7.0000    5.0000    7.0000
```

```
MTB > NOTE Anova for Part Two: Time on the Job
MTB > aovoneway c46 c53 c60

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       0.47       0.23      0.17     0.843
ERROR     183     249.45       1.36
TOTAL     185     249.91

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  ----+---------+---------+---------+--
C46        70      5.743      1.304         (-------------*-------------)
C53        64      5.625      1.047   (-------------*-------------)
C60        52      5.692      1.112     (---------------*---------------)
                                       ----+---------+---------+---------+--
POOLED STDEV =     1.168               5.40      5.60      5.80      6.00
MTB > aovoneway c47 c54 c61

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       4.32       2.16      1.63     0.199
ERROR     183     242.97       1.33
TOTAL     185     247.29

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  -+---------+---------+---------+-----
C47        70      5.614      1.300                   (----------*----------)
C54        64      5.281      1.046   (----------*-----------)
C61        52      5.327      1.061   (------------*------------)
                                       -+---------+---------+---------+-----
POOLED STDEV =     1.152            5.00      5.25      5.50      5.75
MTB > aovoneway c48 c55 c62

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       0.67       0.34      0.26     0.771
ERROR     183     236.39       1.29
TOTAL     185     237.06

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  --+---------+---------+---------+----
C48        70      5.814      1.266           (-------------*-------------)
C55        64      5.797      1.026          (-------------*-------------)
C62        52      5.673      1.080  (---------------*--------------)
                                       --+---------+---------+---------+----
POOLED STDEV =     1.137            5.40      5.60      5.80      6.00
MTB > aovoneway c49 c56 c63
```

```
ANALYSIS OF VARIANCE
SOURCE.     DF         SS         MS         F         p
FACTOR       2       1.34       0.67      0.32     0.729
ERROR      183     385.53       2.11
TOTAL      185     386.87

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV  --+---------+---------+---------+----
C49         70      4.743      1.491            (----------*----------)
C56         64      4.609      1.329       (-----------*-----------)
C63         52      4.538      1.540  (------------*-------------)
                                       --+---------+---------+---------+----
POOLED STDEV =     1.451               4.20      4.50      4.80      5.10
MTB > aovoneway c50 c57 c64

ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2       12.42       6.21      2.46     0.088
ERROR      182     459.83       2.53
TOTAL      184     472.25

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV  ------+---------+---------+---------+
C50         69      2.928      1.683         (-------*-------)
C57         64      2.594      1.444  (-------*--------)
C64         52      3.250      1.631               (--------*--------)
                                       ------+---------+---------+---------+
POOLED STDEV =     1.590               2.50      3.00      3.50      4.00
MTB > aovoneway c51 c58 c65

ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2        2.29       1.15      0.81     0.448
ERROR      183     260.33       1.42
TOTAL      185     262.62

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV  -------+---------+---------+---------
C51         70      5.200      1.269                (----------*----------)
C58         64      5.094      1.123          (-----------*-----------)
C65         52      4.923      1.169   (------------*------------)
                                       -------+---------+---------+---------
POOLED STDEV =     1.193                4.75      5.00      5.25
MTB > aovoneway c52 c59 c66

ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2        2.01       1.01      0.52     0.593
ERROR      182     349.21       1.92
TOTAL      184     351.22

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV  --+---------+---------+---------+----
C52         69      5.058      1.392             (------------*------------)
C59         64      4.812      1.390   (------------*-------------)
C66         52      4.923      1.370      (--------------*--------------)
                                       --+---------+---------+---------+----
POOLED STDEV =     1.385               4.50      4.75      5.00      5.25
```

MTB > describe c46-c52

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C46	70	0	5.743	6.000	5.871	1.304	0.156
C47	70	0	5.614	6.000	5.726	1.300	0.155
C48	70	0	5.814	6.000	5.952	1.266	0.151
C49	70	0	4.743	5.000	4.806	1.491	0.178
C50	69	1	2.928	2.000	2.841	1.683	0.203
C51	70	0	5.200	5.000	5.290	1.269	0.152
C52	69	1	5.058	5.000	5.127	1.392	0.168

	MIN	MAX	Q1	Q3
C46	1.000	7.000	5.000	7.000
C47	1.000	7.000	5.000	7.000
C48	1.000	7.000	5.000	7.000
C49	1.000	7.000	4.000	6.000
C50	1.000	7.000	1.500	4.000
C51	1.000	7.000	4.750	6.000
C52	1.000	7.000	4.000	6.000

MTB > describe c53-c59

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C53	64	5.625	6.000	5.672	1.047	0.131
C54	64	5.281	5.000	5.293	1.046	0.131
C55	64	5.797	6.000	5.879	1.026	0.128
C56	64	4.609	5.000	4.638	1.329	0.166
C57	64	2.594	2.000	2.500	1.444	0.181
C58	64	5.094	5.000	5.121	1.123	0.140
C59	64	4.812	5.000	4.862	1.390	0.174

	MIN	MAX	Q1	Q3
C53	2.000	7.000	5.000	6.000
C54	2.000	7.000	5.000	6.000
C55	2.000	7.000	5.000	6.750
C56	1.000	7.000	4.000	5.750
C57	1.000	7.000	1.000	4.000
C58	2.000	7.000	4.000	6.000
C59	1.000	7.000	4.000	6.000

MTB > describe c60-c66

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C60	52	5.692	6.000	5.761	1.112	0.154
C61	52	5.327	5.000	5.348	1.061	0.147
C62	52	5.673	6.000	5.739	1.080	0.150
C63	52	4.538	4.000	4.587	1.540	0.214
C64	52	3.250	3.000	3.174	1.631	0.226
C65	52	4.923	5.000	4.957	1.169	0.162
C66	52	4.923	5.000	5.000	1.370	0.190

	MIN	MAX	Q1	Q3
C60	3.000	7.000	5.000	6.750
C61	3.000	7.000	5.000	6.000
C62	2.000	7.000	5.000	6.750
C63	1.000	7.000	4.000	6.000
C64	1.000	7.000	2.000	4.000
C65	1.000	7.000	4.000	6.000
66	1.000	7.000	4.000	6.000

```
MTB > describe c53-c59

              N        N*      MEAN    MEDIAN   TRMEAN     STDEV   SEMEAN
C53         136         0    5.6838    6.0000    5.7623    1.1592   0.0994
C54         136         0    5.441     5.000     5.492     1.166    0.100
C55         136         0    5.8235    6.0000    5.9262    1.1410   0.0978
C56         136         0    4.625     4.000     4.664     1.510    0.129
C57         135         1    2.889     3.000     2.777     1.647    0.142
C58         136         0    5.088     5.000     5.156     1.208    0.104
C59         136         0    4.978     5.000     5.049     1.432    0.123

              MIN       MAX       Q1       Q3
C53        1.0000    7.0000    5.0000   7.0000
C54         1.000     7.000     5.000    6.000
C55        1.0000    7.0000    5.0000   7.0000
C56         1.000     7.000     4.000    6.000
C57         1.000     7.000     1.000    4.000
C58         1.000     7.000     4.000    6.000
C59         1.000     7.000     4.000    6.000

MTB > nopaper
```

```
MTB > NOTE TTests on Part Three: Breakfast vs. No Breakfast
MTB > twosample c46 c52

TWOSAMPLE T FOR C46 VS C52
        N      MEAN      STDEV   SE MEAN
C46    49      4.10       1.56      0.22
C52   136      4.07       1.33      0.11

95 PCT CI FOR MU C46 - MU C52: (-0.46, 0.53)

TTEST MU C46 = MU C52 (VS NE): T= 0.14  P=0.89  DF=  74

MTB > twosample c47 c53

TWOSAMPLE T FOR C47 VS C53
        N      MEAN      STDEV   SE MEAN
C47    48      3.67       1.23      0.18
C53   136      3.67       1.13     0.097

95 PCT CI FOR MU C47 - MU C53: (-0.40, 0.399)

TTEST MU C47 = MU C53 (VS NE): T= -0.01  P=0.99  DF=  76

MTB > twosample c48 c54

TWOSAMPLE T FOR C48 VS C54
        N      MEAN      STDEV   SE MEAN
C48    49      2.98       1.22      0.17
C54   136      3.53       1.28      0.11

95 PCT CI FOR MU C48 - MU C54: (-0.96, -0.14)

TTEST MU C48 = MU C54 (VS NE): T= -2.67  P=0.0089  DF=  89

MTB > twosample c49 c55

TWOSAMPLE T FOR C49 VS C55
        N      MEAN      STDEV   SE MEAN
C49    49      4.76       1.16      0.17
C55   136      4.71       1.01     0.087

95 PCT CI FOR MU C49 - MU C55: (-0.33, 0.416)

TTEST MU C49 = MU C55 (VS NE): T= 0.22  P=0.82  DF=  75

MTB > twosample c50 c56

TWOSAMPLE T FOR C50 VS C56
        N      MEAN      STDEV   SE MEAN
C50    49      4.51       1.24      0.18
C56   136     4.485      0.966     0.083

95 PCT CI FOR MU C50 - MU C56: (-0.37, 0.416)

TTEST MU C50 = MU C56 (VS NE): T= 0.13  P=0.90  DF=  69
```

```
MTB > twosample c51 c57

TWOSAMPLE T FOR C51 VS C57
       N      MEAN     STDEV   SE MEAN
C51   49      3.00      1.47      0.21
C57  136      3.31      1.23      0.11

95 PCT CI FOR MU C51 - MU C57: (-0.78, 0.16)

TTEST MU C51 = MU C57 (VS NE): T= -1.31  P=0.19  DF=  73

MTB > describe c46-c51

                 N        N*      MEAN    MEDIAN    TRMEAN     STDEV    SEMEAN
C46             49         0     4.102     5.000     4.156     1.558     0.223
C47             48         1     3.667     4.000     3.659     1.226     0.177
C48             49         0     2.980     3.000     2.956     1.216     0.174
C49             49         0     4.755     5.000     4.822     1.164     0.166
C50             49         0     4.510     5.000     4.578     1.244     0.178
C51             49         0     3.000     2.000     2.956     1.472     0.210

                MIN       MAX        Q1        Q3
C46           1.000     6.000     3.000     5.000
C47           1.000     6.000     3.000     4.000
C48           1.000     6.000     2.000     4.000
C49           2.000     6.000     4.500     5.500
C50           1.000     6.000     4.000     5.000
C51           1.000     6.000     2.000     4.000

MTB > describe c52-c57

                 N      MEAN    MEDIAN    TRMEAN     STDEV    SEMEAN
C52            136     4.066     4.000     4.123     1.329     0.114
C53            136    3.6691    4.0000    3.6967    1.1291    0.0968
C54            136     3.529     3.500     3.500     1.282     0.110
C55            136    4.7132    5.0000    4.7869    1.0104    0.0866
C56            136    4.4853    5.0000    4.5328    0.9660    0.0828
C57            136     3.309     3.000     3.311     1.232     0.106

                MIN       MAX        Q1        Q3
C52           1.000     6.000     3.000     5.000
C53          1.0000    6.0000    3.0000    4.0000
C54           1.000     6.000     2.000     4.750
C55          2.0000    6.0000    4.0000    5.0000
C56          2.0000    6.0000    4.0000    5.0000
C57           1.000     6.000     2.000     4.000

MTB > nopaper
```

```
MTB > NOTE Anova Part Three: Time on Job
MTB > aovoneway c46 c52 c58

ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2       7.23       3.62      1.90     0.152
ERROR      183     347.71       1.90
TOTAL      185     354.95

                                          INDIVIDUAL 95 PCT CI'S FOR MEAN
                                          BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV      ----------+---------+---------+------
C46         70      3.843      1.431       (--------*--------)
C52         64      4.125      1.386                (---------*---------)
C58         52      4.327      1.294                     (----------*---------)
                                          ----------+---------+---------+------
POOLED STDEV =     1.378                          3.85      4.20      4.55
MTB > aovoneway c47 c53 c59

ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2       2.92       1.46      1.11     0.333
ERROR      182     239.97       1.32
TOTAL      184     242.89

                                          INDIVIDUAL 95 PCT CI'S FOR MEAN
                                          BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV      ----------+---------+---------+------
C47         70      3.643      1.104            (----------*----------)
C53         64      3.547      1.284         (----------*----------)
C59         51      3.863      1.020                   (------------*-----------)
                                          ----------+---------+---------+------
POOLED STDEV =     1.148                          3.50      3.75      4.00
MTB > aovoneway c48 c54 c60

ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2       0.11       0.05      0.03     0.969
ERROR      183     305.55       1.67
TOTAL      185     305.66

                                          INDIVIDUAL 95 PCT CI'S FOR MEAN
                                          BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV      -+---------+---------+---------+-----
C48         70      3.371      1.456          (---------------*--------------)
C54         64      3.406      1.178           (---------------*---------------)
C60         52      3.346      1.186        (----------------*----------------)
                                          -+---------+---------+---------+-----
POOLED STDEV =     1.292                       3.00      3.20      3.40      3.60
MTB > aovoneway c49 c55 c61
```

```
ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       0.64       0.32      0.28     0.756
ERROR     183     209.68       1.15
TOTAL     185     210.32

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    -+---------+---------+---------+-----
C49        70      4.643      1.168     (-----------*-----------)
C55        64      4.781      0.951           (-----------*-----------)
C61        52      4.712      1.073       (-------------*-------------)
                                        -+---------+---------+---------+-----
POOLED STDEV =     1.070               4.40      4.60      4.80      5.00
MTB > aovoneway c50 c56 c62

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       2.37       1.19      1.06     0.347
ERROR     183     204.04       1.11
TOTAL     185     206.41

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    --------+---------+---------+--------
C50        70      4.443      1.112           (---------*---------)
C56        64      4.625      1.000                     (---------*---------)
C62        52      4.346      1.046    (-----------*-----------)
                                        --------+---------+---------+--------
POOLED STDEV =     1.056               4.25      4.50      4.75
MTB > aovoneway c51 c57 c63

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       1.02       0.51      0.30     0.743
ERROR     183     312.95       1.71
TOTAL     185     313.96

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    ---------+---------+---------+------
C51        70      3.300      1.366              (-----------*-----------)
C57        64      3.219      1.253           (------------*------------)
C63        52      3.115      1.293    (--------------*-------------)
                                        ---------+---------+---------+------
POOLED STDEV =     1.308               3.00      3.25      3.50
MTB > describe c46-c51
```

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C46	70	3.843	4.000	3.887	1.431	0.171
C47	70	3.643	4.000	3.677	1.104	0.132
C48	70	3.371	3.000	3.355	1.456	0.174
C49	70	4.643	5.000	4.726	1.168	0.140
C50	70	4.443	5.000	4.516	1.112	0.133
C51	70	3.300	3.500	3.306	1.366	0.163

	MIN	MAX	Q1	Q3
C46	1.000	6.000	3.000	5.000
C47	1.000	6.000	3.000	4.000
C48	1.000	6.000	2.000	4.250
C49	2.000	6.000	4.000	5.000
C50	1.000	6.000	4.000	5.000
C51	1.000	6.000	2.000	4.000

```
MTB > describe c52 c57
```

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C52	64	4.125	4.000	4.190	1.386	0.173
C57	64	3.219	3.000	3.190	1.253	0.157

	MIN	MAX	Q1	Q3
C52	1.000	6.000	3.000	5.000
C57	1.000	6.000	2.000	4.000

```
MTB > describe c52-c57
```

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C52	64	4.125	4.000	4.190	1.386	0.173
C53	64	3.547	4.000	3.552	1.284	0.160
C54	64	3.406	3.000	3.397	1.178	0.147
C55	64	4.781	5.000	4.828	0.951	0.119
C56	64	4.625	5.000	4.672	1.000	0.125
C57	64	3.219	3.000	3.190	1.253	0.157

	MIN	MAX	Q1	Q3
C52	1.000	6.000	3.000	5.000
C53	1.000	6.000	3.000	4.000
C54	1.000	6.000	2.250	4.000
C55	2.000	6.000	4.000	5.000
C56	2.000	6.000	4.000	5.000
C57	1.000	6.000	2.000	4.000

```
MTB > describe c58-c63
```

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C58	52	0	4.327	4.500	4.413	1.294	0.179
C59	51	1	3.863	4.000	3.867	1.020	0.143
C60	52	0	3.346	3.000	3.348	1.186	0.165
C61	52	0	4.712	5.000	4.804	1.073	0.149
C62	52	0	4.346	5.000	4.391	1.046	0.145
C63	52	0	3.115	3.000	3.130	1.293	0.179

	MIN	MAX	Q1	Q3
C58	1.000	6.000	4.000	5.000
C59	1.000	6.000	3.000	4.000
C60	1.000	6.000	2.000	4.000
C61	2.000	6.000	4.000	5.000
C62	2.000	6.000	4.000	5.000
C63	1.000	5.000	2.000	4.000

MTB > nopaper

```
MTB > NOTE: Ttests for Part Four: Breakfast vs. No Breakfast
MTB > twosample c46 c55

TWOSAMPLE T FOR C46 VS C55
        N      MEAN      STDEV   SE MEAN
C46    49      3.61       1.92      0.27
C55   136      2.87       1.67      0.14

95 PCT CI FOR MU C46 - MU C55: (0.13, 1.36)

TTEST MU C46 = MU C55 (VS NE): T= 2.40  P=0.019  DF=  75

MTB > twosample c47 c56

TWOSAMPLE T FOR C47 VS C56
        N      MEAN      STDEV   SE MEAN
C47    49      2.90       1.42      0.20
C56   136      3.80       1.61      0.14

95 PCT CI FOR MU C47 - MU C56: (-1.39, -0.42)

TTEST MU C47 = MU C56 (VS NE): T= -3.68  P=0.0004  DF=  95

MTB > twosample c48 c57

TWOSAMPLE T FOR C48 VS C57
        N      MEAN      STDEV   SE MEAN
C48    49      5.43       1.46      0.21
C57   136      5.17       1.54      0.13

95 PCT CI FOR MU C48 - MU C57: (-0.23, 0.75)

TTEST MU C48 = MU C57 (VS NE): T= 1.05  P=0.30  DF=  89

MTB > twosample c49 c58

TWOSAMPLE T FOR C49 VS C58
        N      MEAN      STDEV   SE MEAN
C49    49      4.76       1.41      0.20
C58   126      4.25       1.55      0.14

95 PCT CI FOR MU C49 - MU C58: (0.03, 0.99)

TTEST MU C49 = MU C58 (VS NE): T= 2.09  P=0.039  DF=  95

MTB > twosample c50 c59

TWOSAMPLE T FOR C50 VS C59
        N      MEAN      STDEV   SE MEAN
C50    49      5.10       1.25      0.18
C59   136      5.47       1.25      0.11

95 PCT CI FOR MU C50 - MU C59: (-0.78, 0.04)

TTEST MU C50 = MU C59 (VS NE): T= -1.77  P=0.080  DF=  85
```

```
MTB > twosample c51 c60

TWOSAMPLE T FOR C51 VS C60
       N      MEAN     STDEV   SE MEAN
C51   48      4.40      1.53      0.22
C60  136      3.76      1.70      0.15

95 PCT CI FOR MU C51 - MU C60: (0.11, 1.16)

TTEST MU C51 = MU C60 (VS NE): T= 2.42  P=0.018  DF=  90

MTB > twosample c52 c61

TWOSAMPLE T FOR C52 VS C61
       N      MEAN     STDEV   SE MEAN
C52   49      4.06      1.60      0.23
C61  136      4.81      1.65      0.14

95 PCT CI FOR MU C52 - MU C61: (-1.28, -0.21)

TTEST MU C52 = MU C61 (VS NE): T= -2.78  P=0.0067  DF=  87

MTB > twosample c53 vs c62

TWOSAMPLE T FOR C53 VS C62
       N      MEAN     STDEV   SE MEAN
C53   49      4.27      1.83      0.26
C62  136      3.37      1.68      0.14

95 PCT CI FOR MU C53 - MU C62: (0.29, 1.49)

TTEST MU C53 = MU C62 (VS NE): T= 2.98  P=0.0039  DF=  78

MTB > twosample c54 c63

TWOSAMPLE T FOR C54 VS C63
       N      MEAN     STDEV   SE MEAN
C54   49      4.43      1.74      0.25
C63  134      4.00      1.80      0.16

95 PCT CI FOR MU C54 - MU C63: (-0.16, 1.01)

TTEST MU C54 = MU C63 (VS NE): T= 1.46  P=0.15  DF=  87

MTB > describe c46-c54
```

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C46	49	0	3.612	3.000	3.578	1.924	0.275
C47	49	0	2.898	3.000	2.844	1.418	0.203
C48	49	0	5.429	6.000	5.511	1.458	0.208
C49	49	0	4.755	5.000	4.800	1.407	0.201
C50	49	0	5.102	5.000	5.156	1.246	0.178
C51	48	1	4.396	4.000	4.386	1.526	0.220
C52	49	0	4.061	4.000	4.089	1.600	0.229
C53	49	0	4.265	5.000	4.289	1.835	0.262
C54	49	0	4.429	5.000	4.467	1.744	0.249

	MIN	MAX	Q1	Q3
C46	1.000	7.000	2.000	5.000
C47	1.000	6.000	2.000	4.000
C48	2.000	7.000	4.000	7.000
C49	1.000	7.000	4.000	6.000
C50	2.000	7.000	4.000	6.000
C51	2.000	7.000	3.000	5.750
C52	1.000	7.000	3.000	5.500
C53	1.000	7.000	3.000	6.000
C54	1.000	7.000	3.000	6.000

MTB > describe c55-c63

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C55	136	0	2.868	2.000	2.746	1.672	0.143
C56	136	0	3.801	4.000	3.803	1.614	0.138
C57	136	0	5.169	5.000	5.270	1.537	0.132
C58	126	10	4.246	4.000	4.272	1.548	0.138
C59	136	0	5.471	6.000	5.549	1.253	0.107
C60	136	0	3.757	4.000	3.730	1.697	0.146
C61	136	0	4.809	5.000	4.877	1.653	0.142
C62	136	0	3.375	3.000	3.344	1.682	0.144
C63	134	2	4.000	4.000	4.000	1.802	0.156

	MIN	MAX	Q1	Q3
C55	1.000	7.000	2.000	4.000
C56	1.000	7.000	3.000	5.000
C57	1.000	7.000	4.000	6.000
C58	1.000	7.000	4.000	5.000
C59	2.000	7.000	5.000	6.000
C60	1.000	7.000	2.000	5.000
C61	1.000	7.000	3.250	6.000
C62	1.000	7.000	2.000	5.000
C63	1.000	7.000	2.000	5.000

MTB > nopaper

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C46	70	0	2.743	2.000	2.581	1.612	0.193
C47	70	0	3.800	4.000	3.790	1.699	0.203
C48	70	0	5.114	5.000	5.210	1.575	0.188
C49	65	5	4.292	4.000	4.305	1.465	0.182
C50	70	0	5.429	6.000	5.532	1.325	0.158
C51	70	0	4.071	4.000	4.081	1.739	0.208
C52	70	0	4.829	5.000	4.903	1.633	0.195
C53	70	0	3.543	4.000	3.500	1.775	0.212
C54	70	0	3.714	3.000	3.677	1.712	0.205

	MIN	MAX	Q1	Q3
C46	1.000	7.000	2.000	4.000
C47	1.000	7.000	2.750	5.000
C48	1.000	7.000	4.000	6.250
C49	1.000	7.000	4.000	5.000
C50	2.000	7.000	4.750	6.000
C51	1.000	7.000	3.000	5.000
C52	1.000	7.000	3.750	6.000
C53	1.000	7.000	2.000	5.000
C54	1.000	7.000	2.000	5.000

```
MTB > describe c55-c63
```

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C55	64	0	3.031	3.000	2.931	1.834	0.229
C56	64	0	3.531	4.000	3.517	1.490	0.186
C57	64	0	5.109	5.000	5.207	1.393	0.174
C58	61	3	4.213	4.000	4.236	1.654	0.212
C59	64	0	5.391	6.000	5.466	1.242	0.155
C60	64	0	3.984	4.000	3.966	1.568	0.196
C61	64	0	4.688	5.000	4.724	1.531	0.191
C62	64	0	3.687	4.000	3.672	1.816	0.227
C63	63	1	4.206	4.000	4.228	1.770	0.223

	MIN	MAX	Q1	Q3
C55	1.000	7.000	1.000	4.750
C56	1.000	7.000	2.250	4.000
C57	1.000	7.000	4.000	6.000
C58	1.000	7.000	3.000	5.000
C59	2.000	7.000	5.000	6.000
C60	1.000	7.000	3.000	5.000
C61	1.000	7.000	3.000	6.000
C62	1.000	7.000	2.000	5.000
C63	1.000	7.000	3.000	6.000

```
MTB > describe c64-c72
```

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C64	52	0	3.558	3.000	3.500	1.798	0.249
C65	52	0	3.231	3.000	3.196	1.628	0.226
C66	52	0	5.596	6.000	5.739	1.563	0.217
C67	50	2	4.720	4.000	4.750	1.386	0.196
C68	52	0	5.192	5.500	5.283	1.329	0.184
C69	51	1	3.667	4.000	3.667	1.705	0.239
C70	52	0	4.154	4.000	4.174	1.872	0.260
C71	52	0	3.673	4.000	3.630	1.757	0.244
C72	51	1	4.608	5.000	4.689	1.856	0.260

	MIN	MAX	Q1	Q3
C64	1.000	7.000	2.000	5.000
C65	1.000	6.000	2.000	4.000
C66	2.000	7.000	4.000	7.000
C67	1.000	7.000	4.000	6.000
C68	1.000	7.000	4.000	6.000
C69	1.000	7.000	2.000	5.000
C70	1.000	7.000	3.000	6.000
C71	1.000	7.000	2.000	5.000
C72	1.000	7.000	3.000	6.000

```
MTB > nopaper
```

```
MTB > NOTE Anova Part Four: Time on Job
MTB > aovoneway c46 c55 c64

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2      19.96       9.98      3.28     0.040
ERROR     183     556.14       3.04
TOTAL     185     576.09

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    ----+---------+---------+---------+--
C46        70      2.743      1.612     (-------*-------)
C55        64      3.031      1.834          (--------*-------)
C64        52      3.558      1.798                   (--------*---------)
                                        ----+---------+---------+---------+--
POOLED STDEV =     1.743                  2.50      3.00      3.50      4.00
MTB > aovoneway c47 c56 c65

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       9.70       4.85      1.87     0.157
ERROR     183     474.37       2.59
TOTAL     185     484.06

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    -+---------+---------+---------+-----
C47        70      3.800      1.699                    (--------*--------)
C56        64      3.531      1.490           (---------*---------)
C65        52      3.231      1.628   (----------*----------)
                                        -+---------+---------+---------+-----
POOLED STDEV =     1.610              2.80      3.20      3.60      4.00
MTB > aovoneway c48 c57 c66

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       8.78       4.39      1.92     0.149
ERROR     183     417.84       2.28
TOTAL     185     426.62

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    -----+---------+---------+---------+-
C48        70      5.114      1.575     (---------*---------)
C57        64      5.109      1.393    (----------*---------
C66        52      5.596      1.563                 (-------      *-----------)
                                        -----+---------+------     ----------+-
POOLED STDEV =     1.511                 4.90      5.25       5.60      5.95
MTB > aovoneway c49 c58 c67
```

```
ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2       7.97       3.99      1.74     0.178
ERROR      173     395.76       2.29
TOTAL      175     403.73

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV  -----+---------+---------+---------+-
C49         65      4.292      1.465     (--------*---------)
C58         61      4.213      1.654   (--------*---------)
C67         50      4.720      1.386               (----------*----------)
                                        -----+---------+---------+---------+-
POOLED STDEV =     1.512                   4.00      4.40      4.80      5.20
MTB > aovoneway c50 c59 c68

ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2       1.83       0.92      0.54     0.582
ERROR      183     308.45       1.69
TOTAL      185     310.28

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV  -------+---------+---------+---------
C50         70      5.429      1.325              (-----------*-----------)
C59         64      5.391      1.242           (-----------*-----------)
C68         52      5.192      1.329  (--------------*-------------)
                                        -------+---------+---------+---------
POOLED STDEV =     1.298                    5.00      5.25      5.50
MTB > aovoneway c51 c60 c69

ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2       5.13       2.56      0.92     0.402
ERROR      182     508.96       2.80
TOTAL      184     514.09

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV  ---------+---------+---------+-------
C51         70      4.071      1.739                (----------*----------)
C60         64      3.984      1.568             (----------*----------)
C69         51      3.667      1.705   (------------*------------)
                                        ---------+---------+---------+-------
POOLED STDEV =     1.672                     3.50      3.85      4.20
MTB > aovoneway c52 c61 c70

ANALYSIS OF VARIANCE
SOURCE      DF         SS         MS         F         p
FACTOR       2      14.48       7.24      2.60     0.077
ERROR      183     510.46       2.79
TOTAL      185     524.95

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL       N       MEAN      STDEV  -------+---------+---------+---------
C52         70      4.829      1.633                  (-------*------)
C61         64      4.688      1.531               (-------*-------)
C70         52      4.154      1.872   (--------*--------)
                                        -------+---------+---------+---------
POOLED STDEV =     1.670                    4.00      4.50      5.00
```

```
MTB > aovoneway c53 c62 c71

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       0.84       0.42      0.13     0.877
ERROR     183     582.56       3.18
TOTAL     185     583.40

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    ------+---------+---------+---------+
C53        70      3.543      1.775    (-------------*-------------)
C62        64      3.687      1.816        (--------------*--------------)
C71        52      3.673      1.757      (---------------*----------------)
                                        ------+---------+---------+---------+
POOLED STDEV =     1.784                  3.30      3.60      3.90      4.20
MTB > aovoneway c54 c63 c72

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       24.11      12.05      3.84     0.023
ERROR     181     568.76       3.14
TOTAL     183     592.87

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    -----+---------+---------+---------+-
C54        70      3.714      1.712     (-------*--------)
C63        63      4.206      1.770              (--------*--------)
C72        51      4.608      1.856                       (---------*---------)
                                        -----+---------+---------+---------+-
POOLED STDEV =     1.773                  3.50      4.00      4.50      5.00
MTB > twosample c54 c72

TWOSAMPLE T FOR C54 VS C72
      N       MEAN      STDEV   SE MEAN
C54  70       3.71       1.71       0.20
C72  51       4.61       1.86       0.26

95 PCT CI FOR MU C54 - MU C72: (-1.55, -0.24)

TTEST MU C54 = MU C72 (VS NE): T= -2.70  P=0.0081  DF=  102

MTB > describe c46-c54
```

```
MTB > twosample c56 c67

TWOSAMPLE T FOR C56 VS C67
       N      MEAN     STDEV   SE MEAN
C56   49     3.673     0.944      0.13
C67  136     3.993     0.803     0.069

95 PCT CI FOR MU C56 - MU C67: (-0.62, -0.017)

TTEST MU C56 = MU C67 (VS NE): T= -2.11  P=0.038  DF=  74

MTB > describe c46-c56

                N      MEAN    MEDIAN    TRMEAN     STDEV    SEMEAN
C46            49     3.694     4.000     3.733     1.103     0.158
C47            49     3.612     4.000     3.644     1.169     0.167
C48            49     3.306     3.000     3.311     1.004     0.143
C49            49     3.816     4.000     3.844     0.755     0.108
C50            49     3.592     4.000     3.600     0.888     0.127
C51            49     4.041     4.000     4.089     0.935     0.134
C52            49     3.551     4.000     3.578     1.062     0.152
C53            49     3.837     4.000     3.867     1.067     0.152
C54            49     3.694     4.000     3.733     1.045     0.149
C55            49     3.551     4.000     3.556     0.792     0.113
C56            49     3.673     4.000     3.711     0.944     0.135

               MIN       MAX        Q1        Q3
C46          1.000     5.000     3.000     5.000
C47          1.000     5.000     2.500     5.000
C48          1.000     5.000     3.000     4.000
C49          2.000     5.000     3.000     4.000
C50          2.000     5.000     3.000     4.000
C51          2.000     5.000     3.500     5.000
C52          1.000     5.000     3.000     4.000
C53          2.000     5.000     3.000     5.000
C54          1.000     5.000     3.000     5.000
C55          2.000     5.000     3.000     4.000
C56          1.000     5.000     3.000     4.000

MTB > describe c57-c67
```

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C57	136	3.596	4.000	3.664	1.346	0.115
C58	136	3.184	3.000	3.205	1.224	0.105
C59	136	2.8235	3.0000	2.8033	1.1214	0.0962
C60	136	4.1765	4.0000	4.2213	0.8063	0.0691
C61	136	3.9265	4.0000	3.9918	0.8746	0.0750
C62	136	3.8824	4.0000	3.9590	1.0260	0.0880
C63	136	3.0809	3.0000	3.0902	0.9892	0.0848
C64	136	3.544	4.000	3.607	1.179	0.101
C65	136	3.4706	4.0000	3.5246	1.0537	0.0904
C66	136	3.8529	4.0000	3.8934	0.8566	0.0735
C67	136	3.9926	4.0000	4.0492	0.8027	0.0688

	MIN	MAX	Q1	Q3
C57	1.000	5.000	3.000	5.000
C58	1.000	5.000	2.000	4.000
C59	1.0000	5.0000	2.0000	4.0000
C60	2.0000	5.0000	4.0000	5.0000
C61	1.0000	5.0000	3.0000	5.0000
C62	1.0000	5.0000	3.0000	5.0000
C63	1.0000	5.0000	2.0000	4.0000
C64	1.000	5.000	3.000	4.000
C65	1.0000	5.0000	3.0000	4.0000
C66	2.0000	5.0000	3.0000	4.0000
C67	2.0000	5.0000	4.0000	5.0000

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MTB > nopaper
```

```
MTB > NOTE Ttests for Part Five: Breakfast vs. No Breakfast
MTB > twosample c46 c57

TWOSAMPLE T FOR C46 VS C57
        N      MEAN     STDEV   SE MEAN
C46    49      3.69      1.10      0.16
C57   136      3.60      1.35      0.12

95 PCT CI FOR MU C46 - MU C57: (-0.29, 0.49)

TTEST MU C46 = MU C57 (VS NE): T= 0.50  P=0.62  DF=  102

MTB > twosample c47 c58

TWOSAMPLE T FOR C47 VS C58
        N      MEAN     STDEV   SE MEAN
C47    49      3.61      1.17      0.17
C58   136      3.18      1.22      0.10

95 PCT CI FOR MU C47 - MU C58: (0.04, 0.82)

TTEST MU C47 = MU C58 (VS NE): T= 2.17  P=0.033  DF=  88

MTB > twosample c48 c59

TWOSAMPLE T FOR C48 VS C59
        N      MEAN     STDEV   SE MEAN
C48    49      3.31      1.00      0.14
C59   136      2.82      1.12     0.096

95 PCT CI FOR MU C48 - MU C59: (0.14, 0.826)

TTEST MU C48 = MU C59 (VS NE): T= 2.79  P=0.0063  DF=  94

MTB > twosample c49 c60

TWOSAMPLE T FOR C49 VS C60
        N      MEAN     STDEV   SE MEAN
C49    49     3.816     0.755      0.11
C60   136     4.176     0.806     0.069

95 PCT CI FOR MU C49 - MU C60: (-0.61, -0.106)

TTEST MU C49 = MU C60 (VS NE): T= -2.81  P=0.0060  DF=  90

MTB > twosample c50 c61

TWOSAMPLE T FOR C50 VS C61
        N      MEAN     STDEV   SE MEAN
C50    49     3.592     0.888      0.13
C61   136     3.926     0.875     0.075

95 PCT CI FOR MU C50 - MU C61: (-0.63, -0.041)

TTEST MU C50 = MU C61 (VS NE): T= -2.27  P=0.026  DF=  83
```

```
MTB > twosample c51 c62

TWOSAMPLE T FOR C51 VS C62
       N      MEAN     STDEV   SE MEAN
C51   49     4.041     0.935      0.13
C62  136      3.88      1.03     0.088

95 PCT CI FOR MU C51 - MU C62: (-0.16, 0.476)

TTEST MU C51 = MU C62 (VS NE): T= 0.99  P=0.32  DF=  92

MTB > twosample c52 c63

TWOSAMPLE T FOR C52 VS C63
       N      MEAN     STDEV   SE MEAN
C52   49      3.55      1.06      0.15
C63  136     3.081     0.989     0.085

95 PCT CI FOR MU C52 - MU C63: (0.12, 0.816)

TTEST MU C52 = MU C63 (VS NE): T= 2.71  P=0.0084  DF=  79

MTB > twosample c53 c64

TWOSAMPLE T FOR C53 VS C64
       N      MEAN     STDEV   SE MEAN
C53   49      3.84      1.07      0.15
C64  136      3.54      1.18      0.10

95 PCT CI FOR MU C53 - MU C64: (-0.07, 0.66)

TTEST MU C53 = MU C64 (VS NE): T= 1.60  P=0.11  DF=  93

MTB > twosample c54 c65

TWOSAMPLE T FOR C54 VS C65
       N      MEAN     STDEV   SE MEAN
C54   49      3.69      1.04      0.15
C65  136      3.47      1.05     0.090

95 PCT CI FOR MU C54 - MU C65: (-0.12, 0.570)

TTEST MU C54 = MU C65 (VS NE): T= 1.28  P=0.20  DF=  85

MTB > twosample c55 c66

TWOSAMPLE T FOR C55 VS C66
       N      MEAN     STDEV   SE MEAN
C55   49     3.551     0.792      0.11
C66  136     3.853     0.857     0.073

95 PCT CI FOR MU C55 - MU C66: (-0.57, -0.034)

TTEST MU C55 = MU C66 (VS NE): T= -2.24  P=0.028  DF=  91
```

```
MTB > NOTE: Anova Part Five: Time on Job
MTB > aovoneway c46 c57 c68

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       3.84       1.92      1.17     0.312
ERROR     183     300.06       1.64
TOTAL     185     303.90

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    -------+---------+---------+---------
C46        70      3.743      1.236               (----------*---------)
C57        64      3.422      1.378     (---------*----------)
C68        52      3.692      1.213               (-----------*-----------)
                                        -------+---------+---------+---------
POOLED STDEV =     1.280                     3.30      3.60      3.90
MTB > aovoneway c47 c58 c69

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       2.50       1.25      0.83     0.437
ERROR     183     275.04       1.50
TOTAL     185     277.53

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    ------+---------+---------+---------+
C47        70      3.343      1.214             (-----------*----------)
C58        64      3.156      1.237    (-----------*-----------)
C69        52      3.442      1.227               (-------------*------------)
                                        ------+---------+---------+---------+
POOLED STDEV =     1.226                   3.00      3.25      3.50      3.75
MTB > aovonewayc48 c59 c70

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       1.99       0.99      0.81     0.447
ERROR     183     224.58       1.23
TOTAL     185     226.56

                                        INDIVIDUAL 95 PCT CI'S FOR MEAN
                                        BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV    --------+---------+---------+--------
C48        70      3.071      1.243             (----------*---------)
C59        64      2.828      0.969    (----------*----------)
C70        52      2.942      1.074       (-----------*-----------)
                                        --------+---------+---------+--------
POOLED STDEV =     1.108                    2.75      3.00      3.25
MTB > aovoneway c49 c60 c71
```

```
ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F        p
FACTOR      2      3.171      1.586      2.46    0.088
ERROR     183    117.775      0.644
TOTAL     185    120.946

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  ---+---------+---------+---------+---
C49        70     4.0571     0.8145           (------*-------)
C60        64     4.2344     0.7714                  (-------*-------)
C71        52     3.9038     0.8227  (--------*--------)
                                      ---+---------+---------+---------+---
POOLED STDEV =    0.8022              3.75      4.00      4.25      4.50
MTB > aovoneway c50 c61 c72

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F        p
FACTOR      2      0.216      0.108      0.13    0.875
ERROR     183    148.278      0.810
TOTAL     185    148.495

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  ---+---------+---------+---------+---
C50        70     3.8571     0.8729        (-------------*-------------)
C61        64     3.7812     0.9167  (-------------*-------------)
C72        52     3.8462     0.9158     (----------------*----------------)
                                      ---+---------+---------+---------+---
POOLED STDEV =    0.9001              3.60      3.75      3.90      4.05
MTB > aovoneway c51 c62 c73

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F        p
FACTOR      2       0.98       0.49      0.48    0.617
ERROR     183     184.81       1.01
TOTAL     185     185.79

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  ----+---------+---------+---------+--
C51        70      3.986      1.014             (-----------*-----------)
C62        64      3.937      1.022          (-----------*-----------)
C73        52      3.808      0.971   (------------*-------------)
                                      ----+---------+---------+---------+--
POOLED STDEV =    1.005               3.60      3.80      4.00      4.20
MTB > aovoneway c52 c63 c74

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F        p
FACTOR      2       1.89       0.95      0.90    0.409
ERROR     183     192.93       1.05
TOTAL     185     194.82

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  -------+---------+---------+---------
C52        70      3.086      0.959   (--------*---------)
C63        64      3.250      1.008         (---------*---------)
C74        52      3.327      1.133           (----------*----------)
                                      -------+---------+---------+---------
POOLED STDEV =    1.027            3.00      3.25      3.50
```

```
MTB > aovoneway c53 c64 c75

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       0.62       0.31      0.23     0.796
ERROR     183     246.79       1.35
TOTAL     185     247.40

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  ------+---------+---------+---------+
C53        70      3.557      1.235  (-------------*-------------)
C64        64      3.656      1.158      (--------------*-------------)
C75        52      3.692      1.058       (---------------*---------------)
                                         ------+---------+---------+---------+
POOLED STDEV =    1.161                      3.40      3.60      3.80      4.00
MTB > aovoneway c54 c65 c76

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2       5.56       2.78      2.56     0.080
ERROR     183     198.75       1.09
TOTAL     185     204.31

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  -----+---------+---------+---------+-
C54        70      3.371      1.144  (---------*---------)
C65        64      3.766      0.988                (----------*---------)
C76        52      3.462      0.959    (----------*----------)
                                         -----+---------+---------+---------+-
POOLED STDEV =    1.042                    3.25      3.50      3.75      4.00
MTB > aovoneway c55 c66 c77

ANALYSIS OF VARIANCE
SOURCE     DF         SS         MS         F         p
FACTOR      2      1.223      0.612      0.85     0.429
ERROR     183    131.836      0.720
TOTAL     185    133.059

                                                 INDIVIDUAL 95 PCT CI'S FOR MEAN
                                                 BASED ON POOLED STDEV
 LEVEL      N       MEAN      STDEV  ------+---------+---------+---------+
C55        70     3.6857     0.8935  (---------*---------)
C66        64     3.8750     0.8637           (----------*---------)
C77        52     3.7500     0.7638    (----------*----------)
                                         ------+---------+---------+---------+
POOLED STDEV =    0.8488                   3.60      3.80      4.00      4.20
MTB > aovoneway c56 c67 c78
```

ANALYSIS OF VARIANCE

SOURCE	DF	SS	MS	F	p
FACTOR	2	0.303	0.152	0.21	0.812
ERROR	183	133.143	0.728		
TOTAL	185	133.446			

LEVEL	N	MEAN	STDEV
C56	70	3.9143	0.8967
C67	64	3.8594	0.7942
C78	52	3.9615	0.8623

POOLED STDEV = 0.8530

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

```
-------+---------+---------+---------
     (------------*------------)
(-------------*-------------)
      (--------------*---------------)
-------+---------+---------+---------
     3.75      3.90      4.05
```

MTB > describe c46-c56

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C46	70	3.743	4.000	3.839	1.236	0.148
C47	70	3.343	4.000	3.387	1.214	0.145
C48	70	3.071	3.000	3.081	1.243	0.149
C49	70	4.0571	4.0000	4.0968	0.8145	0.0973
C50	70	3.857	4.000	3.919	0.873	0.104
C51	70	3.986	4.000	4.065	1.014	0.121
C52	70	3.086	3.000	3.081	0.959	0.115
C53	70	3.557	4.000	3.629	1.235	0.148
C54	70	3.371	3.000	3.419	1.144	0.137
C55	70	3.686	4.000	3.710	0.894	0.107
C56	70	3.914	4.000	3.968	0.897	0.107

	MIN	MAX	Q1	Q3
C46	1.000	5.000	3.000	5.000
C47	1.000	5.000	2.000	4.000
C48	1.000	5.000	2.000	4.000
C49	2.0000	5.0000	3.7500	5.0000
C50	1.000	5.000	3.000	4.000
C51	1.000	5.000	3.000	5.000
C52	1.000	5.000	2.000	4.000
C53	1.000	5.000	3.000	5.000
C54	1.000	5.000	3.000	4.000
C55	2.000	5.000	3.000	4.000
C56	2.000	5.000	3.000	5.000

MTB > describe c57-c68

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C57	64	3.422	4.000	3.466	1.378	0.172
C58	64	3.156	3.000	3.172	1.237	0.155
C59	64	2.828	3.000	2.845	0.969	0.121
C60	64	4.2344	4.0000	4.2759	0.7714	0.0964
C61	64	3.781	4.000	3.828	0.917	0.115
C62	64	3.937	4.000	4.017	1.022	0.128
C63	64	3.250	3.000	3.276	1.008	0.126
C64	64	3.656	4.000	3.724	1.158	0.145
C65	64	3.766	4.000	3.845	0.988	0.123
C66	64	3.875	4.000	3.914	0.864	0.108
C67	64	3.8594	4.0000	3.8966	0.7942	0.0993
C68	52	3.692	4.000	3.783	1.213	0.168

	MIN	MAX	Q1	Q3
C57	1.000	5.000	2.000	5.000
C58	1.000	5.000	2.000	4.000
C59	1.000	5.000	2.000	3.000
C60	2.0000	5.0000	4.0000	5.0000
C61	1.000	5.000	3.000	4.000
C62	1.000	5.000	3.000	5.000
C63	1.000	5.000	3.000	4.000
C64	1.000	5.000	3.000	4.750
C65	1.000	5.000	3.000	4.000
C66	2.000	5.000	3.000	4.750
C67	1.0000	5.0000	3.0000	4.0000
C68	1.000	5.000	3.000	5.000

MTB > describe c68-c78

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
C68	52	3.692	4.000	3.783	1.213	0.168
C69	52	3.442	4.000	3.500	1.227	0.170
C70	52	2.942	3.000	2.935	1.074	0.149
C71	52	3.904	4.000	3.935	0.823	0.114
C72	52	3.846	4.000	3.891	0.916	0.127
C73	52	3.808	4.000	3.870	0.971	0.135
C74	52	3.327	3.000	3.370	1.133	0.157
C75	52	3.692	4.000	3.761	1.058	0.147
C76	52	3.462	3.000	3.478	0.959	0.133
C77	52	3.750	4.000	3.783	0.764	0.106
C78	52	3.962	4.000	4.022	0.862	0.120

	MIN	MAX	Q1	Q3
C68	1.000	5.000	3.000	5.000
C69	1.000	5.000	2.250	4.000
C70	1.000	5.000	2.000	4.000
C71	2.000	5.000	3.000	4.750
C72	2.000	5.000	3.000	5.000
C73	1.000	5.000	3.000	4.000
C74	1.000	5.000	3.000	4.000
C75	1.000	5.000	3.000	4.750
C76	1.000	5.000	3.000	4.000
C77	2.000	5.000	3.000	4.000
C78	2.000	5.000	4.000	5.000

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