

Arlington Food Cooperative
Membership Survey
Part 2

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Preface

This is an analysis of survey data I did for the Arlington Food Co-op back when I was on its board of directors in 1981. I had gotten a job teaching econometrics at Tufts University and was looking for a community activity where I could apply my econometrics. This dropped in my lap and stayed there for awhile.

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June 18, 2003

1 Introduction

This paper is a continuation of Arlington Food Cooperative Membership Survey, Part 1, by Dena Ressler.¹ It presents data summaries for question responses which were not examined in that earlier work as well as doing further analyses of relationships between various variables. The sample used is restricted to those people who were found to be actively shopping at the co-op ($N = 43$).²

The body of the paper, which contains the data presentations and analyses, is divided into three sections. The first section examines how expenditures made at the co-op³ vary with satisfaction with different areas of the co-op's operation. Both direct and indirect measures of satisfaction are used. The examination of the direct measures of satisfaction was a major feature of the first report; so, some of the analyses presented there are very similar to ones presented here.⁴ The differences and similarities are noted in the course of the presentation of the analysis. The indirect measures of satisfaction used were not examined at all in the first report. These measures consist of items people mentioned that they bought outside the co-op, their reasons for buying things outside the co-op, the type of items they frequently found out of stock at the co-op, the type of items that they would like to see added to the co-op's inventory, and suggestions they gave for improving the co-op. Since these data items weren't presented in the first report, this report gives a summary of their characteristics as well as analyzes their relationship to expenditures.

The second section examines how expenditures at the co-op vary with the reasons people cite for shopping at the co-op, with the advantages people perceive the co-op as having over commercial stores, with the percent of people in the household who are co-op members, and with the location of the household. In addition, breakdowns of the reasons people gave for belonging to the co-op and the advantages cited for the co-op are presented since they are of interest in their own right and weren't examined in the Part 1 report.

The third section presents some cross-tabulations aimed at seeing whether people who were dissatisfied with a given area, or who were buying items in that area outside the co-op,

¹The Part 1 report goes over the contents, administration, and purpose of the survey in detail. A copy of the questionnaire used in the survey is contained in Appendix D of this report. The data analysis for both the Part 1 and Part 2 reports was done on the Tufts Computing Center's DECSYSTEM-10 facility using version 8.1 of SPSS. I would like to thank Dena for suggesting most of the analyses done here and Linda Holt for supplying the SPSS file containing the variables used in the analyses.

²In the Part 1 report, there was a detailed report of how inactive members responded to various questions. Those questions were separate from those asked of active members.

³Expenditures are measured in two ways, by the percent of their total food expenditures co-op members made at the co-op (PERCENT), and by the expenditures made at the co-op per co-op member in the household (MONEYPER).

⁴The main reason that these analyses were redone was to present the interrelationships in a format which was more easily interpretable, i. e. as differences in means rather than correlation coefficients.

desired items added to the inventory in that area. This investigation hopefully sheds some light on whether stock limitations are the source of dissatisfaction in various areas.

The conclusion of the paper presents qualifications which should be kept in mind in examining the analyses presented. It also compares the data collection methodology used in the survey with another survey methodology frequently used by the co-op to stay in touch with its members. This examination goes over the relative advantages of each methodology.

This report also has three appendices. Appendix A summarizes all the statistical testing where differences in means were examined. Appendix B gives a detailed breakdown of responses to open-ended questions examined in this report. Appendix D is a copy of the questionnaire used in the survey.

Before we get into the data tabulations and analyses proper, there are two other things which should be noticed. Firstly, the number of responses tends to vary dramatically from question to question at times. This is due to the fact that some of the questions were only asked of people who did less than 90% of their shopping at the co-op. Also, people had the option of responding “no opinion” to the questions regarding satisfaction with various areas of the co-op. Of course, these people weren’t included when data analysis was done, and thus the “N” jumps around depending on how many people had opinions on a particular aspect of the co-op. Secondly, questions involving statistical significance are resolved using an F-statistic (one degree of freedom in numerator, number of observations less two degrees of freedom in the denominator) for differences in means and Fisher’s Exact Test in the case of the 2x2 tables implied in Tables 10 and 11 of Section 4.

2 The Relationship of Expenditures to Satisfaction with the Co-op

The survey directly asked participants about how satisfied they were with 25 different aspects of the co-op.⁵ There were four areas in which expenditures were significantly positively related to satisfaction: social events, location, dairy, and meat. There were also two areas, wait in checkout and quality, in which, strangely enough, expenditures were significantly negatively related to satisfaction.

People who were satisfied⁶ with the co-op’s social events spent a significantly greater portion of their food budget (76%, $N = 16$) at the co-op than those who expressed

⁵The relationship of expenditure to satisfaction in each area is summarized in Table 12 in Appendix A. The table is arranged so that areas with which people were most satisfied are presented first. For more details, see the footnotes to the table.

⁶See the footnotes to Table A for precise definitions of “satisfied” and “expressed reservations.”

reservations, who spent only 55% (N = 8). The difference between the two groups in expenditures per co-op member wasn't quite so dramatic (and was insignificant, statistically speaking). The average of expenditures per member among households who expressed satisfaction was \$14.72 (N = 16), while that among households who expressed reservations was \$12.04 (N = 8).

Another factor which appeared to be significantly related to expenditures was satisfaction with the co-op's location. Although satisfaction with the store's location seemed to be relatively high compared with other areas (It ranked fourth in median satisfaction when compared with the other areas.), people who expressed reservations about the co-op's location did spend a significantly smaller percentage of their food budgets at the co-op. Those who were satisfied with the co-op's location spent an average of 77% (N = 28) of their food budgets at the co-op, while those who expressed reservations about the store's location spent only 61% (N = 14). Again, there was no significant difference between the two groups when average expenditures per co-op member in the household was analyzed.

While the above two relationships were analyzed in the Part 1 report, none of the relationships were found to be significant.⁷ This is due to the fact that satisfaction was measured in a somewhat different manner in these analyses than in those original ones. Also, a different statistical methodology was used for this report.⁸

The following result *does* represent the verification of a previously discovered relationship: people who were satisfied with the dairy section of the co-op spent a significantly greater portion of their food budget at the co-op (79%, N = 21) than those who had reservations (64%, N = 20).

The significant relationship between satisfaction with the co-op's selection and percent of food budget spent at the coop found in the original report was not found here. People who were satisfied with the co-op's selection spent an average of 80% (N = 11) of their budget at the co-op, while those who expressed reservations spent an average of 70% (N = 30). While this difference is appreciable in magnitude, it is not statistically significant at a 5% level, the cut-off used for the analyses here.⁹ The same was the case when the relationship

⁷Paragraph three of page 17 of the Part 1 report names the areas where significant results were found. It states, "there is an interrelationship between percentage of total food shopping done at the AFC, selection, satisfaction with groceries, dairy, and food/needs/preferences met."

⁸The original report used the raw one-to-five response people gave when asked about their satisfaction in a given area. A response of five represented complete satisfaction. A response of one represented complete dissatisfaction. In the analysis done here, the responses were broken into two groups, people who were "satisfied" and people who expressed "reservations" (see the footnotes to Table 12 for exact definitions of these terms). For each group, the mean percentage spent or mean expenditures per member was computed. A statistical test was made to see if there was a significant difference in means between the two groups. In the original analysis, a correlation coefficient was computed between the raw response and expenditures. The statistical significance of that correlation was then examined. Each method has its strengths and weaknesses. I favor the one used here since I think the results are more readily interpretable by the non-statistician.

⁹It is statistically significant only at a 15% level.

between satisfaction with the co-op's grocery section and expenditures was examined, except here the relationship didn't even approach statistical significance as it did in the original report, likewise for the relationship between expenditures and satisfaction with the way the co-op met a household's needs overall.

Another relationship found here which was not found in the original report was a relationship between satisfaction with the co-op's meat section and average expenditures of the household per co-op member in the household. Households which were satisfied with the co-op's meat section spent an average of \$19.10 (N = 10) per co-op member in the household, while those who expressed reservations spent an average of \$11.28 (N = 10). Statistically speaking, this difference is highly significant. However, there was not a statistically significant difference in percentage of food budget spent at the co-op between the two groups (80% (N = 10) vs. 71% (N = 11)).

In two areas, wait in checkout and quality, anomalous relationships were discovered. People who expressed satisfaction with the wait in the check out line spent an average of 65% (N = 22) of their food budgets at the co-op, while those who were somewhat *dissatisfied* with the wait spent a *greater* percentage, an average of 79% (N = 19) . People who expressed satisfaction with the co-op's quality spent *less* per co-op member in the household (\$11.39, N = 22), than those who had reservations, who spent an average of \$15.43 (N = 18) per member.¹⁰

This concludes the analysis of the relationship between expenditures at the co-op and *direct* measures of satisfaction. The next subject for examination is how expenditures is related to *indirect* measures of satisfaction. The indirect measures considered are: items people mentioned that they bought outside the co-op, their reasons for buying things outside the co-op, the type of items they frequently found out of stock at the co-op, the type of items that they requested be stocked at the co-op, and suggestions they gave for improving the co-op. These are indirect measures of satisfaction in that when people say they are buying certain types of items outside the store, or are buying outside the store for a given reason, etc., that may indicate dissatisfaction with that aspect of the store and may in turn affect how much people spend at the store.

The first indirect measure of satisfaction we consider is reasons people gave for purchasing items outside of the co-op. Table 1 summarizes the distribution of responses to this question.¹¹ Note that this question was only asked of households that spent less than 90% of their food budgets at the co-op.

As the table shows, in general, there are several reasons people buy things outside the co-op: stock limitations, price, convenience, and quality. No one reason seems to be the overwhelmingly significant factor when compared with other reasons cited. All are equally

¹⁰These somewhat unexpected results will be discussed further in the conclusion.

¹¹Table 1 is a condensed version of Table 20 in Appendix B.

Reason	Number Mentioning	Percent of Number Responding
Stock Limitations	19	63.3%
Price	18	60.0%
Convenience	16	53.3%
Quality	15	50.0%
Other	9	30.0%

(Number Responding = 30)

Table 1: Reasons Items Purchased Outside the Co-op

significant factors in people's decisions to buy items outside the co-op.

Before we examine relationship between variables, a technical but important statistical point needs to be made. There is a problem with the sample here which goes beyond the low number of observations. It stems from the fact that only households for which the proportion of food expenditures made at the co-op is less than 90% are used. This truncation of the dependent variable in the analyses leads to smaller differences in the means than would be present otherwise.¹²

The practical implications of this for the tests done here is that, for variables where the question was only asked of the shop-less-than-90% subsample, we should expect statistical insignificance to be the rule when proportion of food expenditures made at the co-op is the variable being examined. In some cases, that insignificance will no doubt be due to how the sample was truncated and not to a true underlying lack of difference between groups. Any significant results we find would probably be much more significant if the entire sample were examined and should be viewed in that light.

As concerns the relationship between expenditures and whether or not a particular reason for buying outside the co-op was mentioned, convenience was the only factor that was found to be decisive in the expected direction. Households who mentioned convenience as a reason they purchased things outside the co-op spent less, both per co-op member in the household (\$10.35, N = 15), and in terms of percentage of total food expenditures made at the co-op (60%, N = 16), than those who didn't, who spent \$15.27 (N = 14) and 66% (N = 14). The difference in expenditures per co-op member in the household is highly

¹²For a highly approachable verbal and diagrammatic discussion of the problem of truncation in the more general case of simple linear regression, see Glen G. Cain, "The Challenge of Segmented Labor Market Theories to Orthodox Theory: A Survey," *Journal of Economic Literature*, December 1976, 14(4), pp. 1246-1247.

Type of Item Purchased Outside	Number Mentioning	Percent of Number Responding
Grocery	19	61.3%
Meat-Fish	18	58.1%
Non-food	12	38.7%
Dairy	12	38.7%
Produce	10	32.3%
Special Items	9	29.0%
Broad Range	6	19.4%
Bulk	3	9.7%

(Number Responding = 31)

Table 2: Type of Items Purchased Outside the Co-op

significant, statistically speaking.¹³

An anomalous relationship was found. Households which purchased items outside because of “other” reasons spent a lot more money per co-op member (\$16.56, N = 8) than those who didn’t mention these reasons (\$11.26, N = 21).

The next indirect measure of satisfaction we examine is the type of items households said they purchased outside the co-op. The items mentioned are broken down categorically in Table 2. Again, this question was only asked of people who said they spent less than 90% of their food budget at AFC.

Most people appear to be buying a limited range of items outside; only 19.4% of those responding mentioned buying a broad range of items outside the co-op. Remarkably few people purchase bulk items outside. That would seem to indicate people’s needs in that area are being met; however, see the comments about items found out of stock below.¹⁴

People who mentioned buying a broad range of items outside spent significantly less at the coop than the rest of the people in this subsample. Households that mentioned buying a broad range outside spend an average of \$6.84 (N = 6) per member in the household and 48% (N = 7) of their total food budget, while other households spent \$13.84 (N = 24) and 68% of their total food budget. Relationships are found when one examines the grocery and bulk categories. Households who mentioned items in these categories spent significantly more per co-op member in the

¹³The difference in money spent per co-op member is significant at a 2.5% level. However, the difference in percentage of food budget spent is insignificant even at a 25% level.

¹⁴See Appendix B for a more detailed breakdown of responses.

Item Out Of Stock	Number Mentioning	Percent of Number Responding
Bulk	22	52.4%
Dairy	12	28.6%
Produce	9	21.4%
Meat	9	21.4%
Grocery	8	19.0%
Non-food	6	14.3%
Nothing	5	11.9%
General	2	4.8%

(Number Responding = 42)

Table 3: Type of Items Found Out of Stock at the Co-op

household than households who didn't mention them.¹⁵

The next indirect measure of satisfaction is the types of items people frequently found out of stock at the co-op. Everyone in the sample was asked this question. Table 3 shows how the responses were distributed.¹⁶

Bulk is overwhelmingly the area cited most frequently as having items out of stock. A look back at Table 2 would seem to indicate that this hasn't driven people out of the co-op to buy bulk items though. Dairy is the next most frequently cited area. The results don't indicate that this area is significantly worse than produce, meat or grocery though.

Responses of people in two of the areas examined in the table, bulk and non-food, were significantly related to expenditures. People who mentioned finding bulk items out of stock spent significantly less per co-op member in the household (\$11.66, N = 21) than people who didn't mention bulk items (\$15.10, N = 20). They also spent a smaller portion of their food budget at the co-op (66%, N = 22) than the others did (80%, N = 20). Contrary to what Table 2 suggests, this would seem to indicate that people *are* going outside the co-op to purchase bulk items. The relationship in the second area was a little anomalous: people who mentioned non-food items spent much more per member in the household (\$19.17, N = 6) than people who didn't mention non-food items (\$12.34, N = 35).

Another indirect measure of satisfaction with a given area of the co-op is whether people would like the co-op to add items to its inventory in that area.¹⁷ Table 4 gives a rundown

¹⁵See Table C in Appendix A for details.

¹⁶See Appendix B for a more detailed breakdown of responses.

¹⁷See Section 4 for an examination of whether or not mentioning items from a given category is related to

Type of Item Mentioned	Number Mentioning	Percent of Number Responding
Grocery	22	52.4%
Nothing	10	23.8%
Dairy	9	21.4%
Meat-Fish	6	14.3%
Non-food	5	11.9%
Natural-Organic	3	7.1%
Bulk	3	7.1%
Produce	2	4.8%

(Number Responding = 42)

Table 4: Items Household Would Like To See Co-op Carry

of the responses people gave when they were asked what items they would like to see the co-op carry that it wasn't carrying presently.¹⁸

Grocery items are overwhelmingly the most frequently mentioned type of item. About a quarter of the people surveyed were apparently completely satisfied with the co-op's stock, judging from the number of people who mentioned nothing.

No relationships of reasonable statistical significance were uncovered when expenditures of people who mentioned items in various areas were compared with those of people who didn't.

The last indirect measure of satisfaction examined here is improvements people suggested for the co-op. Table 5 gives a rundown of the types of responses people gave when asked what improvements could be made at the co-op to encourage them to do more of their shopping there.¹⁹ This question was only asked of people who said they did less than 90% of their shopping at the co-op.

satisfaction in that area, or to whether items from that area are purchased outside the co-op.

¹⁸This table is a summary of Table E in Appendix A. Also see Appendix B for a more detailed breakdown of responses.

¹⁹This table is a summary of Table E in Appendix A. Also see Appendix B for a more detailed breakdown of responses.

Improvement Suggested	Number Mentioning	Percent of Number Responding
Selection	10	35.7%
Price	9	32.1%
Quality ²⁰	8	28.6%
Publicity	3	10.7%
Location	1	3.6%
Other	8	28.6%

(Number Responding = 28)

Table 5: Suggestions Given for Improving the Co-op

3 The Relationship of Expenditures to Other Household Characteristics

The purpose of this section is to examine how expenditure is related to four characteristics of the household: the reasons given for belonging to the co-op, the perceived advantages the co-op has over commercial stores, the percent of the household which belongs to the co-op, and the location of the household. In addition, since this information was not presented in the Part 1 report, tabulations of the first two characteristics over the households interviewed are presented. In these tabulations, more than in the others, the categorizations are rather crude, although useful for data analysis purposes. It is suggested that the reader glance over the more detailed listing of the responses to these questions in Appendix B to get a fuller notion of their flavor. A precise view of how the detailed responses of Appendix B were resolved into the categories listed here can be found by using Tables G and H of Appendix A in conjunction with Appendix B.

Table 6 summarizes the sorts of responses households gave when asked what the three most important reasons they belonged to the co-op were. Overwhelmingly, the most frequently cited reason was price. A significant number also shopped at the co-op out of enjoyment of the people and atmosphere there, because they have an affinity for the co-op's philosophy, or because they like the selection. To a much lesser extent, quality of food is also an important factor in people's choice to belong to the co-op. It would be interesting to compare this table with responses to a similar question in a survey of people shopping

²⁰This includes several references to consistency in certain areas. I interpreted this to mean consistency in quality. However, on re-reading the Part 1 report, I think consistency in availability might have been what was meant. For details, see Table F in Appendix A, and use the table for "IMPROVE" in Appendix B to find out what the various codes mean.

²¹This category doesn't have the same problems of interpretation here as it did in Table 5.

Reason	Number Mentioning	Percent of Number Responding
Price	36	63.7%
People-Atmosphere	19	44.2%
Co-op Philosophy	17	39.5%
Selection	16	37.2%
Quality ²¹	9	20.9%
Location	5	11.6%
Miscellaneous	2	4.7%

(Number Responding = 43)

Table 6: Reasons Cited for Belonging to the Co-op

commercial stores. None of these reasons appeared to differentiate people as far as expenditures are concerned.²²

Table 7 summarizes the sorts of responses people gave when asked what advantages they thought the co-op had over commercial stores.²³ *A priori*, one would expect these responses to duplicate those listed in Table 6 to a great extent, as they do. There are important differences though. “Co-op Philosophy” and price are mentioned much less frequently here than in Table 6.

In this table, there does appear to be a characteristic which differentiates people as far as their expenditures are concerned. That characteristic is whether or not people mentioned “Atmosphere-People” as an advantage of the co-op. Those who did spent 68.5% (N = 14) of their food budgets at the co-op, while those who didn’t spent only 56.3% (N = 15).²⁴ However, none of the rest of the advantages cited appeared to differentiate people as far as expenditures were concerned.

Next, the relationship of expenditures to the percent of the household who were members of the co-op is examined. This exploration is done out of curiosity more than anything else. The purpose of it is to see if people in households where a large proportion of the household doesn’t belong to the co-op shop outside the co-op more than others, that is, do people find it more convenient to buy things outside when a lot of the people they live with do?

²²Statistical results for all the categories are summarized in Table G of Appendix A. None of the differences in means are statistically significant at a 20% level.

²³This question was only asked of people who said they did less than 90% of their food shopping at the co-op. A more detailed breakdown of the responses can be found in Appendix B.

²⁴The statistical significance of this difference is only .08 which is somewhat marginal. However, it should be recalled that a truncated sample is being used in this table which would tend to bias the significance downward.

Advantage	Number Mentioning	Percent of Number Responding
Price	20	69.0%
People-Atmosphere	14	48.3%
Selection	10	34.5%
Co-op Philosophy	7	24.1%
Quality	4	13.8%
Location	2	6.9%
Miscellaneous	9	31.0%

(Number Responding = 29)

Table 7: Perceived Advantages of the Co-op Over Commercial Stores

Percentage Who Shop AFC	Number of Households	Percent of Number Responding
100%	31	72.1%
75%	1	2.3%
67%	3	7.0%
50%	3	7.0%
33%	4	9.3%
20%	1	2.3%

(Number Responding = 43)

Table 8: Percentage of Household Members Who Shop AFC

Table 8 summarizes how the sample broke down as far as the percent of the household that belonged to the co-op. The mean of the distribution is 85%. As the table shows, in the vast majority of households in the sample, 100% of the household shopped AFC.

When expenditures per household member in the co-op (MONEYPER) are regressed on the proportion of the household which belongs to the co-op (PROPMEMB), the following equation is obtained:

$$\text{MONEYPER} = \$16.99 - \$0.19 \times \text{PROPMEMB} \quad (\text{No. of obs} = 42) \\ (\$3.67)$$

The standard error of the coefficient of PROPMEMB (\$3.67) is so much larger than the coefficient itself (\$0.19) that it is not worthwhile to interpret the equation as its results are statistically very insignificant. The equation doesn't even allow the conclusion that the effect of PROPMEMB on MONEYPER is empirically small as the standard error of the coefficient of PROPMEMB is so large that there could be an empirically significant positive *or* negative underlying relationship.

When the proportion of food expenditures a household makes at the co-op (PERCENT) is regressed on the proportion of the household that shops AFC (PROPMEMB), the following equation is obtained:

$$\text{PERCENT} = 49.5\% + 26.2\% \times \text{PROPMEMB} \quad (\text{No. of obs} = 43) \\ (13.3\%)$$

The coefficient of PROPMEMB in this equation (26.2%) has a small enough standard error (13.3%) that it is significant statistically.²⁵ The equation indicates that, for a household where everyone shops AFC, the average percent of food expenditures made at AFC will be 75.7%, while for a household where half the people shop AFC, the percent will be 62.6%. So there does appear to be a leakage effect. However, there is a slight statistical problem with this equation in that PERCENT isn't in a form which makes it suitable for linear regression. If a logistical transformation²⁶ is applied to PERCENT to get it into a more suitable form, and the result denoted LOGPERC, the following equation is obtained:

$$\text{LOGPERC} = -0.397 + 1.94 \times \text{PROPMEMB} \quad (\text{No. of obs} = 43) \\ (0.88)$$

Again, the relatively small standard error of the coefficient of PROPMEMB and the positivity of the coefficient indicate that the relationship between PERCENT and

²⁵The coefficient is statistically significant at a 5% level.

²⁶The logistic transformation is $\text{LOGPERC} = \log(\text{PERCENT}/(1 - \text{PERCENT}))$, where log indicates taking a natural logarithm. For information on this transformation and what makes it useful in this case, see Robert S. Pindyck and Daniel L. Rubinfeld, *Econometric Models and Economic Forecasts* (2nd ed.), New York: McGraw-Hill, Inc., 1981, pp. 287-290.

Location of Household	Mean of MONEYPER	Mean of PERCENT
Overall Mean	\$13.21 (N = 40)	71.0% (N = 41)
Arlington	\$14.03 (N = 25)	71.9% (N = 26)
Outside Arlington	\$11.84 (N = 15)	69.4% (N = 15)
Somerville	\$11.07 (N = 8)	67.9% (N = 8)
Med,Cam,Bel,Lex	\$15.40 (N = 5)	74.0% (N = 5)
Medford	\$13.50 (N = 2)	80.0% (N = 2)
Cambridge	\$12.50 (N = 1)	50.0% (N = 1)
Belmont	\$17.50 (N = 1)	80.0% (N = 1)
Lexington	\$20.00 (N = 1)	80.0% (N = 1)
Wat,Act	\$12.00 (N = 2)	64.2% (N = 2)
Watertown	\$ 8.50 (N = 1)	95.0% (N = 1)
Acton	\$ 3.50 (N = 1)	33.0% (N = 1)

Table 9: Mean Expenditures at the Co-op By Location of Household

PROPMEMB is highly statistically significant in the expected direction,²⁷ that is, when a higher proportion of the household shopped AFC, the proportion of their food budgets members spent at AFC was higher.

The last relationship examined in this section is that between location of the household and expenditures at the co-op. Table 9 summarizes how both money spent per co-op member (MONEYPER) and the proportion of food expenditures made at the co-op breakdown by the location of the household.

Although there does appear to be quite a bit of variation of expenditure with location, none of these differences is significant, statistically speaking.

4 The Impact of Stock Deficiencies

In this section, two questions are investigated. First, are stock deficiencies a significant source of dissatisfaction with various areas of the co-op? Second, are stock deficiencies within a given area a significant source of members buying items in that area outside the

²⁷The coefficient of PROPMEMB is statistically significant at a 2.5% level.

Area	Percent Desiring Additions in the Area	
	Of People Who Were Satisfied With the Area	Of People Who Were Not Satisfied With the Area
Bulk	7.1% (N = 28)	8.3% (N = 12)
Dairy	20.0% (N = 20)	25.0% (N = 20)
Natural Foods	11.1% (N = 18)	5.6% (N = 18)
Organic Foods	12.5% (N = 8)	14.3% (N = 14)
Selection ²⁸	10.0% (N = 10)	23.3% (N = 30)
Produce	0.0% (N = 10)	6.3% (N = 32)
Poultry ²⁹	12.5% (N = 16)	16.7% (N = 12)
Grocery	63.6% (N = 22)	50.0% (N = 16)
Fish ²⁹	15.4% (N = 13)	9.1% (N = 11)
Meat ²⁹	30.0% (N = 10)	18.2% (N = 11)

Table 10: Relation of Satisfaction to Whether Household Wants Items Added to Inventory

co-op? Both of these questions are aimed at seeing to what extent the co-op can improve its performance in various areas by working on its inventory.

4.1 Stock Deficiencies and Dissatisfaction

To examine the first question, it is inquired whether a greater percentage of households who were dissatisfied with an area thought that the co-op should add to its inventory in that area when compared with households who were satisfied with the area. The results of this inquiry are tabulated in Table 10.

The results suggest that if stock limitations are a significant source of dissatisfaction with the co-op, the sample size is too small to detect it. None of the differences in percentages is statistically significant, even at a 10% level.³⁰

²⁸With “Selection”, the percent of people who wanted any type of item at all added to the inventory is calculated for those satisfied and those not satisfied.

²⁹With “Poultry”, the percent of people who mentioned either poultry, fish or meat items which they wanted added to the inventory is examined for those satisfied and those not satisfied. This was done since the categories used in examining what types of items the household wanted added to the inventory are more aggregated than the ones used for examining satisfaction. The same procedure was used with the “Fish” and “Meat” categories.

³⁰For this table, tests of significance were done using Fisher’s Exact Test on the implied 2x2 tables. For more information on this test, which is used here in preference to the usual Chi-square test since the

Area	Percent Desiring Additions in the Area	
	Of People Who Bought This Type Of Item Outside	Of People Who Didn't Buy This Type Of Item Outside
Grocery	52.6% (N = 19)	63.6% (N = 11)
Meat-Fish ³²	23.5% (N = 17)	0.0% (N = 13)
Non-food	8.3% (N = 12)	11.1% (N = 18)
Dairy ³³	27.3% (N = 11)	5.3% (N = 19)
Produce	11.1% (N = 9)	4.8% (N = 21)
Broad Range ³⁴	28.6% (N = 7)	21.7% (N = 23)
Bulk	33.3% (N = 3)	5.6% (N = 27)

Table 11: Relation of Whether Items in an Area Bought Outside to Whether Household Wants Items Added to Inventory in that Area

4.2 Stock Deficiencies and Outside Purchases

When it comes to the second question, namely are stock limitations a significant source of people doing their shopping outside,³¹ there are significant results. Table 11 summarizes these results.

There is a statistically significant difference in percentages in two areas, dairy and meat. In both these areas, people who were buying these types of items outside the co-op expressed more interest in having the co-op stock these sorts of items than those who weren't buying the items outside the co-op. In meat the difference is highly significant (5% level), whereas in dairy it is less so (10% level). So it appears that stock limitations in these areas are a significant source of people going outside to buy things.

sample sizes are small, see Sidney Siegel, *Nonparametric Statistics for the Behavioral Sciences*, New York: McGraw-Hill, Inc., 1956, pp. 96-104.

³¹Recall that Table 1 showed 63.3% of households who did less than 90% of their shopping at the co-op cited stock limitations as the reason.

³²The difference in percentages is statistically significant at a 5% level.

³³The difference in percentages is statistically significant at a 10% level.

³⁴With "Broad Range", the percentage of people who mentioned any type of item at all which they would like added to the co-op's inventory is calculated for each category.

5 Coding Errors

The database seems to have a problem with coding errors. Tables 22, 23, 25 and 26 all had unlabeled entries in them in the original database. These entries now appear with the label “Coding Error” in the referenced tables. These errors surfaced because the erroneous codes happened to be ones that weren’t used. There are probably other invisible errors where the erroneous codes matched existing codes. This errors-in-variables problem makes relationships more difficult to uncover. So, there were probably some significant relationships in some areas which the statistical tests failed to show.

A more optimistic assessment of these blank entries is that they are correctly coded, but the labels were just omitted inadvertently. This still creates an errors-in-variables problem, although a smaller one, since these entries would be lumped in to categories like “Other” or “Miscellaneous” when most likely they should go in to another category.

6 Conclusion

The presence of a statistical relationship doesn’t always signify the presence of an underlying relationship which can be used in decision making. To cite a modified version of a caveat that the U.S. Center for Disease Control in Atlanta puts at the end of its reports:

The presence of an association does not of itself indicate a causal relation between a given characteristic and an indicator of expenditures. A cross-sectional survey of this nature cannot provide the type of information needed to establish causal relationships. Information on the magnitude and location of major problems, plus certain associations of moderate or greater degree can, however, provide guidance in selecting areas for further inquiry into causality for planning programs and for evaluating their effectiveness.³⁵

What this means as far as the AFC Membership Survey is that when one observes a positive correlation between, say, household expenditures at the co-op and *dissatisfaction* with the co-op’s quality as we did in Section 2, that does not necessarily mean that doing something to decrease satisfaction with the quality of the co-op’s food will necessarily improve the co-op’s revenues.

³⁵The original unmodified quote (the same except for references to malnutrition) can be found in *Arab Republic of Egypt Nutrition Status Survey, 1978*, Atlanta, Georgia: Center for Disease Control, Public Health Service, U.S. Department of Health, Education, and Welfare, December 6, 1978, p. 87.

The correlation could be due to many things. In this case, it may be that lower-income people are concerned with different sections of the store's stock than higher-income people are. The section they are concerned with, say bulk, may be a very high-quality section of the co-op, while the section higher-income people are concerned with, say meat, may be a very low-quality section of the co-op. Under this interpretation, what the results are saying is that higher-income people are less satisfied with the quality of food they buy than are lower-income people. It doesn't say dissatisfaction is a source of people spending more at the co-op. Decreasing the quality of the co-op's food would probably not, under this interpretation, cause lower-income people to spend more at the co-op. It would more likely lead to a major or minor exodus out of the co-op.

Of course, the result discussed here is rather anomalous, but it points up the importance of a critical analysis of more "reasonable" results which may also be another outcome of the same income effects. The moral is that the correlations must be taken with a grain of salt, as the excerpt above states. Any conclusions made from the correlations presented in this report should be corroborated with other sorts of evidence before being used to guide co-op decision making.

The greatest advantage of this sort of survey methodology is its comprehensivity; that is, it is designed so that all points of view get represented. This can be best seen by comparing it to another sort of survey method: leave a questionnaire out and those who wish to fill it out do so; those who don't, don't. In a survey designed, say, to find out what people's interests as far as social events are, this may not be a bad approach, as those who don't fill out the questionnaire probably just aren't interested in participating in that aspect of the co-op anyway. However, if one wants to find out such things as why people are shopping outside the co-op or leaving the co-op, this latter sort of survey technique is likely to produce very misleading results. The non-participants are exactly the ones who need to be reached for any useful information to be obtained. It is precisely the comprehensivity of the survey analyzed in this report that has allowed the depth of insight into the co-op that probably very few co-ops have.

The disadvantages of this sort of survey methodology are the great amount of time consumed in carrying it out and analyzing the results and the need for extensive computational facilities. Of course, people can get work-hours credit for the time they spend, but the cost to the co-op is still very large. The example provided by this survey and its accompanying reports will hopefully mitigate these costs in future similar surveys in AFC or other co-ops as it provides an example of how to set such a survey up and analyze the results.

A Detailed Statistical Relationships

Table 12: Expenditures and Satisfaction: Detailed Relationships

Area Considered		Mean Of MONEYPER ³⁶	Mean Of PERCENT ³⁷
Staff (Median = 4.864) (Satisfied = 5)	Satisfied	\$12.61 (N = 32)	72.9% (N = 33)
	Reservations	\$15.09 (N = 9)	67.0% (N = 9)
	F-Statistic	1.309	0.468
Bulk (Median = 4.793) (Satisfied = 5)	Satisfied	\$12.86 (N = 29)	71.1% (N = 29)
	Reservations	\$13.98 (N = 11)	72.6% (N = 12)
	F-Statistic	0.284	0.039
Social Events (Median = 4.765) (Satisfied = 5)	Satisfied	\$14.72 (N = 16)	76.0% (N = 16)
	Reservations	\$12.04 (N = 8)	55.0% (N = 8)
	F-Statistic	1.132	13.010 ³⁸
Store's Location (Median = 4.750) (Satisfied = 5)	Satisfied	\$13.28 (N = 27)	76.9% (N = 28)
	Reservations	\$12.91 (N = 14)	61.2% (N = 14)
	F-Statistic	0.036	5.722 ³⁹
Staff-Membership Communication (Median = 4.741) (Satisfied = 5)	Satisfied	\$12.77 (N = 26)	74.9% (N = 27)
	Reservations	\$14.87 (N = 14)	69.9% (N = 14)
	F-Statistic	1.313	0.621
Members (Median = 4.692) (Satisfied = 5)	Satisfied	\$13.07 (N = 25)	72.1% (N = 26)
	Reservations	\$12.75 (N = 16)	70.9% (N = 16)
	F-Statistic	0.030	0.028

Work Hours (Median = 4.571) (Satisfied = 5)	Satisfied	\$13.12	(N = 20)	75.8%	(N = 21)
	Reservations	\$13.41	(N = 18)	72.1%	(N = 18)
	F-Statistic		0.022		0.346
Wait in Checkout (Median = 4.568) (Satisfied = 5)	Satisfied	\$12.52	(N = 22)	64.9%	(N = 22)
	Reservations	\$13.82	(N = 18)	78.5%	(N = 19)
	F-Statistic		0.481		4.498 ⁴⁰
Dairy (Median = 4.524) (Satisfied = 5)	Satisfied	\$12.80	(N = 21)	79.0%	(N = 21)
	Reservations	\$13.32	(N = 19)	63.6%	(N = 20)
	F-Statistic		0.079		5.930 ⁴¹
Quality (Median = 4.512) (Satisfied = 5)	Satisfied	\$11.39	(N = 22)	70.5%	(N = 23)
	Reservations	\$15.43	(N = 18)	75.9%	(N = 18)
	F-Statistic		5.280 ⁴²		0.747
Natural Foods (Median = 4.500) (Satisfied = 5)	Satisfied	\$14.77	(N = 18)	75.5%	(N = 18)
	Reservations	\$12.38	(N = 17)	70.6%	(N = 18)
	F-Statistic		1.749		0.435
Food Information (Median = 4.400) (Satisfied = 5)	Satisfied	\$13.42	(N = 16)	74.6%	(N = 17)
	Reservations	\$14.26	(N = 19)	74.8%	(N = 19)
	F-Statistic		0.231		0.000
Overall Needs (Median = 4.310) (Satisfied = 5)	Satisfied	\$11.34	(N = 16)	76.0%	(N = 16)
	Reservations	\$14.71	(N = 23)	71.8%	(N = 24)
	F-Statistic		3.727		0.446
Cleanliness (Median = 4.308) (Satisfied = 5)	Satisfied	\$12.48	(N = 19)	69.8%	(N = 19)
	Reservations	\$13.66	(N = 23)	73.9%	(N = 24)
	F-Statistic		0.445		0.387

Organic Foods (Median = 4.167) (Satisfied = 5)	Satisfied	\$12.59	(N = 8)	72.4%	(N = 8)
	Reservations	\$15.12	(N = 13)	82.4%	(N = 14)
	F-Statistic		1.341		2.495
Prices (Median = 4.139) (Satisfied = 5)	Satisfied	\$14.66	(N = 14)	79.8%	(N = 14)
	Reservations	\$11.92	(N = 26)	67.9%	(N = 27)
	F-Statistic		2.166		3.124
Selection (Median = 4.048) (Satisfied = 5)	Satisfied	\$12.11	(N = 11)	80.4%	(N = 11)
	Reservations	\$13.62	(N = 29)	70.2%	(N = 30)
	F-Statistic		0.528		2.189
Board-Member Communication (Median = 4.000) (Satisfied = 5)	Satisfied	\$14.78	(N = 10)	73.8%	(N = 10)
	Reservations	\$12.50	(N = 15)	73.7%	(N = 16)
	F-Statistic		1.085		0.000
Produce (Median = 4.000) (Satisfied = 5)	Satisfied	\$12.68	(N = 11)	72.2%	(N = 11)
	Reservations	\$13.28	(N = 31)	72.0%	(N = 32)
	F-Statistic		0.089		0.000
Poultry (Median = 3.784) (Satisfied = 4,5)	Satisfied	\$15.80	(N = 16)	79.8%	(N = 16)
	Reservations	\$12.58	(N = 12)	77.8%	(N = 12)
	F-Statistic		2.520		0.091
Grocery (Median = 3.750) (Satisfied = 4,5)	Satisfied	\$12.09	(N = 22)	75.8%	(N = 23)
	Reservations	\$14.05	(N = 16)	69.1%	(N = 16)
	F-Statistic		1.042		1.020

Fish (Median = 3.643) (Satisfied = 4,5)	Satisfied	\$13.05	(N = 12)	75.2%	(N = 13)
	Reservations	\$13.23	(N = 11)	68.5%	(N = 11)
	F-Statistic		0.007		0.417
Getting Requested Items (Median = 3.583) (Satisfied = 4,5)	Satisfied	\$11.07	(N = 7)	70.5%	(N = 8)
	Reservations	\$14.71	(N = 7)	77.1%	(N = 7)
	F-Statistic		2.500		0.366
Stairs (Median = 2.938) (Satisfied = 3,4,5)	Satisfied	\$12.36	(N = 23)	71.8%	(N = 23)
	Reservations	\$14.50	(N = 15)	70.8%	(N = 16)
	F-Statistic		1.180		0.022
Meat (Median = 2.375) (Satisfied = 3,4,5)	Satisfied	\$19.10	(N = 10)	79.8%	(N = 10)
	Reservations	\$11.28	(N = 10)	71.4%	(N = 11)
	F-Statistic		16.039 ⁴³		1.008

The above table is arranged so that the areas with the highest median satisfaction come first. Means of both MONEYPER and PERCENT are taken by subgroup. One subgroup consists of people who said they were satisfied. For areas where median satisfaction was high, these are just the people who gave the area the highest rating (code 5). For areas where median satisfaction was lower, people who gave the area the second-highest rating (code 4) were included in this subgroup. For areas where median satisfaction was very low, even people who gave the area the third-highest rating (code 3) are included in the “Satisfied” subgroup. In all cases, the rest of the people were put in the “Reservations” subgroup. An F-statistic was computed to see if the difference in the means between the two subgroups is statistically significant.

³⁶MONEYPER is the amount the household spent at the co-op divided by the total number of co-op members in the household.

³⁷PERCENT is the household’s response to the question “What percentage of food shopping do you do at the co-op?”

³⁸Statistically significant at a 0.1% level.

³⁹Statistically significant at a 1% level.

⁴⁰Statistically significant at a 4% level.

⁴¹Statistically significant at a 2% level.

⁴²Statistically significant at a 3% level.

⁴³Statistically significant at a 0.1% level.

Table 13: Expenditures and Reasons for Outside Purchases: Detailed Relationships

Reason		Mean Of MONEYPER ⁴⁴		Mean Of PERCENT ⁴⁵	
Stock Limitations (Codes 5,6,7)	Mentioned	\$13.96	(N = 18)	63.2%	(N = 19)
	Not Mentioned	\$10.70	(N = 11)	62.1%	(N = 11)
	F-Statistic	2.090		0.021	
Price (Codes 1,2)	Mentioned	\$13.01	(N = 17)	65.6%	(N = 18)
	Not Mentioned	\$12.32	(N = 12)	58.6%	(N = 12)
	F-Statistic	0.092		1.005	
Convenience (Codes 8-11)	Mentioned	\$10.35	(N = 15)	59.9%	(N = 16)
	Not Mentioned	\$15.27	(N = 14)	66.1%	(N = 14)
	F-Statistic	5.680 ⁴⁶		0.819	
Quality (Codes 3,4,15)	Mentioned	\$13.80	(N = 14)	64.9%	(N = 15)
	Not Mentioned	\$11.72	(N = 15)	60.7%	(N = 15)
	F-Statistic	0.871		0.296	
Other (Codes 13,14)	Mentioned	\$16.56	(N = 8)	69.4%	(N = 9)
	Not Mentioned	\$11.26	(N = 21)	59.9%	(N = 21)
	F-Statistic	5.203 ⁴⁷		1.692	

(Number Responding = 30)

The above table is arranged so that the reasons mentioned most frequently come first. Means of both MONEYPER and PERCENT are taken by subgroup. One subgroup consists of people who mentioned the given reason for buying items outside the co-op. The

⁴⁴MONEYPER is the amount the household spent at the co-op divided by the total number of co-op members in the household.

⁴⁵PERCENT is the household's response to the question "What percentage of food shopping do you do at the co-op?"

⁴⁶Statistically significant at a 2.5% level.

⁴⁷Statistically significant at a 3% level.

other consists of people who didn't mention that reason. The categories were created for data analysis purposes. The original codes were more specific.⁴⁸ An F-statistic was computed to see if the difference in the means between the two subgroups is statistically significant.

⁴⁸See Table 20.

Table 14: Expenditures and Types of Items for Purchased Outside: Detailed Relationships

Reason		Mean Of MONEYPER ⁴⁹	Mean Of PERCENT ⁵⁰
Overall Mean		\$12.53 (N = 30)	63.7% (N = 31)
Grocery (Codes 30-33,43, 44,48-52,54,55, 60-62,64,69,82,96)	Mentioned	\$14.69 (N = 18)	66.3% (N = 19)
	Not Mentioned	\$ 9.28 (N = 12)	59.4% (N = 12)
	F-Statistic	7.135 ⁵¹	0.969
Meat-Fish (Codes 70,72-78, 80,81,85,86,89)	Mentioned	\$13.76 (N = 17)	65.6% (N = 18)
	Not Mentioned	\$10.91 (N = 13)	61.0% (N = 13)
	F-Statistic	1.717	0.424
Non-food (Codes 38-42,53, 56-58)	Mentioned	\$14.25 (N = 12)	66.3% (N = 12)
	Not Mentioned	\$11.38 (N = 18)	62.0% (N = 19)
	F-Statistic	1.694	0.360
Dairy (Codes 20-24,66)	Mentioned	\$12.75 (N = 11)	66.7% (N = 12)
	Not Mentioned	\$12.40 (N = 19)	61.8% (N = 19)
	F-Statistic	0.023	0.487
Produce (Codes 10-13,36)	Mentioned	\$11.60 (N = 10)	69.5% (N = 10)
	Not Mentioned	\$12.99 (N = 20)	60.9% (N = 21)
	F-Statistic	0.351	1.428
Special Items (Codes 25,26,34, 35,37,45,46,65, 67,68,71,94)	Mentioned	\$13.83 (N = 9)	65.0% (N = 9)
	Not Mentioned	\$11.97 (N = 21)	63.1% (N = 22)
	F-Statistic	0.603	0.062
Broad Range (Codes 1-9)	Mentioned	\$ 6.84 (N = 6)	47.6% (N = 7)
	Not Mentioned	\$13.95 (N = 24)	68.3% (N = 24)
	F-Statistic	8.496 ⁵¹	8.010 ⁵¹
Bulk (Codes 10-13,36)	Mentioned	\$19.00 (N = 3)	73.3% (N = 3)
	Not Mentioned	\$11.81 (N = 27)	62.6% (N = 28)
	F-Statistic	4.339 ⁵²	0.864

(Number Responding = 31)

The above table is arranged so that the type of items mentioned most frequently come first. Means of both MONEYPER and PERCENT are taken by subgroup. One subgroup consists of people who mentioned buying the item(s) in question outside the co-op. The other consists of people who didn't. The categories were created for data analysis purposes. The original codes were by specific item.⁵³ An F-statistic was computed to see if the difference in the means between the two subgroups is statistically significant.

⁴⁹MONEYPER is the amount the household spent at the co-op divided by the total number of co-op members in the household.

⁵⁰PERCENT is the household's response to the question "What percentage of food shopping do you do at the co-op?"

⁵¹Statistically significant at a 1% level.

⁵²Statistically significant at a 5% level.

⁵³See Table 21.

Table 15: Expenditures and Types of Items Found Out of Stock: Detailed Relationships

Item Out Of Stock		Mean Of MONEYPER ⁵⁴	Mean Of PERCENT ⁵⁵
Overall Mean		\$13.34 (N = 41)	72.6% (N = 42)
Bulk (Codes 46,52, 60-68,70-72,80)	Mentioned	\$11.66 (N = 21)	66.3% (N = 22)
	Not Mentioned	\$15.10 (N = 20)	79.6% (N = 20)
	F-Statistic	4.177 ⁵⁶	4.485 ⁵⁷
Dairy (Codes 23,24)	Mentioned	\$11.40 (N = 12)	69.8% (N = 12)
	Not Mentioned	\$14.14 (N = 29)	73.7% (N = 30)
	F-Statistic	2.082	0.296
Produce (Codes 10-13, 15-19,21)	Mentioned	\$15.06 (N = 9)	85.9% (N = 9)
	Not Mentioned	\$12.85 (N = 32)	69.0% (N = 33)
	F-Statistic	1.088	4.970 ⁵⁸
Meat (Codes 81-97)	Mentioned	\$13.58 (N = 9)	77.9% (N = 9)
	Not Mentioned	\$13.27 (N = 32)	71.2% (N = 33)
	F-Statistic	0.022	0.401
Grocery (Codes 35,48,50, 51,53,54,55,74, 76)	Mentioned	\$14.11 (N = 7)	74.9% (N = 8)
	Not Mentioned	\$13.18 (N = 34)	72.1% (N = 34)
	F-Statistic	0.156	0.112
Non-food (Codes 40,45, 56-59,69)	Mentioned	\$19.17 (N = 6)	82.5% (N = 6)
	Not Mentioned	\$12.34 (N = 35)	71.0% (N = 36)
	F-Statistic	9.168 ⁵⁹	1.559
Nothing (Code 0)	Mentioned	\$14.65 (N = 5)	77.0% (N = 5)
	Not Mentioned	\$13.15 (N = 36)	72.0% (N = 37)
	F-Statistic	0.308	0.242
General (Codes 1,14)	Mentioned	\$10.63 (N = 2)	75.0% (N = 2)
	Not Mentioned	\$13.48 (N = 39)	72.5% (N = 40)
	F-Statistic	0.486	0.026

(Number Responding = 42)

The above table is arranged so that the type of item mentioned most frequently comes first. Means of both MONEYPER and PERCENT are taken by subgroup. One subgroup consists of people who mentioned not finding the type of item in question at the co-op. The other consists of people who didn't mention that type of item. The categories were created for data analysis purposes. The original codes were by specific item.⁶⁰ An F-statistic was computed to see if the difference in the means between the two subgroups is statistically significant.

⁵⁴MONEYPER is the amount the household spent at the co-op divided by the total number of co-op members in the household.

⁵⁵PERCENT is the household's response to the question "What percentage of food shopping do you do at the co-op?"

⁵⁶Statistically significant at a 5% level.

⁵⁷Statistically significant at a 4% level.

⁵⁸Statistically significant at a 3% level.

⁵⁹Statistically significant at a 0.4% level.

⁶⁰See Table 22.

Table 16: Expenditures and Type of Item Requested for Stock: Detailed Relationships

Item		Mean Of MONEYPER ⁶¹	Mean Of PERCENT ⁶²
Overall Mean		\$13.34 (N = 41)	72.6% (N = 42)
Grocery (Codes 11-14,16, 32,35-38,40-48, 53,54,57,58,66,90)	Requested	\$12.23 (N = 21)	71.9% (N = 22)
	Not Requested	\$14.50 (N = 20)	73.4% (N = 20)
	F-Statistic	1.715	0.047
Nothing (Code 0)	Requested	\$11.13 (N = 10)	65.5% (N = 10)
	Not Requested	\$14.05 (N = 31)	74.8% (N = 32)
	F-Statistic	2.119	1.503
Dairy (Codes 21-27,33)	Requested	\$15.83 (N = 9)	83.0% (N = 9)
	Not Requested	\$12.63 (N = 32)	69.8% (N = 33)
	F-Statistic	2.369	2.907
Meat-Chicken-Fish (Codes 59,64,65, 70-75)	Requested	\$17.08 (N = 6)	81.7% (N = 6)
	Not Requested	\$12.69 (N = 35)	71.1% (N = 36)
	F-Statistic	3.327	1.299
Non-food (Codes 15,50-52, 60,61,62)	Requested	\$14.25 (N = 5)	74.8% (N = 5)
	Not Requested	\$13.21 (N = 36)	72.3% (N = 37)
	F-Statistic	0.148	0.060
Natural-Organic (Codes 9,19,39, 49)	Requested	\$12.92 (N = 3)	90.0% (N = 3)
	Not Requested	\$13.37 (N = 38)	71.3% (N = 39)
	F-Statistic	0.018	2.261
Bulk (Codes 9,19,39, 49)	Requested	\$14.00 (N = 3)	68.3% (N = 3)
	Not Requested	\$13.28 (N = 38)	72.9% (N = 39)
	F-Statistic	0.044	0.129
Produce (Codes 4-8,55)	Requested	\$ 9.63 (N = 2)	82.5% (N = 2)
	Not Requested	\$13.53 (N = 39)	72.1% (N = 40)
	F-Statistic	0.921	0.455

(Number Responding = 42)

The above table is arranged so that the type of items requested most frequently come first. Means of both MONEYPER and PERCENT are taken by subgroup. One subgroup consists of people who requested the item(s) in question for the co-op's stock. The other consists of people who didn't. The categories were created for data analysis purposes. The original codes were by specific item.⁶³ An F-statistic was computed to see if the difference in the means between the two subgroups is statistically significant.

⁶¹MONEYPER is the amount the household spent at the co-op divided by the total number of co-op members in the household.

⁶²PERCENT is the household's response to the question "What percentage of food shopping do you do at the co-op?"

⁶³See Table 23.

Table 17: Expenditures and Suggestions Given for Improvement: Detailed Relationships

Item		Mean Of MONEYPER ⁶⁴	Mean Of PERCENT ⁶⁵
Overall Mean		\$13.16 (N = 27)	66.4% (N = 28)
Selection (Codes 36-49)	Mentioned	\$14.28 (N = 10)	66.0% (N = 10)
	Not Mentioned	\$12.50 (N = 17)	66.6% (N = 18)
	F-Statistic	0.543	0.007
Price (Codes 1-5,7,8)	Mentioned	\$13.05 (N = 9)	73.3% (N = 9)
	Not Mentioned	\$13.20 (N = 18)	63.1% (N = 19)
	F-Statistic	0.004	2.213
Quality (Codes 20-24,31, 32,33,50,51)	Mentioned	\$16.29 (N = 7)	62.5% (N = 8)
	Not Mentioned	\$12.05 (N = 20)	67.9% (N = 20)
	F-Statistic	2.757	0.542
Publicity (Codes 6,66,67)	Mentioned	\$10.83 (N = 3)	71.7% (N = 3)
	Not Mentioned	\$13.45 (N = 24)	65.7% (N = 25)
	F-Statistic	0.501	0.303
Location (Codes 60,77)	Mentioned	\$ 7.50 (N = 1)	70.0% (N = 1)
	Not Mentioned	\$13.38 (N = 26)	66.2% (N = 27)
	F-Statistic	0.927	0.837
Other (Codes 70-76,95, 96)	Mentioned	\$12.73 (N = 8)	57.9% (N = 8)
	Not Mentioned	\$13.34 (N = 19)	69.8% (N = 20)
	F-Statistic	0.058	2.813

(Number Responding = 28)

The above table is arranged so that the type of suggestion mentioned most frequently comes first. Means of both MONEYPER and PERCENT are taken by subgroup. One subgroup consists of people who made the type of suggestion. The other consists of people who didn't. The categories were created for data analysis purposes. The original codes

⁶⁴MONEYPER is the amount the household spent at the co-op divided by the total number of co-op members in the household.

⁶⁵PERCENT is the household's response to the question "What percentage of food shopping do you do at the co-op?"

were more specific.⁶⁶ An F-statistic was computed to see if the difference in the means between the two subgroups is statistically significant.

⁶⁶See Table 24.

Table 18: Expenditures and Reasons Cited for Belonging to the Co-op: Detailed Relationships

Item		Mean Of MONEYPER ⁶⁷	Mean Of PERCENT ⁶⁸
Overall Mean		\$13.13 (N = 42)	72.1% (N = 43)
Price (Codes 1,2,11,37)	Mentioned	\$13.30 (N = 35)	73.4% (N = 36)
	Not Mentioned	\$12.25 (N = 7)	65.2% (N = 7)
	F-Statistic	0.195	0.886
People/Atmosphere (Codes 3,4,5,7, 8,9,19)	Mentioned	\$12.20 (N = 19)	70.9% (N = 19)
	Not Mentioned	\$13.89 (N = 23)	73.0% (N = 24)
	F-Statistic	0.915	0.095
Co-op Philosophy (Codes 6,50-59)	Mentioned	\$13.55 (N = 16)	68.6% (N = 17)
	Not Mentioned	\$12.87 (N = 26)	74.3% (N = 26)
	F-Statistic	0.140	0.753
Selection (Codes 22-26, 38-42)	Mentioned	\$14.41 (N = 16)	75.6% (N = 16)
	Not Mentioned	\$12.34 (N = 26)	70.0% (N = 27)
	F-Statistic	1.314	0.687
Quality (Codes 31-36)	Mentioned	\$11.08 (N = 9)	76.4% (N = 9)
	Not Mentioned	\$13.68 (N = 33)	70.9% (N = 34)
	F-Statistic	1.489	0.463
Location (Codes 1,2,11,37)	Mentioned	\$14.50 (N = 5)	73.8% (N = 5)
	Not Mentioned	\$12.94 (N = 37)	71.9% (N = 38)
	F-Statistic	0.324	0.037
Miscellaneous (Codes 70,71)	Mentioned	\$12.50 (N = 2)	75.0% (N = 2)
	Not Mentioned	\$13.16 (N = 40)	71.9% (N = 41)
	F-Statistic	0.025	0.039

(Number Responding = 43)

⁶⁷MONEYPER is the amount the household spent at the co-op divided by the total number of co-op members in the household.

⁶⁸PERCENT is the household's response to the question "What percentage of food shopping do you do at the co-op?"

The above table is arranged so that the reasons cited most frequently come first. Means of both MONEYPER and PERCENT are taken by subgroup. One subgroup consists of people who mentioned the reason. The other consists of people who didn't. The categories were created for data analysis purposes. The original codes were more specific.⁶⁹ An F-statistic was computed to see if the difference in the means between the two subgroups is statistically significant.

⁶⁹See Table 25.

Table 19: Expenditures and Perceived Advantages of the Co-op: Detailed Relationships

Item		Mean Of MONEYPER ⁷⁰	Mean Of PERCENT ⁷¹
Overall Mean		\$12.20 (N = 28)	62.2% (N = 29)
Price (Codes 1-3,11-16, 19,38)	Mentioned	\$12.12 (N = 19)	59.9% (N = 20)
	Not Mentioned	\$12.36 (N = 9)	67.2% (N = 9)
	F-Statistic	0.012	0.953
People/Atmosphere (Codes 4,5,7-10)	Mentioned	\$13.48 (N = 14)	68.5% (N = 14)
	Not Mentioned	\$10.91 (N = 14)	56.3% (N = 15)
	F-Statistic	1.633	3.314 ⁷²
Selection (Codes 15,16, 20-25,36,39-46)	Mentioned	\$11.33 (N = 9)	62.5% (N = 10)
	Not Mentioned	\$12.61 (N = 19)	62.0% (N = 19)
	F-Statistic	0.335	0.004
Co-op Philosophy (Codes 6,50-58)	Mentioned	\$11.89 (N = 7)	62.1% (N = 7)
	Not Mentioned	\$12.30 (N = 21)	62.2% (N = 22)
	F-Statistic	0.029	0.000
Quality (Codes 31-35,38)	Mentioned	\$14.00 (N = 3)	62.5% (N = 4)
	Not Mentioned	\$11.98 (N = 25)	62.1% (N = 25)
	F-Statistic	0.369	0.001
Location (Codes 60,61)	Mentioned	\$11.88 (N = 2)	77.5% (N = 2)
	Not Mentioned	\$12.22 (N = 26)	61.0% (N = 27)
	F-Statistic	0.007	1.476
Miscellaneous (Codes 37,62-75)	Mentioned	\$11.72 (N = 9)	61.1% (N = 9)
	Not Mentioned	\$12.42 (N = 19)	62.7% (N = 20)
	F-Statistic	0.100	0.042

(Number Responding = 29)

⁷⁰MONEYPER is the amount the household spent at the co-op divided by the total number of co-op members in the household.

⁷¹PERCENT is the household's response to the question "What percentage of food shopping do you do at the co-op?"

⁷²Statistically significant at an 8% level.

Advantage represents the responses to the question, “In your opinion, what are three advantages the co-op has over commercial stores?” The above table is arranged so that the advantages cited most frequently come first. Means of both MONEYPER and PERCENT are taken by subgroup. One subgroup consists of people who mentioned the advantage. The other consists of people who didn’t. The categories were created for data analysis purposes. The original codes were more specific.⁷³ An F-statistic was computed to see if the difference in the means between the two subgroups is statistically significant.

⁷³See Table 26.

B Detailed Responses

Table 20: Reason Items Purchased Outside: Detailed Responses

Category Label	Code	Count
Cheaper	1	46
Buys Loss Leader - Sales	2	3
Better Quality	3	17
Fresher	4	5
Variety	5	16
AFC Often Out	6	9
AFC Doesn't Carry	7	22
Convenience, General	8	25
Lives Far Away	10	1
Shops Every 2 Weeks	11	2
Like Patronizing Small Business	13	1
AFC Doesn't Carry Brand	14	18
Likes Fresh, Not Frozen	15	1

(Number Responding = 30)

Table 21: Items Purchased Outside: Detailed Responses

Category Label	Code	Count
Everything But Cheese and Peanut Butter	1	1
Everything But Cheese and Grains	2	1
Loss Leader	3	1
Buy With Non-AFC Housemates	4	2
Miscellaneous	5	2
Produce, General	10	6
Fruit	11	1
Temple Oranges	12	2
Celery	13	2
Dairy, General	20	1
Milk	21	8
Eggs	22	2
Cheese	23	3
Cottage Cheese	24	1
Unsalted Butter	26	1
Grocery, General	30	1
Canned, General	31	4
Canned Juices	32	1
Canned Vegetables	33	1
Canned Sugarless	34	1
Chicken Broth	35	1
Beets	36	1
Cleaning Fluids	37	2
Dish Detergent	38	1
Laundry Detergent	39	1
Hand Soap	40	2
Natural Toiletries	41	1
Coffee	43	1
Soda	44	1
Glogg	45	1
Hot Chocolate	46	1
Frozen Juices	47	3
Milk Powder	48	1
Sugar	49	1
Cereals	50	3

Bread	51	3
Crax	52	1
Tin Foil	53	3
Pasta	54	1
Spaghetti Sauce	55	1
Paper Goods	56	7
Toilet Paper	57	1
Prepared Foods	60	1
Cookies	61	3
Sweets	62	1
Cake Mix	64	1
Taco Chips	65	1
Ice Cream	66	2
Ethnic Foods	67	1
Salt-free	68	1
Pet food	69	3
Meat, General	70	10
Deli	71	3
Sausage	72	1
Pork Chops	73	1
Roasts	74	1
Ham	75	1
Stew Beef	76	1
Unspecified	77	1
Liver, Kidney	78	1
Fish, General	80	3
Fresh Fish	81	1
Tuna	82	3
Poultry, General	85	7
Chicken Breast	86	2
Meat, Fish, Chicken	89	1
Whole Grains	90	1
Granola	91	1
Nuts	92	1
Raisins	93	1
Exotic Natural Foods	94	1
Dark Roast Coffee	96	1

(Number Responding = 31)

Table 22: Items Often Found Out of Stock: Detailed Responses

Category Label	Code	Count
Nothing	0	5
Always Something Different	1	1
Produce, General	10	2
Macintosh Apples	11	1
Tangelos	12	1
Salad Vegetables	13	1
Standard Stuff	14	1
Spinach	15	1
Organic Carrots	17	1
Sprouts	18	2
Bananas	19	2
Coding Error	20	1
Fresh Vegetables	21	1
A Specific Cheese	23	11
Ricotta	24	2
Canned Fruit	32	1
Vegetable Bullion	35	1
Hand Soap	40	1
Quinine Water	45	1
Coffee	46	1
Milk Powder (20 lb.)	48	1
Coding Error	49	1
Breakfast Cereal: Oats Gn	50	2
Pepperidge Farm Bread	51	2
Stoned Wheat Thins	52	1
Bagels	53	3
Bread, Rolls, Pita	54	1
Tomato Sauce	55	1
Paper Towels	56	2
Kleenex	58	1
Bulk, General	60	3
Kona Coffee	61	2
Fresh Roasted Coffee	62	1
Other Coffee	63	3
Bulgar	65	1

Millet	66	2
Whole Wheat Berries	67	1
Tofu	68	3
Cat Food	69	2
Flour	70	1
Rye Flour	71	2
Whole Wheat Pastry Flour	72	1
Unknown	73	2
Wheat Germ	80	2
No-Salt Chunky Peanut Butter	81	1
Brown Sugar	83	1
Meat, General	90	2
Pork Chop	92	1
Steak	93	1
Chicken	94	2
Poultry, General	95	1
Variety of Fish	96	1
Fresh Fish	97	1

(Number Responding = 42)

Table 23: Items Requested for Addition to Inventory: Detailed Responses

Category Label	Code	Count
Nothing	0	9
Temple Oranges	7	1
More Natural Foods	9	1
Coding Error	10	1
Trial Brands: Groceries	11	2
Co-op and Another Brand	12	1
More Specialty Displ	13	1
More Convenience Foods	14	3
Hardware	15	1
Better HH Selection	16	1
Hood Cottage Cheese	21	1
Cottage Cheese (2 lb.)	22	1
Low-Fat Cottage Cheese	23	2
Low Salt Cheese	24	1
Diet Margarine	25	1
Jumbo Eggs	26	1
Gallon Low-Fat Milk	27	1
Coding Error	30	1
Coding Error	31	1
Horseradish	32	1
Coleslaw	33	1
Coding Error	34	1
Protein Enriched Pasta	35	1
Shredded Wheat	36	1
Honey Nut Cheerios	37	1
Kretchmirs Wheat Germ	38	1
No-Additive Cereals	39	1
Different Orange Juice Brand	40	1
More Soda	41	1
Schweppes Diet Ginger Ale	42	1
Bulk Swiss Miss	44	1
LS Cranberry Juice	45	1
Beer	46	2
Eurathes Sesame Crackers	47	1
Pretzel Rods	48	1

No-Preservative Cookies	49	1
Cycle Dog Food	50	1
Gainsburgers	51	1
Kal-Kan Cat Food	52	1
B&M Beans	53	1
Canned Baked Beans	54	1
Beets	55	1
Coding Error	56	1
Pineapple+Own Juice	57	2
More Baked Goods	58	2
WH Meat	59	1
Crest	60	1
Dial	61	1
Non-Co-op Dish Detergent	62	1
Decaffeinated Coffee	63	1
Pickled Herring	64	1
Mackeral	65	1
Corn Syrup	66	1
Organic Meat	70	1
Nitrite-less Bacon	71	1
Sausage	72	1
Meat, General	73	1
More Sea Fish	75	1
Cold-pressed Oil	90	1
Steel Cut Whole Wheat Berries	91	1
Ungrnd Flour	92	1
Dark Roast Coffee	93	1

(Number Responding = 42)

Table 24: Suggested Improvements: Detailed Responses

Category Label	Code	Count
Price	1	2
Cheaper Paper Goods	2	2
Cheaper Canned Goods	3	1
Cheaper Meat	4	1
Bulk Vegetable Discount	5	1
Publish Specials, Good Buys	6	1
Cheaper, Variety Meat, Groceries	7	1
No-salt Butter Cheaper	8	1
Consistency, General	20	2
Fish Consistent	22	1
Pudding Consistent	23	1
Meat Consistent	24	1
Spruce Up Produce	31	1
Spruce Up Vegetables	32	1
Fresher Organic Produce	33	1
Small Packages of Tuna, Cheese	36	2
Large Packages of Cereal, Soap	37	1
Widen Meat	40	2
Widen Grocery	41	1
Carry Salt-free	42	1
Egg Beaters	43	1
Widen Pet Food	44	1
Widen Whole Grains	45	1
Widen Produce	46	2
Carry Delicatessen	47	1
Lo-fat Milk (Gallon)	48	2
Dark Roast Coffee	49	1
Better Meat Quality	50	1
Better Poultry Quality	51	1
Info Re: Store More A	66	1
Theme a week brightens	67	1
Open Monday	70	1
Better Parking	71	1
Better Lighting	72	1
Main Floor	73	2

Packing Assistance	74	1
Escalator	75	1
Supervised Childcare	76	1
Closer to Somerville	77	1
NT: Live Troppo Far	95	1
NT: No Make Conven St	96	1
Don't Know, Not Sure	97	3

(Number Responding = 28)

Table 25: Reasons for Belonging to Co-op: Detailed Responses

Category Label	Code	Count
Cheaper	1	32
Was Cheaper	2	2
Atmosphere	3	3
More Pleasant	4	4
Like Members	5	2
Member Attitudes	6	1
Friendly People	7	4
Know Faces	8	4
Enjoy AFC Shopping	9	4
Cheaper Produce	11	1
Like Staff	19	1
Selection	20	4
Certain Foods Available	21	1
Needed Foods Available	22	4
Natural Foods	23	3
Selection for Vegetables	24	1
Desired Foods Available	25	2
Unpackaged Produce	26	2
Quality	31	4
Quality Produce	32	2
Quality Produce	34	1
No Junk Food	36	2
Bulk Buying	37	1
Cheese Selection	38	1
Produce Selection	39	1
Coffee Selection	40	1
Grains Selection	41	3
Produce Selection	42	1
Coding Error	43	1
All Working	50	5
Control of Food	51	1
Community Activity	52	4
Less Bureaucratic	53	1
Non-Profit	56	2
Coding Error	57	2

Alternative	58	1
Helps All	59	1
Convenient	60	3
Close	61	2
House Requirement	70	1
Get Him Out	71	1

(Number Responding = 43)

Table 26: Advantages of the Co-op: Detailed Responses

Category Label	Code	Count
Cheaper	1	10
Certain Items Cheaper	3	3
More Pleasant	4	2
Congenial Atmosphere	5	5
Co-op Attitudes	6	1
Friendlier	7	6
People Familiar	8	1
Likes AFC Shopping	9	1
No Muzak	10	1
Price: Produce, Cheese	11	1
Price: Coffee	12	1
Price: Spices	13	1
Price: Grains	14	1
Price and Selection: Bulk	15	1
Price, Selection and Bread	16	4
More Personal	18	1
Price (Sometimes)	19	1
Selection: Produce, Grain	21	2
Selection: Grains, Sun	23	2
Coding Error	24	1
Fresher	31	2
Quality Produce	32	2
No Junk, Only Essentials	36	2
Bulk Buying in Small Amounts	37	1
AFC Concerns: Price, Quality	38	2
Selection: Produce	39	1
Selection: Grains	43	1
Selection: Cheese, Coffee, Produce	44	1
Coding Error	45	2
Selection: Produce, Grains	46	1
Working Together – Own Needs	50	1
Ability to Change Things	51	1
Sense of Community Involvement	52	3
Community Ownership, Run	54	1
Alternative	55	1

Non-profit	56	1
Keep People Informed	58	1
Coding Error	59	1
Convenience, General	60	1
Close	61	1
Store's Size	62	3
Self-Service	63	1
Special Ordering	64	2
Less Waste	72	1
Habit	74	1
Care in Pricing	75	1

(Number Responding = 29)

C Supplement

On reviewing the survey questionnaire and the two reports based on it, it was found tabulations of responses to two important questions had been omitted. Those tabulations are presented here.

The first question regards how long people in the sample had been members of the co-op. The distribution for the active and the inactive subsamples is summarized in Table 27.

Category	Active Subsample		Inactive Subsample	
	Number	Percent	Number	Percent
0 to 6 months	10	23.3%	1	7.7%
7 to 12 months	6	14.0%	3	23.1%
13 to 24 months	11	25.6%	7	53.8%
25 to 36 months	7	16.3%	1	7.7%
Over 36 months	9	20.9%	1	7.7%
Total	43	100.0%	13	100.0%

Table 27: How Long Respondent Had Been In Co-op

The other question asked whether the respondent went to look in the cooler or the grocery shelves when they found something was not stocked on the floor. Table 28 summarizes those responses.

Response	Number	Percent
Very Likely	26	61.9%
Somewhat Likely	11	26.2%
Not Likely	5	11.9%
Total	42	100.0%

Table 28: Whether Respondent Looked In Back For Items Not Found On Floor

It's important to note that these tables are tabulated by number of *households* and not by number of *people*. Thus, Table 27 probably understates the turnover experienced by the co-op in terms of number of members while perhaps being accurate on a household level.

The reason for this is that younger households, where most of the turnover probably takes place, have more people in them on the average than older households.

It definitely looks like people are not reticent about going in the back when they find things are not on the shelves out in front.

D Text of Survey

Not available.