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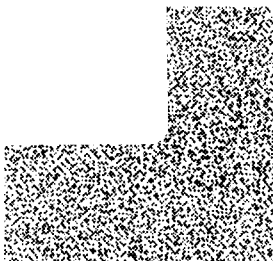
UNIVERSITY OF MINNESOTA

**THE ECONOMIC IMPACT  
OF RURAL BYPASSES:  
IOWA AND MINNESOTA  
CASE STUDIES**

**Daniel Otto and Connie Anderson,  
Economics,  
Iowa State University**

**Sponsored by:  
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**THE ECONOMIC IMPACT OF RURAL BYPASSES: IOWA AND  
MINNESOTA CASE STUDIES**

**FINAL REPORT**

**Daniel Otto and Connie Anderson**

**Department of Economics  
Iowa State University**

**June 1993**

**The Economic Impact of Rural Highway Bypasses:  
Iowa and Minnesota Case Studies**

Daniel Otto and Connie Anderson

Highway bypasses around rural communities in heavily traveled transportation corridors are viewed as a highly cost effective method of improving traffic flow along non-interstate transportation routes. However the bypassing of a central business district raises concerns among merchants over possible adverse impacts to their businesses. This paper addresses the question of bypass impacts using a variety of measures. First, the effect on overall retail sales in bypassed communities will be examined by comparing to cities without bypasses for comparable periods. Next, the total sales are decomposed into categories or classes of retail sales to analyze for differential impacts from the bypass. Finally, the effects of the bypass on individual merchants will be examined by analyzing the results of a personal survey of businesses in these bypass communities to test their assessment of the bypass impacts.

The sample for this evaluation of bypass impacts is drawn from 11 communities in Iowa that had bypasses opened since the late 1970's and 10 communities in Minnesota. This time frame was chosen in order to use retail sales data which has been available in a detailed format of sales categories since 1969. Map 1 and 2 detail the location of these bypasses in each state and Table 1 lists population and date of bypass opening in these communities. Each of these bypass cities was then matched against three "control

cities" chosen as having populations, traffic volume and location to metropolitan areas comparable to the bypass cities. In another comparison, the bypass city's performance is contrasted against all other cities of a comparable population range in the state.

#### **Total Sales**

Data on per capita total sales for the bypass cities are plotted against the average for the control cities in Figures 1 and 2. No distinct pattern of retail sales in the bypass community versus the control cities is evident in either Minnesota or Iowa. A test for difference between the mean scores for the bypass and control cities also was not significant. In a separate paper, the issue of retail sales differential retail sales performance was tested in a model regressing total retail sales against a variety of community characteristics including population, income, size of shopping malls, freeway accessibility, county seat towns, as well as the presence of a bypass around the community (Otto 1991). This regression approach also found no significant difference in total retail sales for communities with a new bypass versus cities without bypasses.

Retail sales per capita adjusted for income and city size is another measure of retail sales performance used for comparison. This calculation, referred to as pull factors, is calculated as actual per capita retail sales for the sample city divided by the expected per capita retail sales for control cities according to the following formula:

$$PF = \frac{PSC}{PSS}$$

Where: PF = Pull factor

PSC = Per capita sales for city

PSS = Per capita sales for state

The score indicates the percentage rank of retail sales performance relative to other cities of comparable size. For example, a score of 1.5 indicates a city's retail sales are 50% higher than the retail performance of other cities in the same population range.

The advantage of the pull factor approach is that it compares cities of comparable size rather than all cities in the state. The pull factor approach for analyzing retail trade data has been used extensively for community trade area analysis in Iowa by Ken Stone. A recent illustration of this methodology is Stone's analysis of the impact of Wal-Mart's on rural Iowa communities (Stone, 1990).

This pull factor analysis for the bypass communities compared to their paired communities for both the Iowa and Minnesota cases also indicated no apparent or significant difference in patterns (Figures 3 and 4). Two types of control cities are used in this study. In the first set, each bypass city is paired with three other non-bypass cities with comparable populations, traffic counts and location relative to other metro regions. The second set of control cities is based on all other Iowa cities within the same population range as the bypass city. Since rural retailing has been affected by a major set of structural changes including the growth of regional shopping malls, discount marketing, and stresses on rural income, it is important to develop relative measures of

performance for a comparable period rather than only before and after indicators.

The average pull factor score for the bypass cities compared to the control city adjusted for years since the bypass opening is used as our main measure of impact. Developing a performance measure for over time provides a test for whether shopping patterns adjust at some point after the new bypass opens. Figure 3 presents estimates of total sales pull factors for the 11 bypass cities in Iowa and compared to the group of control cities for the initial year and four subsequent years after the bypass opening. The same plot for the Minnesota bypass communities compared to the paired group of cities yielded similar results suggesting that a bypass did not result in a significant change in the overall retailing performance of a community (Figure 4). For both states, these results from the pull factor analysis and per capita sales plots indicate no significant difference in total sales between bypass cities and a sample of comparable cities.

#### **Classes of Retail Sales**

While overall sales do not appear to be significantly affected by the bypass, individual classes of retail businesses such as gas stations or restaurants may be more affected because they rely more on through traffic. A pull factor analysis for each category of retail sales in the bypass and control cities was used to investigate impacts of the bypass on different types of businesses within a community. Plots of the pull factor scores for bypass cities and control cities in Iowa are presented in Figures 5-16. A similar set of plots are presented for the Minnesota bypass

cities compared to their control groups are presented in Figures 17-24. A T-test to analyze the difference in means between the bypass and control group of cities did not find a statistically significant difference between the two groups. Using a four year period to observe relative retail sales performance indicate this sample of bypass cities losing ground to the non-bypass cities in the categories of auto sales, furniture sales, miscellaneous sales, and wholesale trade. The bypass cities appeared to have relative improvement in their pull factor scores for apparel, building supplies and general merchandise. While these were apparent patterns, none of the differences were statistically significant. There appeared to be off setting or no relative change in the other categories of retail sales for the Iowa group of cities.

The sample of Minnesota cities had a somewhat different pattern. The bypass cities had an apparent improvement in retail sales performance in the categories of general merchandise and apparel sales and declines in lumber and auto sales categories. The other categories had no apparent change in relative positions. Again these differences did not test as being significantly different.

A second version of this pull factor analysis compares pull factor scores for various categories of retailing in bypass cities to the scores for all cities within the comparable population range. These results are presented in Figures 25-37. While this process meant a larger sample of control cities, the results are similar to the analysis using a paired city approach. Differences in sales patterns existed, but the differences were not

statistically significant. Bypass cities in Iowa did appear to be losing ground relative to cities of comparable size in retail categories of auto sales, eating and drinking establishments, general services, wholesaling, and miscellaneous sales. Relative gains were observed in apparel and general merchandise sales in the bypass cities. While these differences were present, none of them were significant. In the remaining categories, retail patterns in bypass and control cities moved in similar directions in response to changing economic conditions.

#### **Attitudes Toward Bypasses by City Businesses**

After relying solely on secondary data to evaluate bypass effects in some detail, a survey was conducted to get perspectives from business owners on how bypasses affected them personally. A survey instrument was mailed to all retail and service businesses in the 11 bypass communities in Iowa, soliciting their reaction to a variety of bypass related issues. A copy of the survey instrument is in Appendix 1. The results of this survey are interesting because they allow us to get a very detailed sense of how individual businesses have been affected as opposed to whole classes of businesses.

The survey results have been summarized for all respondents and broken out by type of business, location of business in relation to bypass as well as by community. The issues of primary interest in the survey are assessing attitude of businesses to the bypass in terms of impacts on commerce and overall quality of life in their community. Perceptions are expected to vary by type of business and by location of businesses in relation to the bypass.

Data in Figures 38-50 assess impacts of the bypass on several quality of life indicators for the communities including highway noise, shopping environment, customers and overall quality of life. Overall, the most common response appears to be that the bypass had no effect on the communities. Highway noise level, business impact, and overall quality of life were indicated to be considerably improved while customer levels and shopping environment had large number of respondents indicating that conditions had worsened. By a 2 to 1 margin, the overall reaction by businesses to the bypass suggests that businesses have not been significantly affected by its opening. An even larger majority indicated that they approved the bypass after it had been built.

Classifying the survey responses according to type of business also presents a noticeable pattern. Businesses that depend on through-traffic such as taverns and eating places, and gas stations appear to have the strongest negatives toward the bypass as it relates to issues of shopping environment and impact on business. While these businesses felt they would be negatively affected by the bypasses, they still agreed that the bypass would reduce noise levels and improve the overall quality of life in the city. Again the most common response was that they thought that the bypass would have no effect on businesses and all business categories except taverns had a majority of businesses reporting in favor of the bypass.

Responses to the survey were also classified according to the location of the business in relation to the bypass. The distribution of business type by location is presented in Figure

43. Categories included: a) Central Business District (CBD), b) near bypass, c) on old bypassed highway, and d) another location. The majority of retailing and service businesses are in the central business district along the old highway route. As expected, cafes, retailing and services tend to be located in the CBD which would place it on the old bypass route. Gas stations were the most frequent business along the new bypass route.

Overall attitudes toward the bypass again suggested that most businesses were better or no worse off regardless of location. Although they are a relatively small number, businesses reporting they were worse off from the bypass tended to be those along the old route or in the central business district. Attitude toward quality of life in the community after the bypass had a similar pattern. Businesses in all location reported quality of life changes that were better or no worse off following opening of the bypass. Businesses in the CBD did report more concerns with shopping environment and customer access than in other locations. However all locations did report improvements in noise and dust problems. Other businesses that serve trade area functions along the old bypass did not report as many instances of the bypass being bad for their business environment.

A third major schema for cross classifying bypass issues is to examine for differences according to city. The overall distribution of responses by businesses according to city is presented in Table 2. None of the cities had the majority of businesses reporting that the overall quality of life was made worse by the bypass with many cities reporting an improvement from

the bypass. A similar pattern was observed for the question of highway noise and the bypass. A somewhat different pattern begins to emerge as the shopping related questions are examined. While most cities reported mostly no effect from the bypass, businesses in the cities of McGregor and Walker reported high levels of negative impacts on business, highly negative impacts on customers, and high negative impacts on overall shopping environment. McGregor was the only city reporting more businesses opposed to the bypass than in favor (Figure 55). The high profile of tourism in the McGregor area and the high dependency of tourism businesses on drop-in and through traffic may explain much of that cities opposition to the bypass.

#### Summary

Efforts to evaluate the impact of bypasses around rural communities in non-interstate transportation corridors are discussed in this paper. This report focused on recently constructed bypasses completed in Iowa and Minnesota since the late 1970's. The results indicate that the overall levels of retail sales in a community do not appear to be significantly affected by the presence of a bypass. Breaking retail sales into component categories indicated some minor distributional effects, bypass cities experienced lower pull factors for furniture, auto and wholesale trade sales, while pull factors improved in building supplies and miscellaneous sales. The report found strong similarities in the responses of rural communities to bypasses in both Iowa and Minnesota. Geographical, economic, and cultural similarities in the states result in similar responses.

This report provides an initial overview evaluating role of bypasses. Additional issues which can be explored from this material are a more formal analysis of factors affecting a business' willingness to support a bypass that will contribute some predictive ability on assessing likely impacts of future bypasses, provide additional insights on variations by community in their support for bypasses and policy lessons from efforts to develop bypasses.

### References

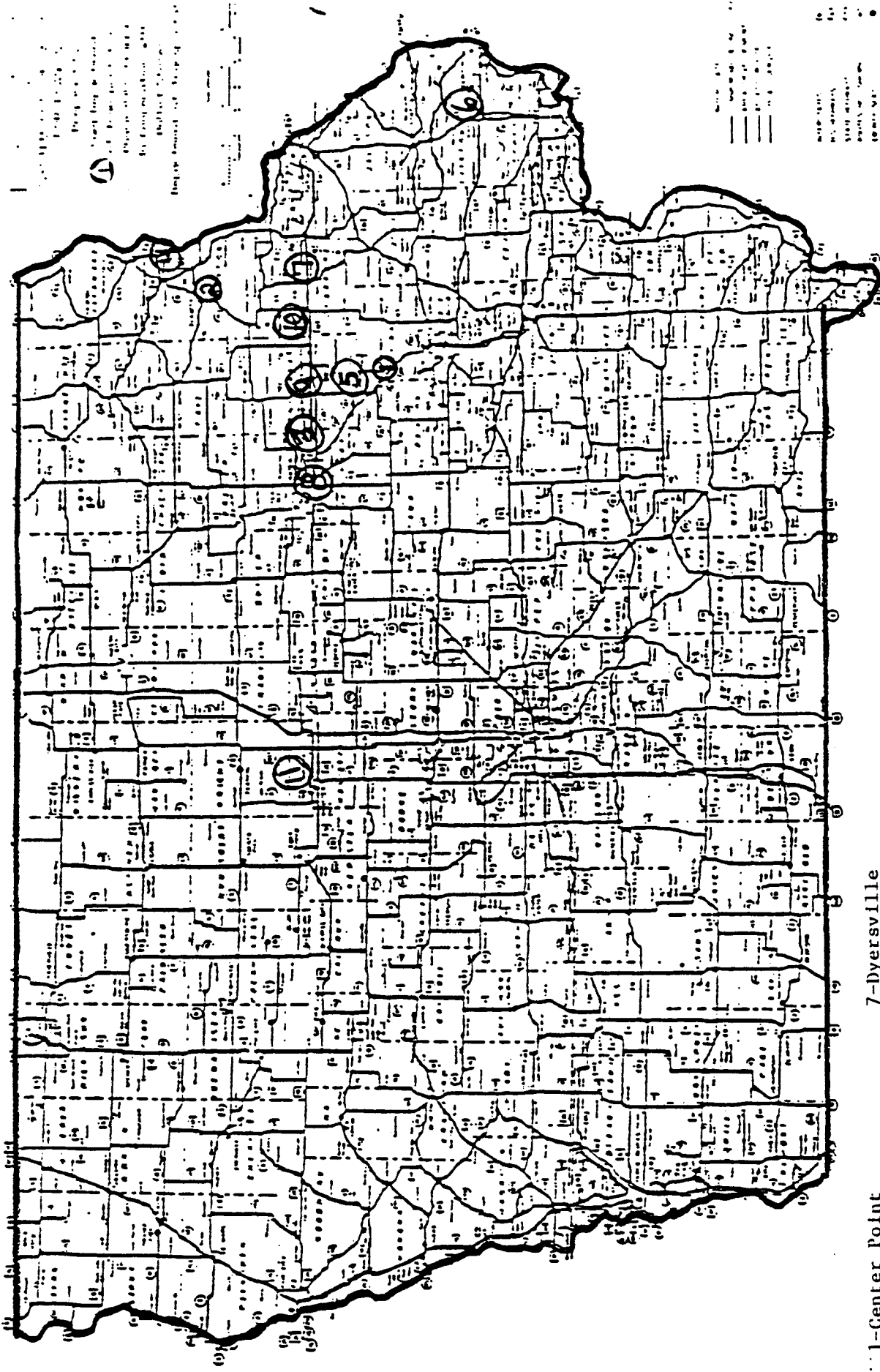
Otto, Daniel M., "The Economic Impact of Non-Interstate Bypasses in Rural Areas," presented at Center for Transportation Studies, 1991 Conference, St. Paul, Minnesota.

Stone, Kenneth E., "The Impact of Wal-Mart Stores on Other Businesses in Iowa," Staff Paper, Iowa State University, 1991.

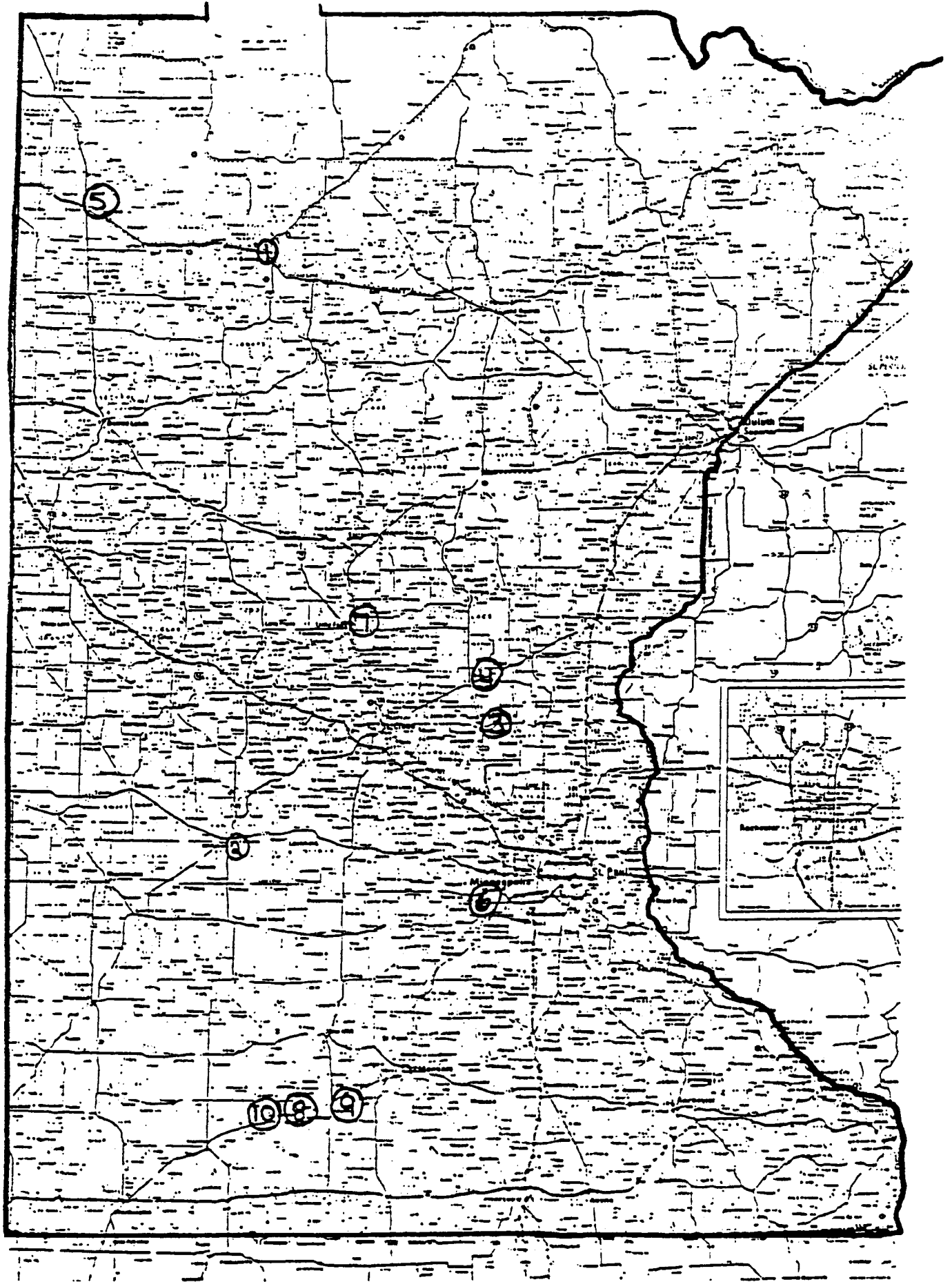
Iowa Department of Revenue, Retail Sales and Use Tax Reports, 1970-90, Des Moines, Iowa.

Minnesota Department of Revenue, Retail Sales Tax Report, 1970-90, St. Paul, Minnesota.

Map 1. Bypass Cities in Iowa.



- 1-Center Point
- 2-Elkader
- 3-Jesup
- 4-McGregor
- 5-Walker
- 6-DeWitt
- 7-Dyersville
- 8-Evansdale
- 9-Independence
- 10-Manchester
- 11-Webster City



1-Bemidji  
2-Willmar  
3-Princeton

4-Milaca  
5-Crookston  
6-Cologne

7-Little Falls  
8-St. James  
9-Madelia

10-Butterfield

Figure 1.

# AVERAGE TOTAL PER CAPITA SALES-IOWA

Bypass vs. Paired vs. Controlled cities

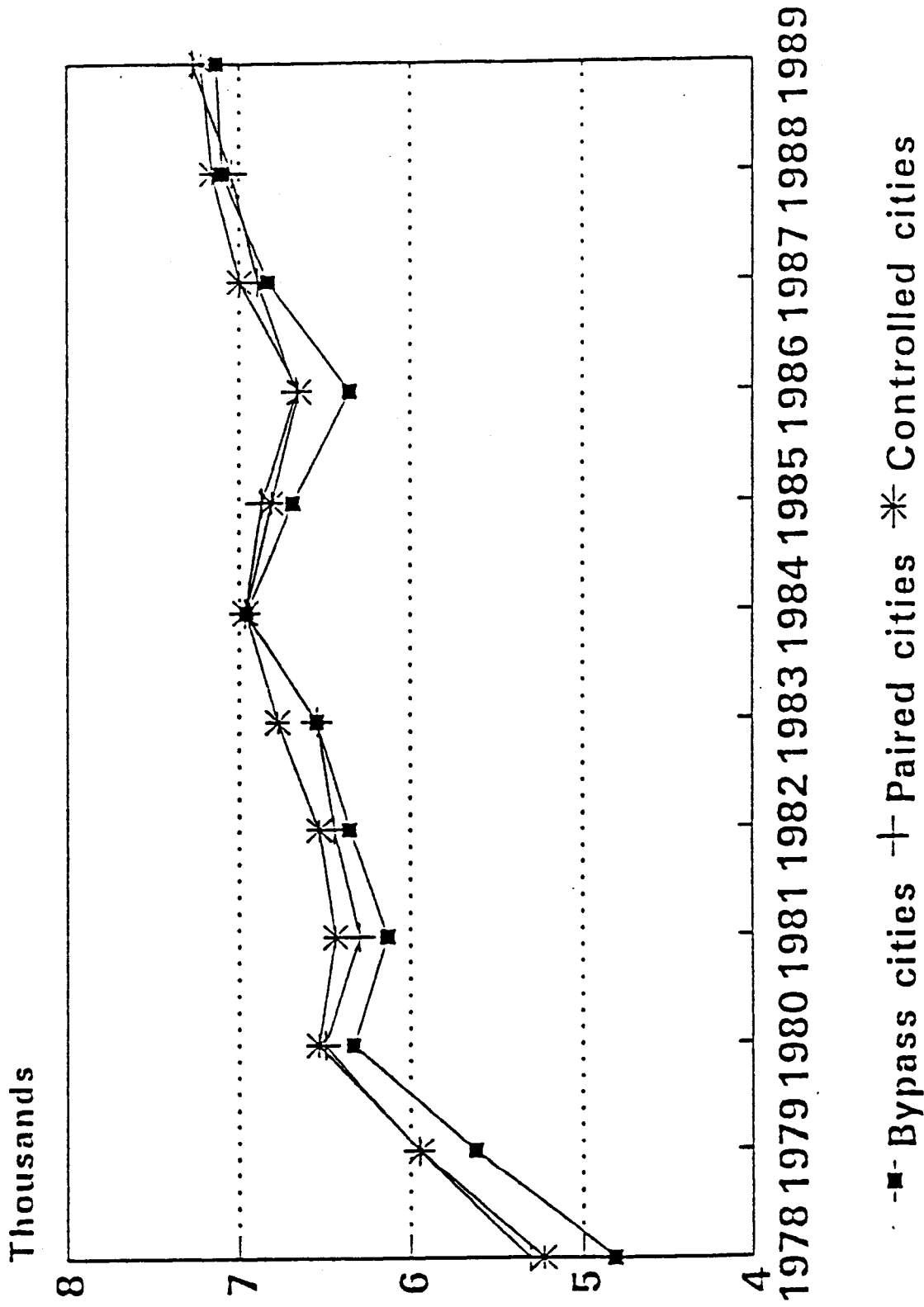


Figure 2.

# AVERAGE TOTAL PER CAPITA SALES-MINNESOTA

Bypass cities vs. Paired cities

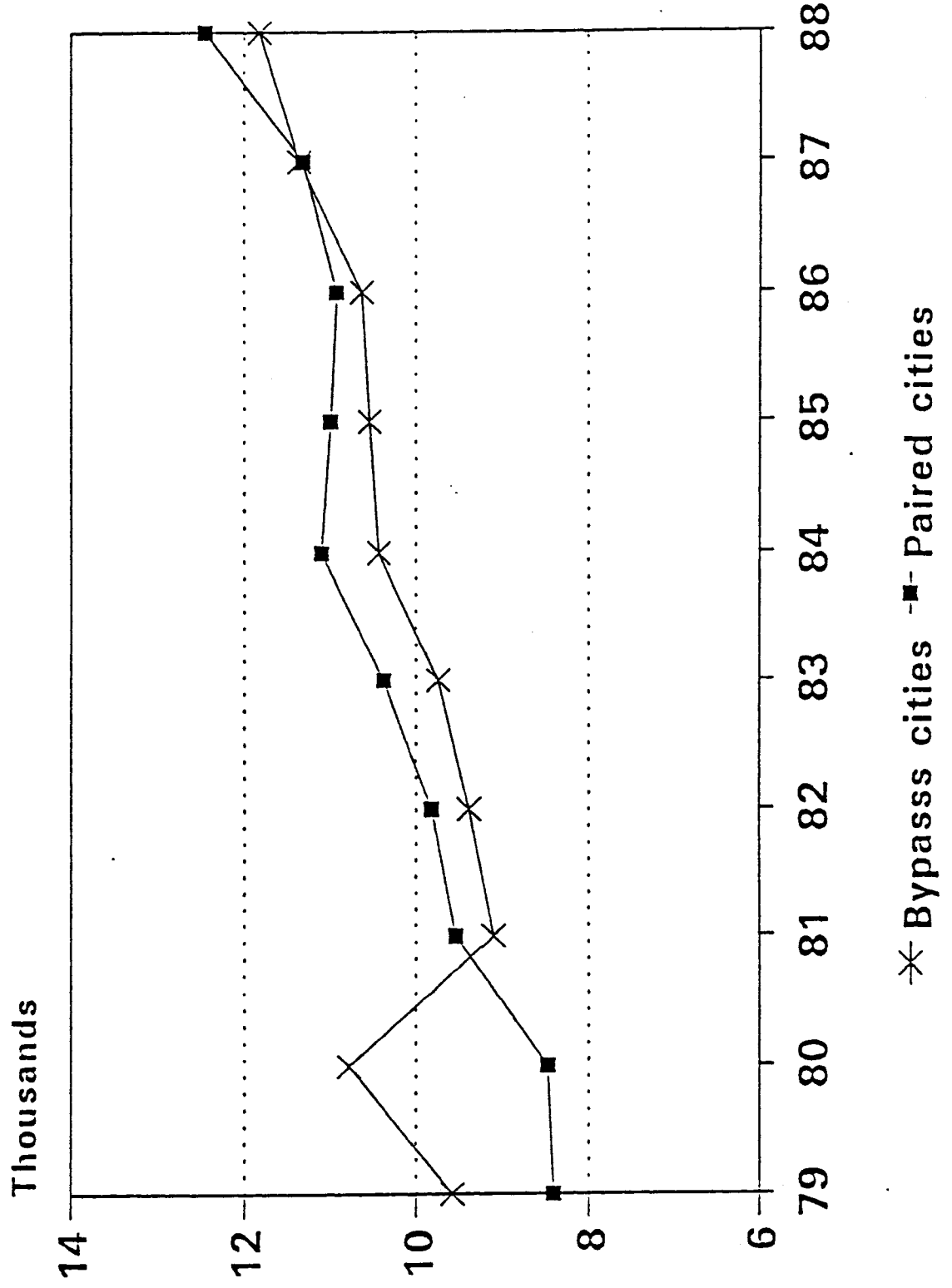


Figure 3.

# Total Sales Pull Factors-Iowa

## Bypass vs. Paired Cities

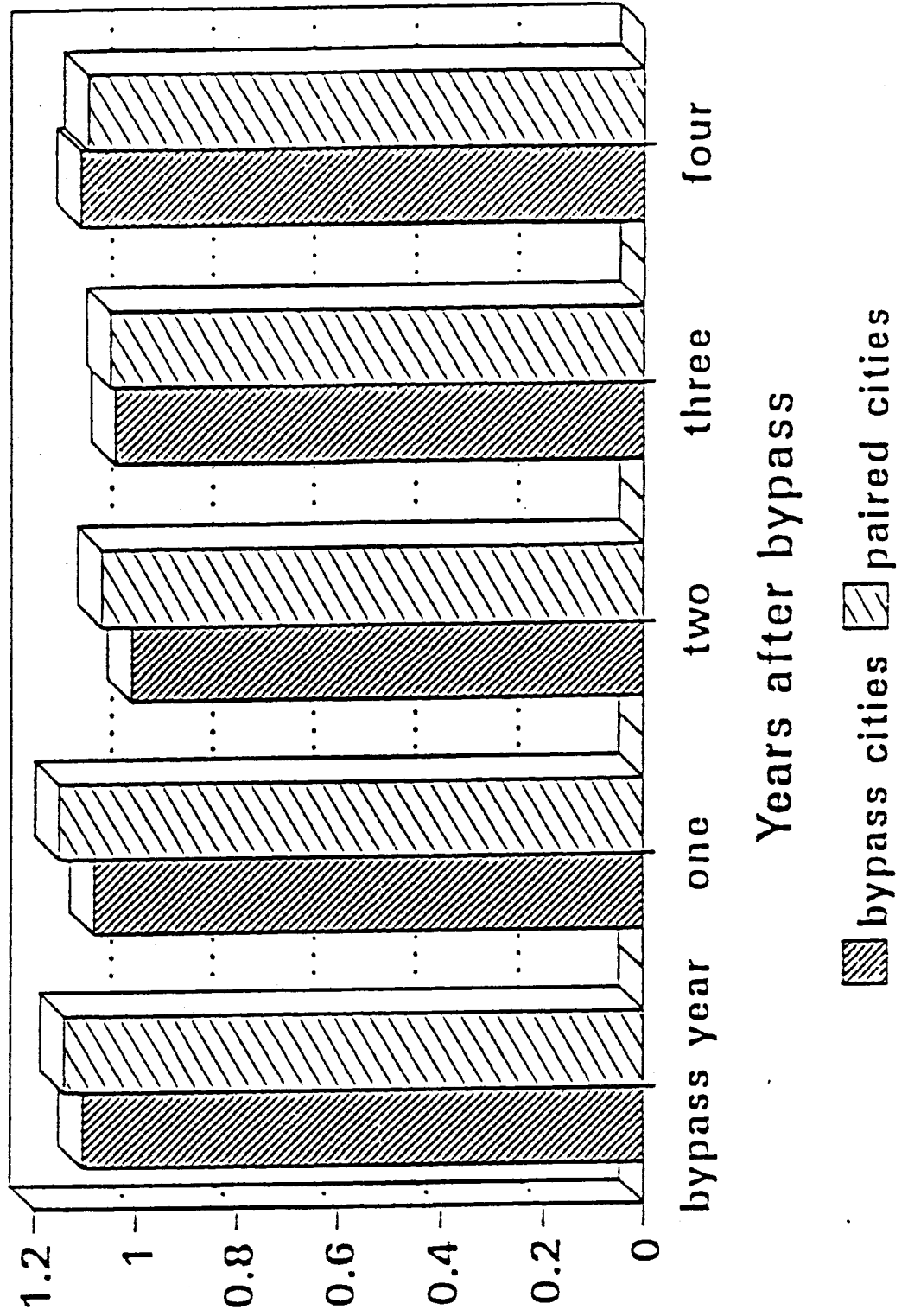
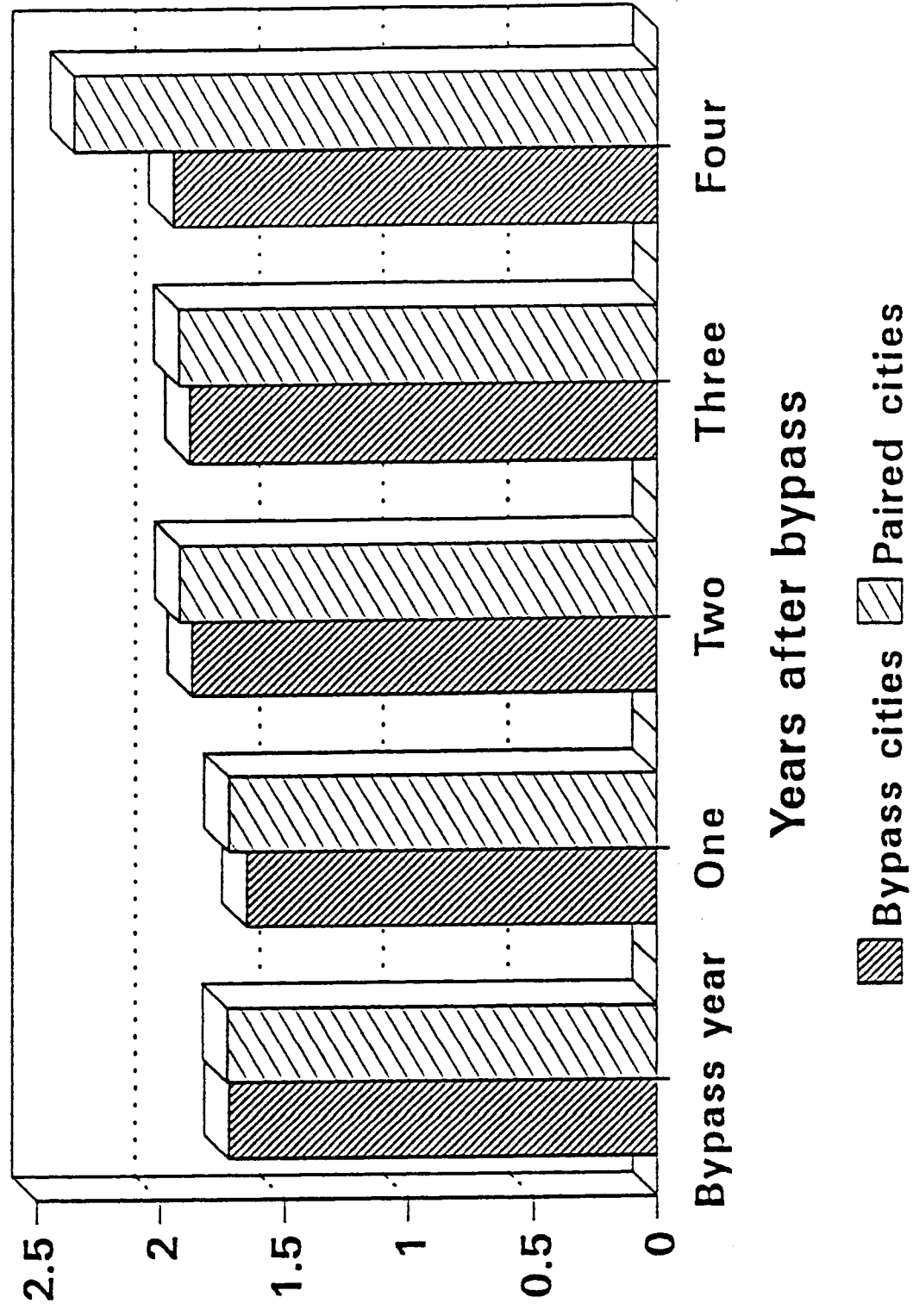


Figure 4.

# Total Sales Pull Factors-Minnesota

## Bypass cities vs. Paired cities



# Building Sales Pull Factors-Iowa

## Bypass vs. Paired Cities

Figure 6.

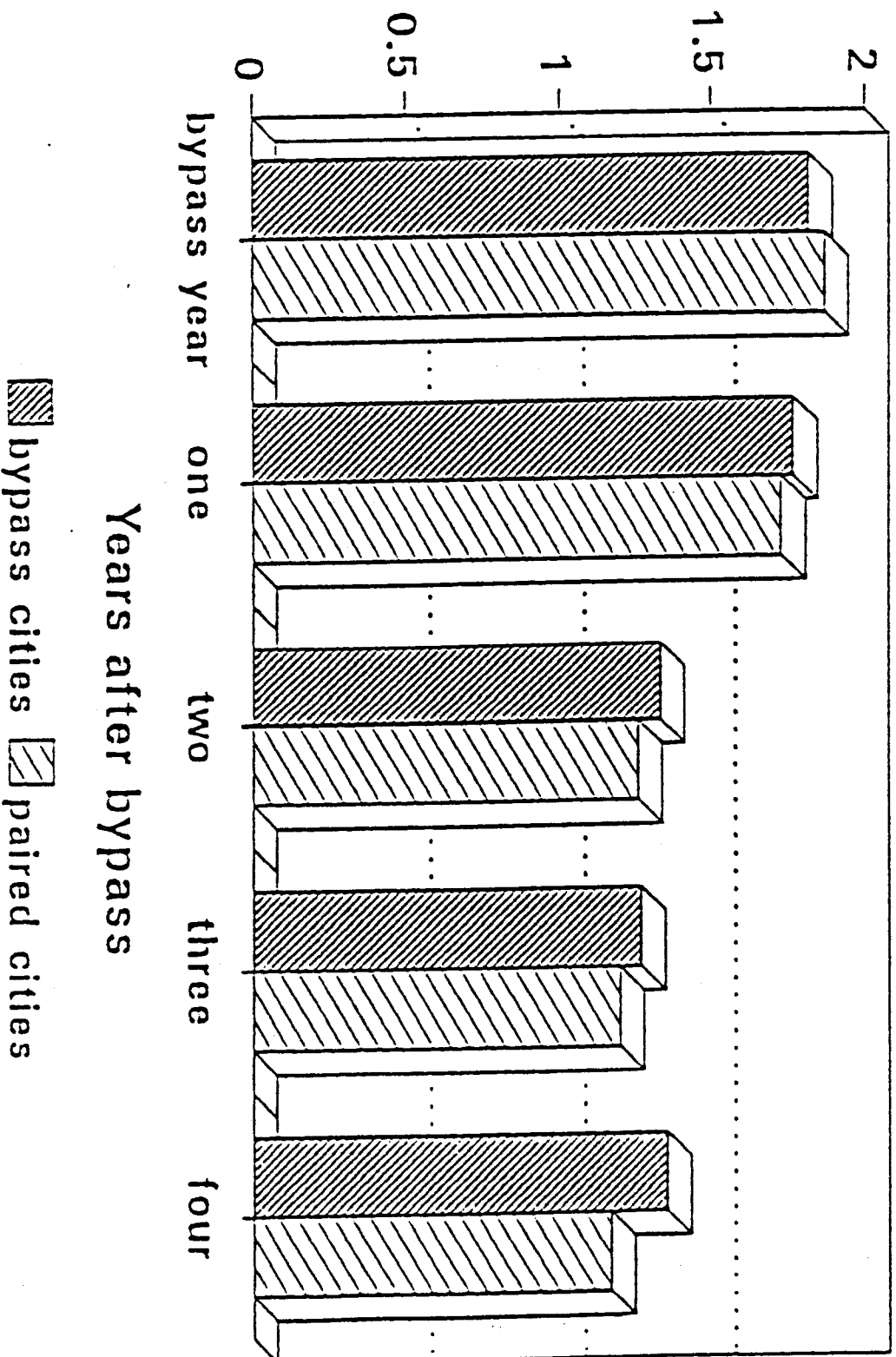


Figure 5.

# Apparel Sales Pull Factors-Iowa

## Bypass vs. Paired Cities

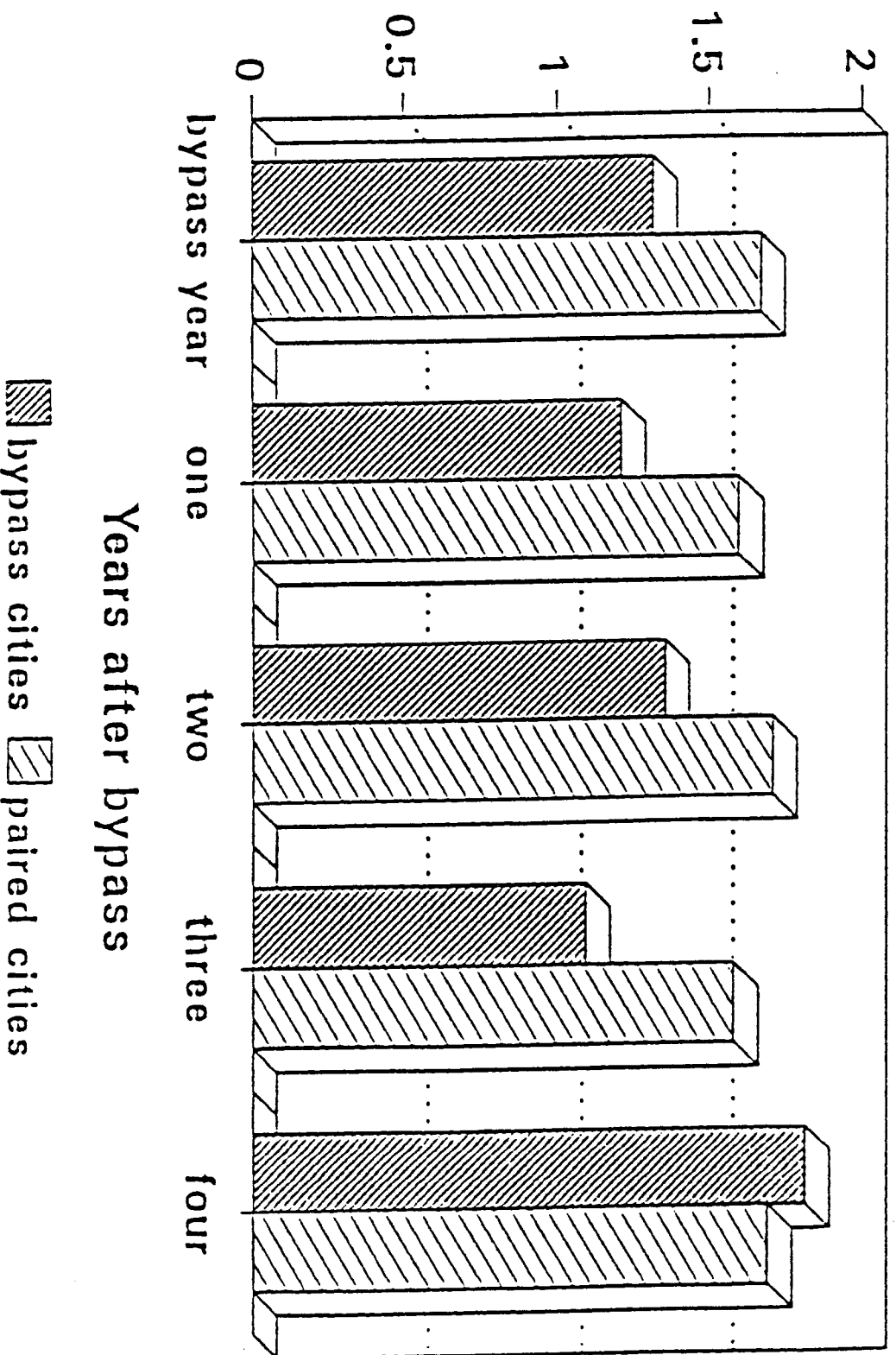


Figure 7.

# Auto Sales Pull Factors-Iowa

## Bypass vs. Paired Cities

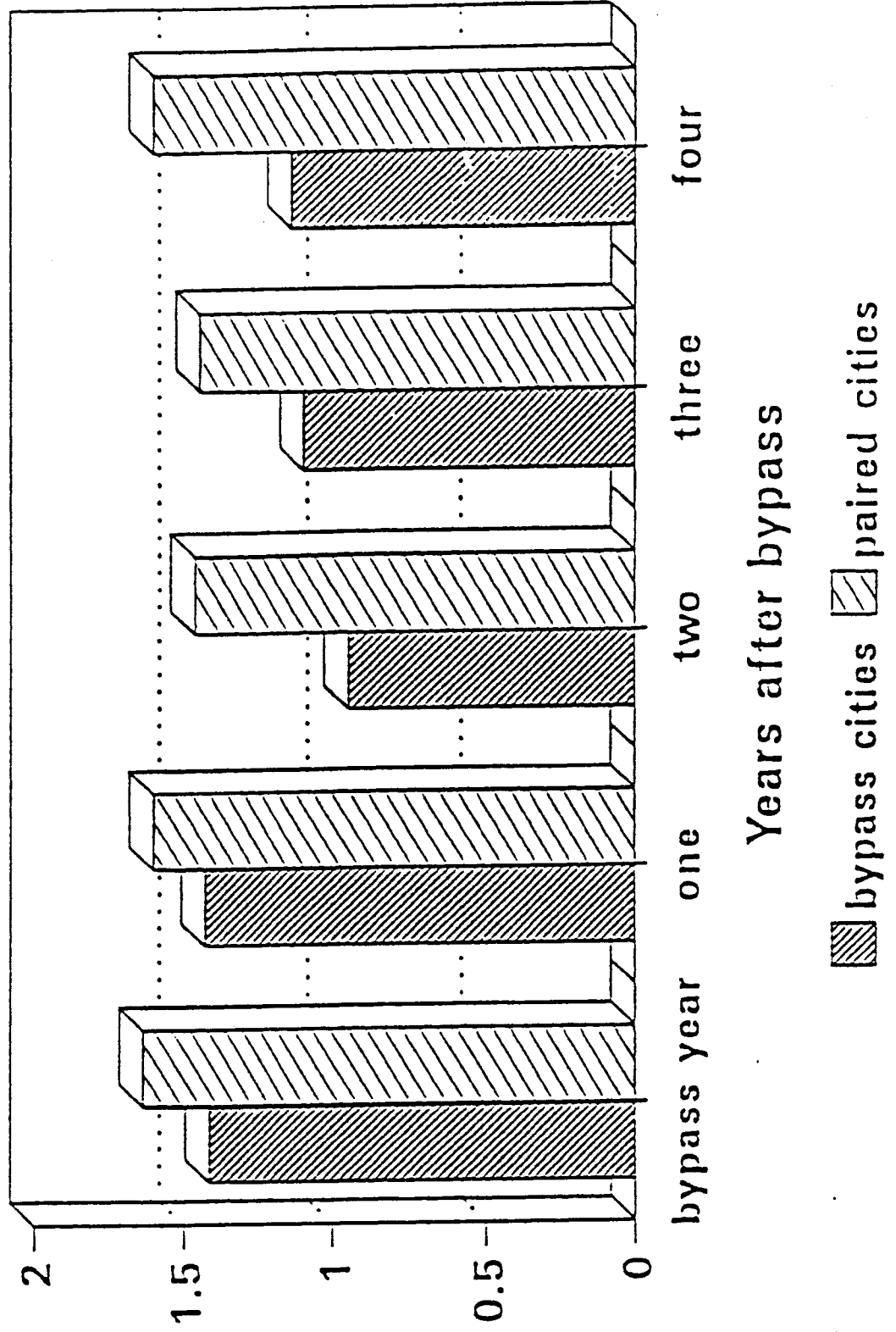


Figure 8.

# Eat & Drink Sales Pull Factors-Iowa

## Bypass vs. Paired Cities

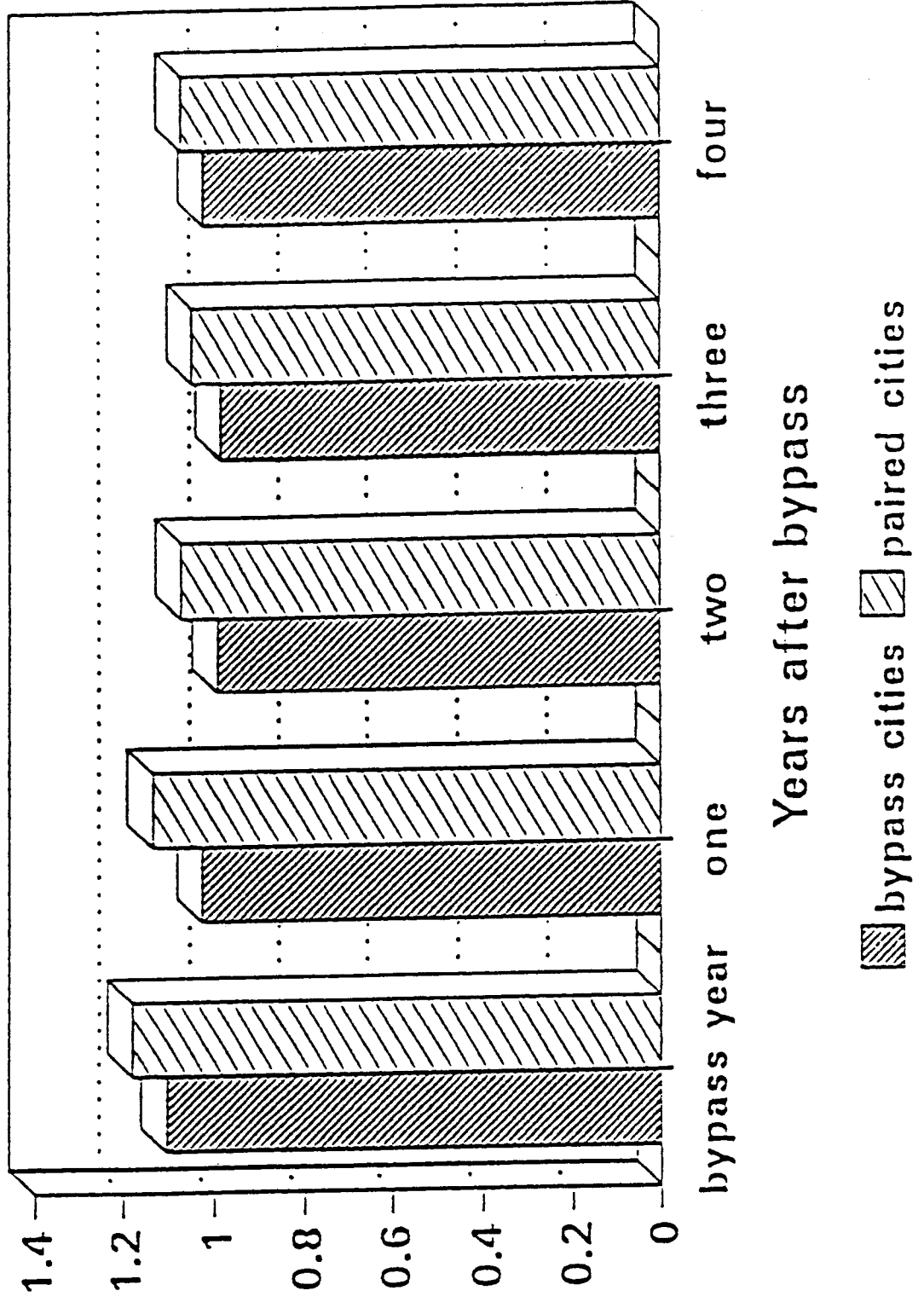


Figure 9.

# Food Sales Pull Factors-Iowa

## Bypass vs. Paired Cities

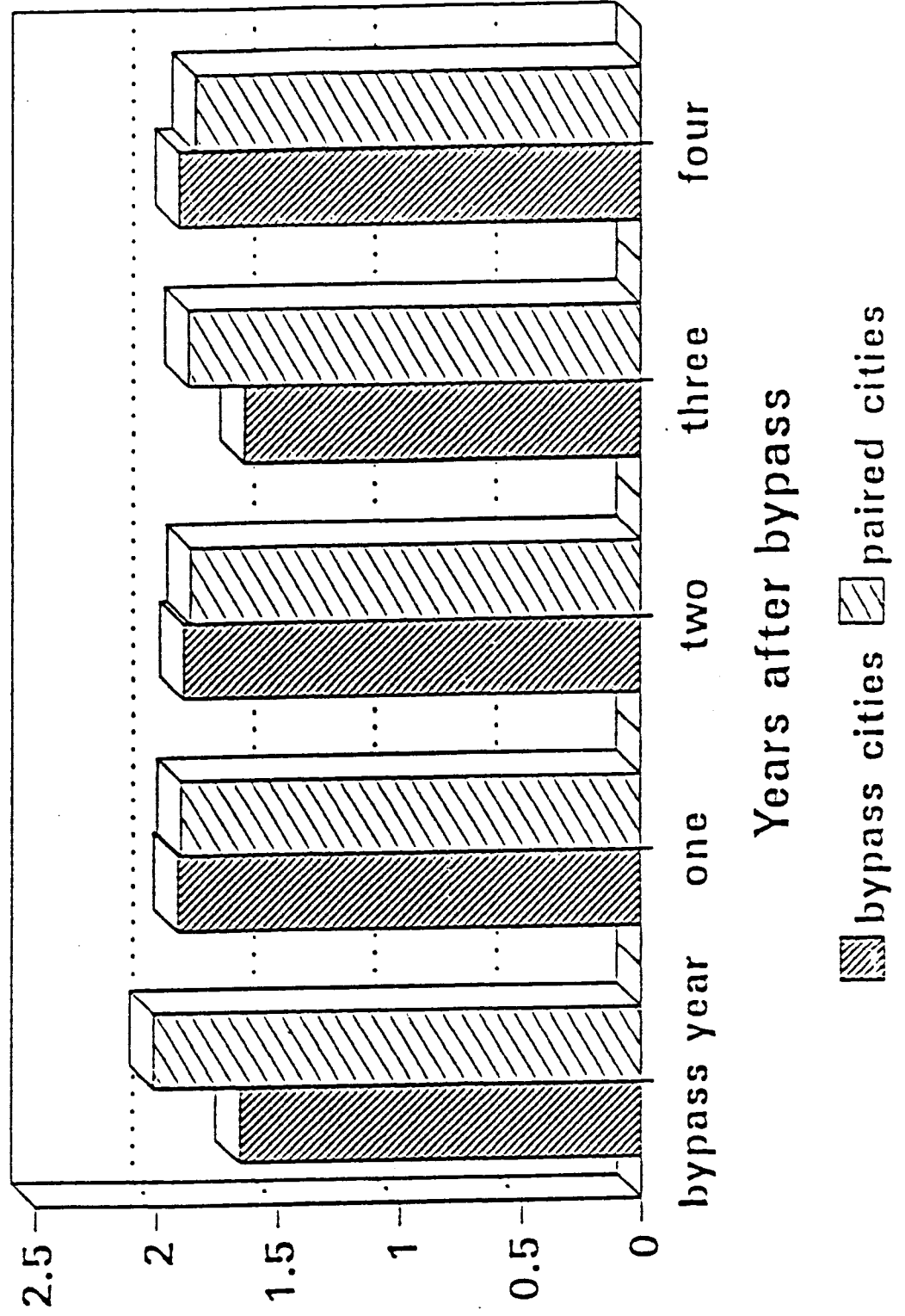


Figure 10.

# Furniture Sales Pull Factors-Iowa

## Bypass vs. Paired Cities

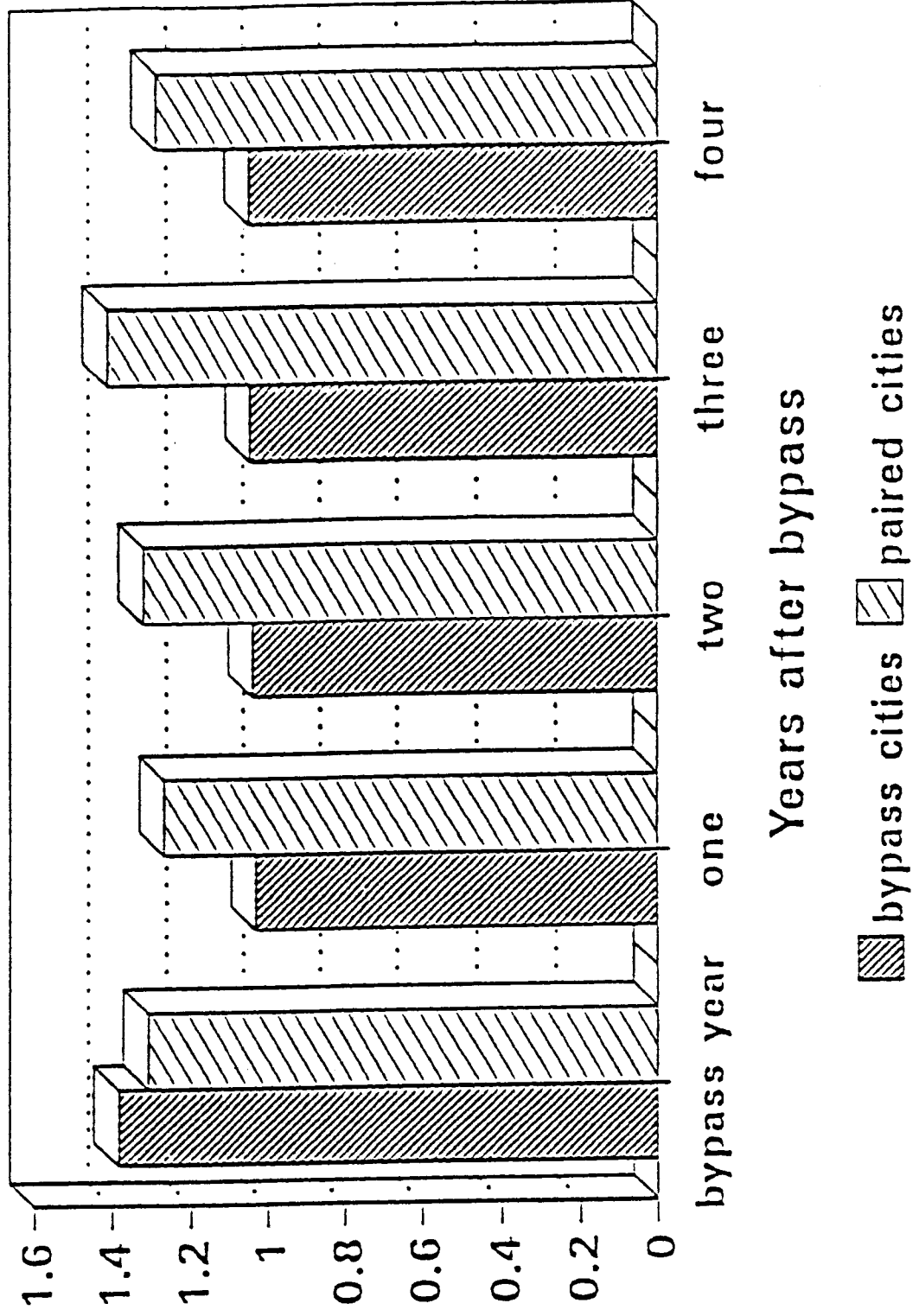


Figure 11.

# General Merchandise Sales Pull Factors

## Bypass vs. Paired Cities

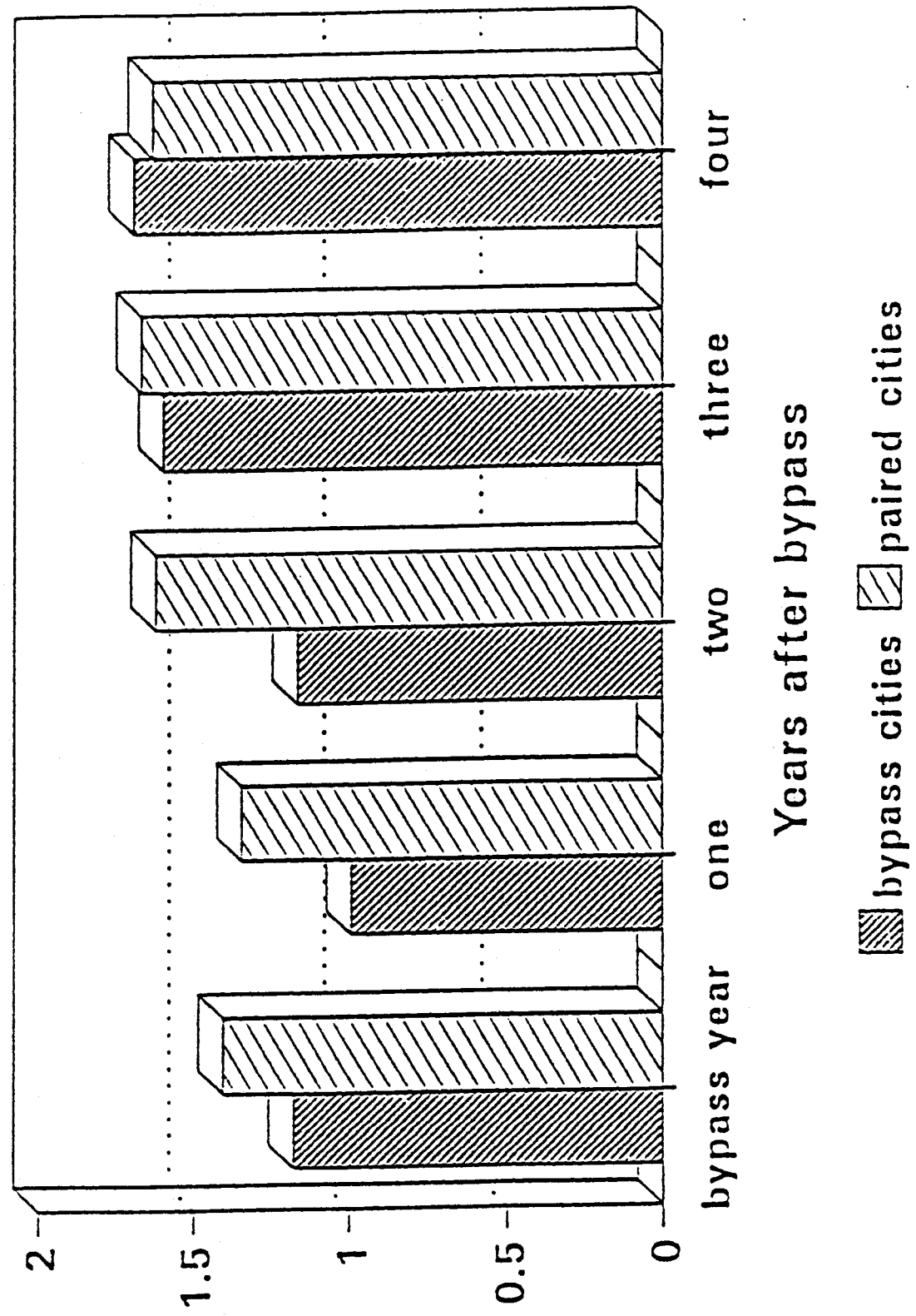


Figure 12.

# Miscellaneous Sales Pull Factors-Iowa

## Bypass vs. Paired Cities

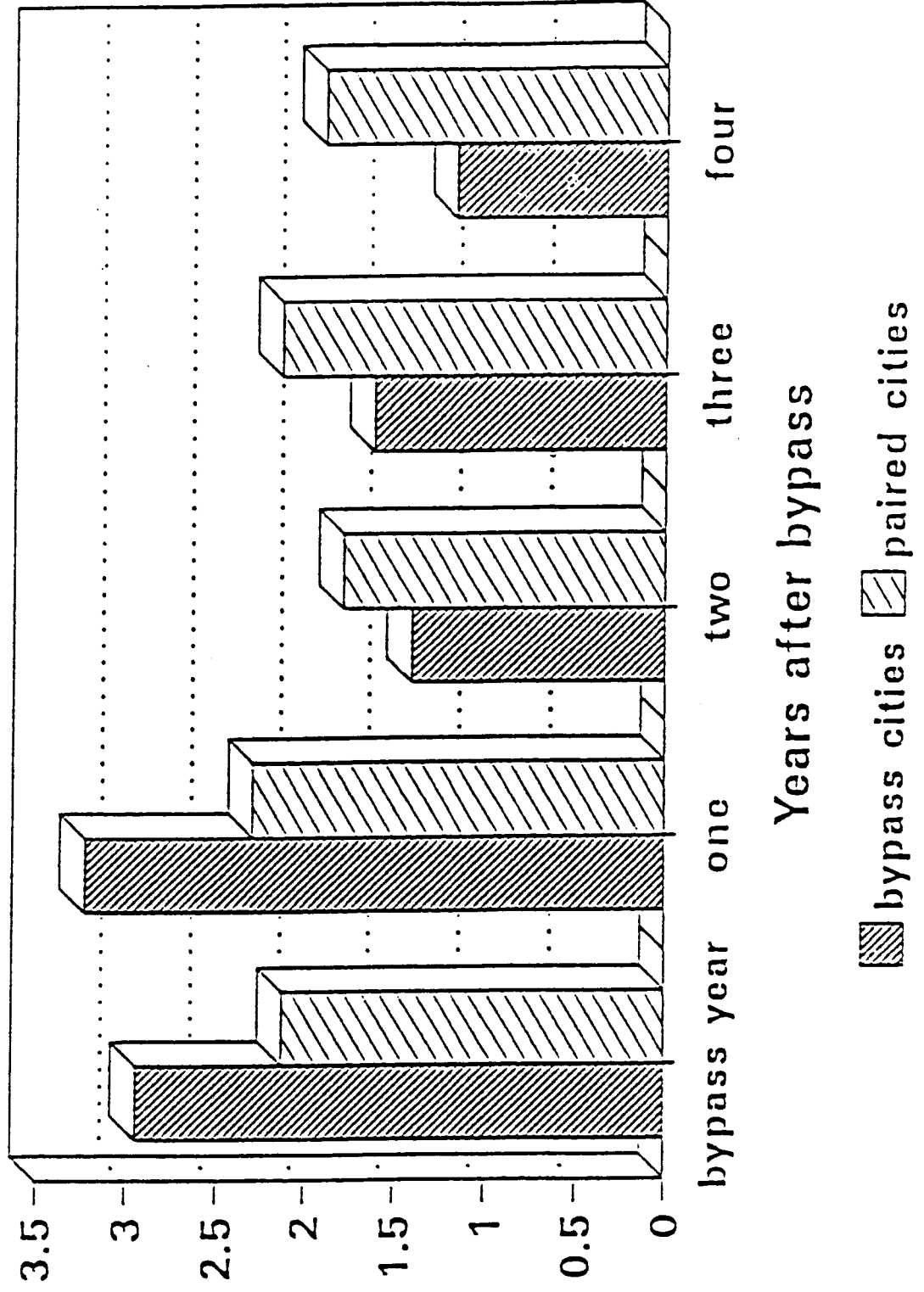


Figure 13.

# Services Pull Factors-Iowa

## Bypass vs. Paired Cities

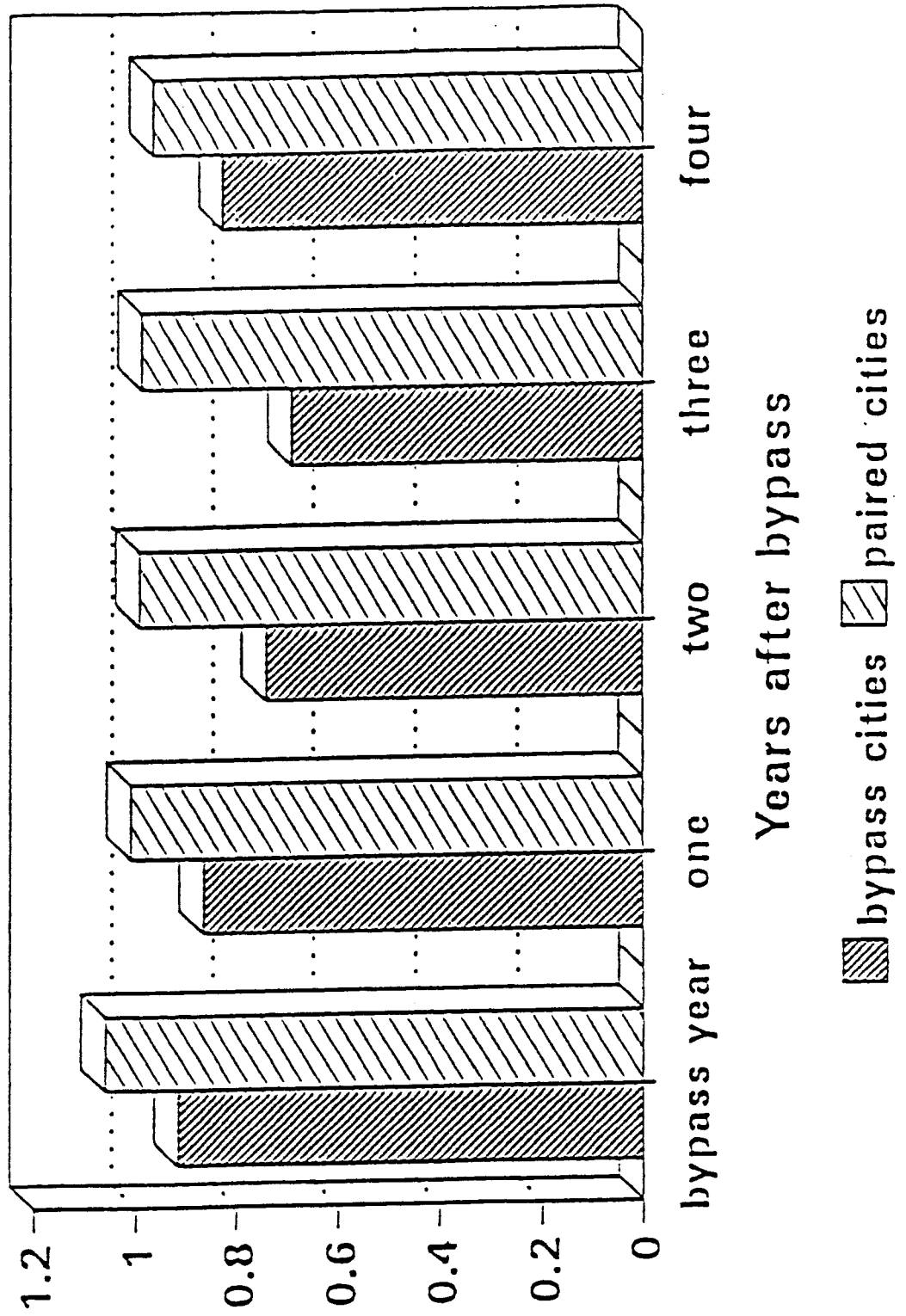


Figure 14.

# Specialties Pull Factors-Iowa

## Bypass vs. Paired Cities

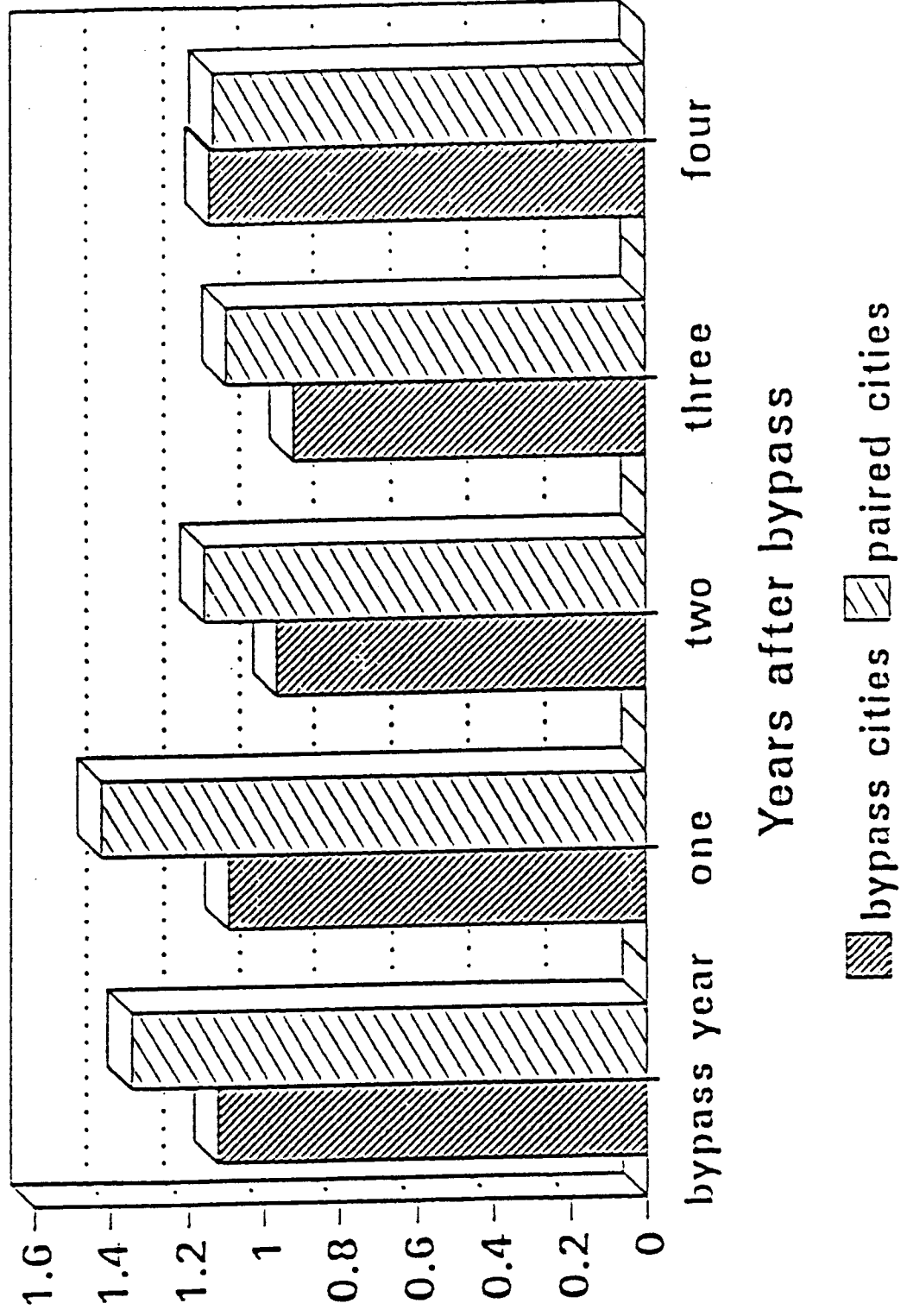


Figure 15.

# Utilities Pull Factors-Iowa

## Bypass vs. Paired Cities

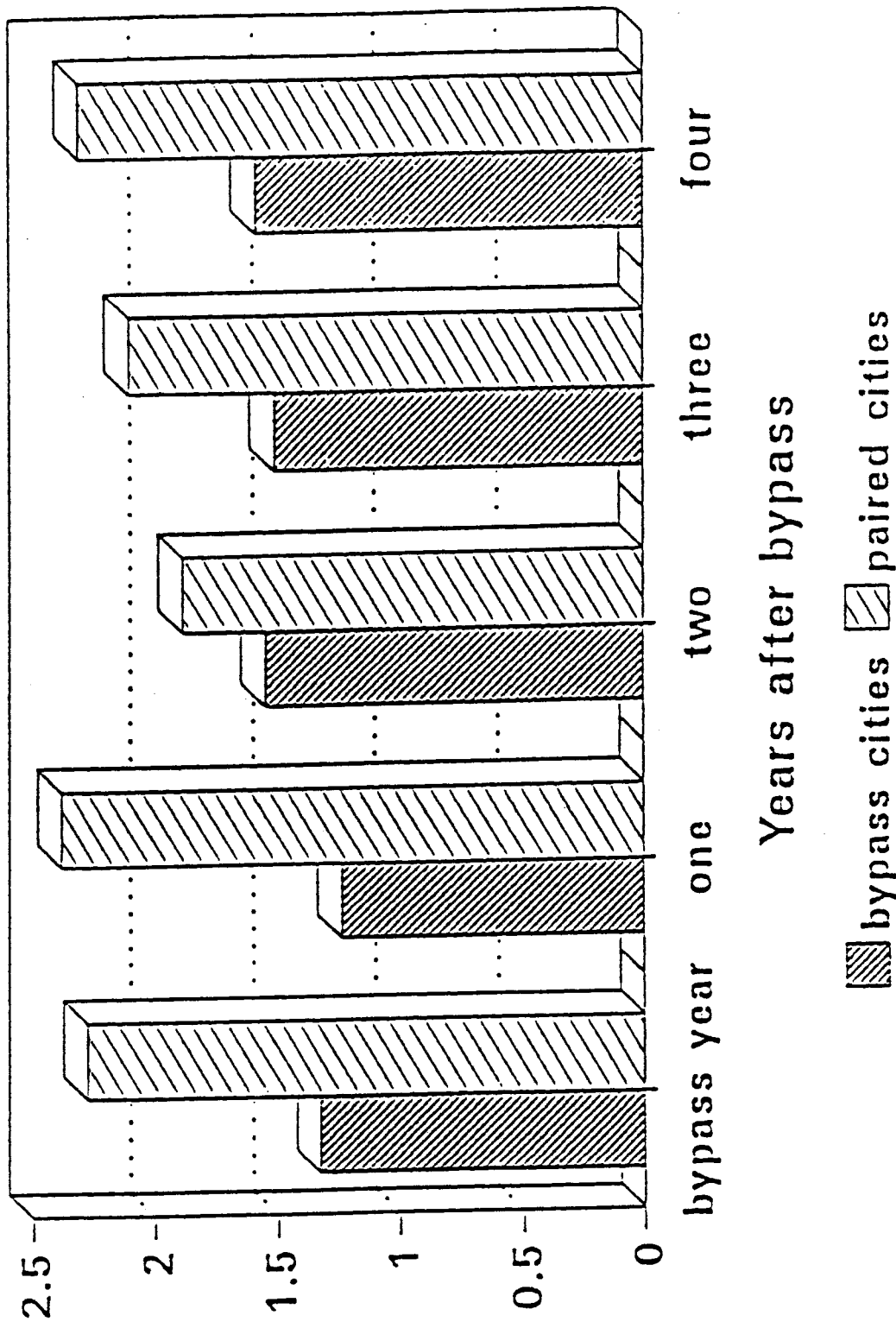


Figure 16.

# Wholesale Sales Pull Factors-Iowa

## Bypass vs. Paired Cities

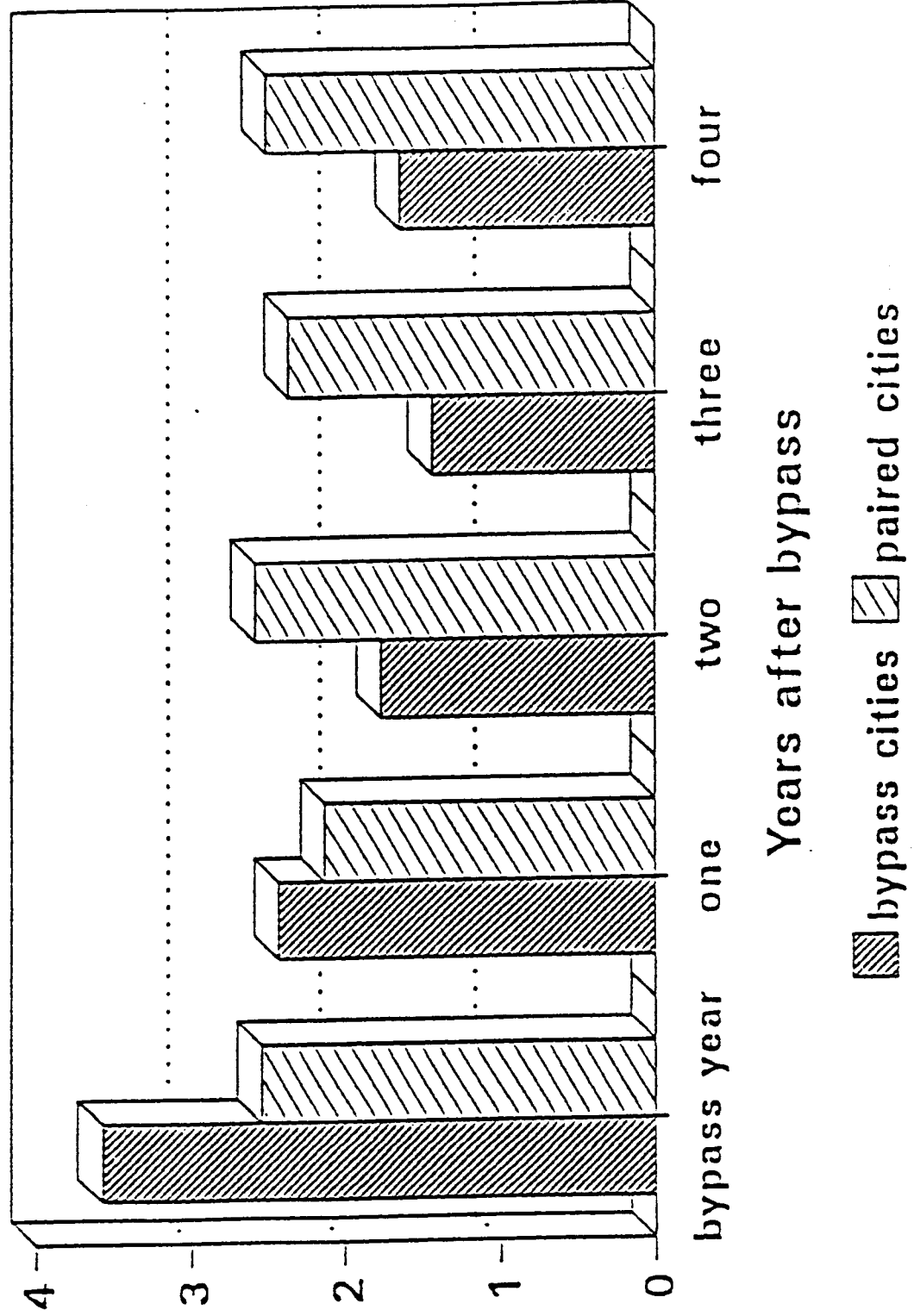


Figure 17.

# Apparel Sales Pull Factors-Minnesota

## Bypass cities vs. Paired cities

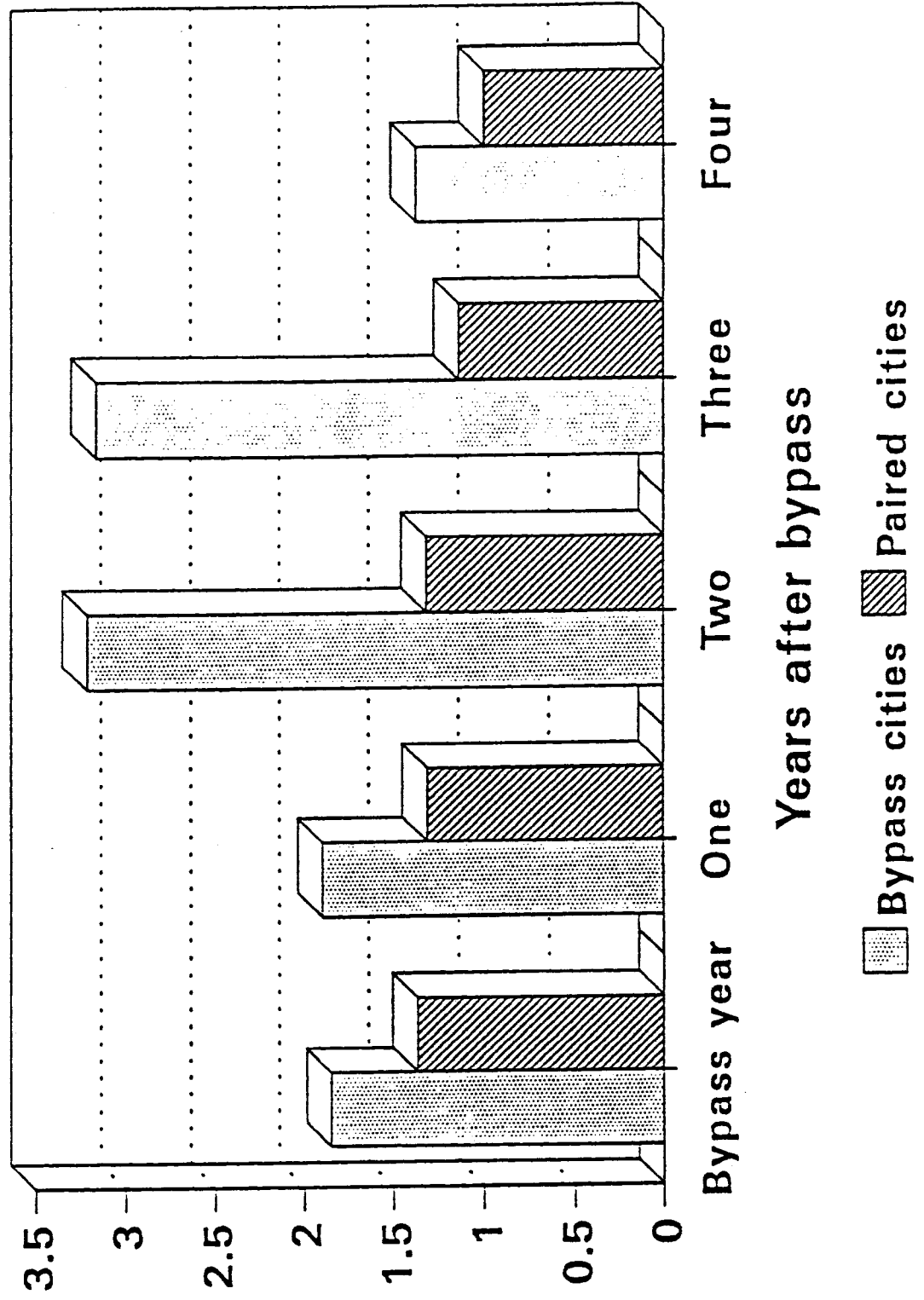


Figure 18.

# General Merchandise Pull Factors

## Bypass cities vs. Paired cities

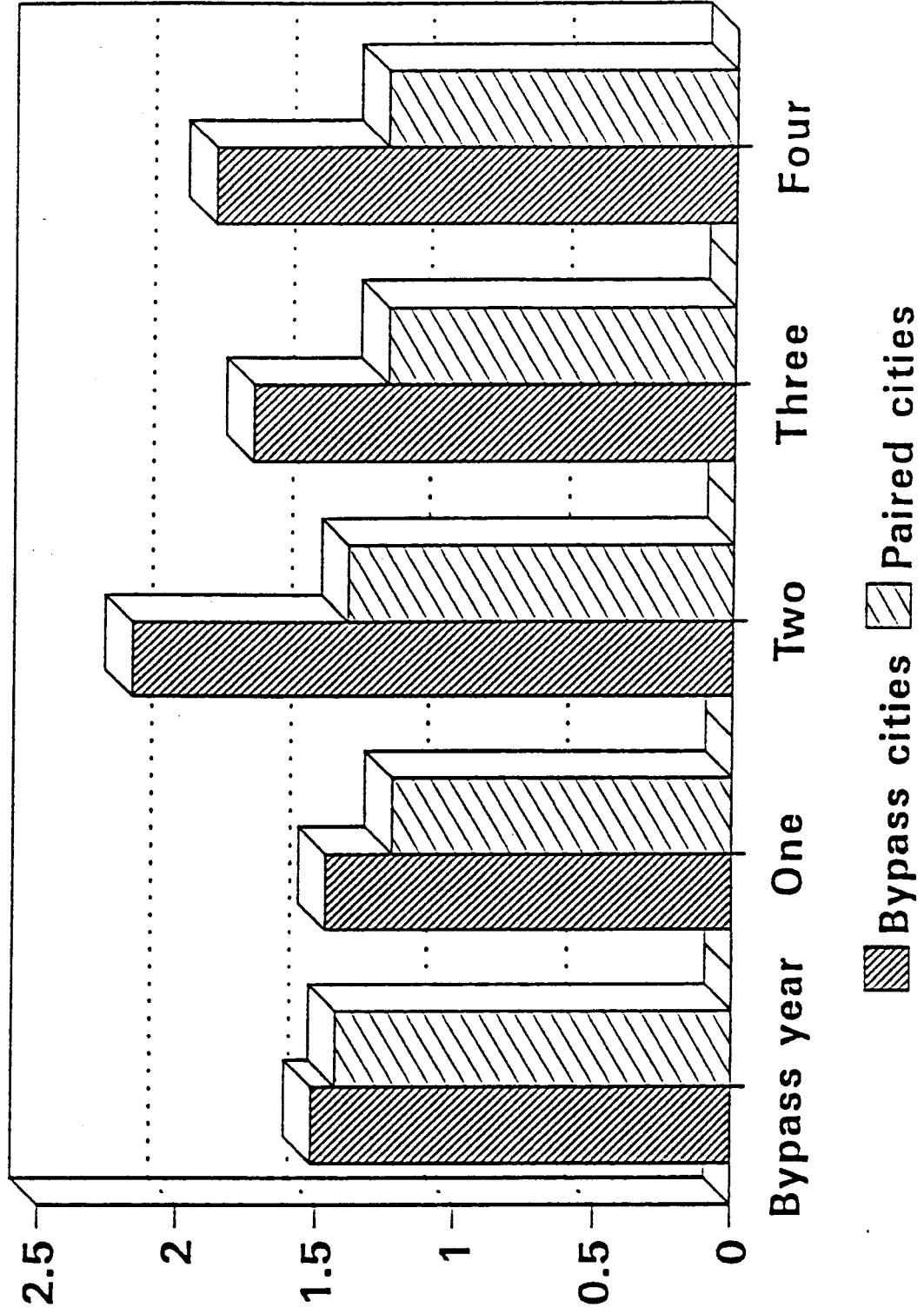


Figure 19.

# Food Sales Pull Factors-Minnesota

## Bypass cities vs. Paired cities

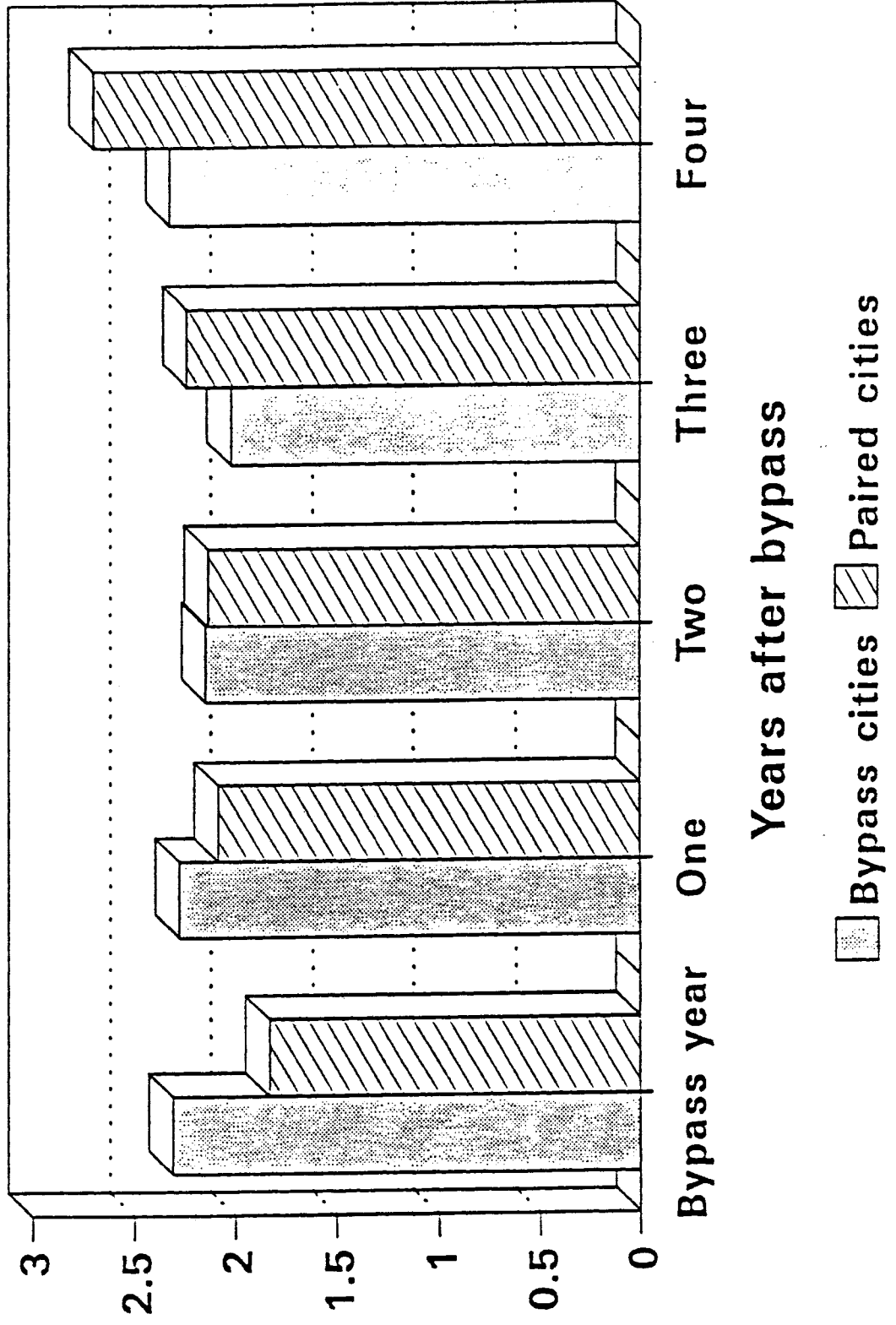


Figure 20.

# Auto Sales Pull Factors-Minnesota

## Bypass cities vs. Paired cities

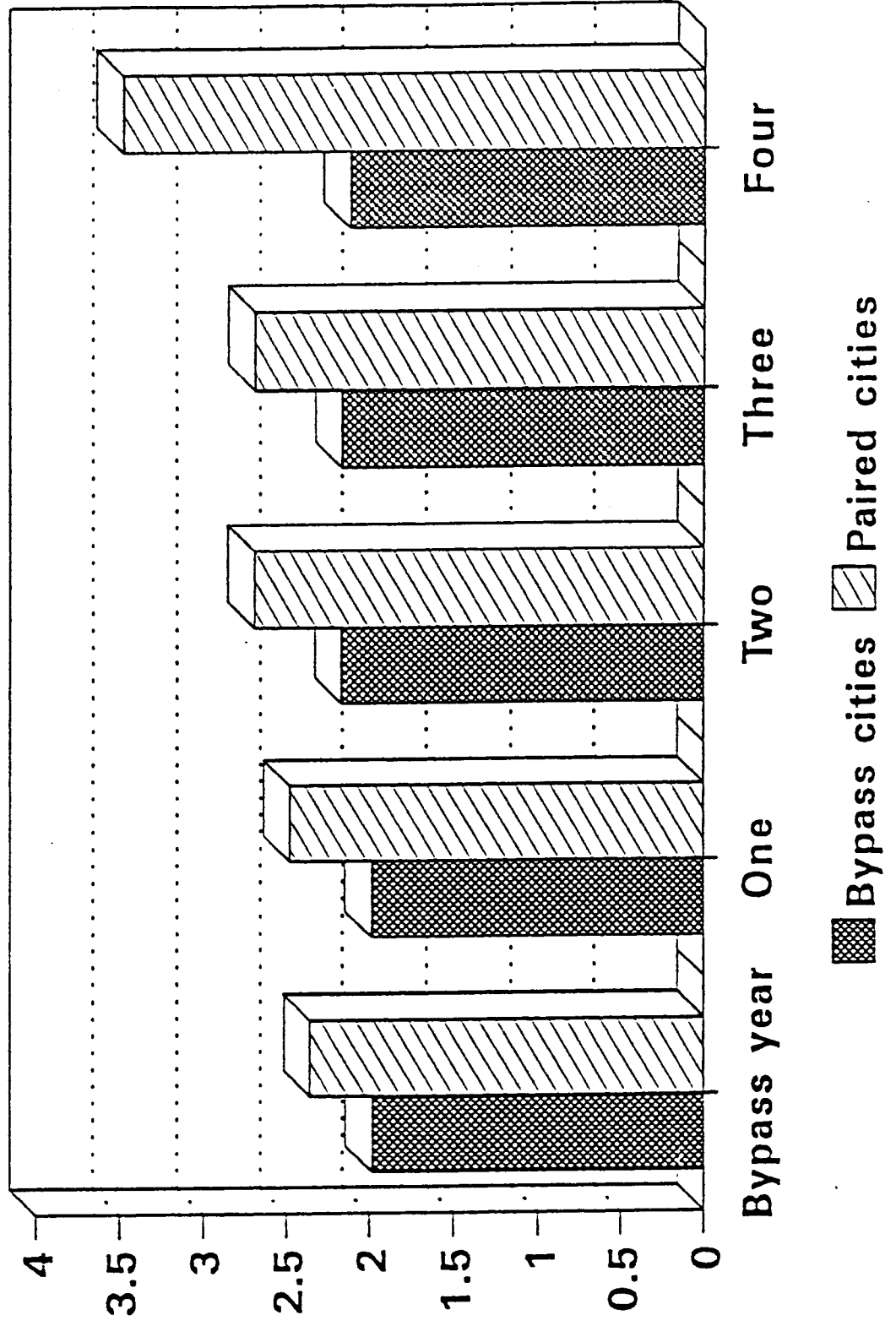


Figure 21.

# Lumber Sales Pull Factors-Minnesota

## Bypass cities vs. Paired cities

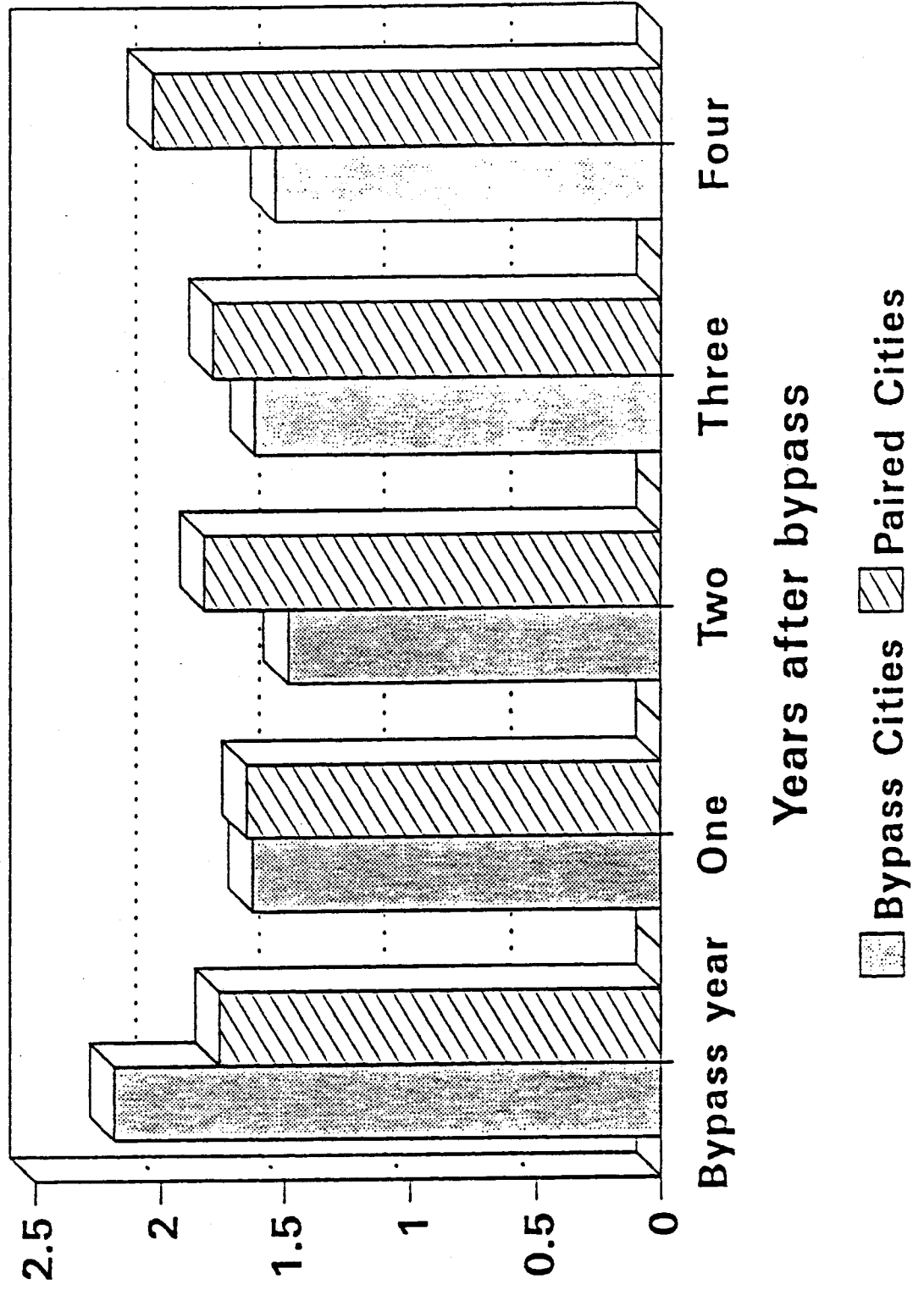
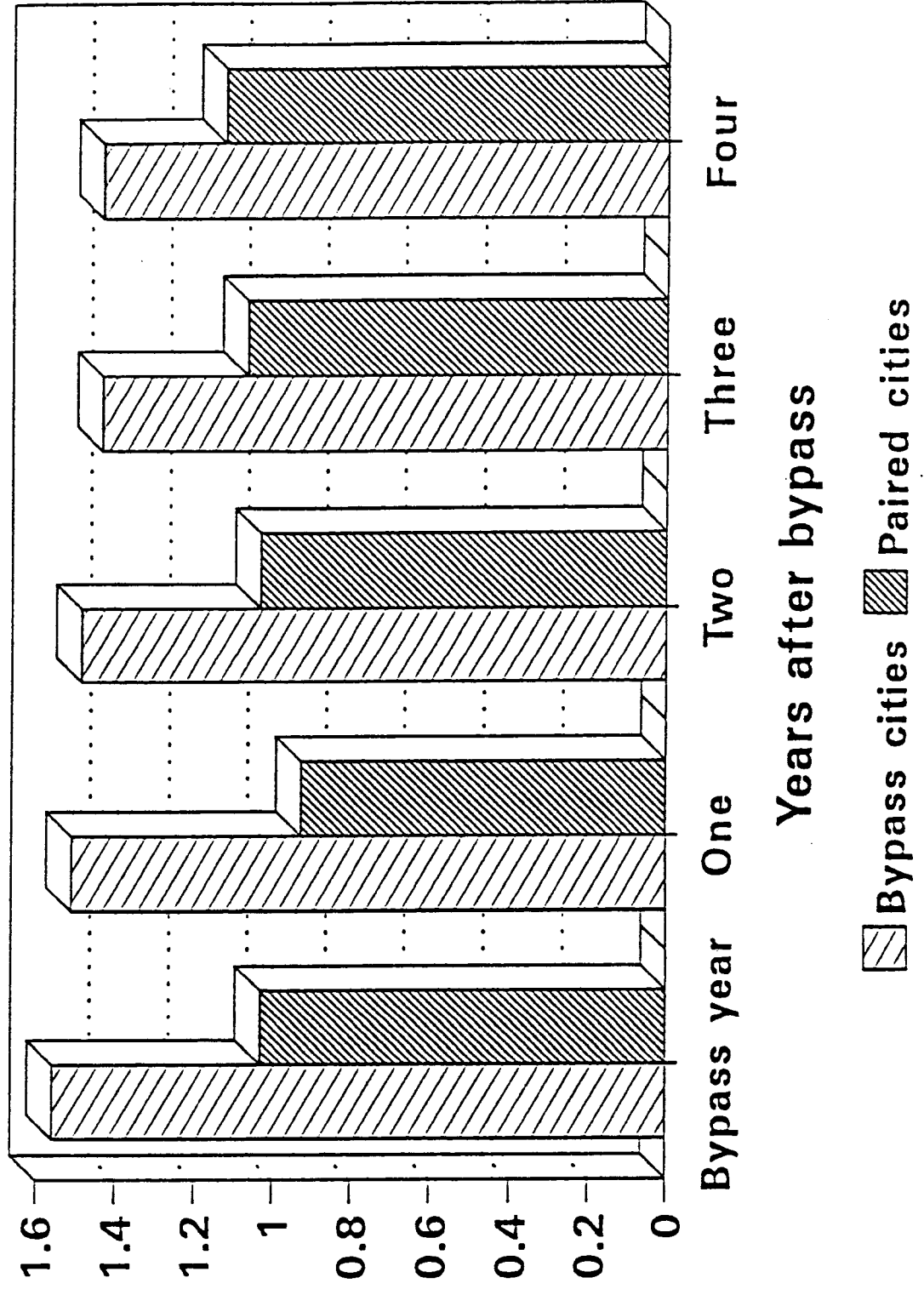


Figure 22.

# Furniture Sales Pull Factors-Minnesota

## Bypass cities vs. Paired cities



# Eat & Drink Sales Pull Factors-Minnesota

## Bypass cities vs. Paired cities

Figure 23.

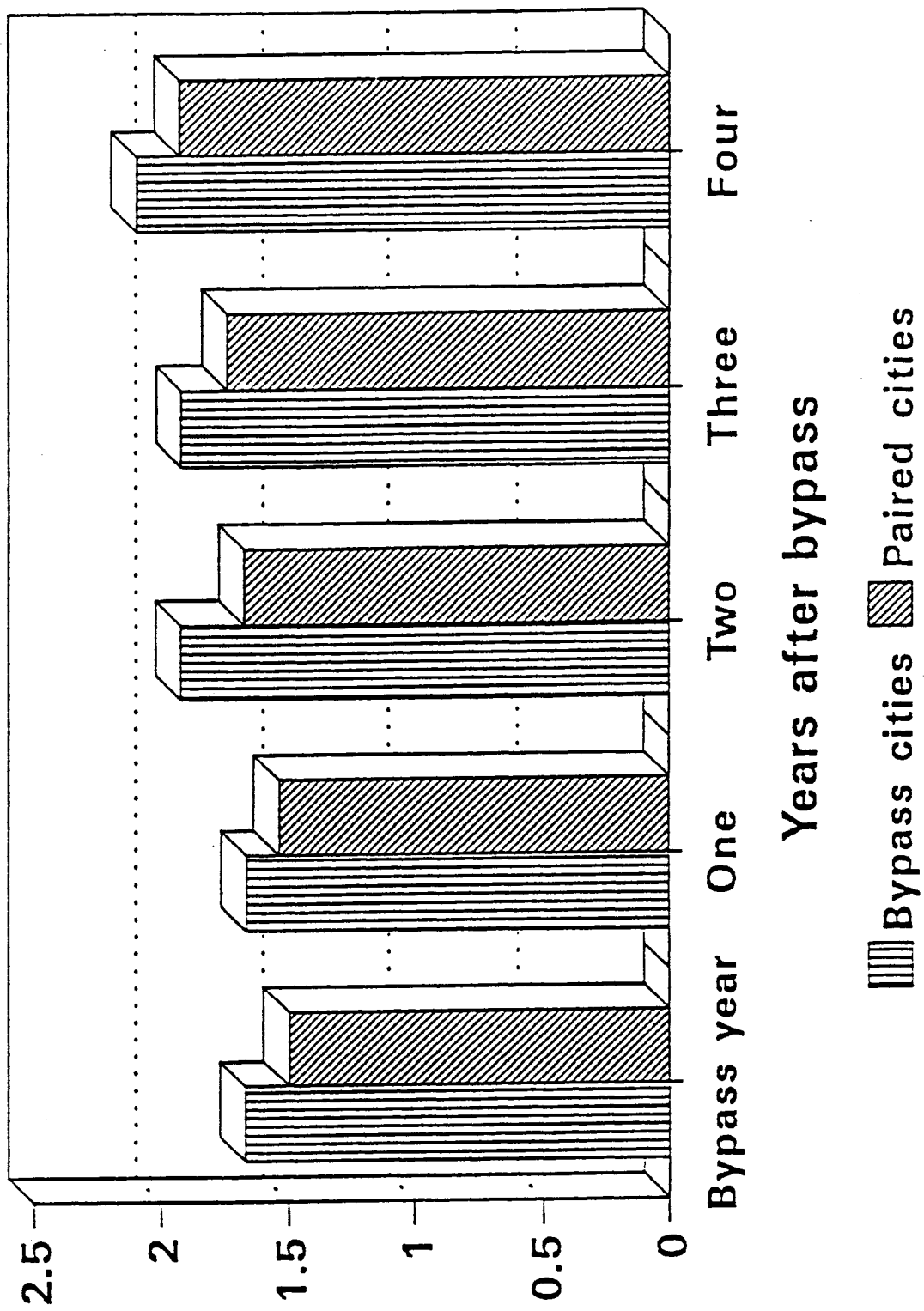


Figure 24.

# Miscellaneous Sales Pull Factors

## Bypass cities vs. Paired cities

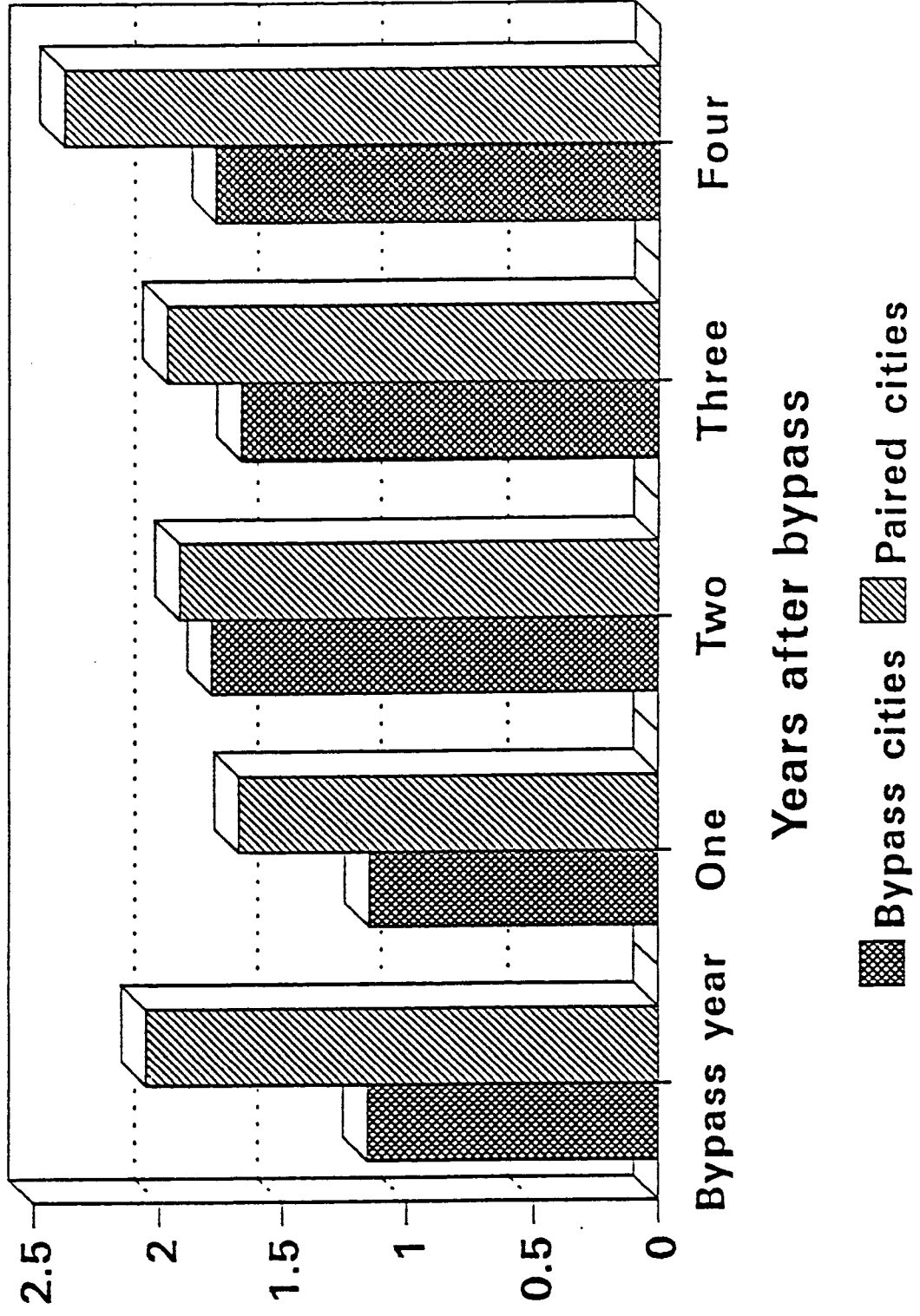


Figure 25.

# Total Sales Pull Factors-Iowa

## Bypass Cities vs. Control Cities

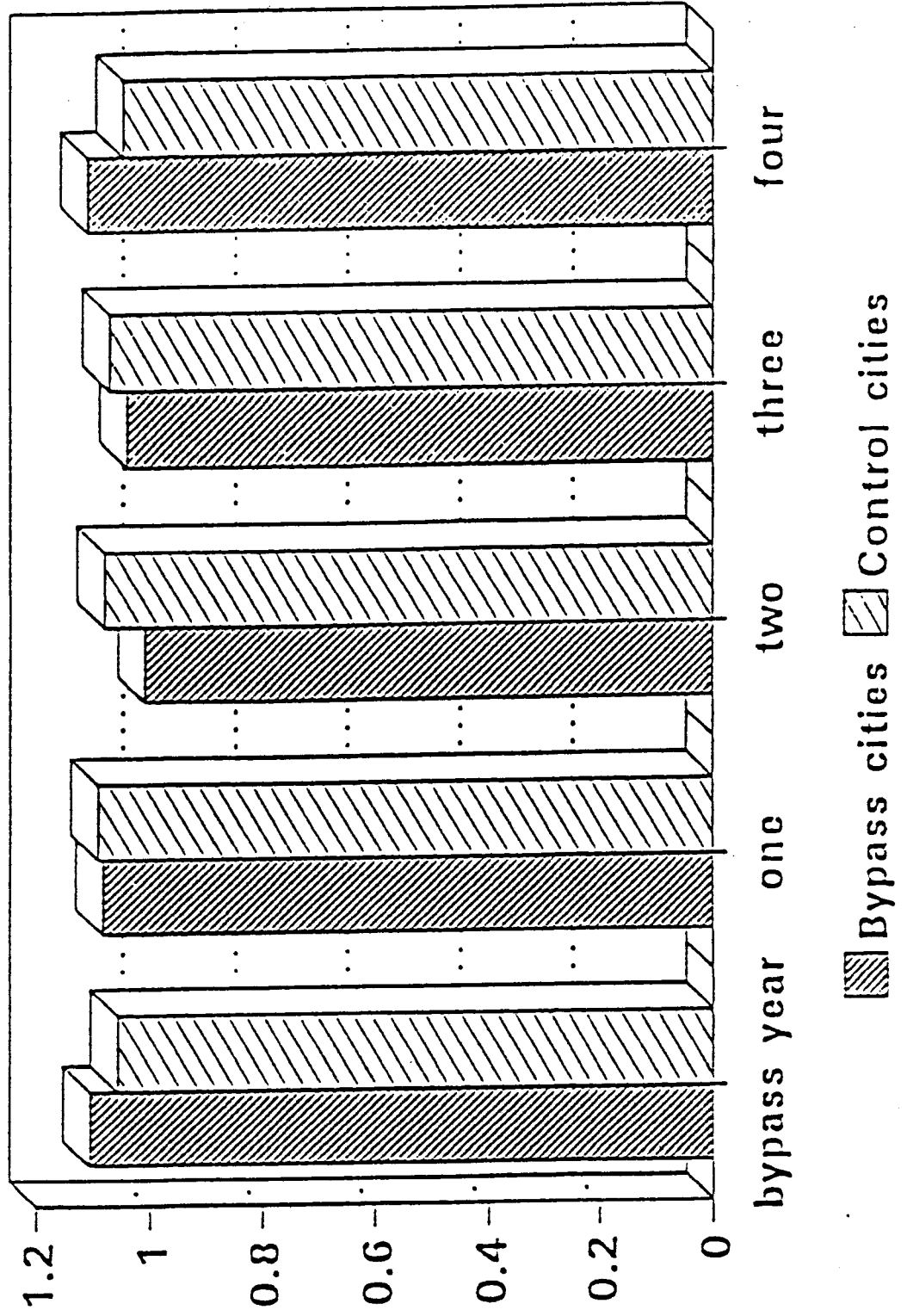


Figure 26.

# Apparel Sales Pull Factors-Iowa

## Bypass Cities vs. Control Cities

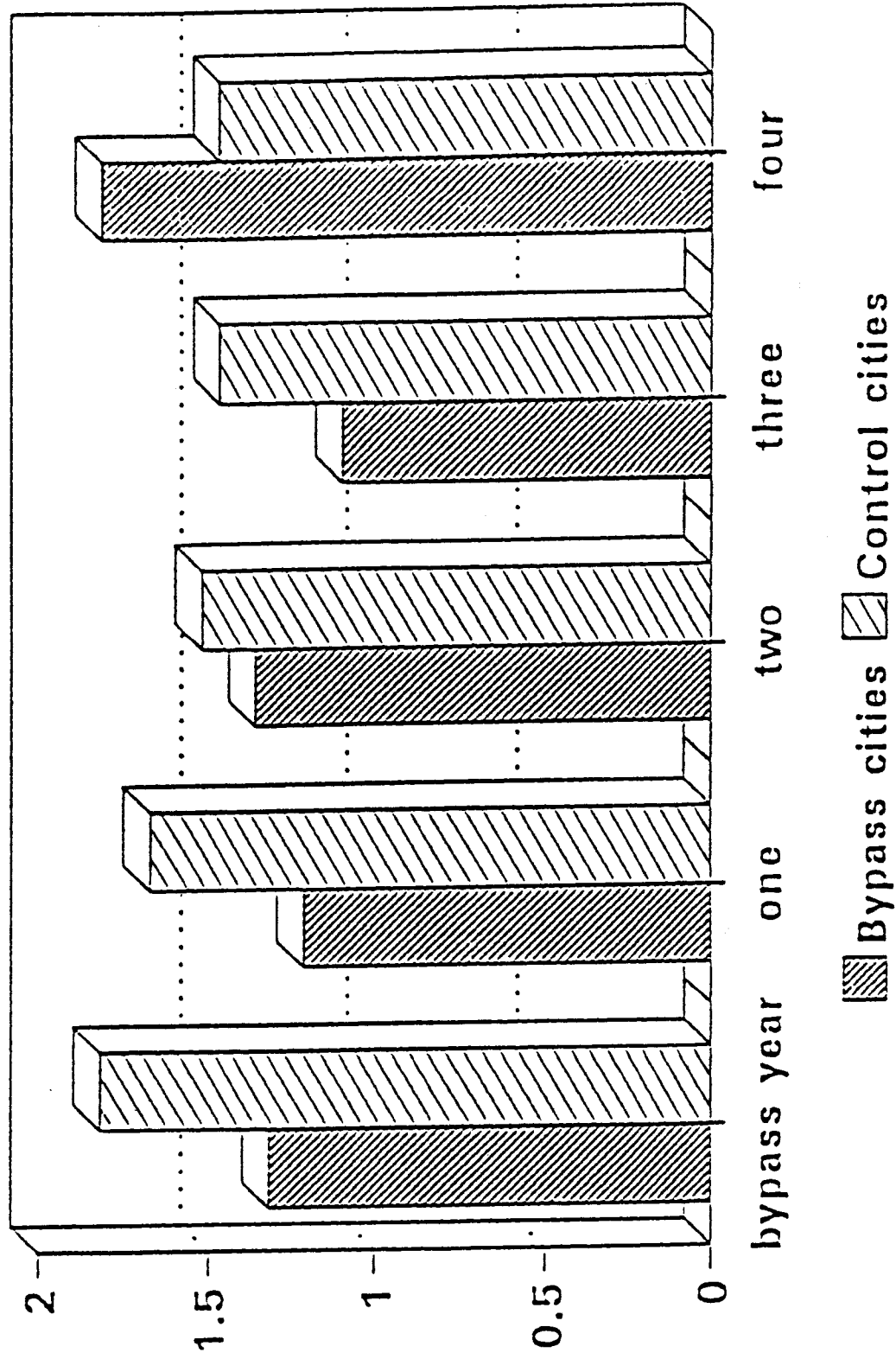


Figure 27.

# Building Sales Pull Factors-Iowa

## Bypass Cities vs. Control Cities

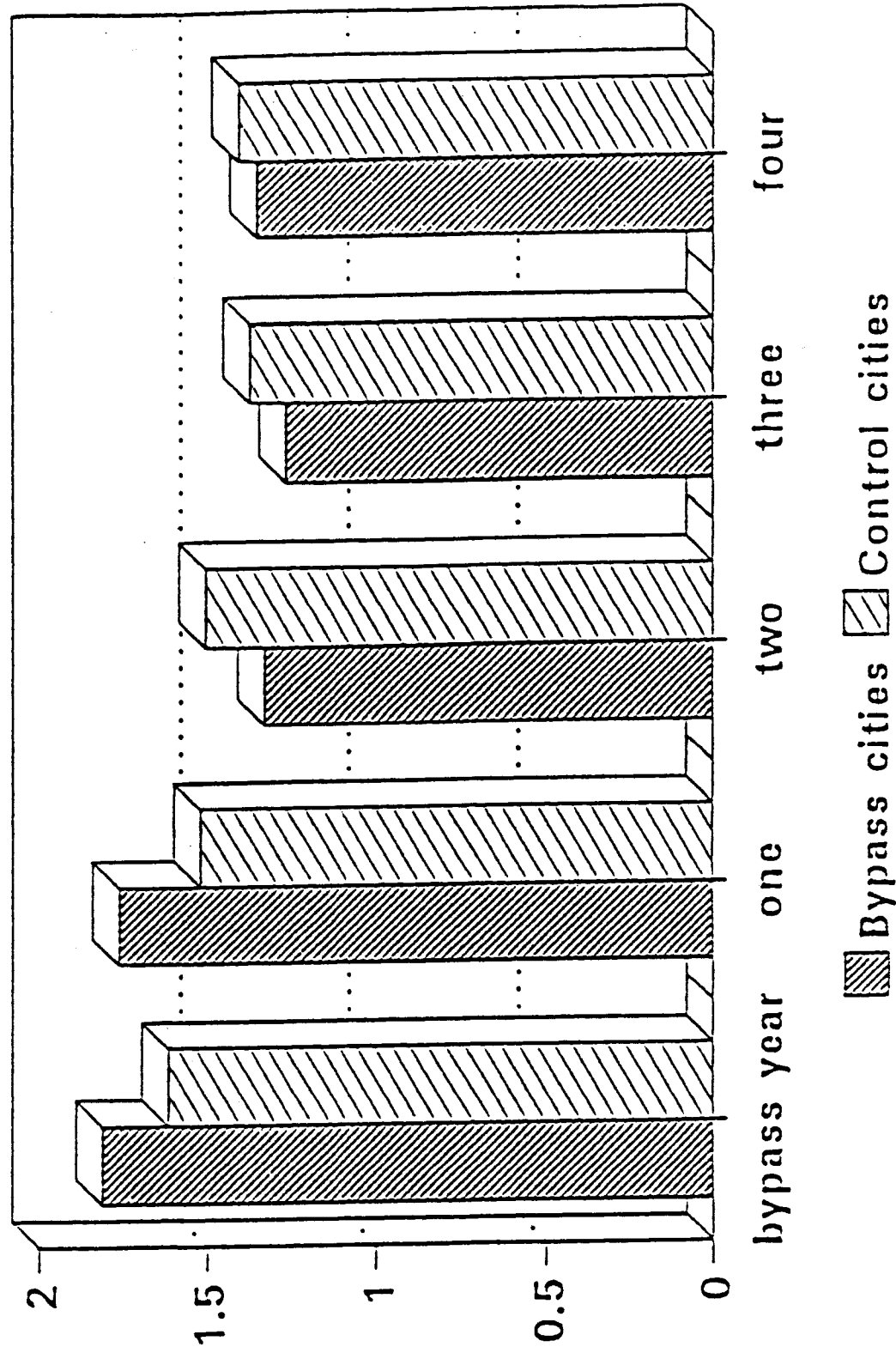


Figure 28.

# Auto Sales Pull Factors-Iowa

## Bypass Cities vs. Control Cities

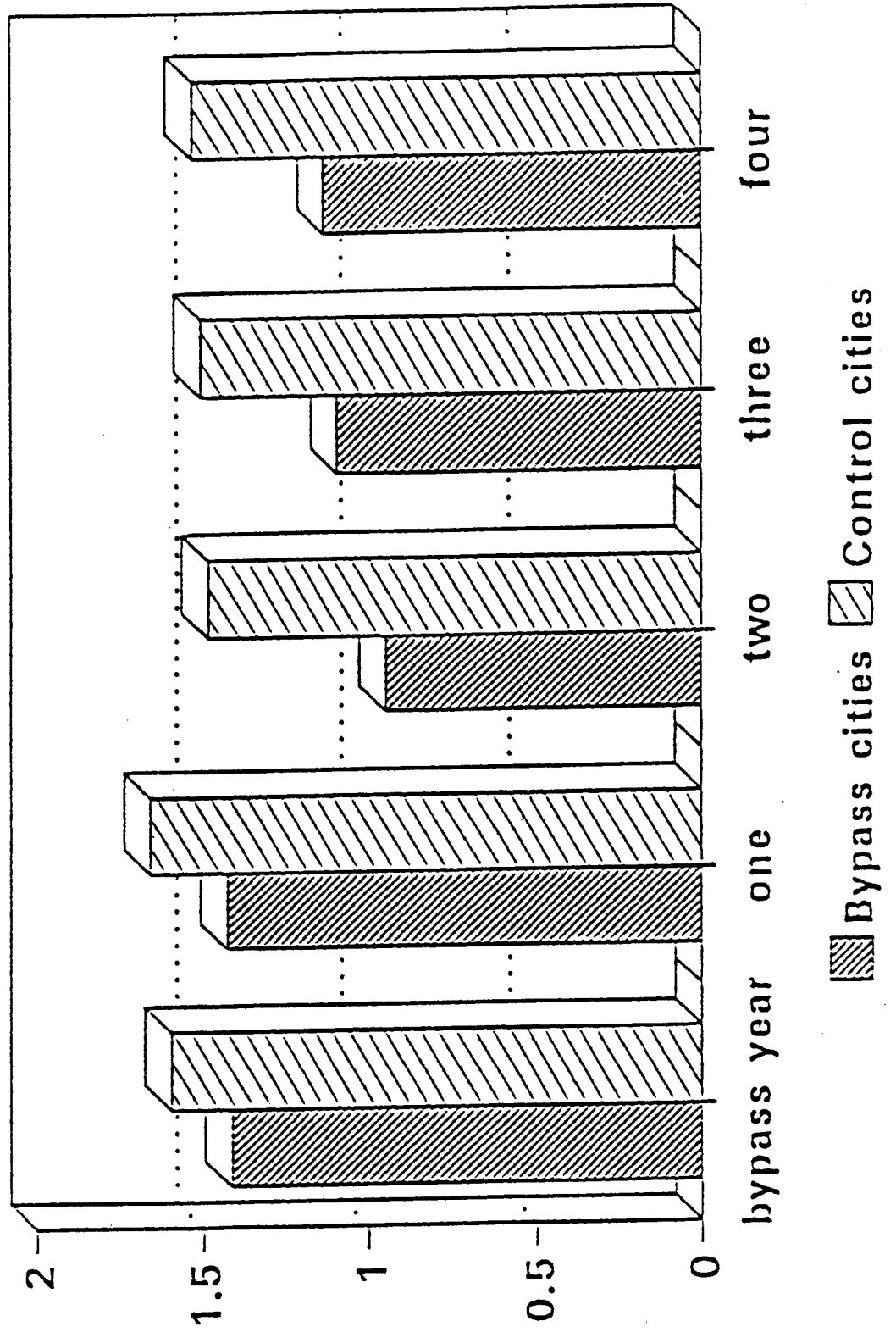


Figure 29.

# Eat & Drink Sales Pull Factors-Iowa

## Bypass Cities vs. Control Cities

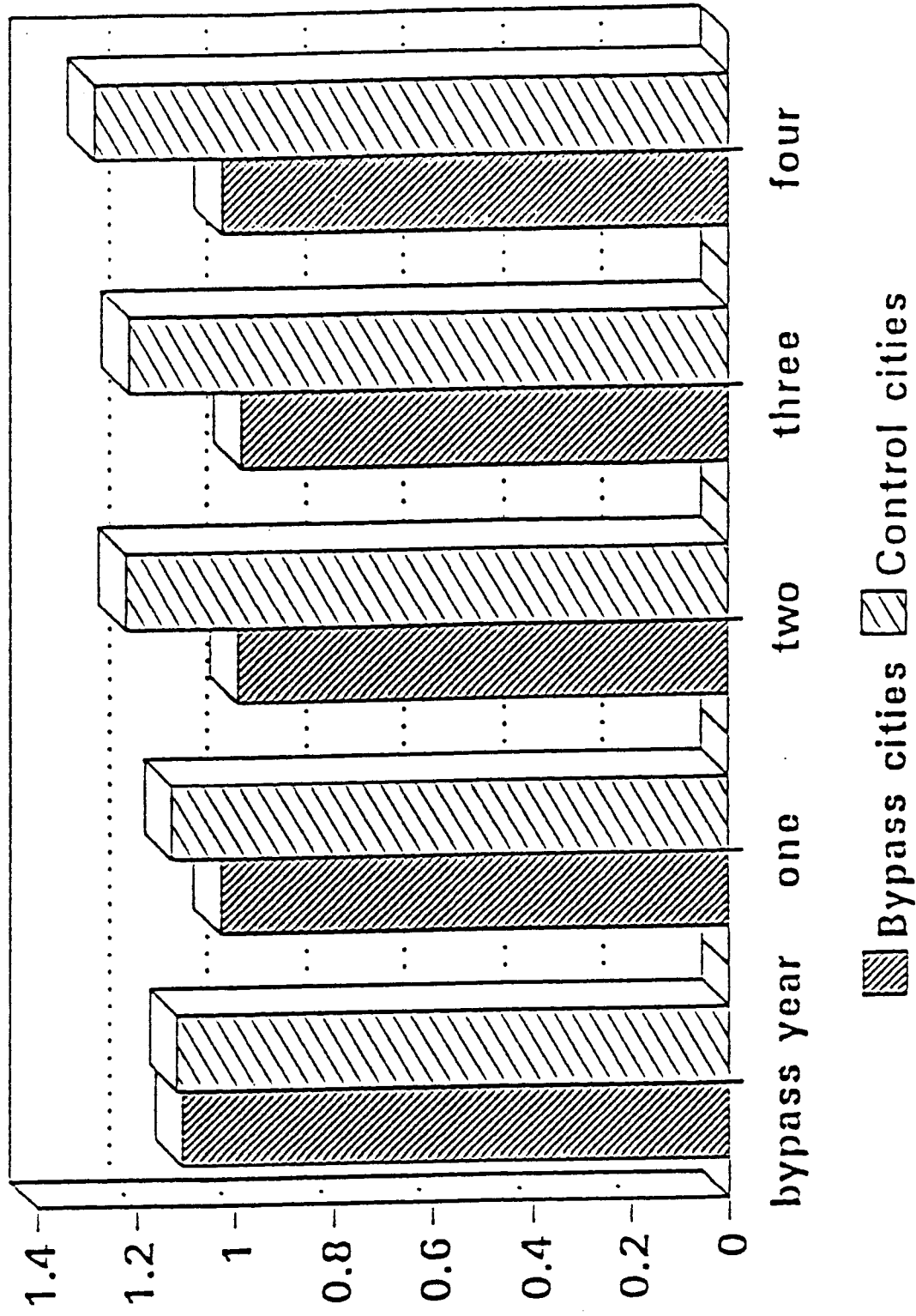


Figure 30.

# Food Sales Pull Factors-Iowa

## Bypass Cities vs. Control Cities

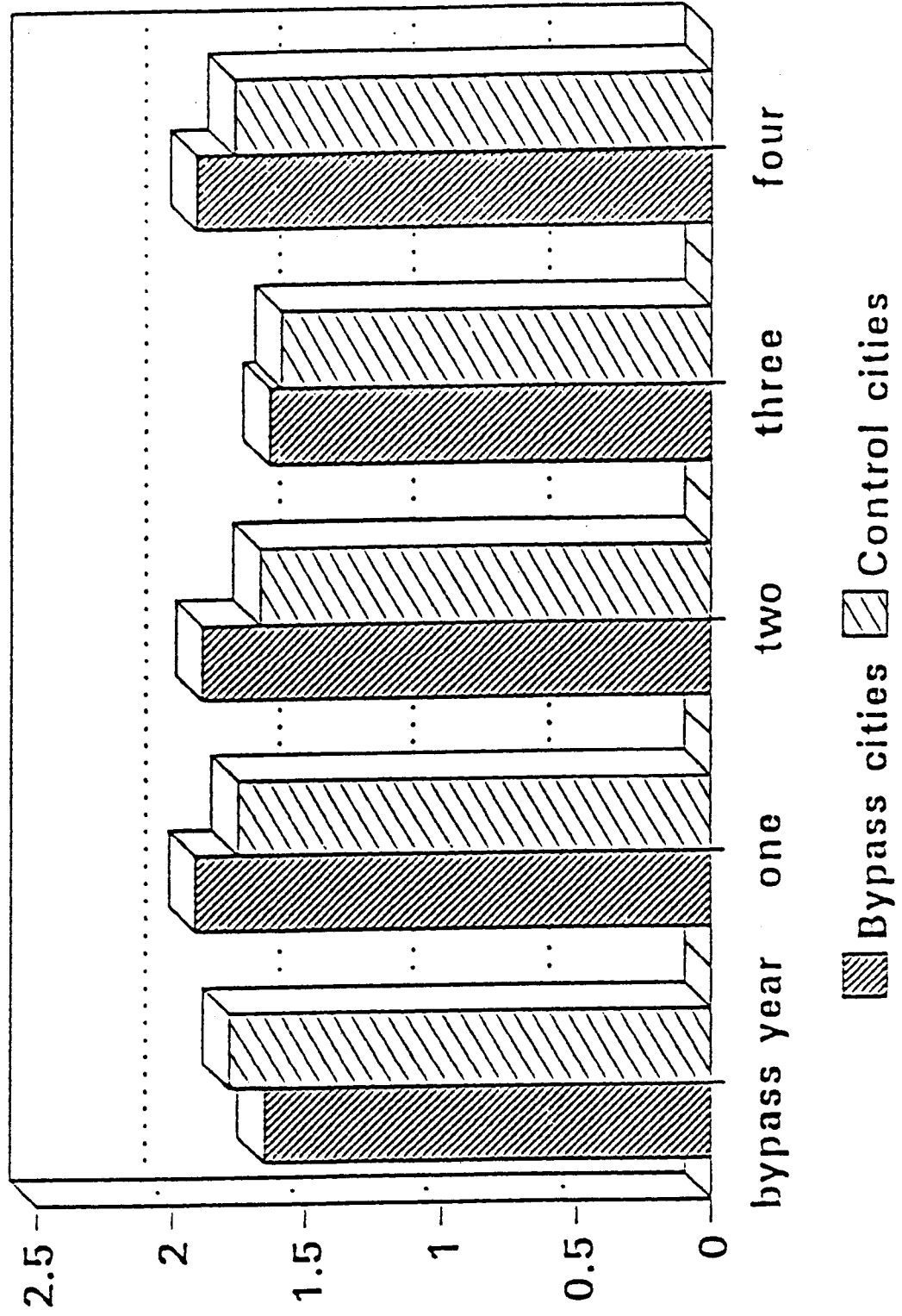


Figure 31.

# Furniture Sales Pull Factors-Iowa

## Bypass Cities vs. Control Cities

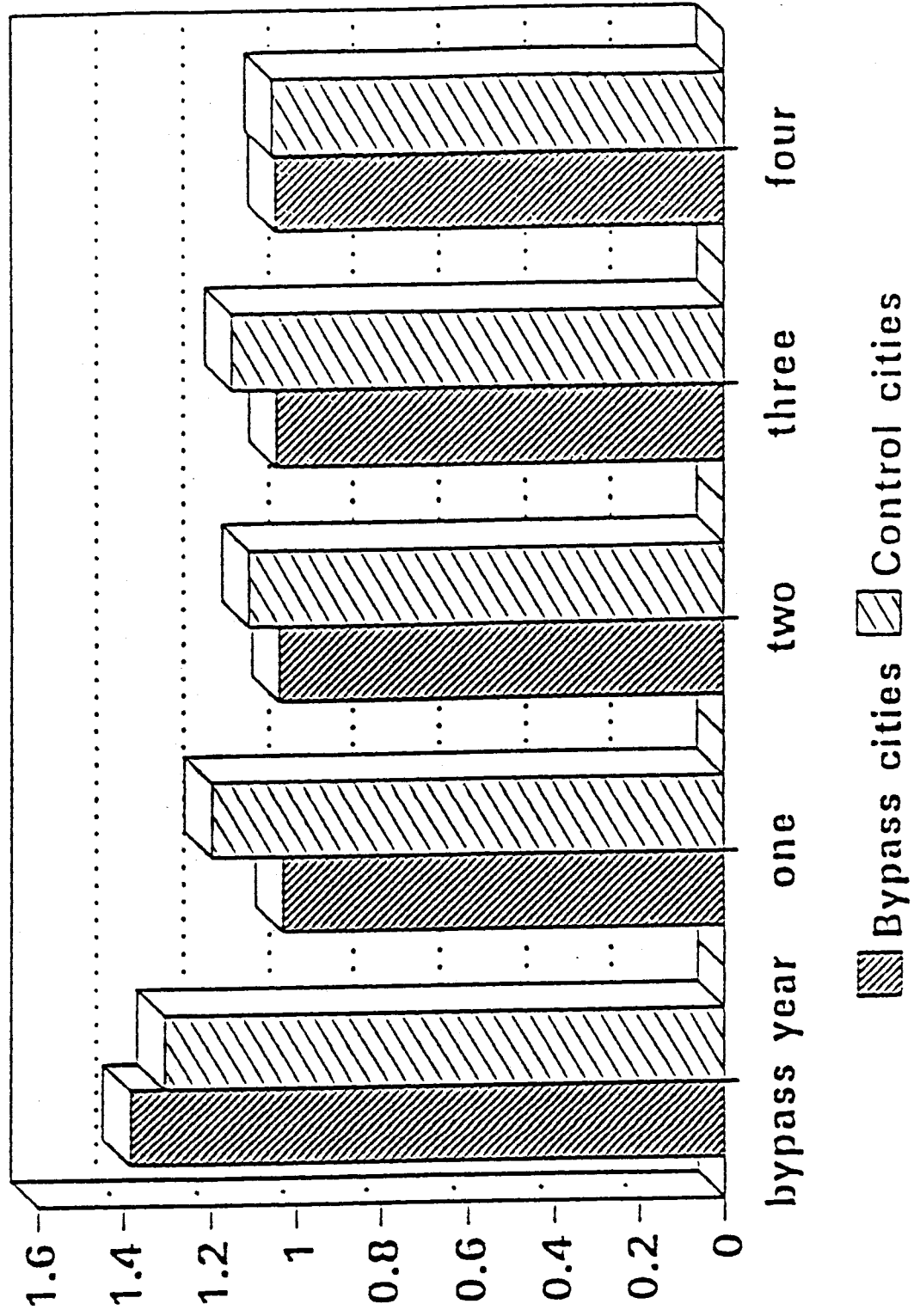


Figure 32.

# General Merchandise Pull Factors-Iowa

## Bypass Cities vs. Control Cities

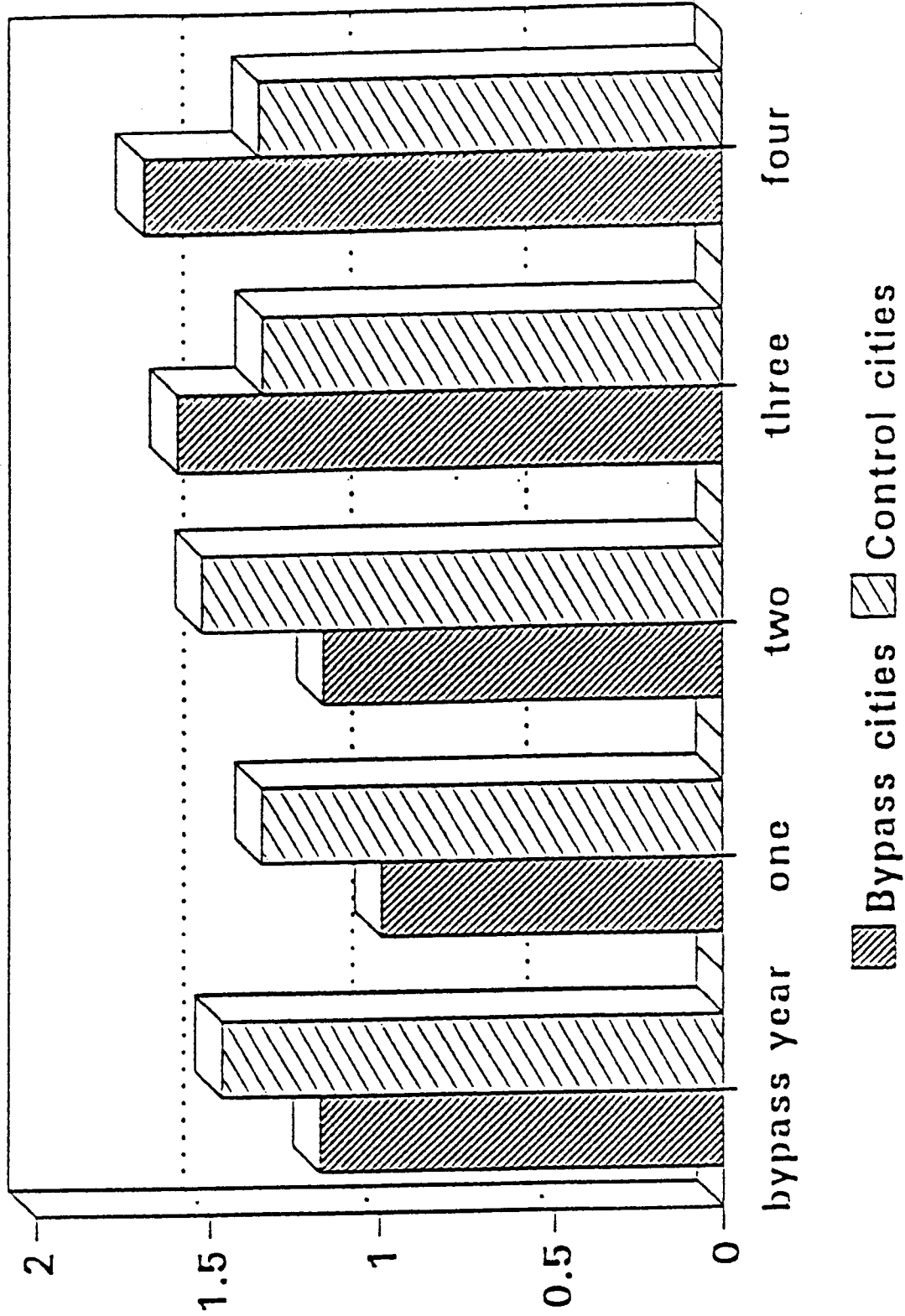


Figure 33.

# Miscellaneous Sales Pull Factors-Iowa

## Bypass Cities vs. Control Cities

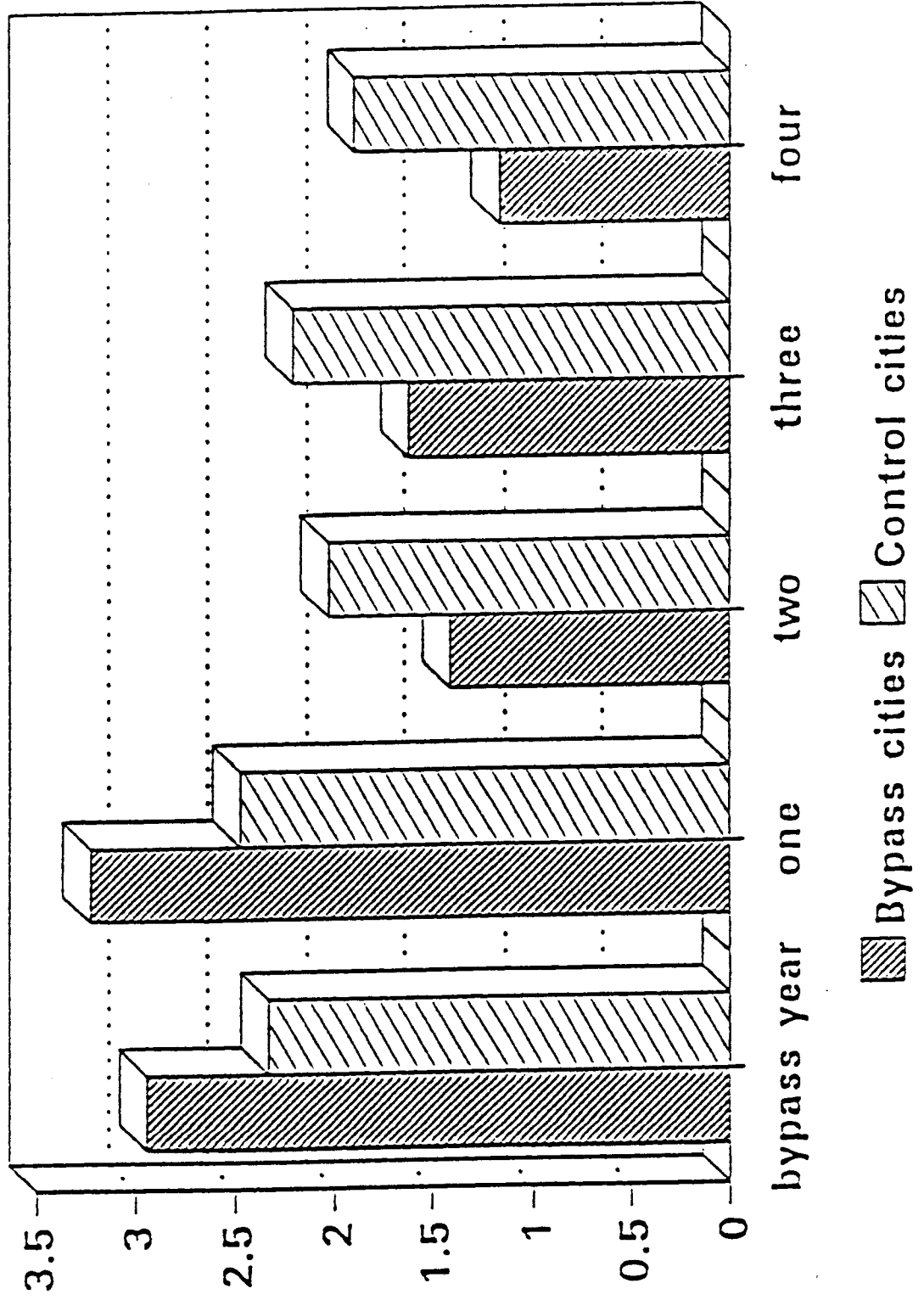


Figure 34.

# Services Pull Factors-Iowa

## Bypass Cities vs. Control Cities

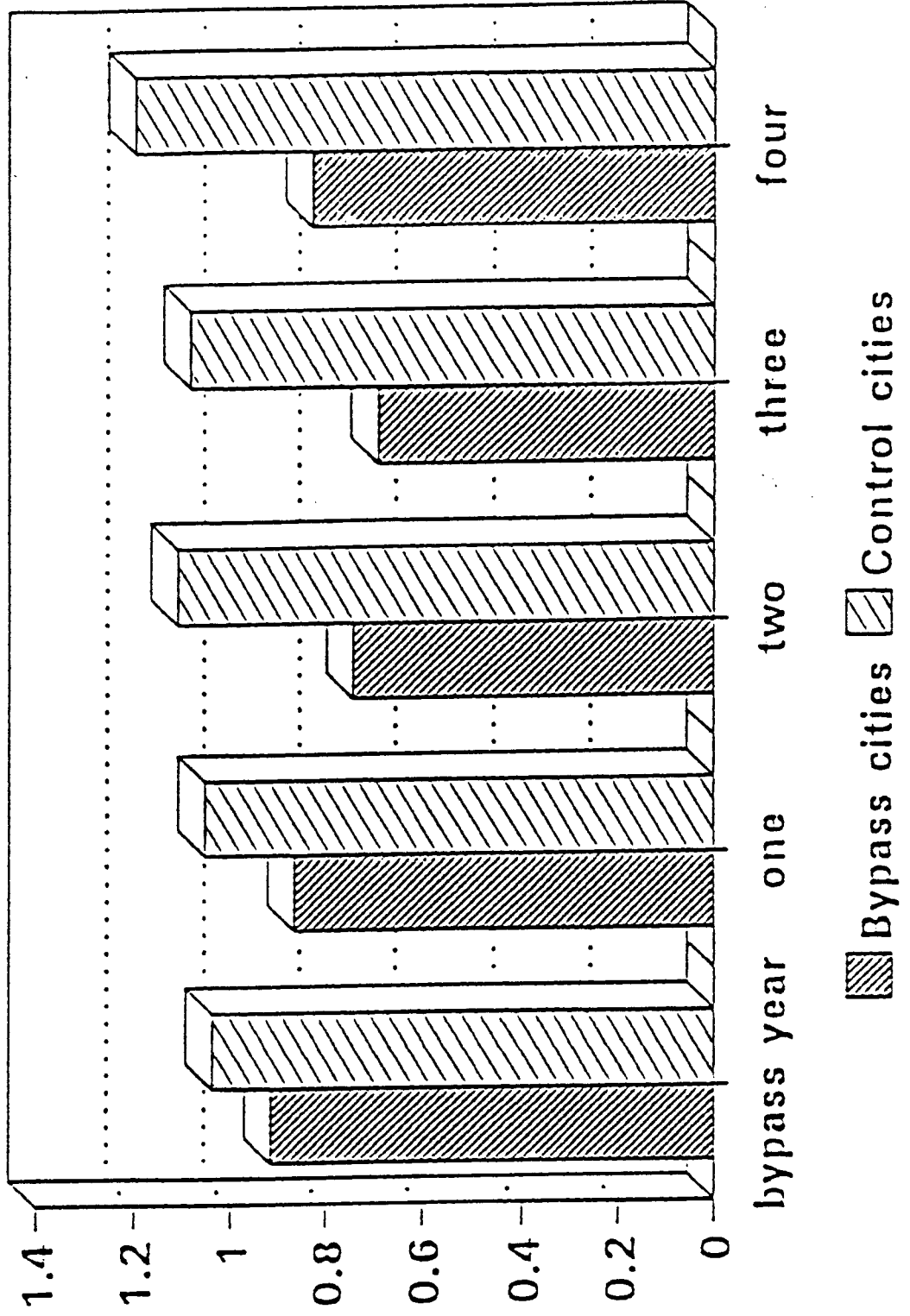


Figure 35.

# Specialties Pull Factors-Iowa

## Bypass Cities vs. Control Cities

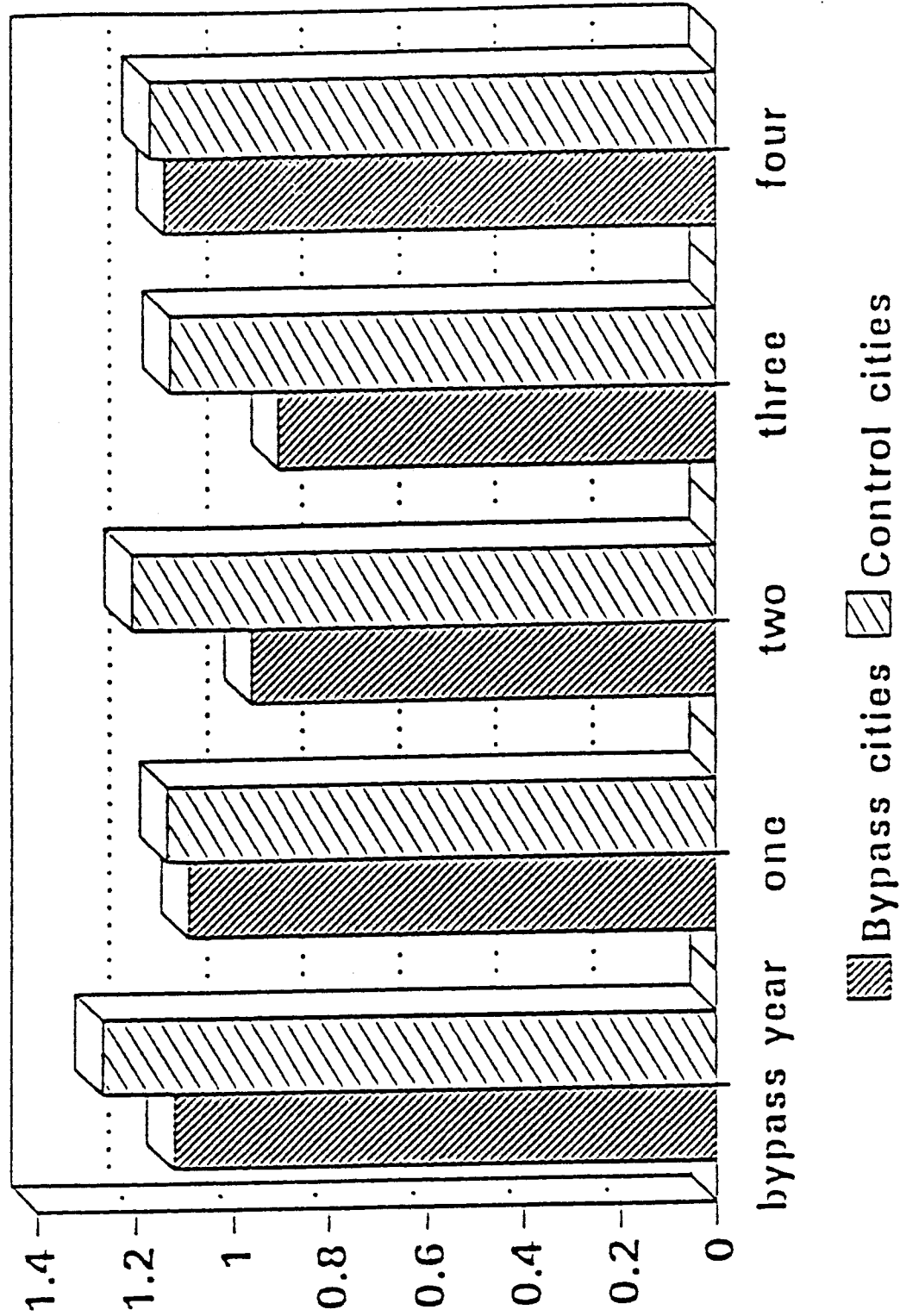


Figure 36.

# Utilities Pull Factors-Iowa

## Bypass Cities vs. Control Cities

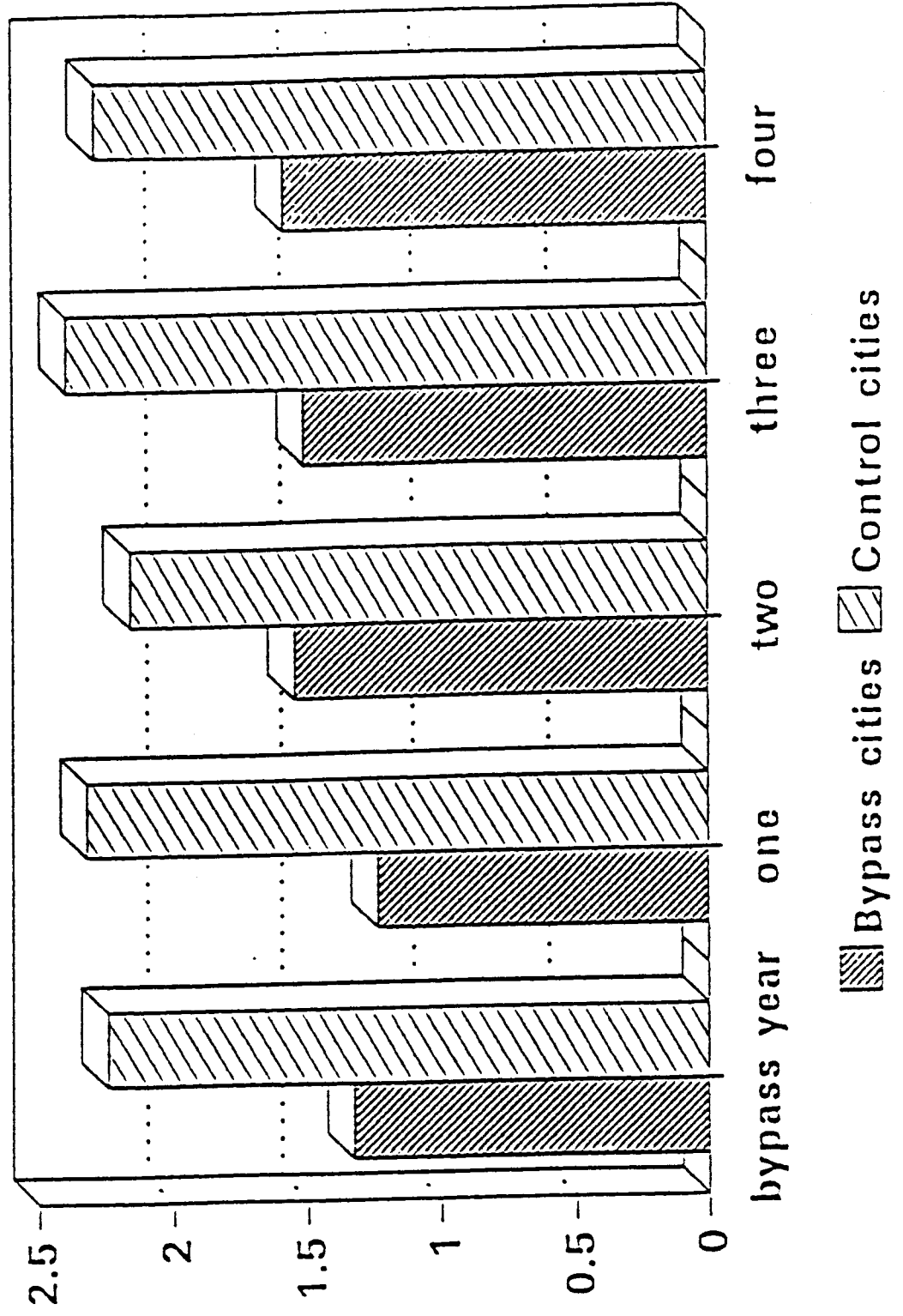


Figure 37.

# Wholesale Sales Pull Factors-Iowa

## Bypass Cities vs. Control Cities

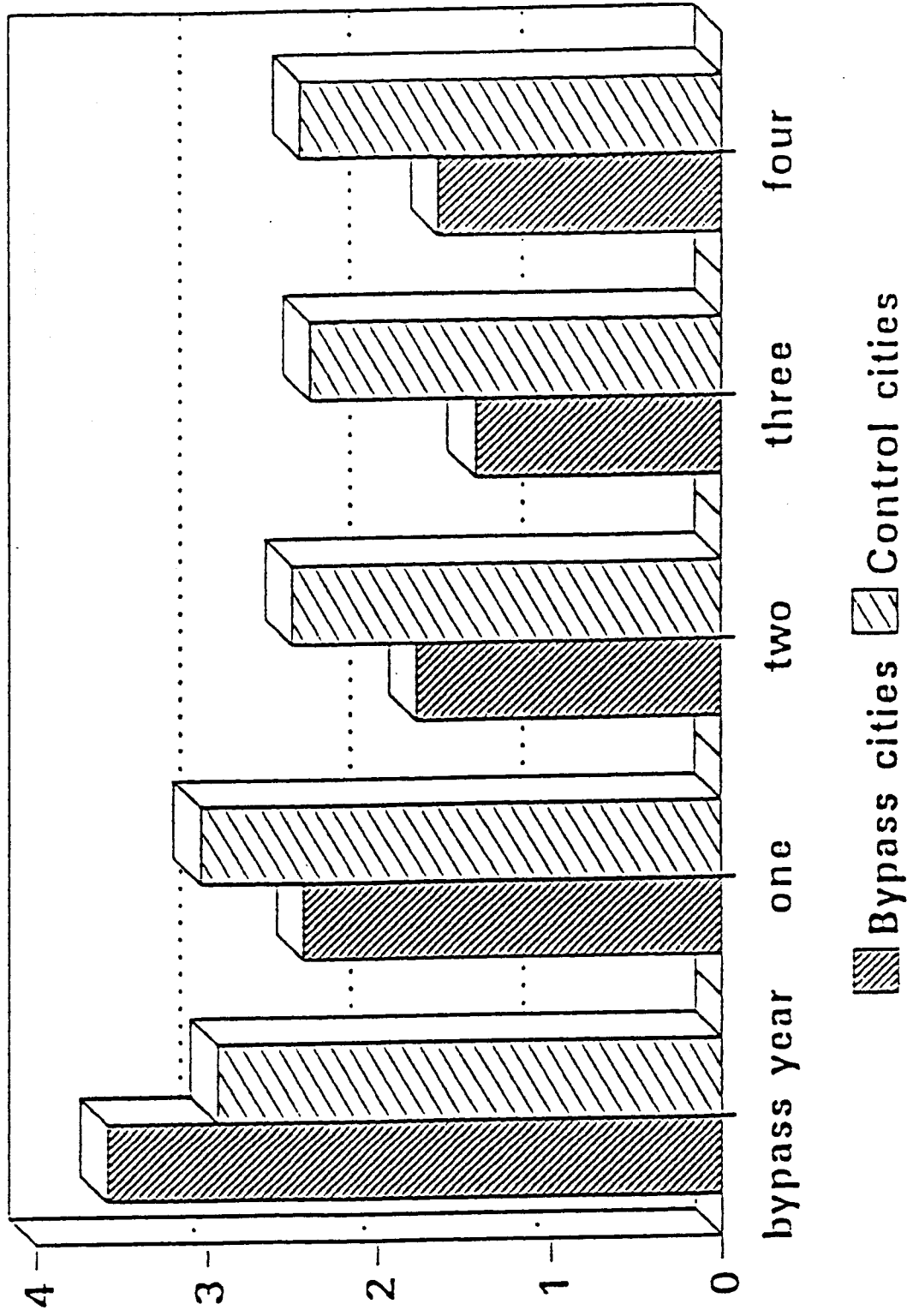


Figure 38.

# IMPACT OF HIGHWAY NOISE QUESTION 1

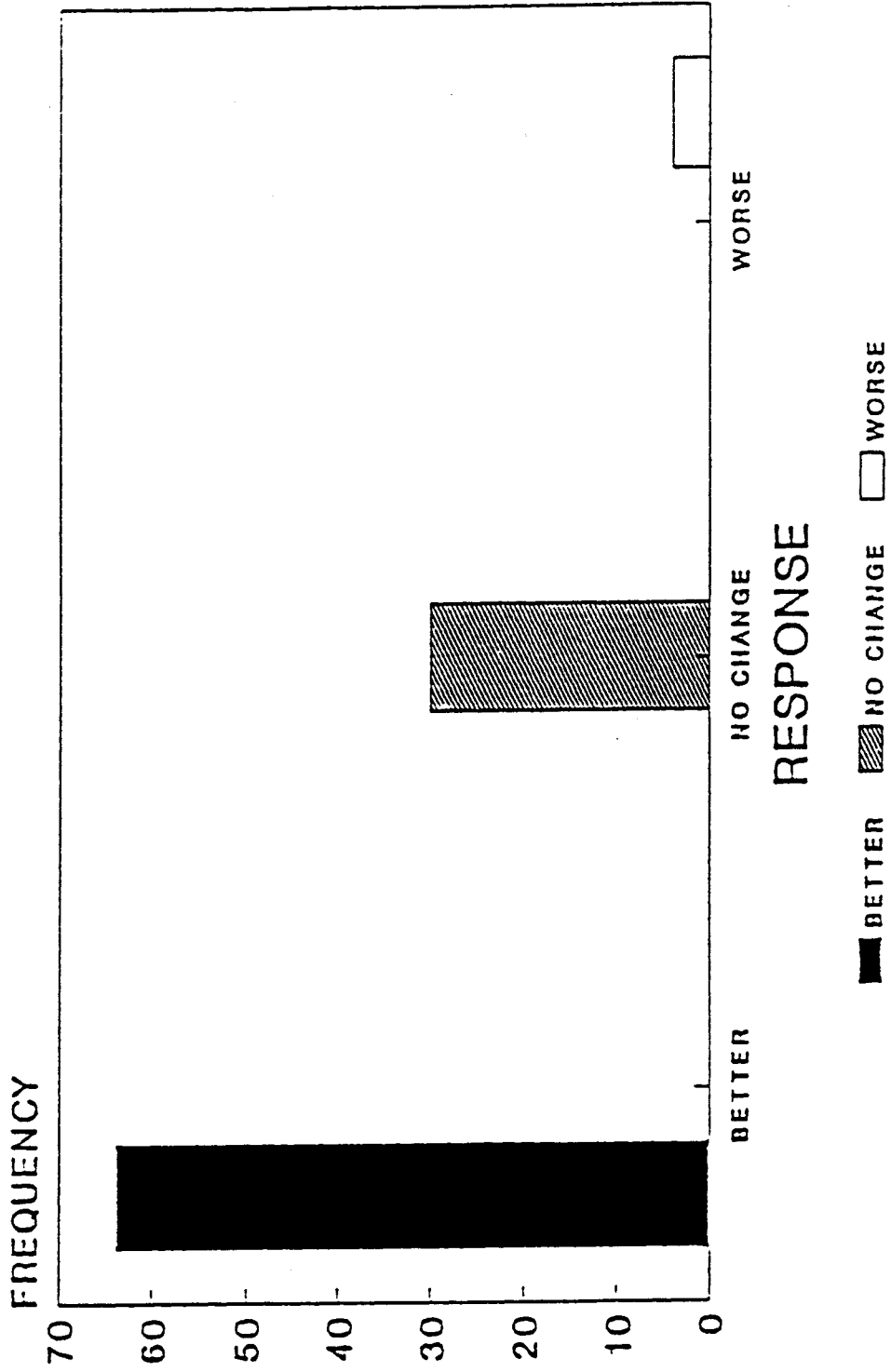


Figure 39.

# IN FAVOR OF THE BYPASS QUESTION 34

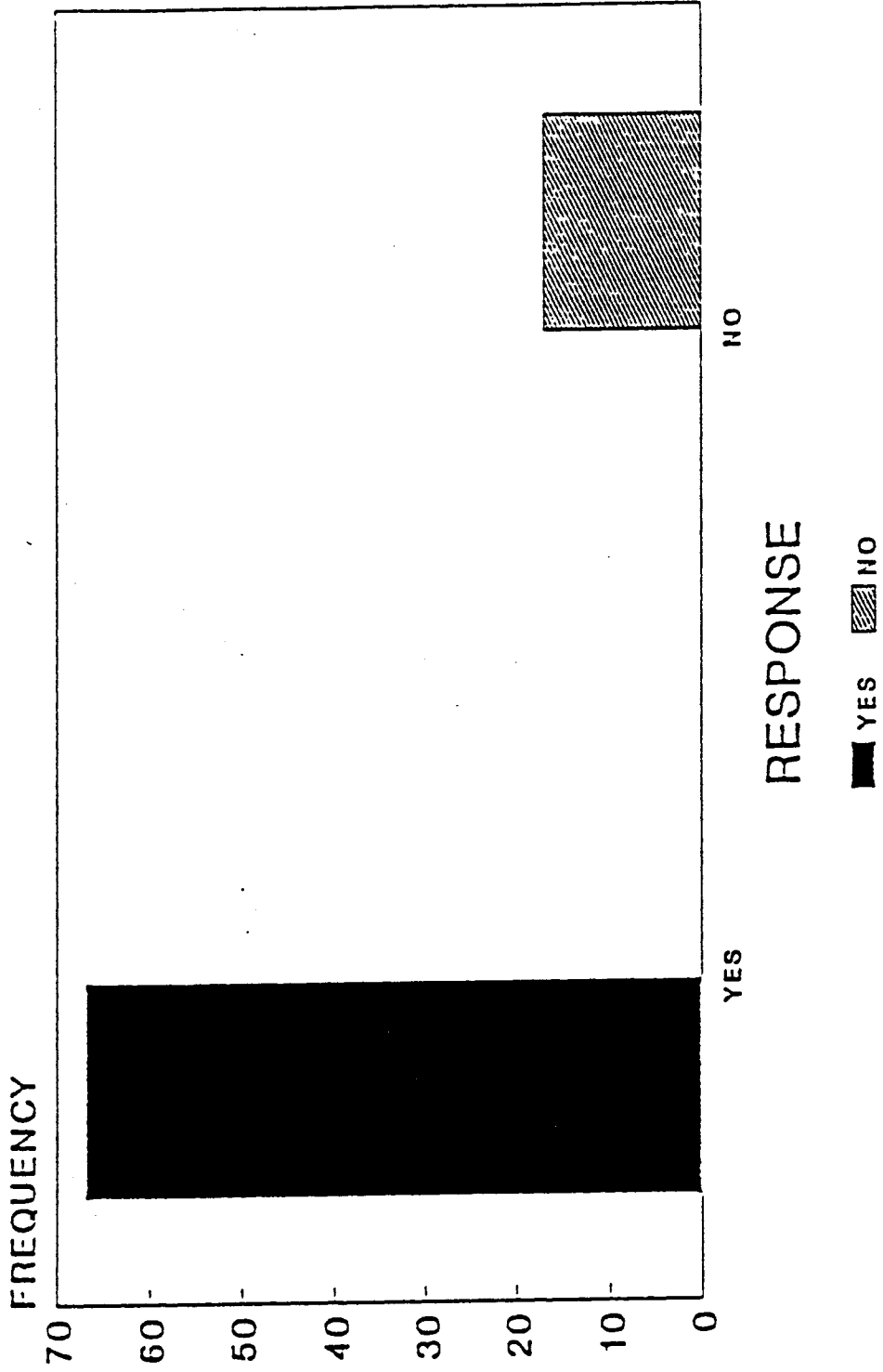


Figure 40.

# IMPACT ON BUSINESS QUESTION 33

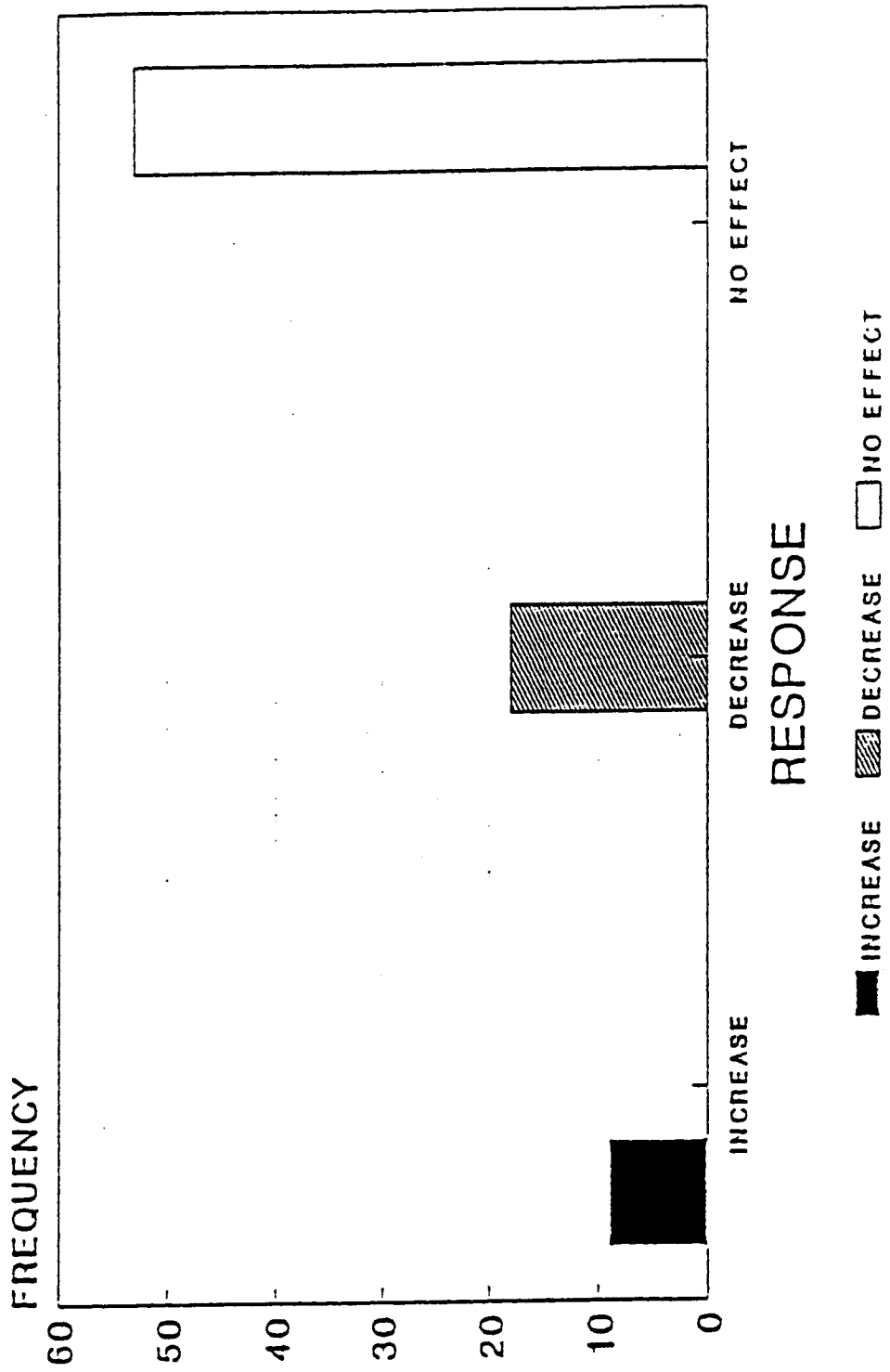


Figure 41.

# IMPACT ON OVERALL QUALITY OF LIFE QUESTION 13

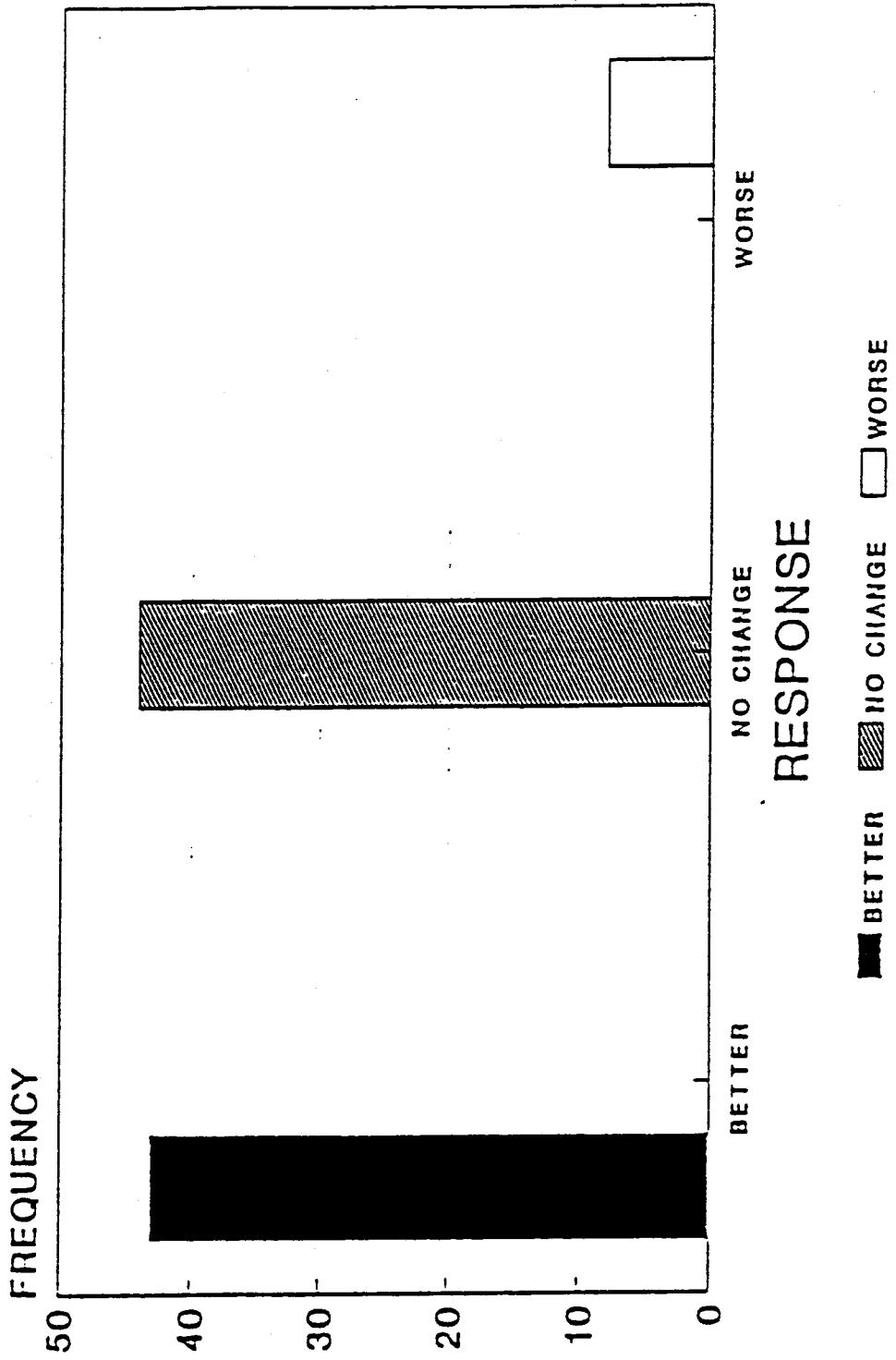


Figure 42.

# IMPACT ON SHOPPING ENVIRONMENT QUESTION 7

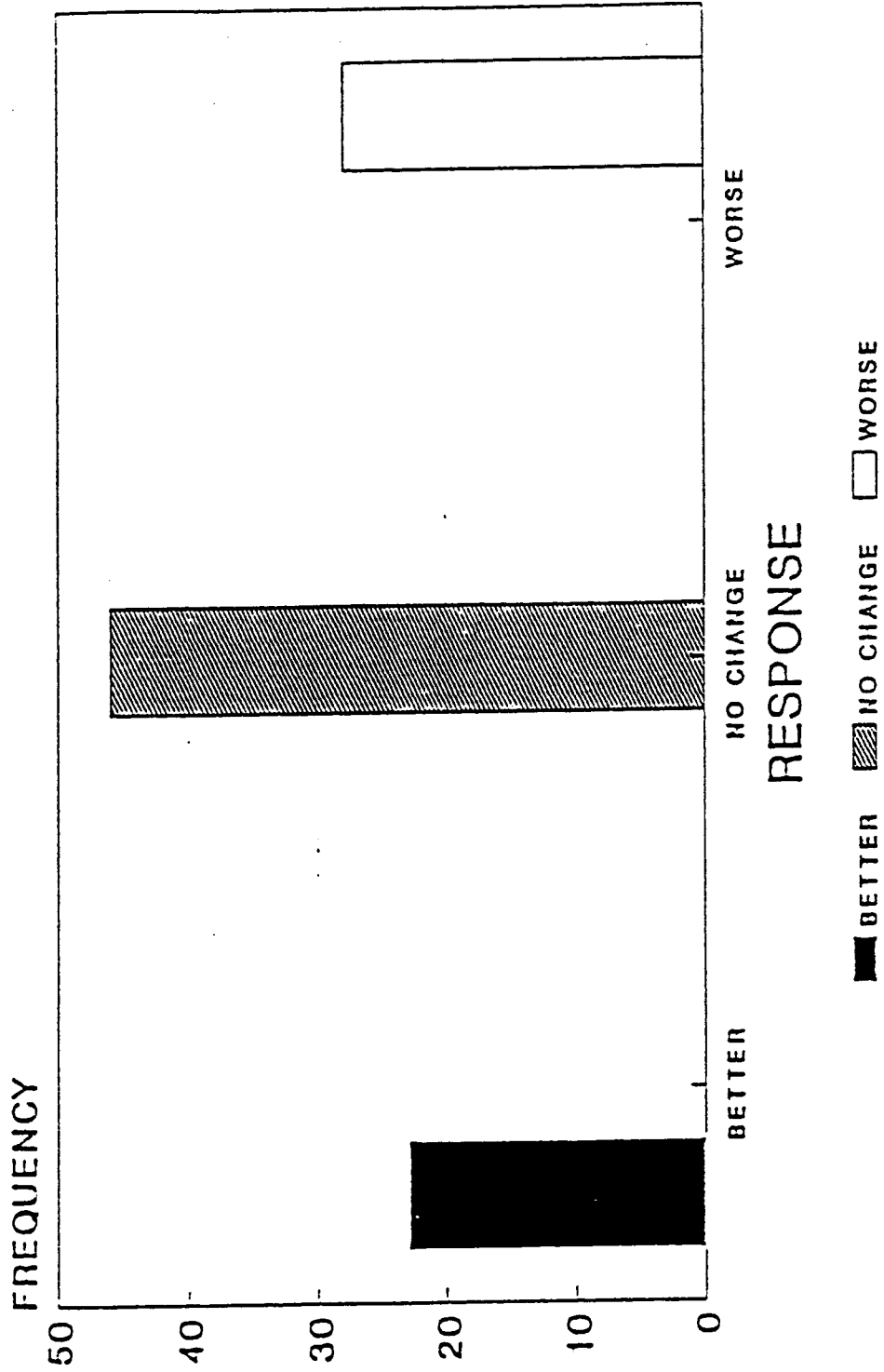


Figure 43.

# BUSINESS LOCATION RELATIVE TO BYPASS

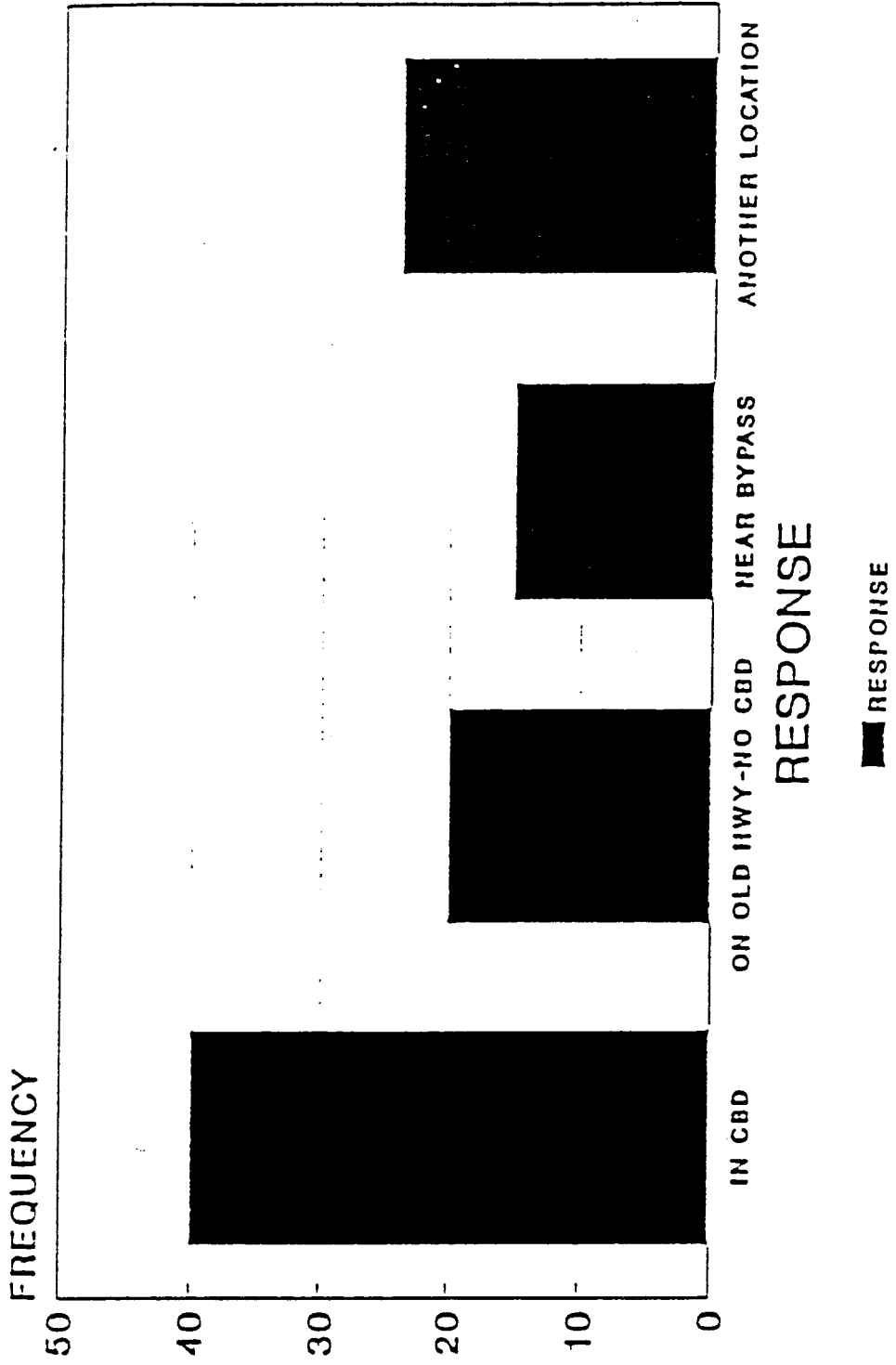


Figure 44.

# LOCATION BY NOISE Q31 BY Q1

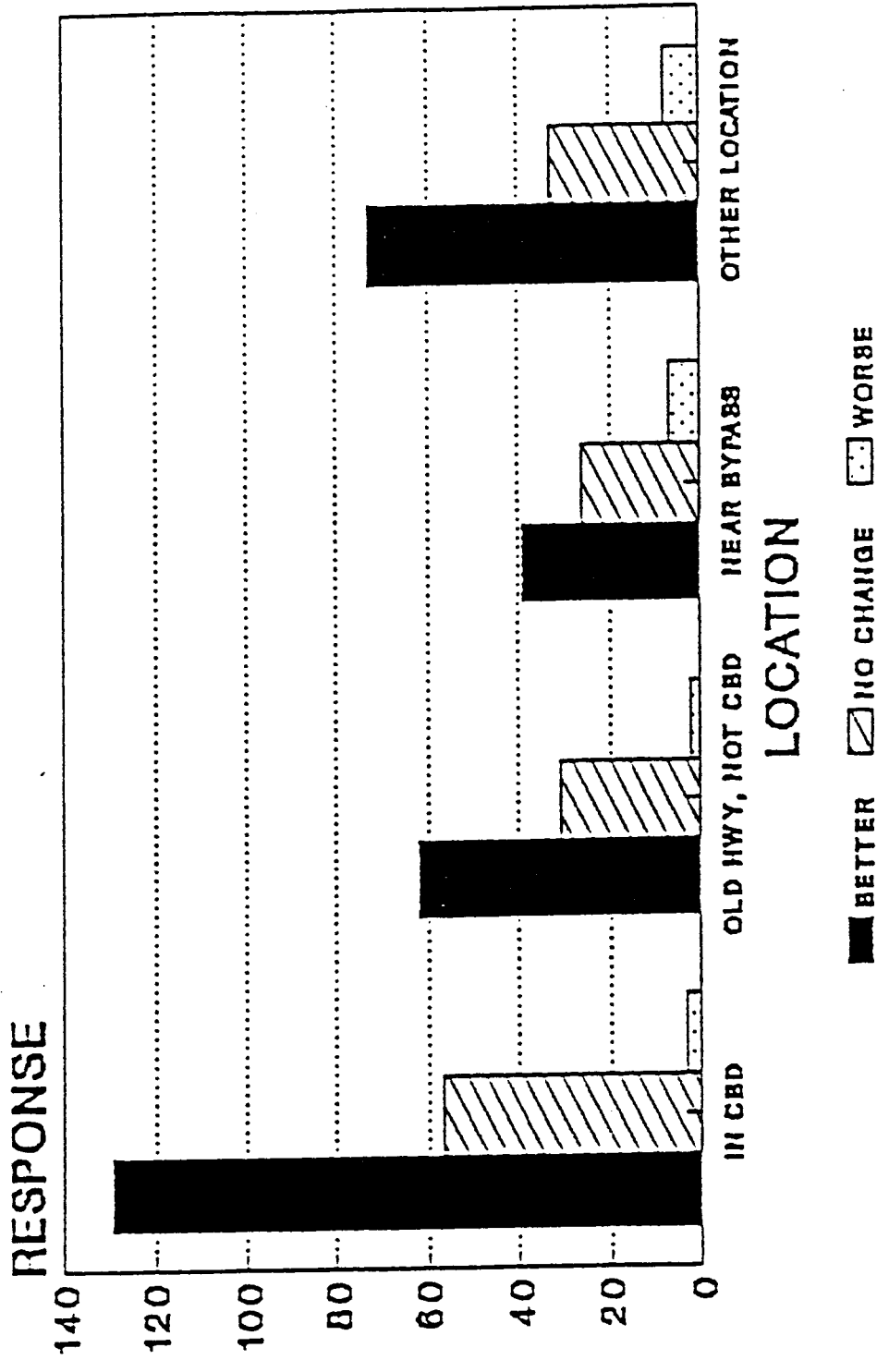


Figure 45.

# LOCATION BY QUALITY OF LIFE Q31 BY Q13

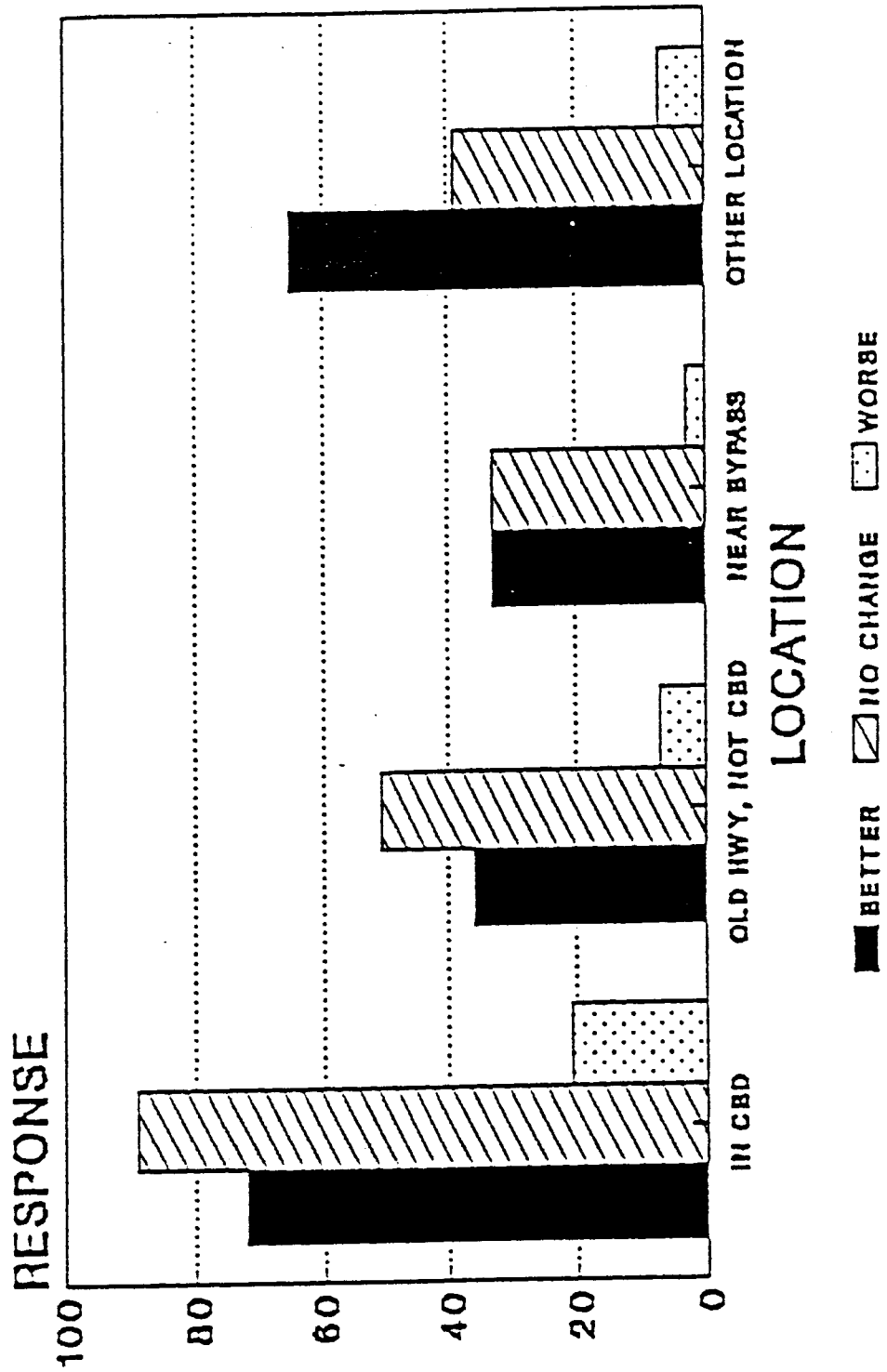


Figure 46.

# LOCATION BY SHOPPING ENVIR. Q31 BY Q7

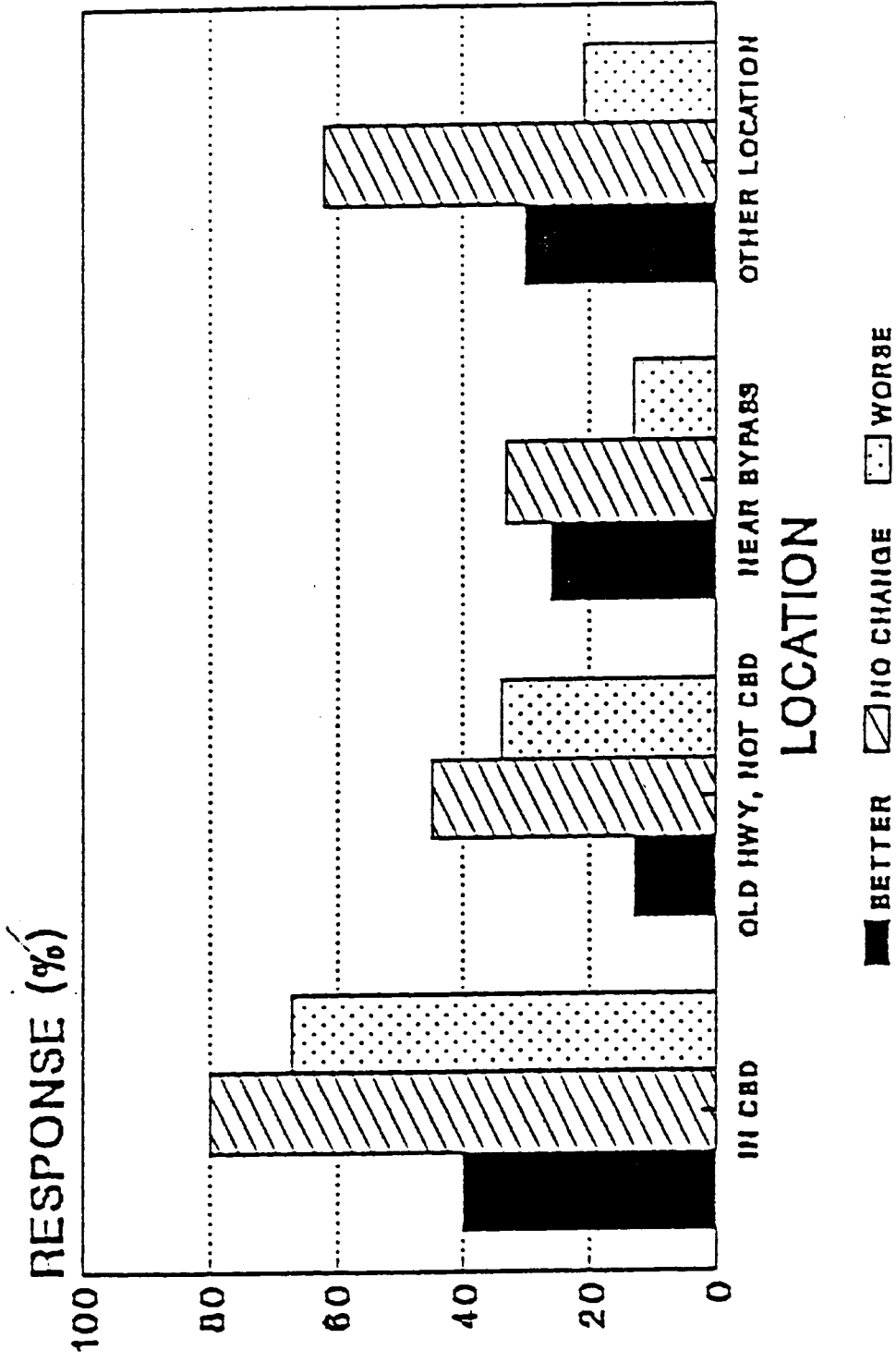


Figure 47.

# LOCATION BY VOLUME Q31 BY Q2

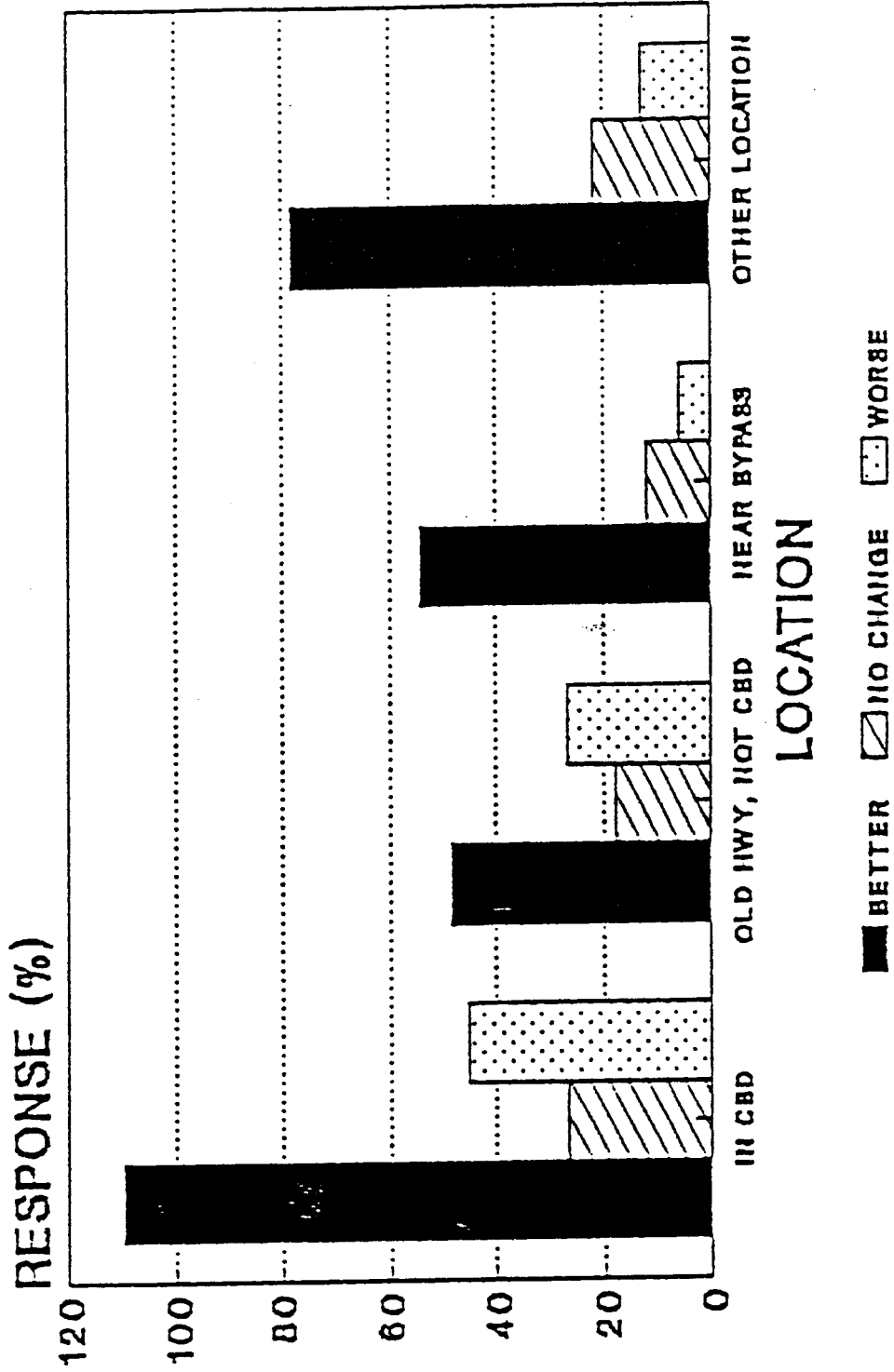


Figure 48.

# LOCATION BY CUSTOMERS Q31 BY Q8

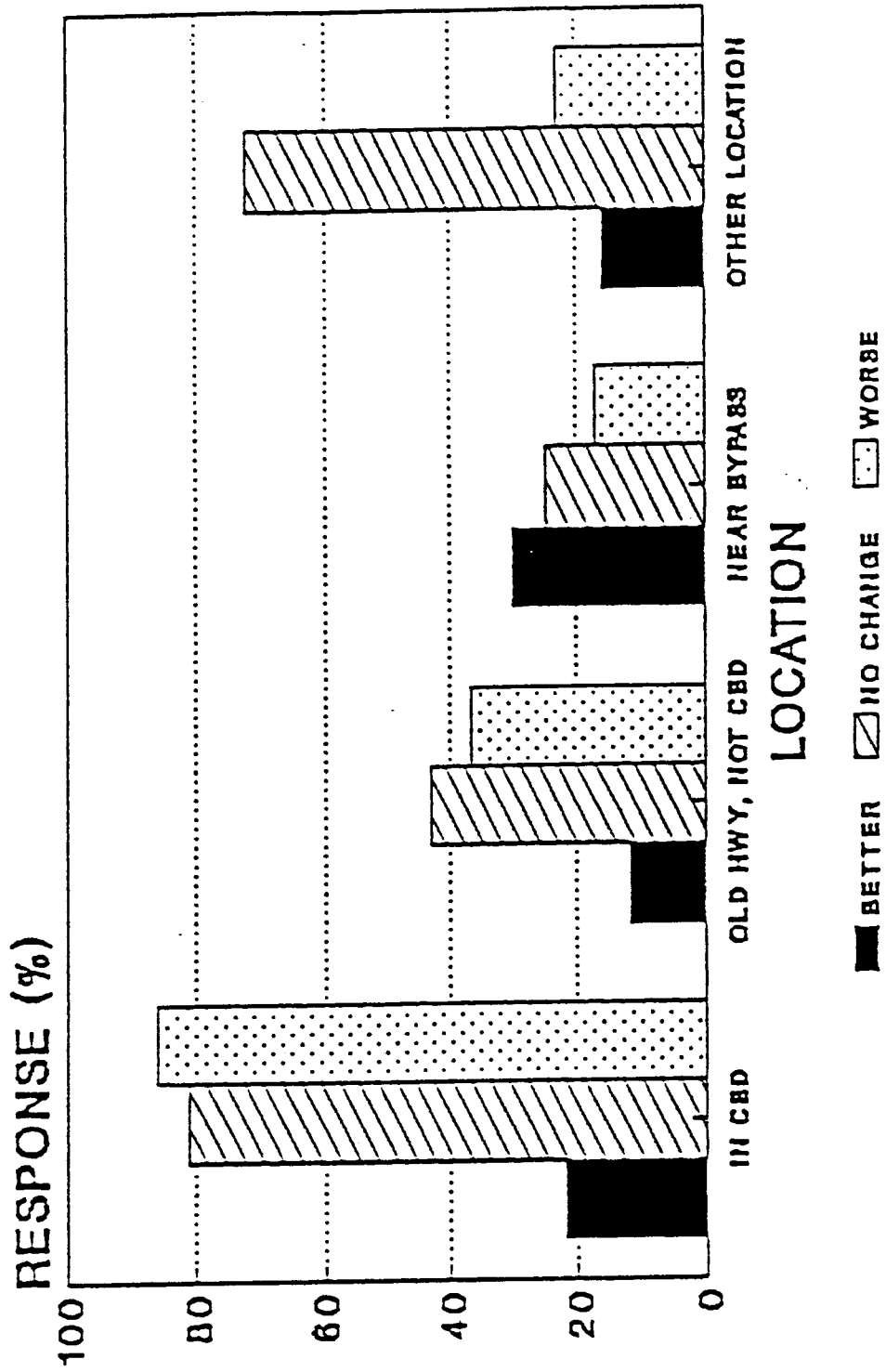


Figure 49.

# LOCATION BY SUPPLIERS Q31 BY Q9

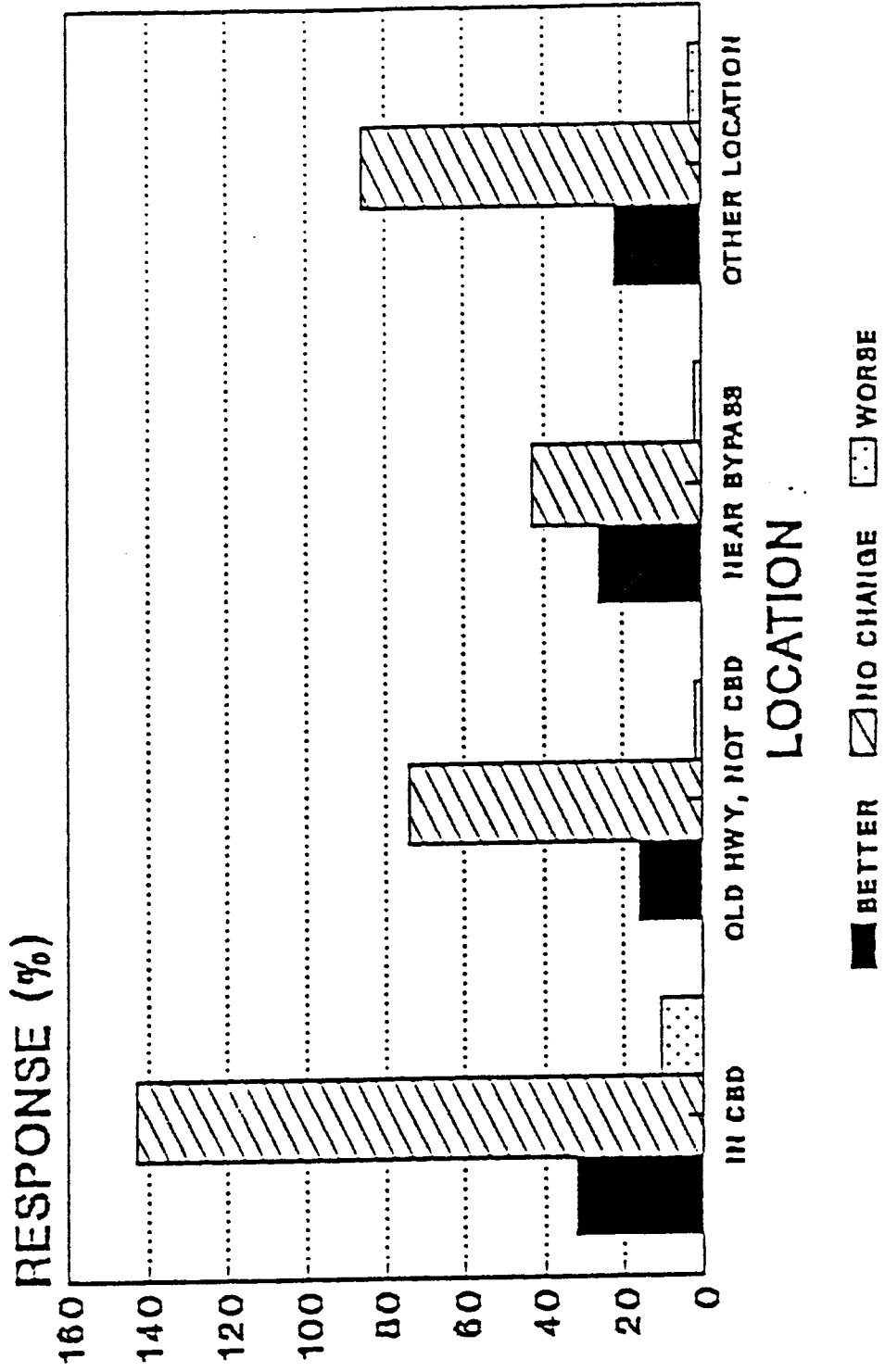


Figure 50.

# LOCATION BY DELIVER PROBLEMS Q31 BY Q10

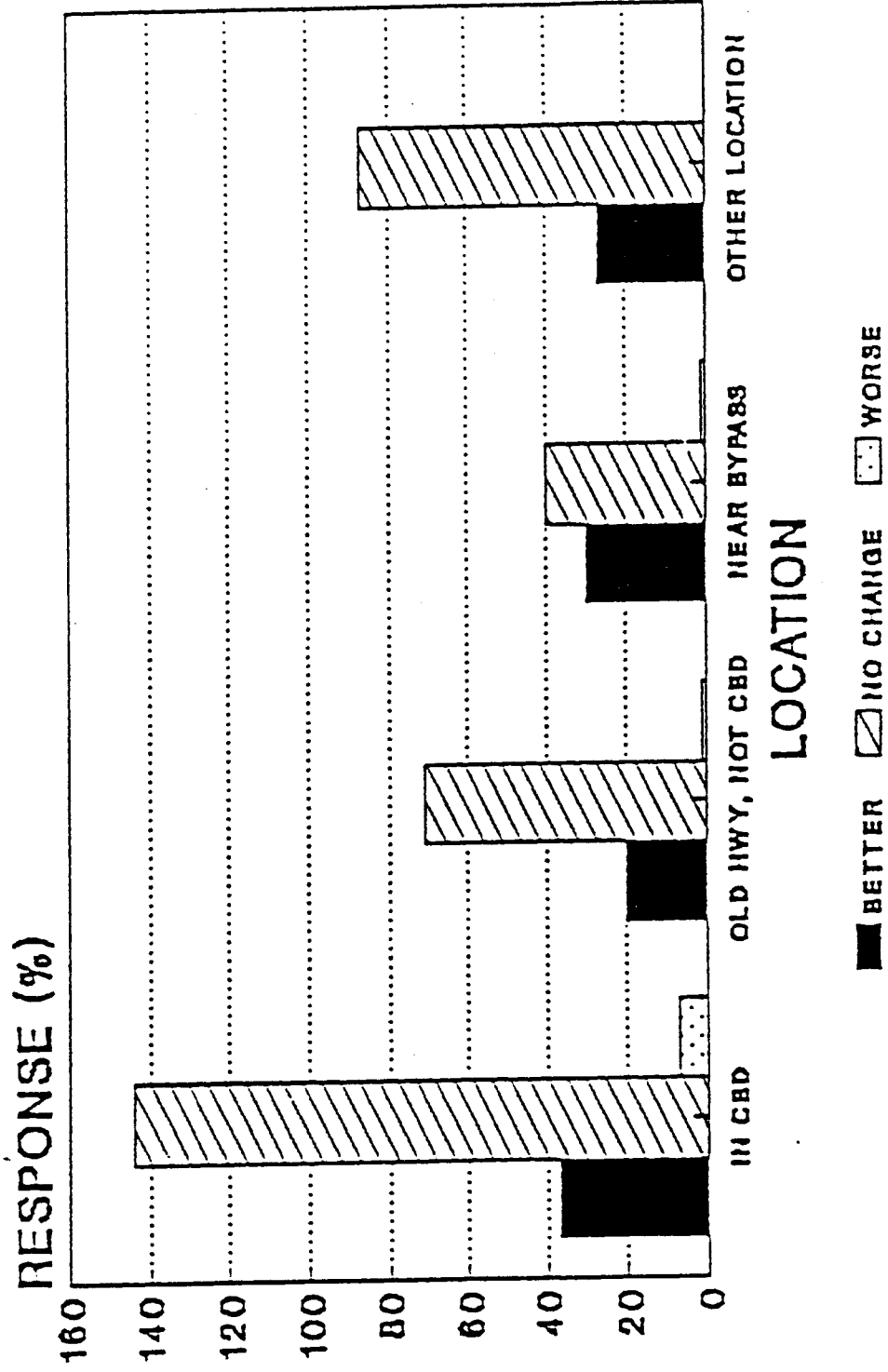


Figure 51.

# IMPACT ON OVERALL QUALITY OF LIFE QUESTION 13

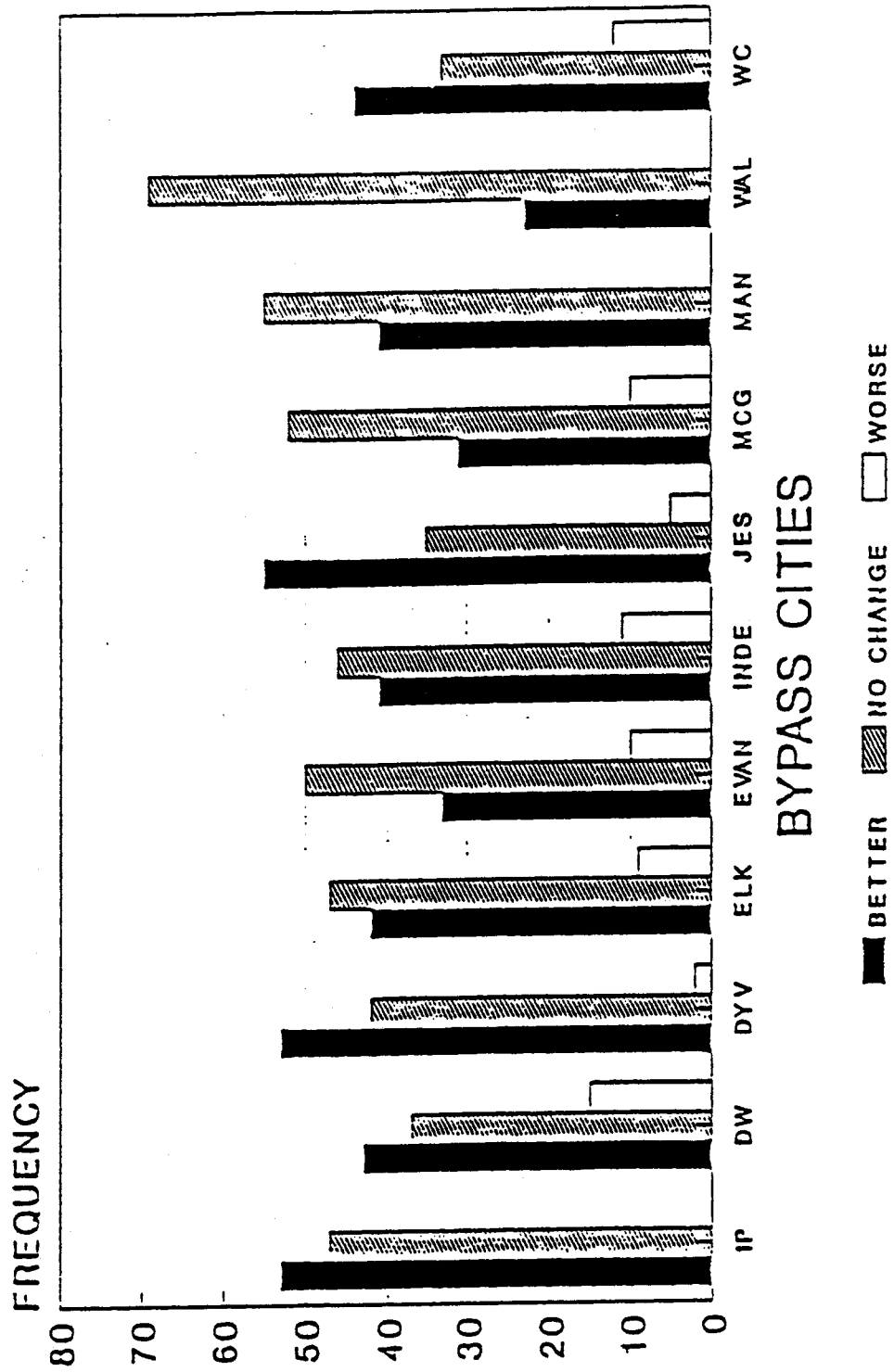


Figure 52.

# IMPACT OF HIGHWAY NOISE QUESTION 1

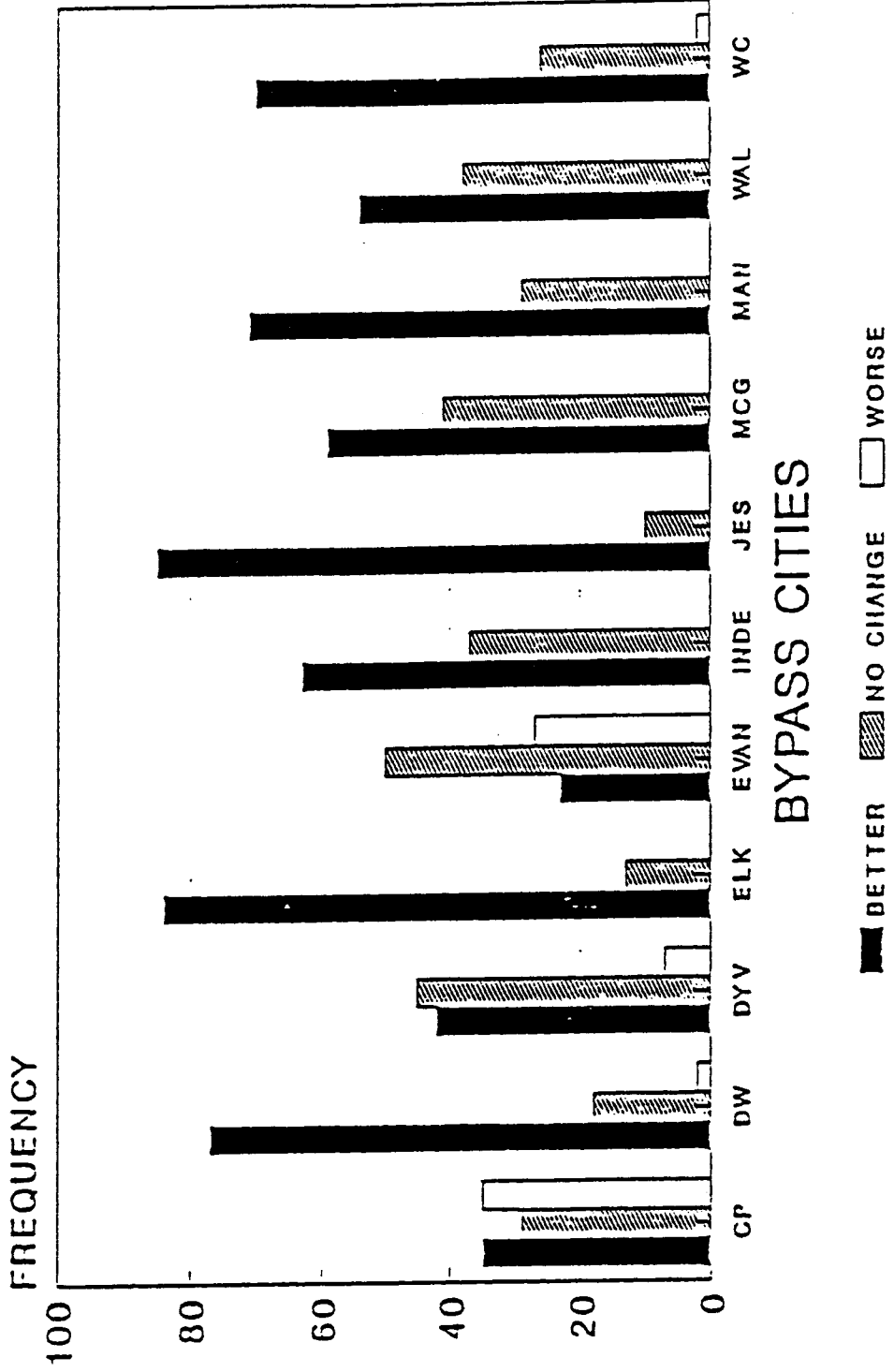


Figure 53.

# IMPACT ON SHOPPING ENVIRONMENT QUESTION 7

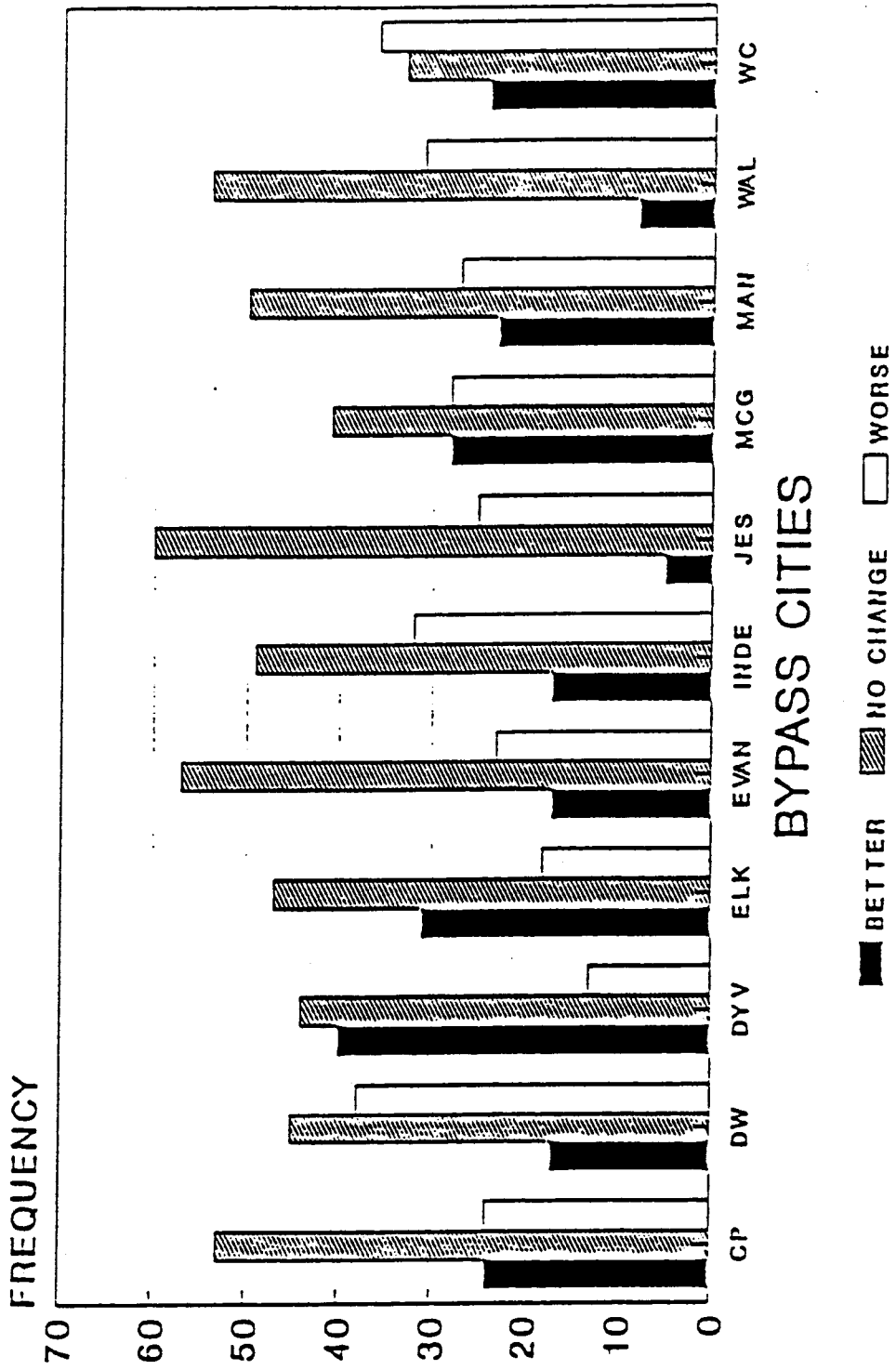


Figure 54.

# IMPACT ON BUSINESS QUESTION 33

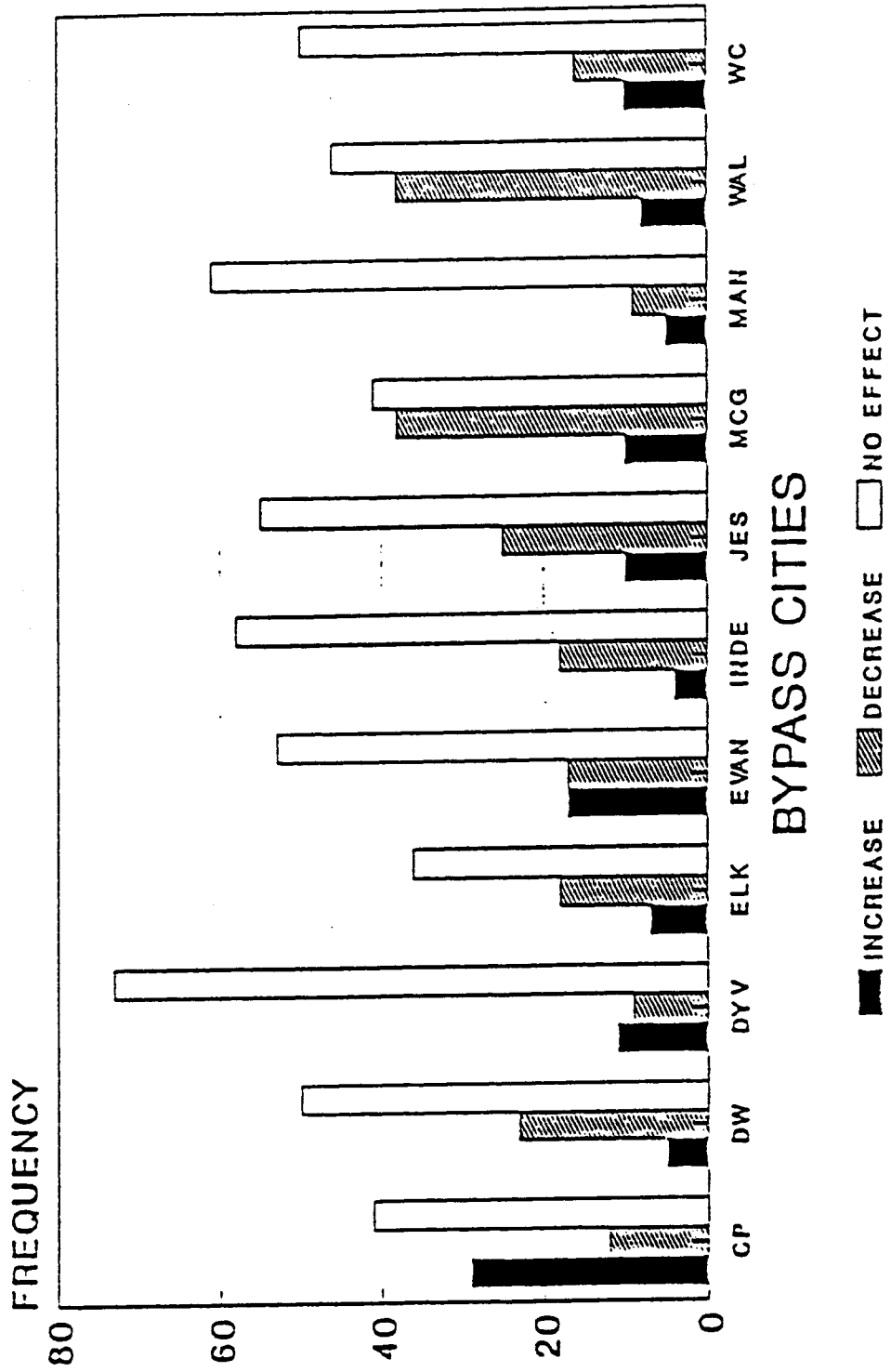


Figure 55.

# IN FAVOR OF THE BYPASS QUESTION 34

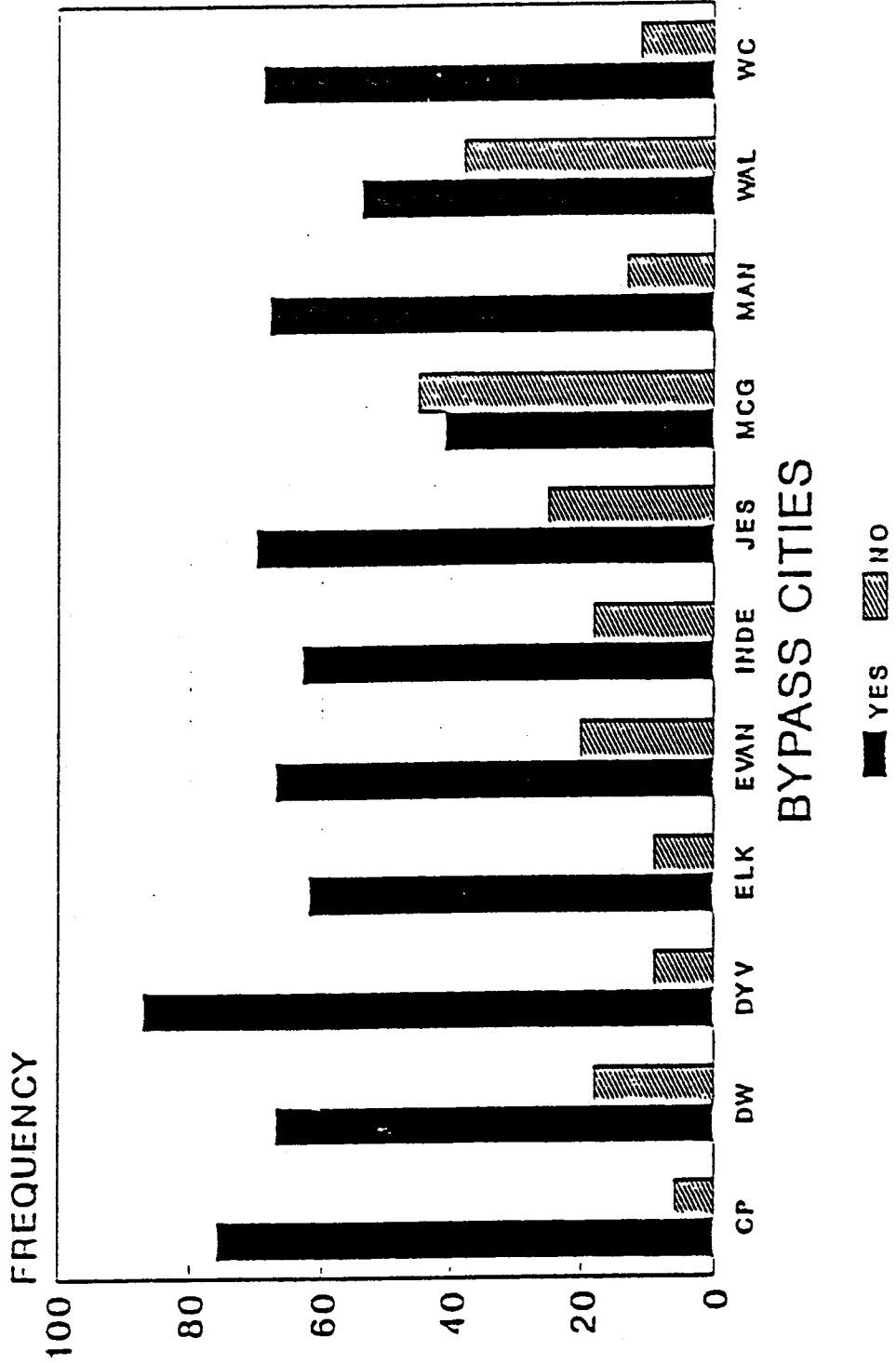


Table 1.

EYPASS TOWN NAMES	COUNTY	EYPASS YEAR	POP (1980)	POP (1988)
STATE OF IOWA			2913808	2833902
DE WITT	CLINTON	1984-85	4512	4320
DYERSVILLE	DUBUQUE	1988-89	3825	3930
EVANSDALE	BLACK HAWK	1986-87	4798	4490
INDEPENDENCE	BUCHANAN	1983	6392	6090
MANCHESTER	DELAWARE	1988-89	4942	4720
WEBSTER CITY	HAMILTON	1980	8572	8280
CENTER POINT	LINN	1984	1591	1693
ELKADER	CLAYTON	1981	1688	1510
JESUP	BUCHANAN	1983	2343	2121
MCGREGOR	CLAYTON	1989	945	797
WALKER	LINN	1984	733	673

Table 2.

BYPASS TOWN NAMES	COUNTY	BYPASS YEAR	POP (1980)
BEMIDJI	BELTRAMI	1982	10949
BUTTERFIELD	WATONWAN	1987	634
COLOGNE	CARVER	1974	545
CROOKSTON	POLK	1987	8628
LITTLE FALLS	MORRISON	1973	7250
MADELIA	WATONWAN	1977	2104
MILACA	MILLELACS	1987	2104
PRINCETON	MILLELACS	1980	3146
ST JAMES	WATONWAN	1978	4346
WILMAR	KANDIYOHI	1985	15895

Table 3.

CITY	# RESPONSES	PERCENT
1. Center Point	17	3.4
2. DeWitt	61	12.2
3. Dyersville	55	11.0
4. Elkader	47	9.4
5. Evansdale	31	6.2
6. Independence	78	15.6
7. Jesup	21	4.2
8. McGregor	29	5.8
9. Manchester	57	11.4
10. Walker	14	2.8
11. Webster City	90	18.0
TOTAL	500	100.0

