A Comparison of Retail Sales Performance Under Individual and Group Quota Systems

Karen Beth Bishop

Western Michigan University

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A COMPARISON OF RETAIL SALES PERFORMANCE UNDER INDIVIDUAL AND GROUP QUOTA SYSTEMS

by

Karen Beth Bishop

A Thesis
Submitted to the Faculty of The Graduate College in partial fulfillment of the requirements for the Degree of Master of Arts
Department of Psychology

Western Michigan University
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A COMPARISON OF RETAIL SALES PERFORMANCE UNDER INDIVIDUAL AND GROUP QUOTA SYSTEMS

Karen Beth Bishop, M.A.
Western Michigan University, 1987

The research goal of this study was to determine if changing from an individual to a group quota system changed variability in sales performance. Data were collected within three branches of the company. Within subject and within group variances were calculated using salesclerk's sales figures. Three months of 1986 represented individual quota figures, while the same three months of 1987 represented group quota figures. Results of the within group variance found two departments had a variance decrease and one department had a variance increase. Cumulative sales for both systems found decreases in sales using the group quota system for two departments of $3,837 and $16,535 and one department increase of $11,699. Paired t test indicated nonsignificance. Apparently, changes in sales were not a result of the group quota system.
ACKNOWLEDGEMENTS

This thesis is dedicated to my parents, Phyllis and Russell Bishop, whose constant love and support enabled me to obtain this degree.

I would also like to express deep appreciation to David Lyon, Dale Brethower, and Paul Mountjoy for their consistent attention in the preparation of this study. Special thanks goes to James Dion for his willingness to allow me to be permitted access to the data.

Karen Beth Bishop
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CHAPTER I

INTRODUCTION

In today's corporation, focus is placed on its most valuable resource—the human resource. As our society moves into the future, we must become aware of the rapidity with which changes are occurring in our economic culture (Howe, 1977). Howe reports that in the future, corporations can anticipate reductions in sales and profits. Because of these reductions, it is widely believed that productivity is the necessary key for organization success, and the use of work groups is the means to increase its sales and profits (Aquilano, 1978; Cummings, 1977; Fisher, 1981; Weisbord, 1985). This study attempts to evaluate two quota systems used by salesclerks in a retail setting. The purpose of this study is to ascertain if a group quota system will evoke team selling behaviors for the salesclerks.

Raudsepp (1980) believes that when individuals work in a cohesive group toward a common goal, then productivity will increase. An example of group effectiveness is the use of semi-autonomous work groups. Fotilas (1981) reports that manufacturing companies that use semi-autonomous work teams have remarkable improvements in employee motivation and that these improvements can be
linked to the successful achievement of the financial goals of the companies. From this perspective, it appears that work groups are beneficial both to the organization and to the employees' morale. Fisher (1981) found improved employee morale and increased productivity in an optical laboratory as a result of the implementation of work groups. The individuals within the work groups were expected to learn all parts of a job necessary to make a completed product. Each group functioned as a separate business group that produced a product which was evaluated for quality and production effectiveness. As a result of the work groups and additional implementations, such as training programs, job security, and staff meetings, these changes improved the standard of performance and had increased productivity by 69%.

Researchers have found that when individuals function in groups, the collaboration can result in reduced monotony and stress (Aquilano, 1977; Fotilas, 1981; Weisbord, 1985). Fotilas (1981) believes that individuals assigned to work in groups will demonstrate a greater degree of involvement in their work than those assigned to work alone. This involvement is due to the power the group possesses to distribute and exchange tasks among group members as they wish. By using work groups, Fotilas concludes that there will be a reduction
in worker monotony and stress resulting in a decline in absenteeism and labor turnover. The latter problems affect not only the financial aspect of the organization, but the constant fluctuation in the work force which disrupts the normal operations of the productivity cycle (Wexley & Yukl, 1984). The disruption in the productivity cycle causes lost time due to training demands of replacement employees and poor product quality because of insufficient well-trained workers.

Aquilano (1977) also found that the application of work teams for mechanics in an automobile dealership leads to benefits such as increased productivity, decreased capital needs, and increased worker morale. Aquilano states that the use of the work teams reduced monotony by providing the workers the opportunity to jointly perform tasks and to rotate jobs with other employees in their skilled area. An explanation of the reduction in monotony when individuals are able to rotate tasks is found in the properties of intrinsic reinforcement. Intrinsic reinforcement increases behavior of an individual when a change has occurred within the environment. This form of reinforcement has positive consequences primarily because it is inherent in the design of a task and includes any kind of change in the task setting (Scott & Podsakoff, 1985). A change in the work environment or task can provide the employee with a
"newness" to their environment, thus reducing habituation effects caused by repetition. Weisbord (1985) provides an analysis advocating the use of teams in order to provide the workers with an outlet to release stress. The use of teams provides the opportunity for each member to receive feedback and to participate in open communication that will ensure team results. The feedback from one team member to another lets each individual know how he or she is functioning with respect to other individuals within the group. As Burke, Hayden, Luthans, Michael, & Odiorne (1981, p. 32) contend, the peer aspect of a group facilitates open communication among team members that allows for self-expression more than if in the presence of one's supervisor. The open communication within the team provides each member with the opportunity to observe that all the individuals within the team are performing within the same environment containing the same stresses. The team thus provides an outlet to relieve stress so that the workers can perform.

Another possible benefit of group processes is the ability for the individuals within the group to receive greater environmental reinforcement than an individual could receive alone. As Skinner (1953) states,

By joining a group, the individual increases his power to achieve reinforcement. . . . The reinforcing consequences generated by the group easily exceed the sum of the consequences which could be achieved by the members acting separately. The total reinforcing effect is enormously increased. (p. 312)
This reinforcement effect can be explained by the power that each member of the group has to display behavior upon which reinforcement is contingent. The interaction of the members within a group, therefore, enhances the opportunity for reinforcement. Once the group receives reinforcement from its environment, it is then allocated in varying amounts to each member of the group according to the proportion of his or her contribution to the system (Gray, Griffith, VonBroembsen & Sullivan, 1982; Griffith & Gray, 1978).

Griffith and Gray provide an empirical analysis in which small groups took part in controlled group tasks. Each group was exposed to varying schedules of reinforcement upon completion of a task. The researchers found that groups that were exposed to greater amounts of external reinforcement had less structural differentiation than groups that had minimal amounts of reinforcement. Structural differentiation refers to the distribution of internal group rewards. The researchers concluded that as the external reinforcement increased, the structural differentiation would eventually approach a state of equity within a group. Gray et al., 1982, describe differentiation as a social form of the "law of effect." These researchers contend that groups differentiate in order to solve environmental problems that they face. The groups exhibit differentiation as a
mechanism that allows exploratory behavior to solve the environmental problems. This differentiation is dependent upon the environmental reinforcement that the group receives regarding its successful performance. The researchers describe differentiation as following the "law of effect" such that activity and compliance are jointly and equitably distributed. Once there is behavioral equity within the group and effective problem solving behaviors are discovered, then exploratory behavior becomes unnecessary and individuals will tend to exhibit those behaviors that receive support from other members of the group. These stated findings support the conclusion that individuals within groups will act in concert with one another to achieve reinforcement that is contingent on their behavior.

An interactive plan which facilitates group processes that can result in positive effects upon an organization is the Scanlon Plan. The underlying theme of the Scanlon Plan is that the work force and management work together to elicit and develop ideas that are related to productivity. As Moore and Ross (1978) point out, establishing the teamwork between labor and management is an essential phase of the plan. They state that the "involvement system is designed to increase efficiency, reduce costs . . . and increase accountability (among employees)" (p. 1). The plan involves
workers in the development of ideas that will be a part of a new program, which decreases the threat of surprise and general resistance to change (Frost, Wakeley & Ruhl, 1974; Michael et al., 1981). Frost contends that if a worker is not able to influence his job assignment or the operating system in which he or she works, then the worker will experience frustration, alienation and a lack of involvement with the organization. These conditions often lead to tardiness, absenteeism, sabotage, and accidents, which in turn lead to losses in productivity, efficiency, quality and an eventual loss in revenue to the organization.

The incentive to the workers attributable by the Scanlon Plan is that a bonus is paid when the group produces more than the pre-established "norm" production value. Management's profit from the plan is derived from increased sales with no corresponding increase in overhead and labor costs (Lesieur, 1958). The Scanlon Plan has been evaluated by Kaiser Steel and the United Steel Workers of America (Geare, 1976). Results of the plan after the first eight months of implementation was a net cost savings of approximately $8 million. The work force received 32.5% of this total, while the company retained 67.5%. This finding demonstrates the value a Scanlon Plan can have both to the organization and to the worker.
Group processes operate on group contingencies while individuals operate on individual contingencies. It is necessary to distinguish between these two forms of contingencies in order to infer their relevance to the reinforcing properties of groups. McReynolds, Shimamura, and Speltz (1982) state:

Group contingencies differ from other group operant strategies (e.g., multiple individual or individualized reinforcement) in that the behavior of one or more group members determines the consequences received by at least one other member of the group. This procedure creates an interdependent social situation that can facilitate behavior change in group situations. (p. 533)

Dickinson, O'Brien, and Rosow (1982) argue that group contingencies may work in producing desired outcomes, but that it is uncertain what produced the results. Each individual within the group has unique characteristics which require different reinforcers. Conditions which motivate one employee to produce will not necessarily have the same effect upon the other individuals within a group. Proponents of individualized contingencies stress that the employees must first be aware of what response is needed in order to receive reinforcement. Once the correct response has been emitted, then he or she must immediately be provided with the reward.

Empirical studies have demonstrated that the use of group contingencies can strengthen targeted behavior.
(Alexander, Corbett & Smigel, 1976; Marholin & Gray, 1976; Speltz et al., 1982). Speltz et al. demonstrated the effects of group contingencies on low performing students ranging in age from seven to ten years old. This study found that students achieved their highest performance average when exposed to group contingencies rather than individualized contingencies. The target behavior rewarded was the correct completion of arithmetic worksheet problems during 10-minute work periods. Four reinforcement contingencies (rotating of individual and group) were treatment conditions applied during a multiple baseline design. The group contingency that resulted in the highest performance average was the identified responder group contingency. This type of contingency consisted of group reward based on the number of correct problems completed during the work period by an identified target student. The effects of the group contingencies increased social interaction among the students in each group. This finding supports the conclusion that individuals working within groups who are dependent upon each other to receive environmental reinforcement will work together under some conditions to achieve their goal.

Alexander et al. (1976) found that group contingencies were more effective than individual contingencies in increasing class attendance to pre-
delinquent male adolescents. A reversal design was used involving individual and group-based contingent reinforcement for class attendance. Group consequences required each student to attend all of his classes for any given day, and every participant would either receive one dollar or no one would receive money. Individual consequences consisted of each student receiving one dollar for each day that he attended all of his classes. The experimenters included daily group meetings in which each student was told how much of the day he had completed and was verbally praised for the classes he had attended. Results of the study indicated that group contingencies increased class attendance to the highest level which may, in part, be attributed to the effects of peer pressure during the daily group meetings in the form of encouragement and praise. This type of interaction evoked behaviors that encouraged each individual of the group to behave in such a way as to reach the group's common goal in order for all to receive reinforcement.

Marholin and Gray (1976) designed a group response-cost procedure in order to decrease cash shortages in a small business. An ABAB reversal design was implemented. Group response cost consisted of subtracting from each cashier's salary for a particular day the amount of cash shortage that exceeded one percent of that particular day's sales receipts. Results of the design found group
response-cost contingency immediately reduced the undesired cash shortages from a mean baseline shortage of 4.02% to a mean of .42%. These results support the generalization that group contingencies can significantly affect individual behavior in the desired direction.

This study attempts to evaluate two goal systems used by salesclerks in a department store. Previously, each salesclerk was given a weekly sales quota which he or she needed to obtain in order to pass his or her yearly evaluation to obtain a wage increase. Upon arrival, the new managers changed the individual quota system to a group quota system. Specifically, each department was assigned a weekly sales quota; the individuals within that department would have to work as a team in order to reach and surpass their goal. The research question in this study relates to the issue of the use of group quota. The results of the group process and the individual quota system were defined for comparison in terms of monthly individual and group sales data gathered during three successive months over a two-year period. The same calendar months, March through May, of 1986 and 1987 were used to evaluate the two quota systems in order to control for seasonal fluctuations, marketing changes, and stock availability.
This study differs from the procedures used in the previous cited studies in that specific individual responses are not required for group reinforcement. In this study, each individual's monthly sales were monitored to see how much the individual had contributed to the team goal, this design did not require each individual within a group to reach his/her goal in order for the total group to receive reinforcement. The studies cited by Alexander et al., 1976; Marholin and Gray, 1976; and Speltz et al., 1982 may be erroneously called "group contingencies" when in fact these designs operated on targeted individual responses prior to defining the availability of group reinforcement.
CHAPTER II

METHODOLOGY

Setting

The study was conducted in a mid-size department store complex that consisted of a main branch and two stores located in malls. The retail store employs approximately 350 individuals. The store predominantly sells clothing but also has cosmetics, home appliances and furnishings. An individual goal system for salesclerks had been functioning since the store opened. In this system, each individual within each department was assigned a sales quota relative to the number of hours he or she was to work each week. This goal was calculated by dividing the total number of hours worked in each department by the number of weeks in each month. This figure was then divided by the number of total hours worked in each department. Finally, each individual's weekly number of hours worked was multiplied by the department's computed hourly figure. The dollar goal for each department was based on its buyer's estimate of how much merchandise needed to be sold for a profit. Therefore, the individual quota was determined by dividing the buyer's estimate among the salesclerks according to the number of hours each worked per week.
The group goal system, which began operating on 1 March, 1987, assigned each department a quota for the total number of hours worked in the department. This goal was determined the same way as the individual quota; however, individual hours and individual goals were not specified. The departmental quotas for 1986 and 1987 were approximately the same. There were no major changes in the store's operation from 1986 to 1987.

General Assumptions

The author obtained permission to conduct this study from the Western Michigan University Human Subjects Institutional Review Board (see Appendix A). A contract was signed by the author and by the company's Executive Vice President which designated agreement of services rendered by both parties (see Appendix B). A three-month period in 1986 and 1987 was selected to collect sales figures for both individual and group quota systems. Sales figures for March, April, and May 1986 represent the individual quota system, while sales figures for March, April and May 1987 represent the group quota system. All sales figures were obtained from the store's monthly sales report, which contains individual weekly sales for each clerk in the three departments. There were 19 clerks reviewed and each department included three to 12 individuals. Department one had three
salesclerks replaced during the 1987 period, and Department three had one replacement during that period.

Data Collection

The managers at each of three stores served as data collectors. Each manager was given a procedural description and a worksheet for data collection (see Appendix C) to provide uniformity of the results with all three of the branches. The worksheets enabled the managers to list each clerk's sales for each of the specified months for each of the three departments. Sales figures for March, April and May 1987 were taken from the store's sales report and were given to the investigator by the company's executive management. These figures were not obtained from the managers at the store branches as were the 1986 figures. All sales figures used in this study were derived from both part-time and full-time salesclerks. All calculations were computed by both the researcher and by the statistical services at Western Michigan University to check for reliability.
CHAPTER III

RESULTS

The purpose of this investigation was to ascertain the effectiveness of two different quota systems used for salesclerks. The research question was to determine if changing from an individual quota system to a group quota system led to a change in sales performance. This change would be reflected in the variance of sales performance for within subjects and within groups.

The variance in sales performance was chosen as the primary statistic to detect if the clerks were functioning as a team or as individuals within each department during the selected months. Within subject and within group variances were calculated. A comparison of the within subject variance for 1986 and 1987 would demonstrate the degree to which individuals had changed their selling "styles" to accommodate the new group system.

The data were analyzed to make individual and departmental comparisons within each branch. The test of variance \( \left( s^2 = \frac{\sum x^2}{n-1} \right) \) was used to detect within subject variances for sales of the specified three month periods of 1986 and 1987 (see Appendix D). The test of variance
was also used to compare within group variances using cumulative sales for each salesperson for the 1986 and 1987 period (see Appendix E).

All sales figures from the three different branches of the company were combined into their respective departments. The within subject variance was calculated from each salesclerk's monthly sales total. The within subject variance is defined as the variance calculated from the three monthly sales figures for each clerk. The mean of the within subject variance was calculated by dividing the sum of the within subject's variance by the total number of individual variance scores for the individual (1986) and group (1987) quota system.

Table 1 presents the mean and variance of the monthly sales for each clerk for the three-month period of 1986 and for the same three-month period of 1987. The total sales for each person for the three-month period in 1986 and 1987 are displayed in Column 1 and 4 of Table 1. Four of the 19 salespersons, identified with an asterisk, were no longer employed during 1987 and so substitute sales figures were drawn from the replacement (i.e., a different sales person). In Department 1, individual variances for clerks B, C, and D in 1986 were arranged to match the highest to lowest variance for 1987 in an attempt to maintain some consistency.
Table 1
Comparison of Individual Variances of Dollars Sold in Departments 1, 2, and 3 for All Store Branches for The Same Three Months of 1986 Under Individual Quota and 1987 Under Group Quota

<table>
<thead>
<tr>
<th>Sales-Person</th>
<th>Total Sales 1986</th>
<th>Mean Sales 1986</th>
<th>$s^2$ 1986</th>
<th>Total Sales 1987</th>
<th>Mean Sales 1987</th>
<th>$s^2$ 1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30,289</td>
<td>10,096</td>
<td>.112</td>
<td>34,597</td>
<td>11,532</td>
<td>.365</td>
</tr>
<tr>
<td>B *</td>
<td>27,827</td>
<td>9,276</td>
<td>.473</td>
<td>32,292</td>
<td>10,764</td>
<td>.505</td>
</tr>
<tr>
<td>C *</td>
<td>5,721</td>
<td>1,907</td>
<td>.144</td>
<td>5,565</td>
<td>1,855</td>
<td>.158</td>
</tr>
<tr>
<td>D *</td>
<td>18,897</td>
<td>6,299</td>
<td>.246</td>
<td>20,745</td>
<td>6,915</td>
<td>.214</td>
</tr>
<tr>
<td>E</td>
<td>26,131</td>
<td>8,710</td>
<td>.131</td>
<td>26,748</td>
<td>8,916</td>
<td>.988</td>
</tr>
<tr>
<td>F</td>
<td>18,406</td>
<td>6,135</td>
<td>.661</td>
<td>19,023</td>
<td>6,340</td>
<td>.124</td>
</tr>
</tbody>
</table>

$x_s^2 = .295$

<table>
<thead>
<tr>
<th>Sales-Person</th>
<th>Total Sales 1986</th>
<th>Mean Sales 1986</th>
<th>$s^2$ 1986</th>
<th>Total Sales 1987</th>
<th>Mean Sales 1987</th>
<th>$s^2$ 1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>74,778</td>
<td>24,926</td>
<td>.490</td>
<td>51,624</td>
<td>17,208</td>
<td>.928</td>
</tr>
<tr>
<td>B</td>
<td>26,102</td>
<td>8,700</td>
<td>.551</td>
<td>19,054</td>
<td>6,351</td>
<td>.521</td>
</tr>
<tr>
<td>C</td>
<td>15,204</td>
<td>5,068</td>
<td>.152</td>
<td>21,054</td>
<td>7,080</td>
<td>.199</td>
</tr>
<tr>
<td>D</td>
<td>50,747</td>
<td>16,916</td>
<td>.328</td>
<td>59,594</td>
<td>19,865</td>
<td>.904</td>
</tr>
<tr>
<td>E</td>
<td>28,495</td>
<td>9,498</td>
<td>.256</td>
<td>39,975</td>
<td>13,325</td>
<td>.131</td>
</tr>
</tbody>
</table>

$x_s^2 = .355$

$x_s^2 = .392$

---

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Table 1 -- Continued

<table>
<thead>
<tr>
<th>Sales-Person</th>
<th>Total Sales 1986</th>
<th>Mean Sales 1986</th>
<th>( s^2 ) 1986</th>
<th>Total Sales 1987</th>
<th>Mean Sales 1987</th>
<th>( s^2 ) 1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>19,930</td>
<td>6,643</td>
<td>.661</td>
<td>17,466</td>
<td>5,822</td>
<td>.563</td>
</tr>
<tr>
<td>B</td>
<td>22,256</td>
<td>7,419</td>
<td>.441</td>
<td>18,032</td>
<td>6,011</td>
<td>.202</td>
</tr>
<tr>
<td>C</td>
<td>24,936</td>
<td>8,312</td>
<td>.981</td>
<td>18,032</td>
<td>6,011</td>
<td>.202</td>
</tr>
<tr>
<td>D *</td>
<td>14,847</td>
<td>4,949</td>
<td>.224</td>
<td>9,779</td>
<td>3,259</td>
<td>.939</td>
</tr>
<tr>
<td>E</td>
<td>15,229</td>
<td>5,076</td>
<td>.366</td>
<td>21,110</td>
<td>7,037</td>
<td>.438</td>
</tr>
<tr>
<td>F</td>
<td>18,186</td>
<td>6,062</td>
<td>.676</td>
<td>19,541</td>
<td>6,514</td>
<td>.568</td>
</tr>
<tr>
<td>G</td>
<td>16,684</td>
<td>5,561</td>
<td>.227</td>
<td>19,484</td>
<td>6,495</td>
<td>.907</td>
</tr>
<tr>
<td>H</td>
<td>13,454</td>
<td>4,485</td>
<td>.478</td>
<td>16,324</td>
<td>5,441</td>
<td>.353</td>
</tr>
</tbody>
</table>

\[ \bar{s}^2 = .507 \quad \bar{s}^2 = .570 \]

Note. All variance scores rounded to nearest one thousandth taken from 10^8.

* Indicates different individuals employed during 1987.

In Departments 1, 2 and 3, the mean of the within subject variance for sales performance increased from the individual quota system to the group quota system by 33%, 51% and 12% respectively. These increases in within subject variance from the change to quota systems indicates that individual sales had less consistency when the group quota system was in effect. It can be speculated that if the individuals were functioning as a team, the within subject variance would have a decrease...
from the change to quota systems. This decrease would be due to the individuals rotating other tasks involved in the functioning of the department.

Table 2 presents the within group variance which were calculated by using the total sales figures for each individual for the months of March, April and May.

Column 1 and 4 of Table 2 represent total sales for each department under the individual and group quota systems respectively, and indicate a mean increase in sales for departments 1 and 2 and a decrease in mean sales for department 3. Comparing Columns 3 and 6, the results of the between group variance shows department 3 had a variance increase of 57% from the transition of individual to group quotas, and departments 1 and 2 had a variance decrease of 86% and 43%, respectively, when using the group quota system. If salesclerks were functioning as a team in order to reach their goal, then variance should have decreased from the change to the quota systems. This is because the individuals should be selling approximately around the mean dollars sold for the group.
Table 2
Comparison of Variances of Total Dollars Sold in Departments 1, 2, and 3 for the Same Three Months of 1986 and 1987

<table>
<thead>
<tr>
<th>Department</th>
<th>1986</th>
<th></th>
<th>1987</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Sales</td>
<td>Mean Sales</td>
<td>Total Sales</td>
<td>Mean Sales</td>
</tr>
<tr>
<td></td>
<td>s^2</td>
<td>s^2</td>
<td></td>
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<td>191,489</td>
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<td>145,522</td>
<td>18,190</td>
<td>.157</td>
<td>128,970</td>
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</tbody>
</table>

Note. Variance scores rounded to nearest one thousandth taken from \(10^8\).

In order to detect if the within subject variance differed under the two quota systems, the following statistic was applied to these data using the .05 level of significance.

\[
t = \frac{s^2_1 - s^2_2}{\sqrt{\frac{4s^2_1s^2_2}{n-2}(1 - r^2_{12})}}
\]

(Glass & Stanley, p.306, 1970). The results of this significance test would indicate if the actual within subject variances were significantly different between the two quota systems.
Table 3 summarizes the results of the test statistic used to compare within subject variances from each department's individual and group quota system. Three separate $t$ tests (one for each department) were performed. Variances and correlations used in the $t$ test were calculated by using the cumulative amount sold for the specified three-month period for each individual who was employed during the 1986 and 1987 time period. Replacement employee sales figures were not used. As indicated in Columns 4 and 6 respectively, the observed $t$ values for each department were less than the critical $t$ values, thus the null hypothesis was retained at the .05 level of significance.

Each of the $t$ tests indicated that the variance scores of the individual quota system and the variance scores of the group quota system were not significantly different from each other. The change from a individual system to the group quota system did not result in a significant decrease in variability. It can be inferred, then, that each individual within each department was selling at his/her same level for both the individual and the group quota systems. It is possible that the degrees of freedom were too small to add power to reject the null hypothesis. The probability of finding significance might increase if additional sales figures had been analyzed.
Table 3

Statistical Significance of Within Subject Variances for 1986 and 1987

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<tr>
<th>Department</th>
<th>$s^2_{86}$</th>
<th>$s^2_{87}$</th>
<th>$r$</th>
<th>Observed $t$</th>
<th>df</th>
<th>Critical $t$</th>
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<td>.80</td>
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<tr>
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<td>.162</td>
<td>.210</td>
<td>-.67</td>
<td>.505</td>
<td>5</td>
<td>2.57</td>
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</table>

Table 4 represents the statistical significance of the dollars sold under the two quota systems. Columns 1 and 2 of Table 4 present the mean dollars sold for the 1986 and 1987 periods. The dollars sold for individuals whose sales figures were reviewed during the three month period for the individual and group quota system were compared. This comparison was made to determine if the group quota system led to an increase in dollars sold per department. It was found that department 1 had a dollar increase using the group quota system, while departments 2 and 3 had dollar decreases. Specifically, department 1 had an increase of $11,699, while departments 2 and 3 had decreases of $3,837 and $16,535 respectively.
In order to detect which system was more profitable to the organization, each departmental cumulative sales were compared for 1986 and 1987. To detect significance, a paired correlated t test was used at the .05 alpha level: 

\[ t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sum d^2}{n(n-1)}}} \]

Three paired t tests were used to determine the significance of these dollar changes. All tests revealed no significant effect from the change of an individual quota system to a group quota system. As presented in Columns 5 and 6 of Table 4, the t obtained was less than the t critical requiring the null hypothesis to be retained at the .05 level of significance.

Table 4

Significance of Dollar Amounts Sold During the 1986 and 1987 Periods

<table>
<thead>
<tr>
<th>Department</th>
<th>( \bar{x}_{86} )</th>
<th>( \bar{x}_{87} )</th>
<th>( d^2 )</th>
<th>( n )</th>
<th>t Obtained</th>
<th>t Critical</th>
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<td>.426</td>
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<td>-1.63</td>
<td>2.57</td>
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<td>.257</td>
<td>7</td>
<td>.68</td>
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CHAPTER IV

DISCUSSION

Within subject variance scores were calculated for each individual in three specified departments to determine if a change from an individual to a group quota system would have an effect on the variability of a salesclerk's total monthly sales. The group quota system was implemented to evoke "team selling," and management anticipated that the within subject and within group variance scores for the group quota system would have less fluctuation than the variance scores of the individual quota system. Individual variance scores were calculated from each individual's monthly amount sold for the three specified months for each quota system. The investigator chose to use monthly sales figures; however, weekly sales figures could also have been used. The investigator determined that monthly sales would be a stronger indicator of sales performance rather than erratic sale fluctuations caused by shorter periods of time, e.g., hourly or weekly.

Results of the study found the mean within subject variance increased for all three departments using the group quota system. The within group variance decreased in two departments after the change to quota systems with
one department having an increase in variance. The within group variance finding suggests that, as individuals, the group quota system had a decrease in variance because the clerks were working as a team to reach their goal. The clerks were able to rotate tasks other than selling in order to obtain their goal; e.g., maintenance, stock, and other tasks necessary to the functioning of the department.

The comparison of the within subjects and within group variance (i.e., Tables 1 and 2) found that within group variances for the group quota system were smaller than the within subject mean variances. Specifically, each department had an overall smaller variance than the average individual variance using the group quota system. This finding suggests that each salesperson did not have a change in the dollar amounts sold, regardless of the quota system in effect. However, the overall departmental variances were decreased by those individuals who changed their selling patterns to accommodate the new group system. Salesclerks who did change their selling behaviors may have been at either extreme of the departmental mean of sales (i.e., high or low). They changed their selling "style" in response to the new team approach. This caused their sales to stabilize around the mean of the team, thus causing a decrease in variability.
Although team effort was found in the within group variances as a result of the group quota system, the significance testing concluded that the changes were not significantly different to conclude that the group system was the causal agent. As the results also indicate, the group quota system led to two departments having a decrease in sales as compared to the individual quota system sales during the specified period.

Three cautions were found from the evaluation of this study. First, the findings in this research may have been affected by the evaluation of a new system too early in its implementation. For example, the salespersons within the departments may not have fully understood the new quota system's procedures and consequences in order for them to maximize the full potential of the system. The results could have been produced simply by a carryover effect from the old system. The salesclerks might not have yet adjusted to the new system and were employing their old skills to accommodate the new system.

The second caution which may have contributed to the results may have been the incentives provided to the salespersons for working in a group manner. Incentives for the group quota system consisted of recognizing the year's top ten sales producers for the entire company. Also, members of the team with the highest sales at the
end of each quarter could select a gift from a special catalog. Given monthly was one "most valuable person" award and a gift certificate. Selections were based on customer service, sales area appearance, sales, and overall teamwork. The names of these individuals were placed on a plaque displayed at their store. These incentives may not have been reinforcing to the individuals within the departments. If incentives are not reinforcing, then the individuals will not be motivated to work as the system required. Why work for something you do not want?

The new incentive system contained components of the original individual incentive system in which individuals were still being singled out as a "high" seller and that particular individual received the recognition. Individual incentives do not involve team participation, rather they evoke individual competition. If reinforcement can be obtained by performing separately rather than as a team, then the individuals within a group will most likely behave separately. Also, it could be that reinforcing the exemplar performer is more reinforcing and beneficial to the salesclerks than it is to reinforce the whole selling team. Another explanation of the results may be that there may have been a lack of social reinforcement within each department for the individuals to behave in a group manner. This lack of reinforcement
may have caused an avoidance behavior on the part of an individual, thus causing the team concept not to be rewarding.

The final caution found was that additional measures need to be looked at to establish if the group quota system had any effects upon the workers and the company. A questionnaire could be sent to all salesclerks asking if they felt a decrease in stress and monotony as Aquilano (1977), Fotilas (1981) and Weisbord (1985) have suggested as a benefit from group processes. The questionnaire could also ask if the salesclerks had changed their selling behaviors to accommodate the group quota system. The company should also focus on other aspects of the selling system, such as the store's buyers. If, for example, the buyers of each department are not buying appropriate merchandise, then the sellers are not going to be selling much of it to the public.

An alternative incentive system for the company to use for its salesclerks could be to delete the individual "high" seller and implement the department "high" seller. This would involve each department competing against the same department in a different branch of the store.

Each store manager could post large signs indicating how much each department within the store has sold and compare those figures to how much the other two stores have sold in each department. The managers could track
these figures on a weekly basis and then reinforce the high selling team in each department at the end of each month. This type of system not only provides feedback to the salesclerks on their performance, but it also provides competition between departments. Both of these factors might produce increases in amounts sold in each department because the salesclerks could see how they compare to their peers. This would then motivate them to work harder in order to obtain the desired reinforcement. This type of system would be beneficial to both the individuals within the "high" selling department and to the company as well. The individuals within the high selling department would receive the reinforcement (e.g., bonus, time off, recognition) which would be likely to motivate them to continue to have high sales in order to obtain the reinforcement again. The company would benefit from this type of system in that the total amounts sold would be increased by having all sales teams within each department selling high in order to obtain the group reinforcement rather than having just a few individuals trying to reach high selling status as the old system did.

Another alternative system would to be establish individual goals that must be met before the group would receive reinforcement. This type of group contingency is similar to those that have proven successful in producing
desired responses of all individuals within a group, as indicated by the previously mentioned research (Alexander et al., 1976; Marholin & Gray, 1976; Speltz et al., 1982). This type of system requires that all individuals within a group must reach their established goals before the group can obtain its reinforcement. The group contingencies rely on the use of assistance that the group members provide each other in order for each individual to reach his/her goal. These contingencies also involve, to some extent, peer pressure. Peer pressure acts as a feedback mechanism to the individuals within a group by letting them know if they are helping or hurting the chances of the group to obtain reinforcement. This usually motivates the individual who isn't performing appropriately to improve his/her performance.

The company could use a commission type system that could be implemented for use in groups or for individual incentive ("With Commission Programs," 1984). This type of system provides monetary incentive to the salesclerks. In general, most commission systems have a ratio of base pay to commission pay such that the more the individual sells, the more he/she will earn. This type of system will work provided the individual finds money reinforcing. As Tyagi and Block (1983) report, the ability for monetary rewards to motivate an individual
depends on the individual's satisfaction with money. If the salesperson is compensated more than what he/she had expected, then he/she will be satisfied. If the individual receives less than what he/she expected, then he/she will be less satisfied. As the article, "With Commission Programs," 1984 concludes, commission systems are difficult to get started and take commitment for years before the payoff is seen, but once the results can be seen, the system will be beneficial (financially) to both the salesperson and the company.

The results of this study imply that group quota systems do not work in a sales environment. The previously cited studies by Aquilano (1977), Fisher (1981) and Fotilas (1981) indicated that increased productivity resulted from using group systems. However, it must be noted that those groups were functioning within manufacturing environments. These particular manufacturing environments were more adaptable to a group system because a team can produce a product according to how the individual members deem it beneficial to them and the product itself. In a sales environment, the goal is to sell as much of the products as possible. It would seem to be more beneficial to the company to have its salesclerks on individual contingencies rather than having all salesclerks selling at the same level to meet a group goal. Sales would always remain constant without
any deviation from a high seller.

To conclude, the present study suggests that the group quota system in this retail store did not work as expected. Individuals did not work as a team and sales decreased. The group quota system may have worked if it were implemented at all levels of the stores hierarchy. As Moore and Ross (1978), Frost et al. (1974) and Michael et al. (1981) state, involvement from all the parties that will be affected by the change will increase efficiency and accountability, and will reduce the threat of surprise, change and resistance.

Future research on individual and group quota systems might entail the implementation of each system on a multiple baseline design. For example, each branch of a company (or each department within a company) would receive the new system at different intervals. Increases in sales performance after the baseline data level had been established would indicate an affect of the system and would rule out other extraneous variables. Further recommendations would be not only to evaluate the quota systems function on performance, but also the incentive system that is a part of the particular quota system.
APPENDICES
Appendix A

Human Subjects Review Board Approval
Western Michigan University
Human Subjects Institutional Review Board

Human Subjects Approval Form

Protocol \\

Received:

DIRECTIONS: Please type or print each response - except signatures. Refer to the Western Michigan University Policy for the Protection of Human Subjects to determine the appropriate level of review.

PRINCIPAL INVESTIGATOR Karen Bishop
DEPARTMENT Psychology

Home Phone 323-0141 Office Phone 363-1914
Home Address 2314 Quincy, Kalamazoo Office Address 2010 Seibert Admin.

PROJECT TITLE: Effects of performance of a group goal system as compared to an individual goal system in a retail setting.

SUBMISSION DATE: 3-24-87 PROPOSED PROJECT DATES 4-87 TO 6-87

Note: The principal investigator should not initiate the research project until the protocol has been reviewed and approved by the Human Subjects Institutional Review Board.

APPLICATION IS: X New Renewal Continuation Supplement

SOURCE OF FUNDING: N/A

Signature of Investigator

STUDENT RESEARCH (Fill out if applicable.)
Name of Student Karen Bishop Phone 323-0141 Address 2314 Quincy, Kalamazoo, MI

The research is: Undergraduate Level x Graduate Level

Faculty Advisor Dr. Paul Mountjoy Department Psychology

Signature of Faculty Advisor

VULNERABLE SUBJECT INVOLVEMENT (Fill out if applicable.)
Research involves subjects who are: (check as many as apply)
1. _ children approximate age__
2. _ mentally retarded persons check if institutionalized
3. _ mental health patients check if institutionalized
4. _ prisoners
5. _ pregnant women

6. Other subjects whose life circumstances may interfere with their ability to make free choices in consenting to take part in research

(Describe Please)
LEVEL OF REVIEW: Please indicate here if you think that the research project is exempt from review, subject to expedited review, or subject to full review.

X Exempt (Forward 1 application to IRB Chair)
Which category of exemption applies? # 5

Expedited (Forward 2 applications to IRB Chair)
Subject to full IRB review (Forward 8 applications to IRB Chair)

Comments:

Your application was reviewed and the Human Subject Institutional Review Board (HSIRB) has determined that:

1. The proposed activities, subject to any conditions and/or restrictions indicated in Remarks below, have (a) provided adequate safeguards to protect the rights and welfare of human subjects involved, (b) established appropriate procedures and/or documents to obtain informed consent, and (c) demonstrated that the potential benefits of the research substantially outweigh the risks.

2. The proposed activities, for reasons indicated in Remarks below do not provide adequate protection for the rights and welfare of the human subjects.

At its meeting on __________, the HSIRB [approved] (provisionally approved... see remarks) this application with regard to the treatment of human subjects. The HSIRB categorized this application as:

1. Involving subjects at no more than minimal risk.

2. Involving subjects at more than minimal risk.

REMARKS:

Signature HSIRB Chair Date
The purpose of this study is to evaluate the effectiveness of two goal systems used in a retail store for its sales clerks. The store that will participate in this study is a department store located in Kalamazoo, Michigan. Specifically, an individual goal system was used in 1986 and a group goal system has been implemented for 1987. The research will focus on the hypothesis that there will be a decrease in variability of performance from using the group goal system as compared to the individual goal system.

Three sales departments at each of the three branches of the store will be used as data sources. Sales figures for individuals in the three departments at each branch will be collected from the stores monthly sales report for the months of March, April, and May 1986. The same process will be used to obtain group data for the same months in 1987. A simple F test will be used to evaluate departmental variances using 1986 and 1987 data. All data obtained will remain confidential with the investigator. Individual names will not be used nor identified with their corresponding sales figures in this study.

The subject population will consist of approximately 27-36 individuals. The subjects vary in sex and age. The source of subjects are sales clerks who have been employed at the store for the months of March, April, and May of 1986 and 1987.

Subjects will be selected primarily on the criteria of having been employed by the store during March, April, and May 1986/87 time period. There will be 3-5 individuals per department per store involved in the study. Total subjects involved is approximately 27-36.
CONFIDENTIALITY OF DATA: Briefly describe the precautions that will be taken to ensure the privacy of subjects and confidentiality of information. Be explicit if data is sensitive.

Data will be collected from the store's monthly sales report. Dollar amounts will be obtained for each individual during the 3-month period. During the data collection phase, individual names will be used to ensure that each individual was employed during the 1986/87 time period. This will be necessary for the investigator to identify possible variability in the data. However, individual names will not be used with their corresponding sales figures in the documentation of this research.

BENEFITS OF RESEARCH: Briefly describe the expected benefits of the research.

Benefits of this research will be a data-based evaluation determining if a transition from an individual goal system to a group goal system decreases variability in performance.

RISKS TO SUBJECTS: Briefly describe the nature and likelihood of possible risks (e.g., physical, psychological, social) as a result of participation in the research.

The likelihood of risk to the individuals involved is null. This study is simply evaluating existing data that the store retains monthly by permission of the store CEO.

PROTECTION FOR SUBJECTS: Briefly describe measures taken to protect subjects from possible risks, if any.

The subjects involved in the study will not be subject to any risks in that only their sales figures will be used and not their names.

INFORMED CONSENT: Please attach a copy of the informed consent form. If oral consent will be obtained, describe procedures for obtaining and documenting such consent. (Subject should be given a copy of the consent form).

Oral consent was obtained from the store's CEO to the investigator to conduct this study and to use data from existing sales reports. A final consent form will be signed by the store's CEO and the investigator describing mutual agreement of the research and its methodology.

QUESTIONNAIRES OR INTERVIEW SCHEDULES: If questionnaires, interview schedules or data collection instruments are used, please identify them and attach a copy of what will be used in the project.

N/A
TO: Karen Bishop  
Paul Mountjoy  

FROM: Ellen Page-Robin, Chair  

DATE: May 11, 1987  

This letter will serve as confirmation that your research protocol is now complete and has been signed off as approved by the HSIRB.  
If you have any questions, please contact me at 383-4917.
Appendix B

Contract
TERMS OF AGREEMENT

The researcher, Karen B. Bishop agrees to provide the client, (A Department Store) with an analysis of the client's previous and current goal systems in use for its sales clerks. The client agrees to allow the researcher with access to the stores monthly sales report's in order to obtain sales figures for each individual within the following departments: Better sports wear, Mean's wear, and Housewares.

All sales figures used in this study will not be identifiable with the corresponding employees name. Thus, this research will involve no risk to the employees within the specified departments used in this study.

The undersigned have agreed to the terms of this contract in full and, therefore, make this contract valid.

_________________________
Client's Signature

_________________________
Researcher's Signature

_________________________
Date
Appendix C

Memo
MEMO

TO: Karen Bishop.
FROM: Karen Bishop.
DATE: February 20, 1987
RE: Data Collection

This memo is to inform you of a study that I am conducting under the direction of Mr. Jim Dion and with the input of Beverly Abbott. I am attempting to evaluate the goal system of the sales clerks by comparing last year's "individual" goal system with this year's "group" goal system. Specifically, I will be using three departments in the store: Mens, Better Sports Wear, and Housewares.

For each department, I need each clerk's weekly amount sold for the months of March, April, and May of 1986. Also, I will need the weekly amounts sold for those same individuals for March, April, and May of 1987 when the figures become available. To decrease variability, I would like to use the same individuals during the specified 3 month period for 1986 and 1987 if this is possible. Enclosed is a worksheet that should be filled out and returned to Beverly Abbott (Downtown). This worksheet pertains only to data March, April, and May 1986 data. If you have any questions on this matter, please contact Mrs. Abbott. Thank you for your cooperation.
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Appendix D

Individual Sales Figures
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BIBLIOGRAPHY


