CHAPTER 3
MOTIVATIONAL IMPACTS OF THE TYPE AND TIGHTNESS OF TARGET COST INFORMATION: A LABORATORY EXPERIMENT [1]

This paper investigates motivational impacts of the alternative methods of providing target cost information and the degree of tightness inherent in that information on the cost-reduction performance of product designers. Management accountants deal with the methods of improving the effectiveness and efficiency of target costing. An organization's target costing effectiveness represents the degree of success in achieving the target costs of products, functions or parts. The target costing efficiency addresses the cost/benefit ratio an organization realizes. A literature survey indicates that there has been no study thus far on how a product's target cost is translated into specific activities of individual designers.

Target costing is a profit management technique. It is used to ensure that future products will contribute planned long-term profits. The process used to achieve the planned cost reduction and profit increase often exerts intense pressure over the product designers. The constant pressure to meet target cost goals can cause management burn-out and create problems with the suppliers when the cost-reduction demand is passed down to them (Kato, Boer and Chow, 1995). These problems become impediments to a successful implementation of target costing.

In this study, we apply the goal-setting theory in psychology to the target-costing process and observe the effects of the alternative methods of providing target information and the target attainability on the cost-reduction performance of product designers. To achieve the per-unit target cost of a product, designers break the cost down to the functional elements assigned to design departments and further

down to part elements. The cost-reduction performance of product designers may vary since different types of target information and the level of tightness inherent in that target will motivate them in different ways. We examine how the different methods of providing target information and the attainability of the targets will influence cost-reduction performance.

3.1. Motivational Aspects of Target Costing

Motivational aspects of budgetary control systems have been examined extensively by behavioral accounting researchers (Argyris, 1952, 1990; Ansari, 1976; Brownell, 1982; Hofstede, 1967; House, 1971; Murry, 1991; Ronen and Livingstone, 1975). The emergence of target costing gives a new life to the study of motivational considerations. An effective way to determine the target cost is to link cost reduction activity to profit planning, and to approach the target cost based on long-range profit planning (Makido, 1989). Allowable cost represents the product manufacturing cost top management believes the product must be manufactured at to achieve the target profit margin. It acts as a signal to all involved in the target costing process regarding the magnitude of cost-reduction objective that eventually must be achieved (Cooper and Slagmulder, 1997).

If allowable cost is adopted as the target of efforts, it is not immediately attainable (Monden and Hamada, 1991). Since allowable cost is derived from external conditions and does not take into account the internal design and production capabilities of the firm, there is a risk that the allowable cost will not be achieved (Cooper and Slagmulder, 1997). Estimated cost based on the present conditions, however, cannot be the appropriate target of efforts. From top management's viewpoint, it is desirable to realize the largest possible target profit,

which tends to present the first allowable cost that is likely to be unrealistically ambitious (Monden, 1986).

The strategic cost reduction challenge represents the difference between the allowable cost and the product-level target cost based on the capabilities of the firm and its suppliers. The difference should reflect the challenge of the firm to match its competitors' efficiency. The target cost-reduction objective is set so that it is achievable only if the entire organization makes significant efforts to reach it. An excessively high level of target cost reduction objective risks workforce burnout and a low level may lead the firm to lose competitive strength (Cooper and Slagmulder, 1997). Determining the proper degree of target cost tightness is essential for a target costing system to be successful.

Motivational considerations must be considered in the determination of the attainability of target costs, minimizing the influence of the organizational power structure. Each target should be determined through consultations between managers and subordinates. An organization needs to devise methods that motivate employees to achieve their targets with a positive attitude (Monden and Hamada, 1991).

3.2. Research Issues

3.2.1. Effect of Target Information Types on Cost-reduction Performance

The product-level target cost is decomposed into discrete elements, along functions and components. Target cost information provided to product designers represents three types: (1) determining target cost by deducting target profit from the target sales price (which is sometimes called as allowable cost), (2) revising target cost by examining the possibilities of cost reduction when the estimated cost exceeds the

allowable cost, and (3) determining the target amount of cost reduction from the difference between estimated and target costs. The product designers will have different perceptions of the three target values. We test whether the different perceptions have any impact on their cost-reduction performance.

3.2.2. Effect of Target Cost Tightness on Cost-reduction Performance

To enable target costs to function as external benchmarks firms set target profit margins considering the capabilities of the most efficient competitor. Thus, the profit objective leads a firm to select either a difficult (low) or an easy (high) target cost. Firms frequently set target costs that can be achieved only with considerable efforts. A target cost can be set as a tight one or a loose one. The degree of tightness inherent in the target cost varies from one company to another. We analyze whether the difference in the level of tightness will have any impact on cost-reduction performance.

3.3. Experimental Design

There are two independent variables in this experiment: (1) types and (2) tightness of target information. Three types of target information and two levels of tightness will create a 3 x 2 matrix. Table 3-1 illustrates the cost-reduction process used in setting a target cost.

Table 3-1. Cost-reduction process in setting product target cost

Tightness / Target Information Type	Tight	Loose
Total ideal target (*IT*) Previous actual (*PA*) Total attainable target (*TT*)	**Group A** *IT*=(*PA*)×(1+.15) *TT*=(*PA*) ×(1+.10)	**Group D** *IT*=(*PA*)×(1+.15) *TT*=(*PA*) ×(1+.05)
Total attainable target (*TT*)	**Group B** *TT*=(*PA*) ×(1+.10)	**Group E** *TT*=(*PA*) ×(1+.05)
Previous actual (*PA*) Incremental Target (*INT*)	**Group C** *INT*=(*PA*) ×(.10)	**Group F** *INT*=(*PA*) ×(.05)

3.3.1. Target-Information Types

Each designing member of Groups A and D receives information relating to ideal target, total attainable target and previous actual performance. All members of groups B and E get the information on the total attainable target, while all members of groups C and F receive the information on incremental targets along with the previous actual performance. The target information given to groups C and F is more specific than those given to the other four groups. The differences among the target-information types represent perception differences. A total or an incremental target for tight and loose target groups are of the same magnitude but are presented differently. A group's "current total target number of correct answers" is equal to that group's "previous total target number of correct answers" multiplied by (1 + α), where α is a learning coefficient. In this experiment α is fixed at 0.10 and 0.05 for tight and loose target groups, respectively.

3.3.2. Information Tightness

Depending on the target information tightness, all groups are divided into two categories: tight and loose. Groups A, B and C receive tight targets while groups D, E and F receive loose targets. Each participant in the tight-target category always

receives a target that is ten percent above his/her previous actual performance. Each participant in the loose-target category received a target that is five percent above the previous actual performance.

3.3.3. Real World Practice versus the Experiment

In order to ascertain that our experiment resembles the real-world practice as much as possible, we identified the following analogy between them:

Real World	Experiment
1. Estimated cost	1. Actual number of correct answers
Estimated cost is the preliminary estimate of a product cost, assuming existing work structures, technology and processes. It is the cost to produce the new product designed with the existing production, capacity utilization levels and distribution methods. It is the accumulation of all cost related with a product without any target. No cost-reduction activities are assumed in computing the estimated cost of the product.	The subjects were encouraged to answer correctly as much as they can. No fixed target was given to them. The actual number of correct answer is considered equivalent to the estimated cost from the viewpoint that there is no specific number to be achieved in it. Estimated cost is simple accumulation of all products related cost also there is no specific limit. Real-world designers try to reduce the variety of parts by increasing the number of common parts. The number of correct answers in this experiment is analogous to the number of common parts.
2. Allowable cost = Target sales price × (1–ROS)	2. Ideal no. of correct answers = Actual no. of correct answers + Additional ideal no. of correct answers
Allowable cost is an early estimate of a target cost. It is determined by subtracting a required profit from a competitive market price and therefore is market	Ideal number of correct answers is the number that the subjects are expected to answer. Usually, this figure is

driven cost. The allowable cost is the maximum that can be committed to a product in the product planning process. A highly efficient firm will have lower allowable cost. This is somewhat idealistic rather than realistic. To sustain in the competitive market, the firm should be able to produce its products at this cost.

3. Target cost =
   Target sales price ×
   (1–Revised target profit rate)

Target cost is the allowable amount of cost that can be incurred on a product and still earn the required profit from the product. It is a market driven costing system in which customer requirements and competitive offerings set cost targets. Cost targets are achieved by focusing on product and process design and making continuous improvements in all support processes.

4. Target amount of cost reduction = Estimated cost – Target cost

The target cost-reduction objective is derived by analyzing the ability of the product designers and suppliers to remove costs from the product by the process like, value engineering. The cost-reduction activities continue until the estimated cost becomes equal to the target cost.

bigger than the actual number of correct answer. It remains the same for both the tight and loose target groups.

Ideal number of correct answer is equivalent to allowable cost in the sense that in determining the ideal number to be answered, the ability of the subjects is not considered.

3. Target no. of correct answers = Actual no. of correct answers + Incremental target no. of correct answers

Target number of correct answer is similar to target cost in the sense that the subjects have to answer the number as fixed by the experimenter to prove their efficiency. In reality also, the designers has to design the parts, function, or products at the target cost.

4. Incremental target no. of correct answers = Target no. of correct answers – Previous actual no. of correct answers

Incremental target number of correct answer is the difference between correct target number to be answered and the actual performance. If the actual performance of the subjects were less than their target, they would strive to increase their actual performance towards the target.

5. Amount of cost reduction

It is not always possible to close fully the gap between estimated cost and allowable cost. The amount of cost reduction is that amount of estimated cost that the designers can remove from the product.

5. Reciprocal of the actual number of correct answers

The more the subjects were motivated to obtain the correct answers, the higher would be the amount of cost reduction. The tasks simulated the cost-reduction activities of the parts designers. In reality, the estimated cost of preparing a designer's trial blueprints should decrease as the design activity is repeated. Similarly, the subjects attempt to increase the number of correct answers at each subsequent trial.

3.3.4. Research Methodology

We use the target costing laboratory experiment approach first used by Monden Akter and Kubo (1997). This experiment simulated a target-cost-setting process in an environment of product design and development. Ninety-six subjects (6 groups × 16 subjects), undergraduate students in the College of Policy and Planning Sciences at the University of Tsukuba, participated in the experiment under the supervision of five coordinators. The subjects were informed prior to the experiment that their performance in the managerial accounting course would be affected by how well they perform in this experiment. The following attributes of the subjects are noted: (1) They passed the rigorous Japanese engineering school entrance examination that requires a high standard of mathematics background. (2) They received an extensive lecture on target costing and took a practice test prior to the experiment. One sample question is included in the appendix 3.

Each subject was asked to add 125 five-digit items. The score earned on the first trial was used as the basis for computing the target for the second trial. Each subject's actual number of correct answers was converted to its reciprocal, representing the amount of cost reduction. It was assumed that the more the subjects were motivated to obtain the correct answers, the higher would be the amount of cost reduction. The tasks simulated the cost-reduction activities of the parts designers. In reality, the estimated cost of preparing a designer's trial blueprints should decrease as the design activity is repeated. Similarly, the subjects attempt to increase the number of correct answers at each subsequent trial. Real-world designers try to reduce the variety of parts by increasing the number of common parts. The number of correct answers in this experiment is analogous to the number of common parts.

To minimize potential differences in the calculation capabilities among the subjects, the actual performance ratio (the reciprocal of the score at the second trial divided by the same at the first trial) is used rather than the actual number of correct answers. A lower ratio indicates a better performance. At the beginning of each test, a coordinator informs the subjects of the target number of correct answers for that test. The target to be achieved in each subsequent period is increased by five percent and ten percent for loose and tight groups, respectively.

Coordinators were told to pretend to know nothing about the experiment. To control for bias, the coordinators collected the scripts and gave them to the members of another group. They then collected the marked scripts from the respective groups, wrote down the "current target number of correct answers" on the scripts, and used the number during the second trial. It took an average of two hours to

complete the whole task. The order of the task-performing groups was randomly assigned.

3.3.5. Experimental Procedures

1. All the subjects are divided into six groups who attended the seminar on management science of Professor Yasuhiro Monden.
2. The subjects sit for the examination relating to simple addition problem. All the subjects put their effort to achieve target number of correct answers. The ways of determining targets and giving target values differ from group to group.
3. Information given to each group will be as follows:

Tightness / Target Information Type	Tight	Loose
Total ideal target (*IT*) Previous actual (*PA*) Total attainable target (*TT*)	**Group A** *IT*=(*PA*)×(1+.15) *TT*=(*PA*) ×(1+.10)	**Group D** *IT*=(*PA*)×(1+.15) *TT*=(*PA*) ×(1+.05)
Total attainable target (*TT*)	**Group B** *TT*=(*PA*) ×(1+.10)	**Group E** *TT*=(*PA*) ×(1+.05)
Previous actual (*PA*) Incremental Target (*INT*)	**Group C** *INT*=(*PA*) ×(.10)	**Group F** *INT*=(*PA*) ×(.05)

4. Each test will be conducted within 5 minutes and will be evaluated based on correct answers.
5. The coordinator of each group will distribute the question paper to the members of the concerned team and will collect the question papers after the test is over and exchange the papers with the coordinator of the other group. The coordinator then distribute the received question papers to the members of the concerned group, and then conduct the grading scheme by reading audibly the

answers that have been prepared beforehand. Then the actual number of correct answer is to be written on the left top of the question paper.

6. The coordinator of each group will collect the question paper when the grading is over, deliver these to the coordinator of the other group, and then take back the question papers of own group. He will calculate the "this time target number of correct answer" and write on the question paper of next trial. However, groups B and E would not have any such information.
7. After receiving the question paper for next trial, each member will be able to know about the information relating to "this time target number of correct answer" which will be different for each member.

3.3.6. Variables

3.3.6.1. Types of target information

Four types of target information were given among the six groups. These are (1) ideal number of correct answer, (2) previous actual number of correct answer (3) total attainable target number of correct answer, and (4) additional target number of correct answer.

• *Total attainable target for groups A, B, D, and E,*

Total target number of correct answers in the second test = Total target number of correct answers of the first test × (1 + α), where α is a learning coefficient. For groups A and D, α is fixed at 10%, while for groups B and E it was determined at 5%.

• *Ideal target for groups A and D,*

Ideal no of correct answers =Previous actual no of correct answers + Additional ideal no of correct answers

= Previous actual number of correct answers × (1+0.15)

• *Incremental targets for groups C and F,*

Incremental target number of correct answers = Target number of correct answers – Previous actual number of correct answer

= Previous actual number of correct answers ×(.10) and ×(.05) for groups C and F respectively

• *Previous actual for groups A, D, C, and F,*

The actual number of correct answers at first trial was informed to the members of these groups before their second trial

3.3.6.2. Levels of tightness

Two levels of tightness are used: (1) tight and (2) loose.

• *Tight target group,*

Groups A, B, and C belong to the tight target group where in the second test, the members were provided with 10% higher target than the actual performance in the first test.

• *Loose target group,*

Groups D, E, and F belong to the loose target group where in the second test, the members were provided with 5% higher target than the actual performance in the first test.

3.3.7. Statistical Method Applied

For the statistical analyses, we used two-way Analysis of Variance (ANOVA). Our experimental data fulfill all the conditions for the use of ANOVA:

(1) each of the samples is drawn from a normal population,

(2) all of the population has the same variance, and

(3) the absence of many factors that might affect our conclusions concerning the factor(s) to be studied.

Data Handling

To remove the calculation abilities among the students, actual performance ratio (APR) data of all the students was used for the analysis purpose. APR was calculated as:

$$APR = \frac{Actual\ Performance\ at\ Second\ Test}{Actual\ Performance\ at\ First\ Test}$$

3.4. Formulation of Hypotheses

We develop our hypotheses based on the theory of goal setting by Locke (1968). A goal is a level of performance whose attainment is associated with "success" and non-attainment with "failure". The basic premise of Locke's theory is that an individual's conscious goals regulate his action. The theory looks at the following aspects among others: (a) goal specificity, (b) goal difficulty, and (c) goal acceptance.

3.4.1. Goal Specificity

It has been proven that increased specificity of task goals is positively correlated to increased employee effort (Steers and Porter, 1974) and to better performance on the job (Barrett, 1963; Harrison, 1959; Likert, 1961; Steers and Porter, 1974). Although goal specificity appears to have beneficial performance implications, its impact on employee attitude may be somewhat mixed (Steers and Porter, 1974). According to Raven and Rietsema (1957), a clear specification of goals is positively associated with greater goal commitment, increased feeling of work-group cohesiveness, and increased interest in the task. However, employees working under goal-setting programs felt unduly constrained by the "excessive formal requirements" of the program. Ronan, Latham and Kinne (1973) conclude that

setting a specific task goal does not affect performance in an industrial setting unless a supervisor is present to encourage goal acceptance. Steers (1975) finds that goal specificity is significantly correlated with goal effort and overall performance only for those supervisors with high achievement needs. Setting a specific and clear goal helps focus attention and effort, which leads to improved task performance. Incremental targets are more specific than the total target figure, and we formulate hypothesis 3-1 as follows:

Hypothesis 3-1: The performance of groups C and F (receiving incremental targets) will be better than the performance of groups A, B, D, and E (receiving total targets).

Tightness / Target Information Types	Tight	Loose
Total ideal target (*IT*) Previous actual (*PA*) Total attainable target (*TT*)	Group A	Group D
Total attainable target (*TT*)	Group B	Group E
Previous actual (*PA*) Incremental Target (*INT*)	Group C	Group F

3.4.2. Goal Difficulty

According to Locke (1968), harder goals produce higher levels of performance than easier goals. A positive, linear relationship exists between the level of difficulty of the assigned goal and the task performance. Stedry and Kay (1966) find that performance improves when the goals are perceived to be challenging as long as the goals are not perceived to be impossible. Stedry (1960) finds that the difficult goals assigned result in better performance only when such goals are set by the experimenter before subjects set their own personal goals for the tasks. If the

personal goals are set first, subjects tend to reject the experimentally assigned goals as too difficult (or impossible) and fail to make a sincere effort. Zander and Nowcomb (1967) find that, when subjects raise their task goals to above the previous performance levels, resulting performances are significantly higher than when they maintain their past goals or set easier goals. In addition, when subjects consistently fail to attain their previous goals, no relation is found between goal level and performance. Goals are more likely to be perceived as challenging rather than impossible if the employee has a high degree of self-assurance and has previously had more successes in goal attainment than failures (Latham and Yukl, 1975). Now we formulate hypothesis 3-2 as follows:

Hypothesis 3-2: The performance of groups A, B, and C (receiving tight targets) will be better than groups, D, E, and F (receiving loose targets).

Tightness / Target Information Types	Tight	Loose
Total ideal target (*IT*) Previous actual (*PA*) Total attainable target (*TT*)	Group A	Group D
Total attainable target (*TT*)	Group B	Group E
Previous actual (*PA*) Incremental Target (*INT*)	Group C	Group F

3.4.3. Goal Specificity and Difficulty

Specific goals that are difficult produce higher levels of performance than do generalized goals (Locke, 1968). Giving an employee a set of goals that are highly specific in nature should allow him to understand what is expected of him on the job. With such reduced search, he will focus attention on the assigned job. If this job is perceived as challenging (moderately difficult), it will result in a significantly

better performance than jobs perceived as impossible or easy to perform. Among six groups, group C possesses the criteria of both goal specificity and goal difficulty.

We formulate hypothesis 3-3 as follows:

Hypothesis 3-3: The performance of group C (receiving a tighter target as an incremental figure) will be the best among all combinations of type and tightness of target cost information.

Tightness / Target Information Types	Tight	Loose
Total ideal target (*IT*) Previous actual (*PA*) Total attainable target (*TT*)	Group A	Group D
Total attainable target (*TT*)	Group B	Group E
Previous actual (*PA*) Incremental Target (*INT*)	Group C	Group F

3.5. Tests of the Hypotheses

The actual performance ratio of all students is displayed in Table 3-2. To test the hypotheses we apply ANOVA to the actual performance ratios of the subjects, as presented in Table 3-3. The use of ANOVA is justified because (1) each sample is drawn from a normal population, and (2) all of the population has the same variance

Table 3-2. Actual performance ratio of all subjects

A	B	C	D	E	F
119.14	118.97	110.29	114.30	104.81	104.41
120.00	118.64	116.88	106.84	127.08	112.99
121.63	118.84	127.78	106.89	112.35	118.60
109.41	118.00	96.05	110.29	116.95	112.50
112.50	119.35	96.34	113.95	105.41	117.98
106.25	97.75	105.13	109.88	117.44	105.36
108.69	105.80	105.13	86.69	120.55	104.35
107.69	112.20	101.37	112.90	97.26	106.60
101.96	108.00	116.90	122.22	103.39	115.56
113.69	114.52	128.81	102.56	107.55	104.62
116.87	109.68	124.14	105.79	100.00	105.41
101.61	101.30	125.00	113.33	108.00	117.33
112.50	106.74	112.12	98.96	108.45	108.92
116.22	107.14	107.46	86.21	97.75	101.33
93.33	102.68	106.33	96.70	100.00	100.00
104.48	100.93	98.32	131.58	100.97	106.76

Table 3-3. Analysis of variance of the actual performance ratio of all subjects

Sources of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	195.535	3	65.178	0.973	0.410
Target Information Types (*TIT*)	30.970	2	15.485	0.231	0.794
Tightness (*TGH*)	164.565	1	164.565	2.456	0.121
TIT-TGH Interaction	16.876	2	8.438	0.126	0.882
Explained	212.411	5	42.482	0.634	0.674
Residual	5628.653	84	67.008		
Total	5841.065	89	65.630		

Note: The authors arranged the data for each group in a random fashion. To remove the effects of outliers, the best performer from each group was eliminated, leaving the total data size at 90 and the number of subjects in each group at 15.

Results suggest that the tight-target group has a tendency to have higher actual performance ratios but this is not significant at the ten-percent level. Both the target information type and its interaction with tightness have an insignificant effect on the performance. Although the difference is not significant, Table 3-4 shows that the average performance ratio of the tight-target group is higher than that of the loose-target group. The average performance ratio of the groups receiving the incremental targets along with previous actual performance (groups C and F), is higher than that of the groups receiving only total targets (groups B and E) and the

groups receiving the previous actual performance, total targets and ideal targets (groups A and D). We also found that the actual performance ratio of group C receiving tight incremental targets is the highest of all.

Table 3-4. Average actual performance ratio of different groups

Tightness / Target Information Type	Tight	Loose	Average of all levels of tightness
Total ideal target (*IT*) Previous actual (*PA*) Total attainable target (*TT*)	Group A 110.37	Group D 107.44	108.91
Total attainable target (*TT*)	Group B 110.03	Group E 108.00	109.02
Previous actual (*PA*) Incremental target (*INT*)	Group C 111.13	Group F 108.92	110.03
Average - all target information	110.51	108.12	109.32

Locke (1968) suggests that task goals will affect behavior only to the extent that they are accepted by the subjects in the form of a personal aspiration level. A level of aspiration pertains to goal striving and the perceived difficulty of the goals that one wishes to attain. Stedry and Kay (1966) observe that efforts to reach an assigned goal and the performance that is influenced by this effort are undoubtedly related to the acceptance of the goal. We assigned the 15 subjects to "high-acceptance" (8) and "low-acceptance" (7) groups on the premise that the actual performance ratio will be higher for the first group. Tables 3-5 and 3-6 present the actual performance ratio of high-acceptance and low-acceptance groups respectively while tables 3-7 and 3-8 show their ANOVA results.

Table 3-5. Actual performance ratio of high-acceptance group

A	B	C	D	E	F
109.41	108.00	107.46	106.89	105.41	106.60
112.50	109.68	110.29	109.88	107.55	106.76
112.50	112.20	112.12	110.29	108.00	108.92
113.69	114.52	116.88	112.90	108.45	112.50
116.22	118.00	116.90	113.33	112.35	112.99
116.87	118.64	124.14	113.95	116.95	115.56
119.14	118.84	125.00	114.30	117.44	117.33
120.00	118.97	127.78	122.22	120.55	117.98
121.63	119.35	128.81	131.58	127.08	118.60

Table 3-6. Actual performance ratio of low-acceptance group

A	B	C	D	E	F
93.33	97.75	96.05	86.21	97.26	100.00
101.61	100.93	96.34	86.69	97.75	101.33
101.96	101.30	98.32	96.70	100.00	104.35
104.48	102.68	101.37	98.96	100.00	104.41
106.25	105.8	105.13	102.56	100.97	104.62
107.69	106.74	105.13	105.79	103.39	105.36
108.69	107.14	106.33	106.84	104.81	105.41

Table 3-7. Analysis of variance of high-acceptance group

Sources of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	153.453	3	51.151	1.912	0.142
Target Information Types (*TIT*)	17.945	2	8.972	0.335	0.717
Tightness (*TGH*)	135.509	1	135.509	5.006	0.030*
TIT-TGH Interaction	22.198	2	11.099	0.415	0.663
Explained	175.652	5	35.130	1.313	0.277
Residual	1123.513	42	26.750		
Total	1299.165	47	27.642		

* Significant at the 5% level.

Table 3-8. Analysis of variance of low-acceptance group

Sources of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	67.571	3	22.524	0.951	0.426
Target Information Type (*TIT*)	26.347	2	13.174	0.556	0.578
Tightness (*TGH*)	41.224	1	41.224	1.741	0.196
TIT-TGH Interaction	118.293	2	59.146	2.498	0.096*
Explained	185.864	5	37.173	1.570	0.193
Residual	852.375	36	23.677		
Total	1038.239	41	25.323		

* Significant at the 10% level.

Table 3-7 shows that when the subjects are assigned tight targets, they perform better and this is significant at the five-percent level. The performance of the tight-target group is better than the loose-target group irrespective of the types of target information, as portrayed in Figure 3-1. Thus, hypothesis 3-2 is accepted based on the results of high-acceptance group. However, no significant effect is found for either the target-information types or its interaction with tightness.

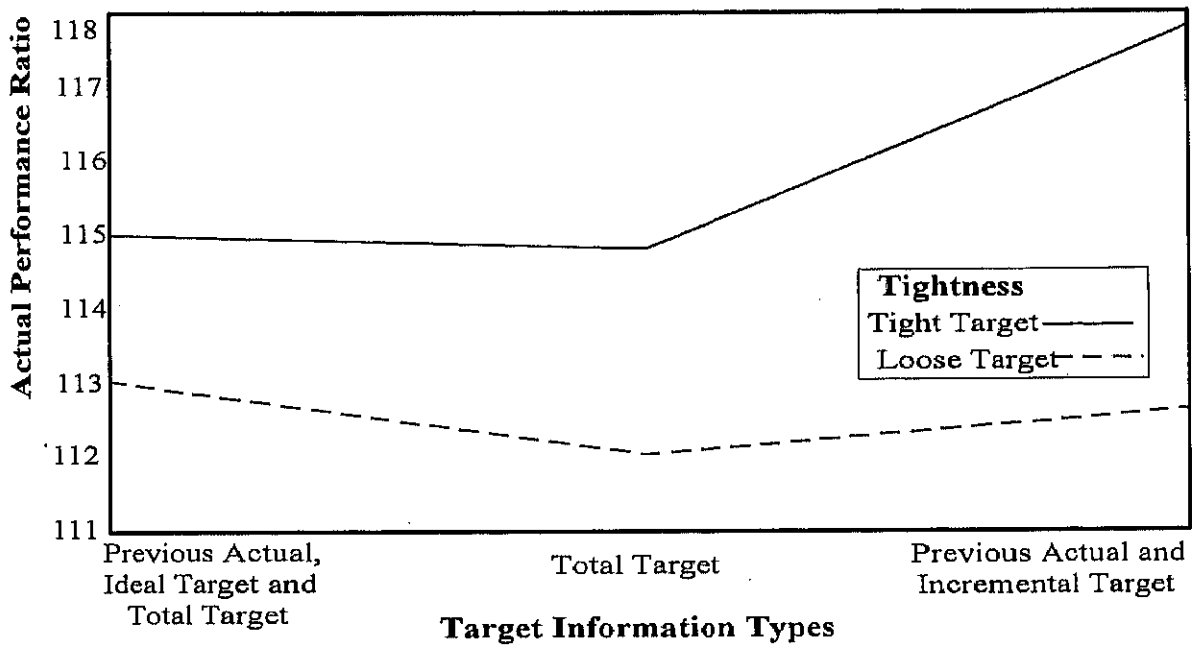

Figure 3-1. Effects of target information type and tightness on the actual performance ratio of the high-acceptance group

The ANOVA results of low-acceptance group in Table 3-8 show that the effect of target information type-tightness interaction is significant at the ten-percent level. When the information on the previous actual and incremental targets is provided to the low-acceptance group, the performance will further improve when the target is set loose rather than tight. When the subjects are provided ideal targets in addition to total targets, the performance is better with tight targets rather than loose targets as shown in Figure 3-2.

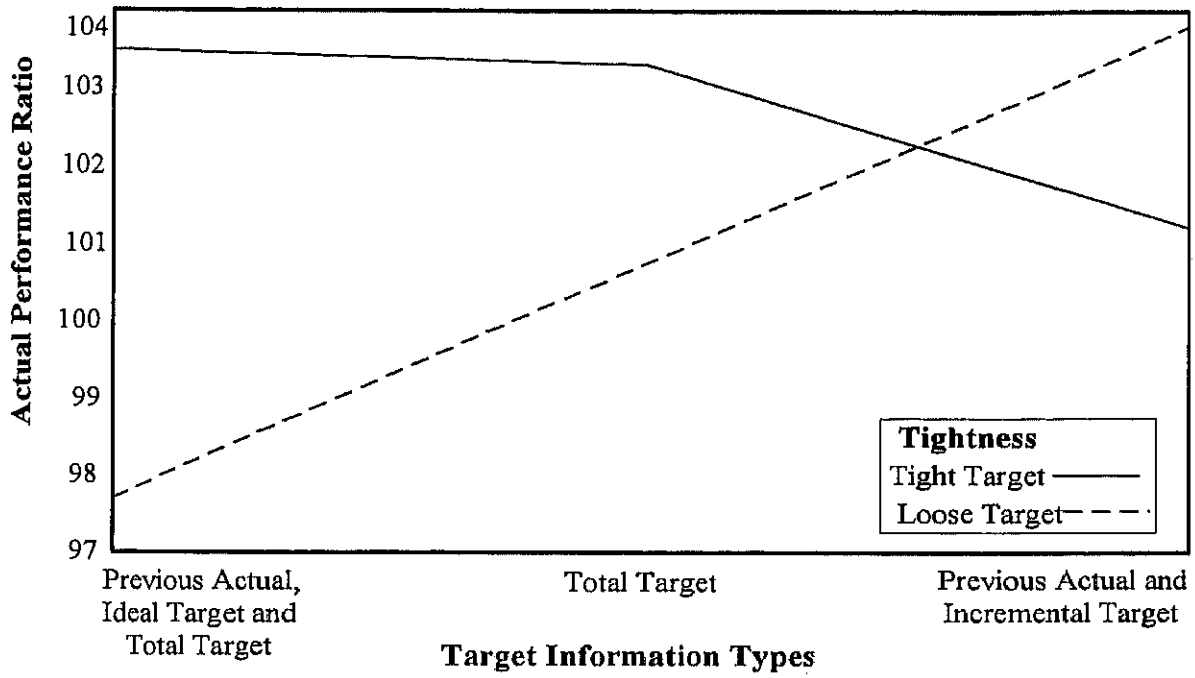

Figure 3-2. Effects of target information type and tightness on the actual performance ratio of the low-acceptance group

3.6. Conclusion

The tightness and interaction between target-information type and tightness have significant effects on the actual performance ratios for high and low-acceptance groups respectively. When incremental targets are assigned to the low-acceptance group, setting loose targets improve the actual performance ratio more. This is interesting in that, for the less-aspired employees, when additional work is solicited over the present workload, it is desirable to confine the additional amount at a low level. If ideal targets are provided along with total targets to the low-acceptance group, setting tight total-targets will produce better performance. In comparison to loose total-targets, tight total-targets are closer to ideal targets and the subjects will be motivated to perform if the gap between ideal and total targets is narrow. The absence of any effect stipulated in hypotheses 3-1, 3-2 and 3-3 may be due to the

identical performance of all subjects irrespective of target information type or level of tightness.

End Notes

1. Akter, Lee and Monden (1999) wrote this chapter as an article, which has already been accepted by *Advances in Management Accounting*, forthcoming in volume 8.