

# ENDOGENOUS PRODUCTION TECHNOLOGY IN A PUBLIC GOODS ENTERPRISE

Douglas A. Norton and R. Mark Isaac

Florida State University

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## 1 . INTRODUCTION

Historically, not-for-profit organizations were viewed as non-profit organizations; that is, their unique status derived not only from the absence of shareholders as the residual claimants on profits but also from a non-traditional objective function, such as output maximization subject to a zero-profit constraint (Newhouse [1970]; Lakdawalla and Philipson [2006]). Both Weisbrod [1977] and Hansman [1980] characterize the defining feature of the non-profit by the identification of its output with the collective or public good. New models of non-profits are emerging, such as the retained earnings maximizing non-profit organization (REM). Such firms produce and sell goods that are largely private in character (Norton [2008]). The non-profit status commits the REM to channel retained earnings into other charitable organizations or activities. For example, a coffee shop retains earnings from a menu indistinguishable from Starbucks; the retained earnings fund a check sent directly to a traditional charity to dig clean water wells in Africa.

The objective function of such a firm (maximizing retained earnings) resembles that of the traditional for-profit firm. However, the non-profit status of the REM enterprise raises issues concerning command and control. The hypothesis of this research is that in the absence of shareholders it is customers who exercise control over the non-profit enterprise. Specifically, we believe that crucial tools for customers to exercise that command and control are transparency and openness. These hypotheses admit of experimental testing.

We characterize the retained-earnings maximizing non-profit (REM) enterprise as essentially a profit maximizer, (although nothing requires the market to be one of perfect competition). If enough customers have even the smallest preference for shopping at a firm whose retained earnings will be donated to a charitable activity, then we argue that these customers can become the agents of control over the non-profit managers. We further argue that this control requires two types of transparency.

- 1) Historical Information: We see the customer as an agent of accountability. The manager produces monetary or operational information in the form of financial reports to the customers.
- 2) Outside Option: The other concept of transparency evaluates disclosure by the appearance of the manager's personal credentials admitting a possible outside employment option.<sup>1</sup> The manager's preference for employment in the non-profit firm

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<sup>1</sup> This information could easily be referenced on the REM's website.

is an indication that her values are aligned with the customers. In this case the customers are signal receivers that will decide their level of involvement.<sup>2</sup>

## 2 . EXPERIMENTAL DESIGN

A laboratory environment capturing all of the market features of an REM would be complex: a seller with something akin to a non-distribution constraint to the management but with retained earnings transferred to a charitable activity; customers with valuations over both the product of the seller and over the charitable activity; and an explicit or induced market environment. The complexity of such an environment is not its only drawback. This environment is so different from previously examined laboratory markets that a great deal of baseline calibration would be required in order to evaluate the effects of the experimental treatments.

To circumvent these problems, we decided to focus not on the industrial organization aspects of this environment, but rather upon the transparency treatments themselves. Our argument is that if we study behavioral effects of the transparency treatments in a similar but simpler and more calibrated, then we will have established a foundation for further research. Thus, our experimental design builds upon the standard linear economic model of public goods provision dating to Isaac, Walker, and Thomas [1984].

Our “public goods enterprise” consists of five individuals: four “customers” and one “manager.” From the point of view of each of the customers, the public goods enterprise looks like a standard linear public goods experiment. Each customer begins each period with 50 tokens. His task is to allocate those tokens between an individual account (returning one experimental dollar per token) and a group enterprise, whose return is the same to all customers regardless of how many tokens each customer invested. Each customer earns from the group enterprise:

$$G * (\text{sum of all investments in the group enterprise}).$$

Note that because the return from the private investment is one, “G” is the same as the familiar marginal per capita return (MPCR), but for brevity we will continue with the shorter notation.

The novel features of our design begin at this point. First, G is unknown to the customers at the time they make their investment decisions. What the customers know is that G is chosen by the manager and that the two possible choices for G are .3 and .75 (these correspond to the low and high MPCR from Isaac, Walker, and Thomas). The manager also begins each period with 50 tokens, worth one experimental dollar each. In addition, the manager also consumes the return

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<sup>2</sup>We have found that Espinola-Arrendondo and Munoz-Garcia [2007] have developed a game-theoretic model of an almost identical phenomenon. It appears that they posit a follower’s utility function incorporating a “concern” about whether a leader has declined an outside option; the source of the concern is not specified, but it does not appear to be inconsistent with the signaling motivation we report here.

from the public goods enterprise *at the same level as provided to any one of the customers*. This is true even though the manager has no option of adding tokens to the group enterprise. The manager is permitted to influence the return from the group enterprise by choosing the value of  $G$  (.3 or .75) for each period. In each period, a choice of the .75 MPCR can be made at a cost of 30 tokens to the manager while .3 is the default MPCR with no cost. Customers must make their decisions before knowing whether the manager has set  $G$  equal to .3 or .75. The customers cannot communicate with one another, nor can any customer communicate with the manager.

In our baseline experiments, we reveal another difference from previous public goods research. The only information provided to participants about the public enterprise is their earnings. They are not told how those earnings are determined by the components of customer investment decisions and the manager's choice of  $G$ . Thus, a low level of earnings could come from low investment by other customers, or by a manager choosing  $G$  equal to .3, or by some combination thereof.<sup>3</sup>

Clearly, a standard argument supports a suboptimal outcome as a Nash Equilibrium. Zero investment in the enterprise is a stage game dominant strategy regardless of whether  $G$  equals .3 or .75. If the customers follow this dominant strategy, then the best response of the manager is to choose  $G$  equal to .3. This is despite the fact that the group optimum is for the manager to choose  $G$  equal to .75 and for each customer to invest all tokens in the enterprise.

Over decades of similar public goods experiments, it has become obvious that subjects do not play the linear public goods game as perfectly self-interested game theorists. Contributions seldom are equal to the pure free riding prediction. However, even if subjects depart from formal game theoretic models, empirically a pessimistic outlook may be supported. Most public goods experiments begin with some positive level of contribution by at least some agents, with a characteristic decline prior to a finite end period. Part of this standard result is there is less provision of the public good with a low MPCR. A pessimistic, suboptimal scenario for this new environment would have customers expecting the manager to set  $G = .3$ , responding with relatively low investment.

The problem for the more efficient outcome is the coordination problem in the absence of any explicit communication, given that customers must make their decisions without knowing the choice of the manager. This is where our two concepts of transparency come into play.

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<sup>3</sup> There are higher levels of provision that will signal a manager's decision. If customers see that the return from the group enterprise exceeds 60 experimental dollars, they have information to conclude that the manager must have chosen an MPCR equal to .75. Likewise, customers may, in certain situations, be able to figure out bounds on the behavior of other customers (an extreme example would be if earnings from the group enterprise were zero).

Transparency is our primary experimental treatment, and it consists of two distinct channels of information. First there is historical information on what the manager has actually chosen. This allows at least the potential for a manager to engage in reputation-building. We have made a design choice that when historical information is available, it is not available instantaneously. Specifically, every three periods the experimenter reveals the manager's choices of  $G$  for the previous three periods (akin to a quarterly report).

Secondly, we enact an experimental treatment in which the manager is offered an outside option. The manager may choose to take that outside option which closes the enterprise for that one period, and receive her 50 existing tokens plus an additional "salary" of 25 tokens. If the manager accepts the salary from the outside option and closes the enterprise for the period, the customers each earn only their 50 tokens automatically deposited in their individual exchange.

The motivation for the outside option is as follows. Non-profit organizations will typically receive donations in the course of their operations. This often includes managers whose skills, education, and credentials would justify a higher salary in the for-profit sector. Through information channels such as the internet, customers of a non-profit can observe which organizations' managers are, in fact, forgoing such an "outside option." The manager may be able to use the fact that she has foregone an outside option to signal that her values line up with those of the customers of the enterprise. This would involve our managers forgoing the outside option to signal that they intend to choose  $G$  equal to .75.

By modeling the choice of the manager as a best response to the expected behavior of the customers, choosing  $G = .3$  is never optimal once we add the outside option. If the manager expects low levels of contributions (fewer than 74 tokens), the best response is to take the outside option. For higher levels, the optimal choice is to set  $G = .75$ . (It must be noted that around the level of 74 tokens, the managerial profit of setting  $G = .3$  is not far below those of the other two options).

In principle, this provides for a 2x2 experimental design based upon historical data (Yes or No) and availability of an outside option (Yes or No). Table 1 denotes the notation we will employ in discussing the treatments, as well as the number of experiments conducted.

	Manager Has Outside Option	Manager Does Not Have Outside Option
Historical Information	<b>BASELINE</b> (7 Sessions: 1-7)	<b>NO O/O</b> (7 Sessions: 15-21)
No Historical Information	<b>NO INFO</b> ( 7 Sessions: 8-14)	<b>NO TRANSP.</b>

Table 1

For practical and budgetary reasons, we began this research with the Baseline, No Info and No O/O sessions. Each session lasted 24 periods. Subjects were recruited through the standard XS/FS protocol at Florida State University, and were paid their known exchange rate calculation of their experimental earnings on top of a \$10.00 show-up fee.<sup>4</sup>

### 3 . EXPERIMENTAL RESULTS

We have not yet had an opportunity to evaluate the individual subject data, so we concentrate on the following summary aggregate results.<sup>5</sup>

#### 3 . 1. Results from Baseline Experiments.

Charts displaying the data from all seven Baseline experiments are included as Figures 1 - 4. A data point denotes the number of tokens invested in the group enterprise. When a data point has no marker next it, that indicates that the manager opened the enterprise and chose  $G = .75$ . A “.3” next to a data point indicates that the manager opened the enterprise with  $G = .3$ , and an “X” indicates that the manager chose the outside option. The reference line at  $GRPX = 73$  indicates

<sup>4</sup> Each session was preceded by eight “practice” periods. The subjects were paid for those periods, but at a lower rate. Before the actual 24-period experiment began, subjects were reassigned roles and groups. In one case in the Baseline condition, we were able to conduct an experiment with only one group of five subjects. Because this created a potentially unique information condition (there was no possible reassignment of groups), we balanced each of the remaining treatments to include exactly one single-group observation.

<sup>5</sup> In prior discussion of this research, we reported the results of four additional sessions with this same design. In re-initializing the computer program for additional sessions, we discovered an error in the way subject profits were reported to the subjects. While the results of those first experiments are quite consistent with the ones reported here, we decided to be cautious and remove them as research sessions. The data from these sessions is available upon request.

the point at which the best response of the manager changes from shutting down to opening and choosing  $G = .75$ .<sup>6</sup>

--Figures 1 – 4 Here--

*Result: Managers usually choose  $G = .75$ .* Five out of seven managers exclusively chose the high MPCR. One manager chose the low MPCR 8 out of 24 periods in an intermittent and perhaps even random fashion and another chose the low MPCR in a majority of periods in which the enterprise was open.

*Result: Although the outside option was available, it was seldom used by most managers.* Four of the seven managers never used the outside option. It was taken only once by a “high quality” manager who experienced a brief regime of steady decay (see Session 2).<sup>7</sup> It was taken twice by the manager who chose  $G = .3$  eight times, and it was taken 14 times by the manager who almost never chose  $G = .75$ .

*Result: The traditional result of decay across periods is less prevalent than expected in a standard VCM environment.* Table 2 presents the results of simple regressions in which the dependent variable, the aggregate number of tokens invested in the group enterprise, is explained solely by a constant and the period number (1 through 24). In four of the sessions (2,4,6 and 7) there is no significant decay across periods. Of note, two of the sessions with a significant decay coefficient (1 and 5) are the two sessions with managers who chose  $G = .3$  frequently. Although contributions in Session 1 began a late decay in period 22, they were at 75% of the group optimum (equal to the level of period 1) as late as periods 19 and 21. Session 5 had low investment in the group enterprise throughout.

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<sup>6</sup> The  $GRPX = 73$  line is included as a broad-brush reference. In the stage game, managers do not know customers’ decision when they make their decision on the MPCR, so there is not an actual “best response” choice. A stage game in which managers knew customer decisions before they made their MPCR choice would have a different game theoretic structure than the one in this research.

<sup>7</sup> When refer to a manager as “high quality” we mean that the manager consistently chooses a  $G$  equal to  $.75$ .

SESSION (Adj R <sup>2</sup> )	CONSTANT (t-statistics)	PERIOD (t-statistics)	FINAL VALUE	OUTSIDE OPTION TAKEN?	PERIODS of MPCR=.75
1 (0.21)	154.41 (14.00)	-2.10 (-2.57)	80/200*	Yes (2x)	14/22
2 (-0.05)	92.45 (6.67)	0.19 (0.20)	85/200	Yes (1x)	23/23
3 (0.45)	193.47 (19.46)	-3.06 (-4.41)	120/200	No	24/24
4 (-0.02)	137.05 (23.61)	-.29 (-.71)	140/200	No	24/24
5 (0.19)	26.58 (4.06)	-1.16 (-2.53)	12/200 **	Yes (14x)	3/10
6 (-0.03)	163.62 (14.42)	-0.48 (-0.60)	140/200	No	24/24
7 (0.06)	161.94 (15.95)	-1.13 (-1.59)	125/200	No	24/24

TABLE 1 (\*Final value is for period 23. This manager took the outside option in period 24; \*\*Final value is for period 17 for the same reason.)

While the typical VCM may be quickly explained by decay across periods, these experiments indicate there is much not being explained by the passage of time. Obviously, something else is going on with these data, and the logical question is whether our concepts of command and control can serve as useful explanations. In advance of any detailed examination of the individual data, we decided to ask whether the actions of the manager provided any explanatory power. We believed two aspects of the manager's behavior contained potential explanations: choice of the outside option and the frequency and pattern of choices of MPCR.

Consider the effects of the outside option taken infrequently by one but quite frequently by another of the managers. Perhaps the manager believes that the customers have forgotten that in order to open the enterprise she has forgone the outside salary. By taking the outside salary she restores her credibility with the customers and signals her quality and future cooperation. Another possibility is that taking the outside option serves as a kind of punishment that only changes behavior in the short run, and it may be for this purpose that it was so frequently employed by the manager in Session 5.

Another impact on the time series of tokens produced through the group exchange would seem to be the manager's selection of the MPCR. As we mentioned, choosing the low MPCR is never a simple best response to expectations about the customers. If a manager's expectations are sufficiently pessimistic, she should take the outside salary. Yet one manager chose the low MPCR one third of the time. Was this use of the low MPCR a clever strategy, or was it ultimately a mistake? We posit that there are three avenues (in addition to the best response argument) by which choosing the low MPCR could be judged to be a mistake for the manager.

First, using the low MPCR immediately lowers customer profits. Customers can see the low return from the group enterprise even in periods in which there is no information about the manager's choice of MPCR. How do subjects respond to this negative hit on profits? It is possible that they respond by lowering their contributions in subsequent periods.

Secondly, it would seem to us that a prudent manager would want to develop a reputation for choosing the high MPCR, especially because the choice of the MPCR is revealed to the customer across three periods. A manager who frequently chooses MPCR equal to .3 may develop a reputation that suggests a low likelihood of choosing MPCR = .75 in the future.

Finally, we think that a third mistake that a manager might make is switching back and forth from an MPCR of .3 to .75 too frequently. Such a manager creates an environment of uncertainty and a reputation of being unreliable. A manager who has chosen a low MPCR and wishes to change directions should probably do so for more than one or two periods in order to re-establish a reputation of *consistently* choosing the high MPCR.

*Conjecture: It appears that the manager plays a signaling or co-ordination role (beyond the simple effect of choosing a high MPCR) that favors increased cooperation among the customers.*

The source of this conjecture can be found in the data in Figure 5. In the top panel, we compare the average level of contributions to the group enterprise to an extrapolated prediction based upon the four-person, .75 MPCR experiments from Isaac and Walker. However, the data from the current experiments are *unconditional* in that they include observations from periods with  $G = .3$  and in which the enterprise was closed. It is remarkable that even including these observations the current averages are typically at or above this one measure of expectations. An even more interesting comparison comes from the bottom panel which is the average data from the current experiments conditional upon the observation being in Sessions 2,3,4,6 or 7 (the uniformly .75 MPCR managers). It is seen that these sessions are well above the expectations from the .75 MPCR IW data both in level and in lack of decay.

-- Figure 5 Here --

Our earliest impressions led us to attempt within-session econometric analysis of the data, but, upon further reflection we concluded that only a between-session analysis could separate the effects of the outside option and information. For example, in Session 2 the manager endured low cooperation in the first two periods followed by ten periods of moderate and stable cooperation. But, the thirteenth period saw the beginning of a slow decay towards free riding and

finally in period eighteen the manager took the outside salary, closed the enterprise and re-opened in period nineteen to a more cooperative group over several periods. Visually we can see that there appear to be two regime changes. One occurs around period 11 when the customers exhibit a more pronounced decay, and the second regime change follows the manager's choice of the outside option in period 18. Because the manager's choice of the outside essentially served to return the group to their earlier pattern of behavior, simple regression analysis shows "no significant effect" of the decision of the manager. Also, the incredible stability, at high contributions no less, of some of our observations renders it difficult to separate our hypotheses about manager decisions from the data inside a single session. For example, the data from Session 4 shown below may have suggested that the constant choice of the high MPCR is reputation building/preserving but it may also be that the customers are responding instead to the existence of the outside option. Furthermore, a legitimate hypothesis could be that the customers are not responding to either the information or the presence of the outside option but to the simple existence of the manager.

It is with this in mind that we turn to an across-group analysis, first with the seven sessions with no information transparency.

### 3.2. Results From the "No-Information Sessions"

The data from the seven "No Info" sessions, denoted as Sessions 8 – 14, are displayed in Figures 6 – 9. And, in Table 3 we present the same default regression analyses that we performed for the baseline sessions.

SESSION (Adj R <sup>2</sup> )	CONSTANT (t-statistics)	PERIOD (t-statistics)	FINAL VALUE	OUTSIDE OPTION TAKEN?	PERIODS of MPCR=.75
8 (0.46)	102.94 (8.81)	-4.09 (-4.56)	50/200	Yes (7x)	5/17
9 (0.03)	107.77 (12.85)	-0.77 (-1.32)	61/200	No	24/24
10 (0.33)	140.41 (19.46)	-1.69 (-3.54)	85/200	No	24/24
11 (0.19)	114.24 (18.48)	-1.09 (-2.50)	82/200	No	20/24
12 (0.20)	159.11 (4.06)	-0.86 (-2.62)	150/200	No	21/24
13 (0.14)	81.88 (5.03)	-2.45 (-2.15)	60/200	Yes (7x)	8/17
14 (0.42)	114.90 (13.50)	-3.97 (-4.20)	125/200	Yes (4x)	10/20

Table 3

-- Figures 6 – 9 Here --

*RESULT: There are more sessions with a statistically significant rate of decay in the No Info condition than in the Baseline condition. Six sessions in No Info present with significant decay, versus three in Baseline. In addition, only 2 of the 5 managers always choose  $G = .75$  when open, compared with 5 of the 7 managers in the baseline condition. Again, only three of the managers actually used the outside option.*

*RESULT: In comparing the unconditional means of investment in the group enterprise, we find that the average from the Baseline condition is almost always greater than No Info condition, often significantly so. The top panel Figure 10 exhibits the comparison. The Baseline mean is greater in 21 of 24 periods, and a proposed treatment effect is statistically significant (critical  $p = .082$  using a Wilcoxon rank sum test) in 8 of those 21 periods (marked with “S”).*

-- Figure 10 Here --

There are a couple of intriguing facts that can be observed from this comparison. First, the data are almost identical in the first two periods, but they separate following period 3, when the Baseline customers receive their first quarterly report. Second, notice that the gap closes in the last three periods, perhaps indicating an end-of-experiment effect that transcends any effect of the information condition (in the last three periods, there will be no effective use for the information for periods 22- 24).

Making a comparison of means conditional upon the manager being one who always opens with  $G = .75$  is difficult because there are only two sessions in the No Info condition that meet this criterion. However, the data are presented, with no significance calculations, in the bottom panel of Figure 10. The direction of the result is that the lack of the quarterly report reduces investment in the group enterprise even conditional upon being in a  $.75$  MPCR group.

### **3.3 “No-Outside-Option” Sessions**

The data from the seven No-Outside-Option sessions, denoted Sessions 15 – 21, are displayed in Figures 11 – 13 (the comparison line, however, in these figures is 68 tokens, the number of tokens in the group exchange at which the manager earns more money by choosing  $MPCR = .75$  rather than  $.3$ ). And, in Table 4 we present the results of the same default regression analysis as before.

-- Figures 11 – 14 Here --

	CONSTANT (t-statistics)	PERIOD (t-statistics)	FINAL VALUE	OUTSIDE OPTION TAKEN?	PERIODS of MPCR=.75
15 (0.48)	95.16 (9.10)	-3.22 (-4.64)	10/200	NA	7/24
16 (0.25)	105.20 (8.86)	-2.42 (-2.91)	51/200	NA	16/24
17 (0.15)	73.95 (11.43)	-1.00 (-2.21)	55/200	NA	16/24
18 (0.30)	94.50 (7.33)	-2.99 (-3.31)	22/200	NA	5/24
19 (0.17)	142.28 (12.33)	-1.95 (-2.41)	60/200	NA	21/24
20 (-0.00)	97.81 (11.00)	-0.59 (-0.95)	80/200	NA	19/24
21 (-0.04)	141.44 (15.84)	0.10 (0.17)	68/200	NA	15/24

*RESULT: The data from the “No-Outside-Option sessions look more like the “No-Information” sessions than the “Baseline” sessions.* This is true in terms of number of sessions with statistically significant negative coefficients on period decay (five in “No-Outside-Option” versus six in “No-Information” and three in “Baseline”). It is true in terms of number of managers who always choose MPCR = .75 when open (zero versus two in “No-Info” and five in “Baseline”). From a purely subjective perspective, a graphical comparison of period-by-period mean levels of investment in the group enterprise (GRPX) across all three treatments is instructive (Figure 15, top panel).

-- Figure 15 --

*RESULT: In a direct comparison between the Baseline sessions and the No-Outside-Option Sessions, one finds that the mean investment in the group enterprise is higher in the Baseline sessions in all 24 periods, and a rank-sum test finds a statistically significant difference in the two samples in 10 of 24 periods (Figure 15, bottom panel).* Statistically, the simple partial effect of removing the outside option is equally harmful to the provision of the public good as the partial effect of removing the quarterly information. Like the previously explained treatments, this treatment, on average, begins with moderate contributions. Over time, no outside option tracks closely with no information and both are below the baseline treatments where both information and the outside option are present.

We were somewhat surprised that the “No-Outside-Option” condition proved to be indistinguishable from the “No-Information” condition. The “No-Information-Condition” appeared to us to place customers in a more uncertain environment, both with regard to the manager’s past and future actions. The lack of information obscures the manager’s past choices. The presence of the outside option provides another choice to the manager which would seemingly create more customer uncertainty about the manager’s future behavior. Instead, it appears that taking either transparency condition away from the baseline has similar effects on the provision of the public good.

#### 4 . CONCLUSIONS AND THOUGHTS ABOUT FUTURE RESEARCH

The world in which a group enterprise has access to two transparency conditions (historical information and the presence of an outside option) supports levels of public goods provision that are greater and more stable than would be expected in a traditional voluntary contributions process. Provision of the public good suffers when either of the transparency conditions is removed. The question is why?

There may be a temptation to reduce explanations for the lower levels of public goods provision solely to the mechanical choice of production technology. Both of the partial conditions feature a more frequent choice of  $G = .3$ . Moreover, there are some obvious behavioral reasons for this fact. In the absence of historical information, the manager may take the anonymity as a license to “shirk” without the customers’ knowledge that it was the manager’s actions that led to the souring of the public goods provision. Without the outside option the manager has only one means, rather than two, by which she can intervene in the public goods process. If customer contributions fall, the manager’s only options are either to do nothing or to change the MPCR. But, whereas using the outside option is a sequential and immediately advertised decision, there appear to be significant coordination issues with the manager’s ability to use the simultaneous and delayed-information tool of changing MPCR as a spur to increase contributions.

On the other hand, we found some indication that customers are more “cooperative” in the Baseline condition even when standardizing on the manager’s choice of MPCR.<sup>8</sup> This indicates that the two transparency conditions are influencing both customer and manager behavior in a simultaneous fashion in a way that will require more work to disentangle.

In any event, the lesson for REM and other non-profit organizations is clear. Transparency matters. Manager credentials and employment paths can be posted and kept current

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<sup>8</sup> In using the term “cooperative”, we are not intending to make a choice among any one of the numerous hypotheses about individual preferences and/or behavior that have grown out of the public goods literature.

on websites. Boards of Directors can disseminate reliable performance measures, either independently or through non-profit rating services such as Charity Navigators.

The conclusions above are strikingly similar to those of a *Wall Street Journal* article (Beatty [2007]) on charity transparency.<sup>9</sup> Such activities may be costly or unfamiliar (or both) to non-profits, but this research suggests that they have the potential to support a behavioral equilibrium that benefits both the organization and its customers.

In contrast to our claims that the presentation of financial, management, and other information would be advantageous, some non-profit managers continue to be wary of transparency. Beatty captures this reluctance to transparency as follows: “Charities worry that too much candor about their struggles could cause donors to take their money elsewhere.” Our experimental environment features managers with certainty over their choice of the public goods production technology. Implicit, however, in Beatty’s description of the managerial perspective is the notion that managers do not have perfect control over the production technology. An interesting variation on the current design would be to make the actual production technology dependent upon the manager’s choice but stochastic in realization. This would capture one kind of “noisiness” in non-profit decision-making. An obvious treatment would be to distinguish between information that reports only the realized outcome of a noisy production technology to one in which transparency reveals both the outcome and the manager’s choice.

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<sup>9</sup> From Beatty: “Too many charities fail to make information about their accomplishments, struggles, boards and executive staff easily available online. As a first step, charities should offer detailed financial and management information on their websites.”

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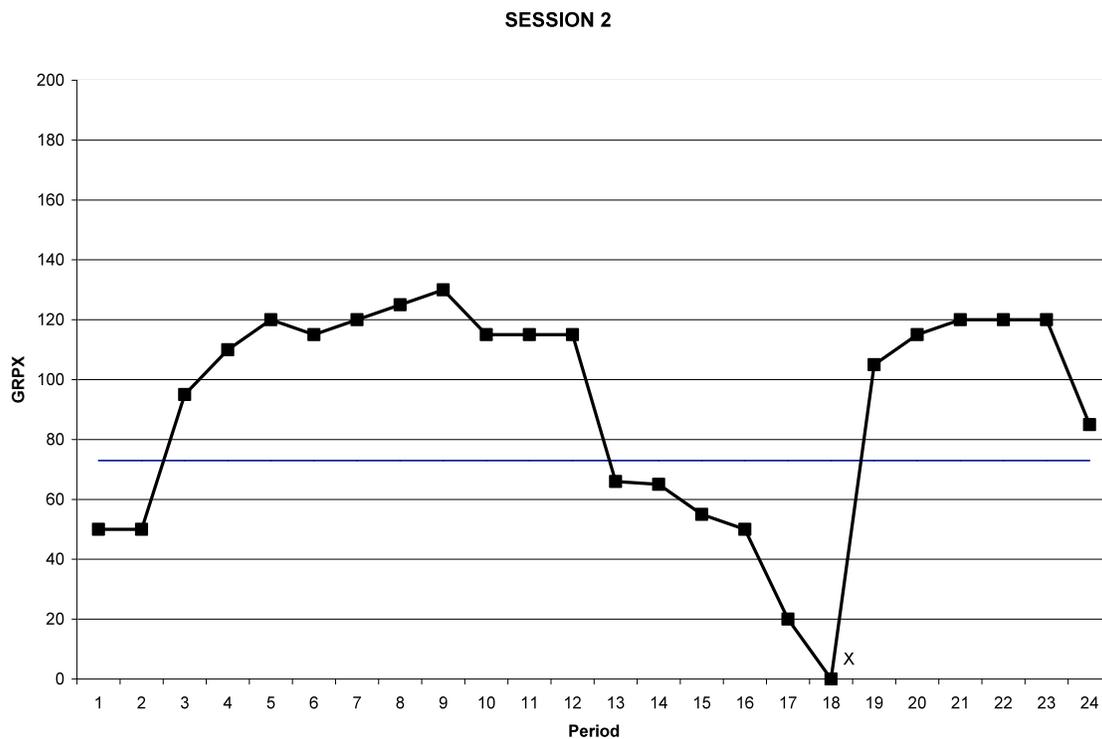
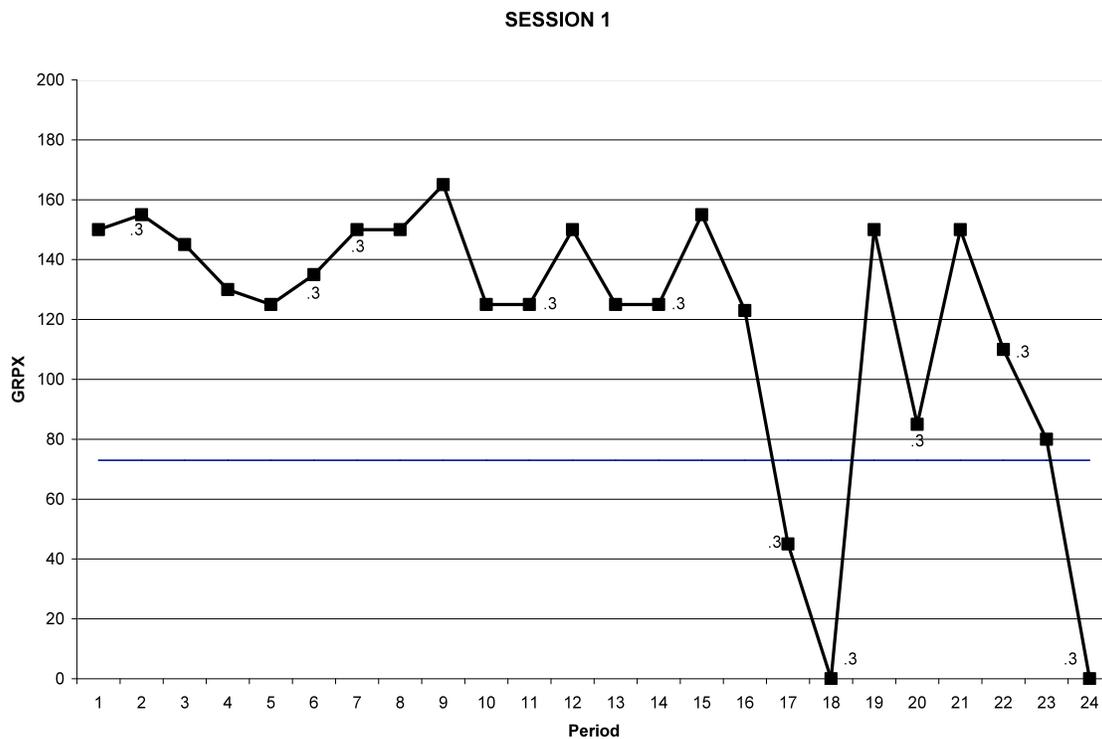


FIGURE 1: SESSIONS 1 & 2 (BASELINE)

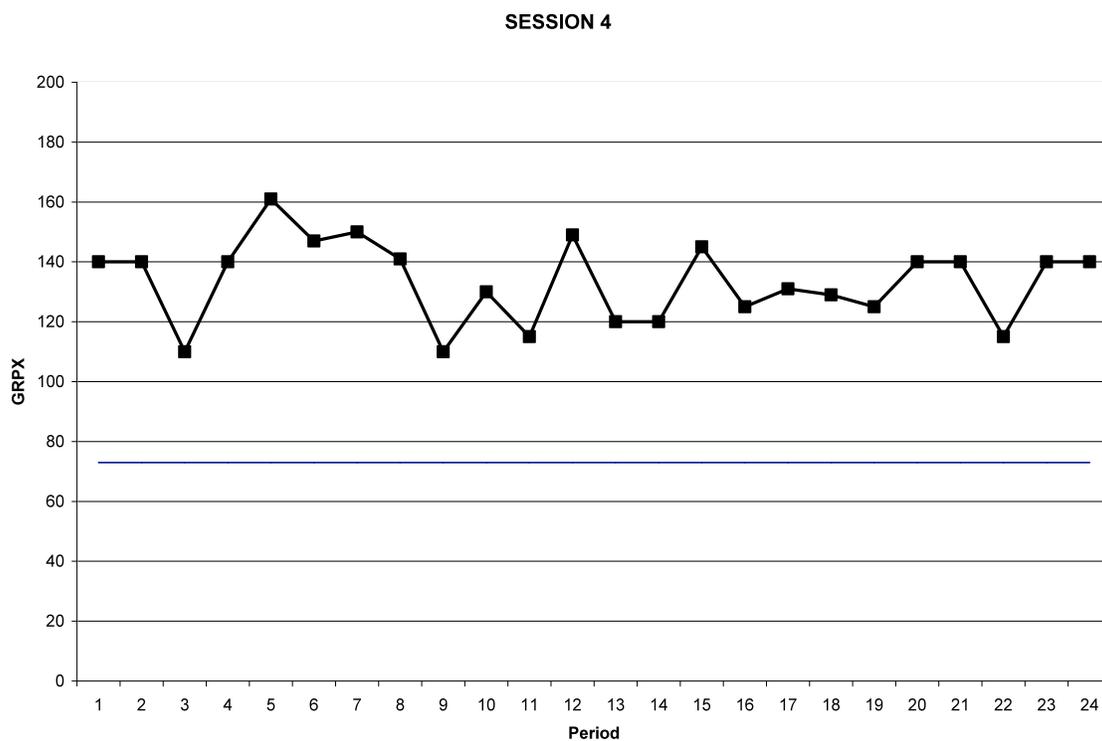
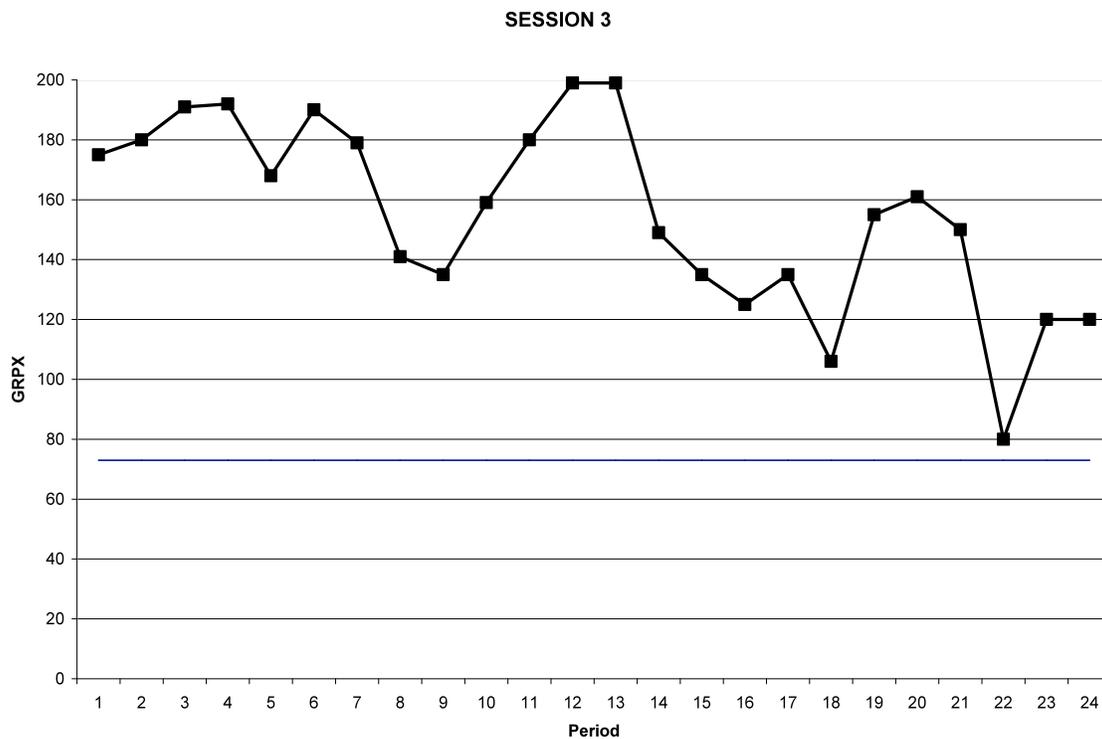


FIGURE 2: SESSIONS 3 & 4 (BASELINE)

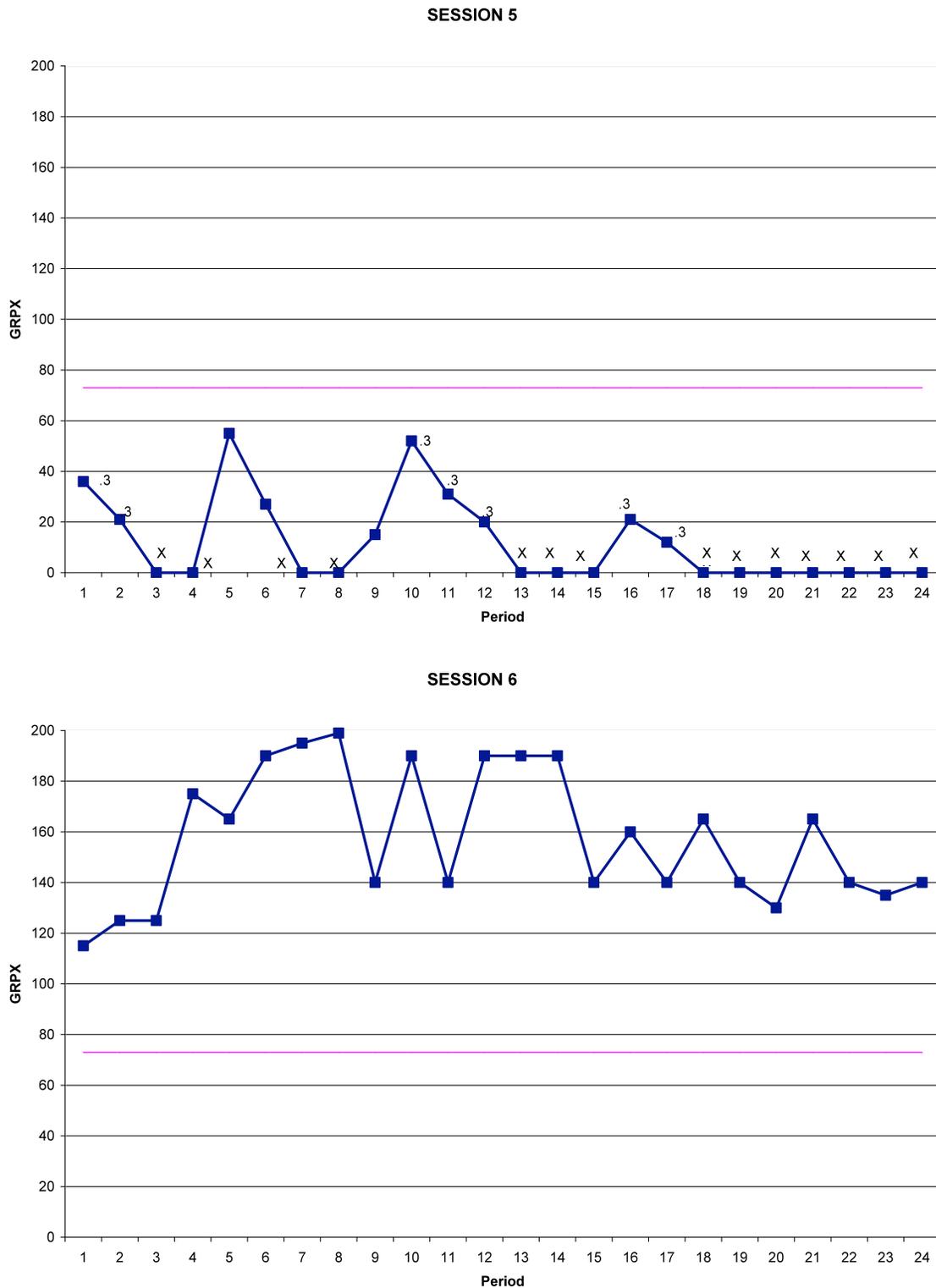


FIGURE 3: SESSION 5 & 6 (BASELINE)

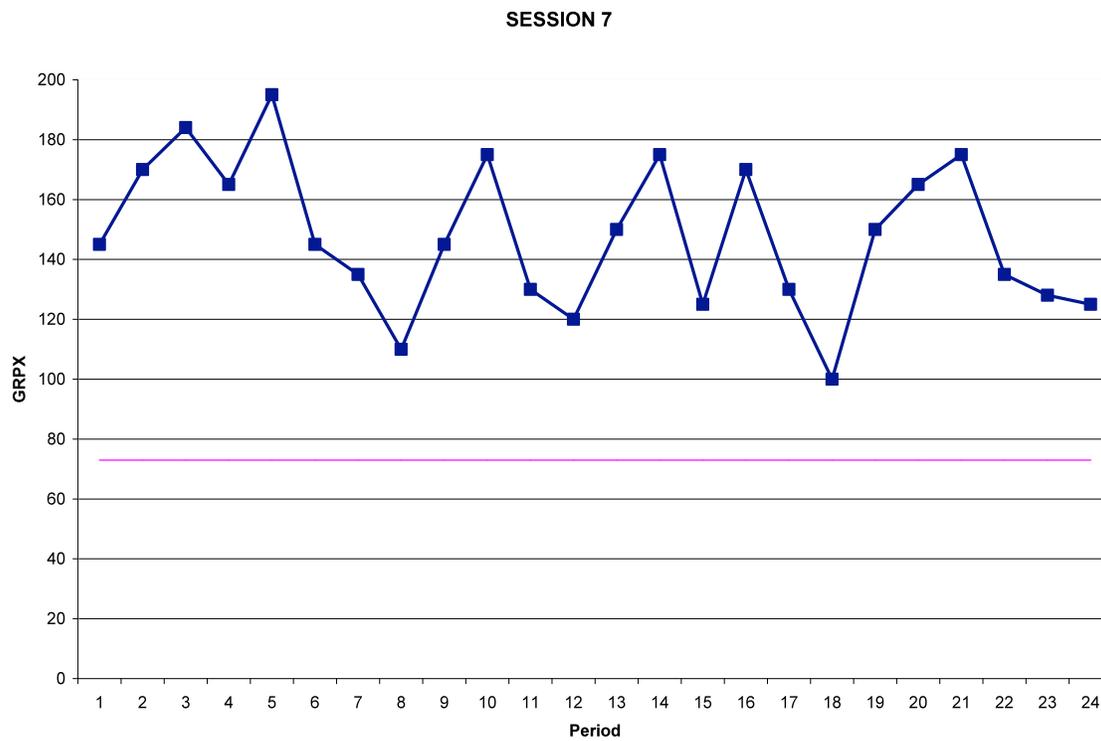


FIGURE 4: SESSION 7 (BASELINE)

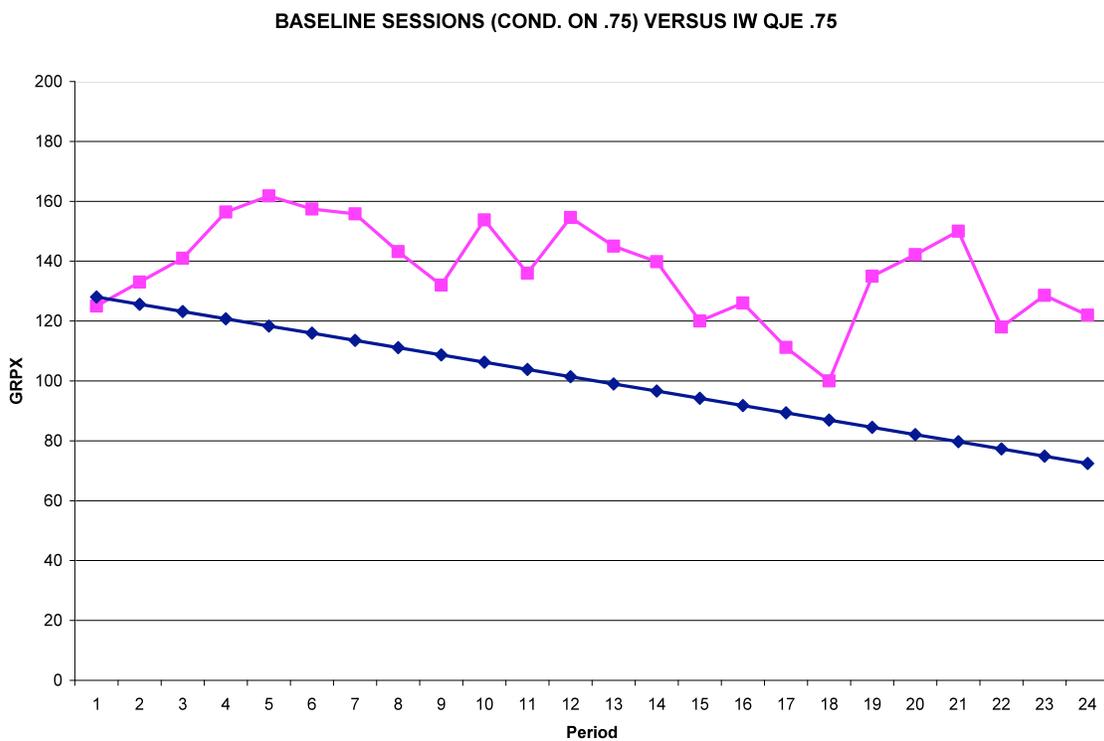
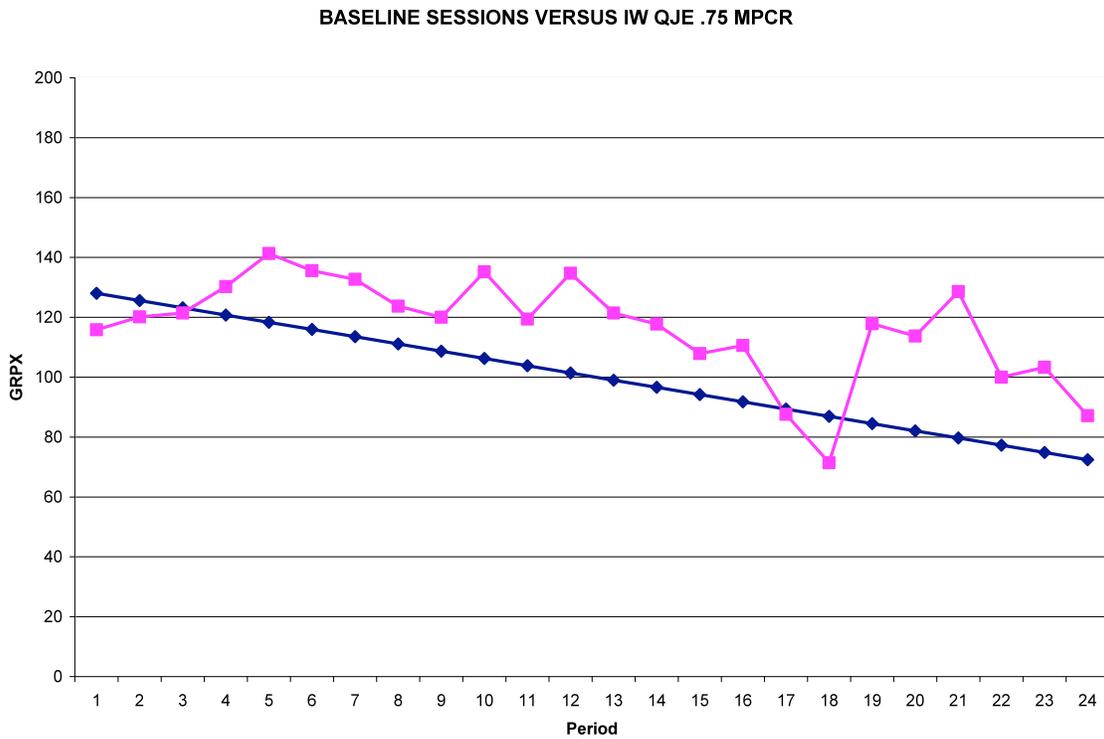


FIGURE 5: COMPARISONS BETWEEN BASELINE SESSION MEANS AND ISAAC AND WALKER QJE .75 MPCR RESULTS.

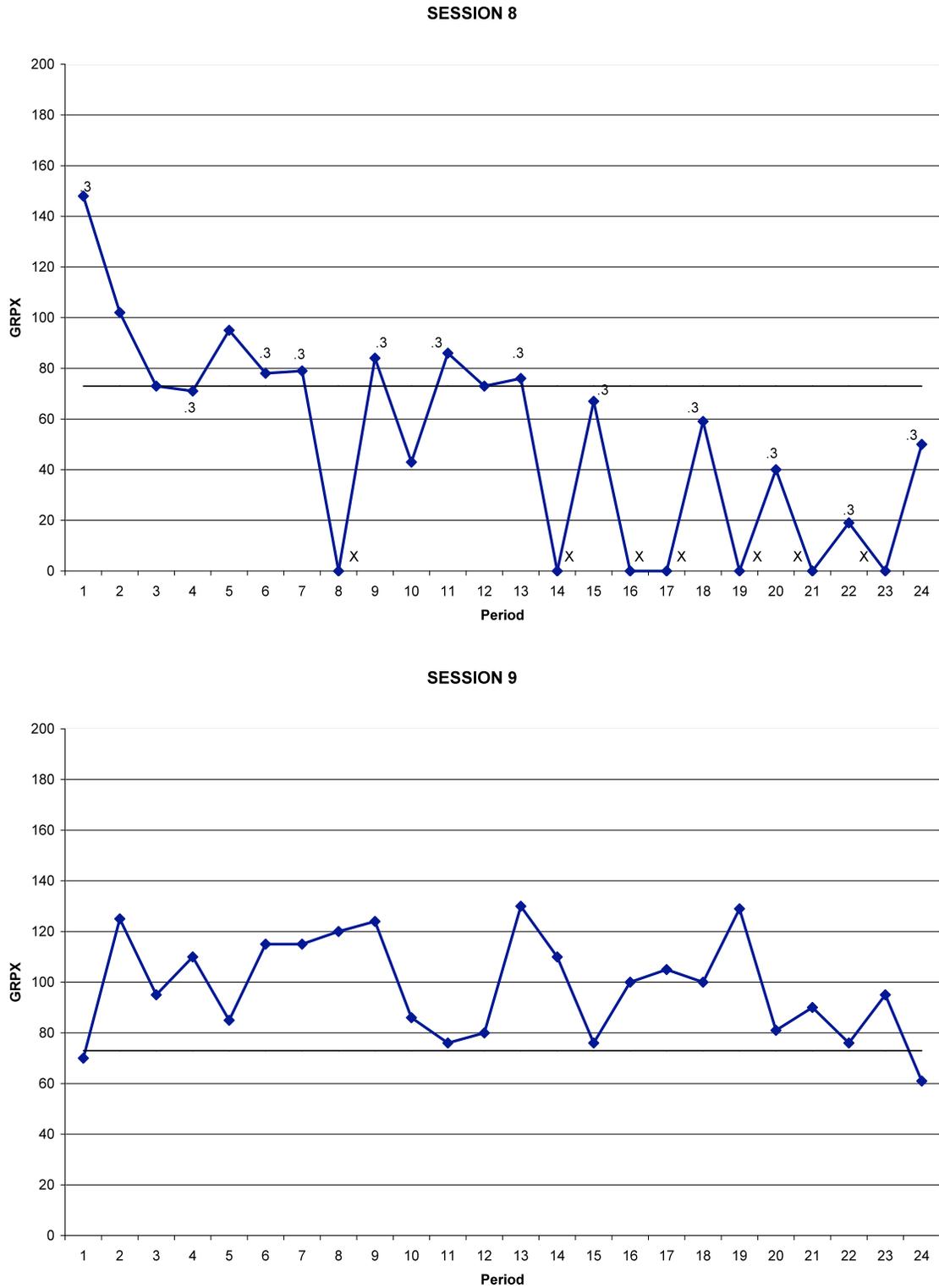


FIGURE 6: SESSIONS 8 & 9 (NO INFO)

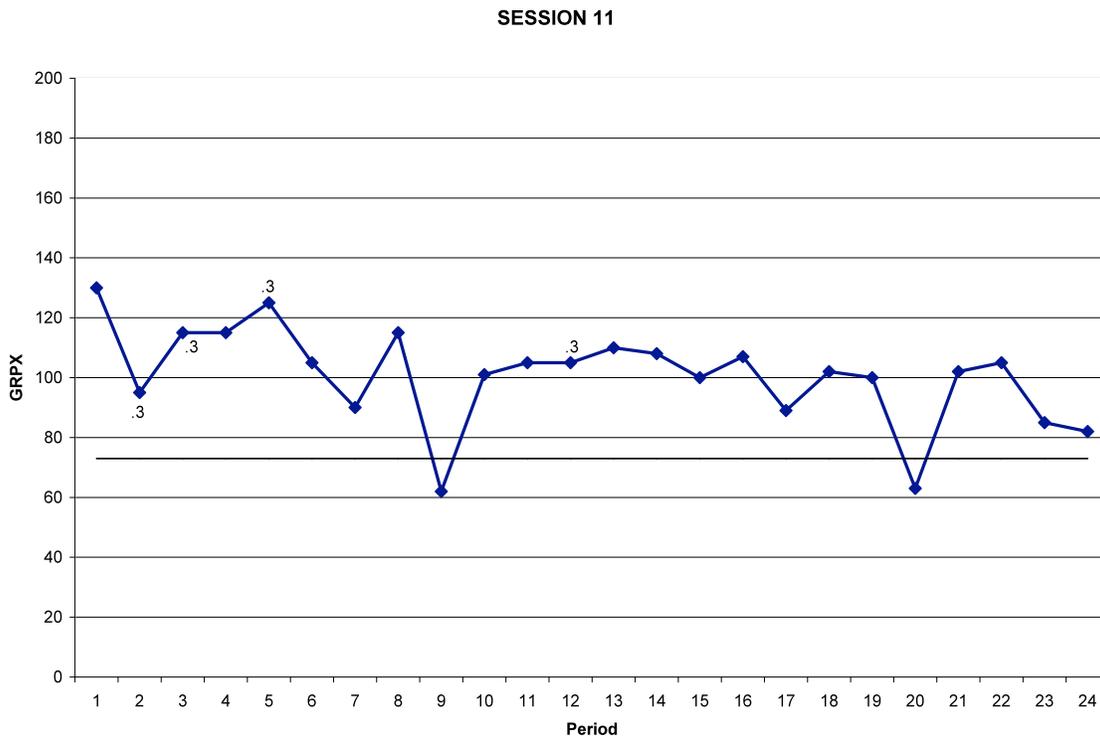
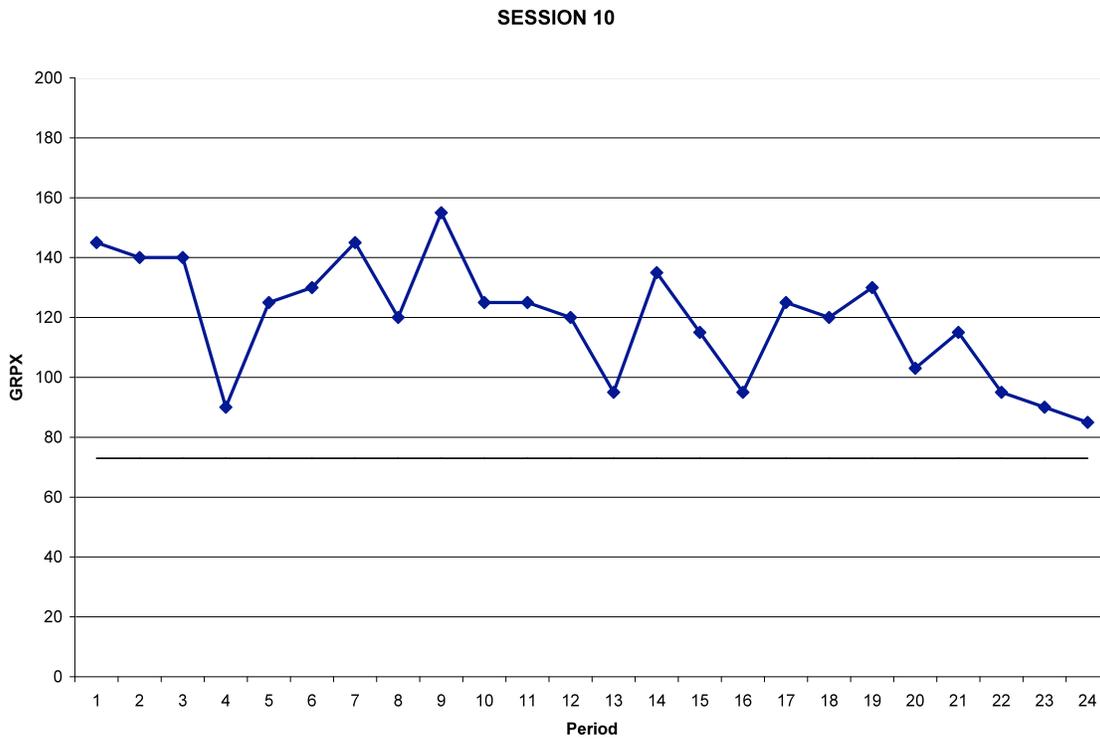


FIGURE 7: SESSIONS 10 & 11 (NO INFO)

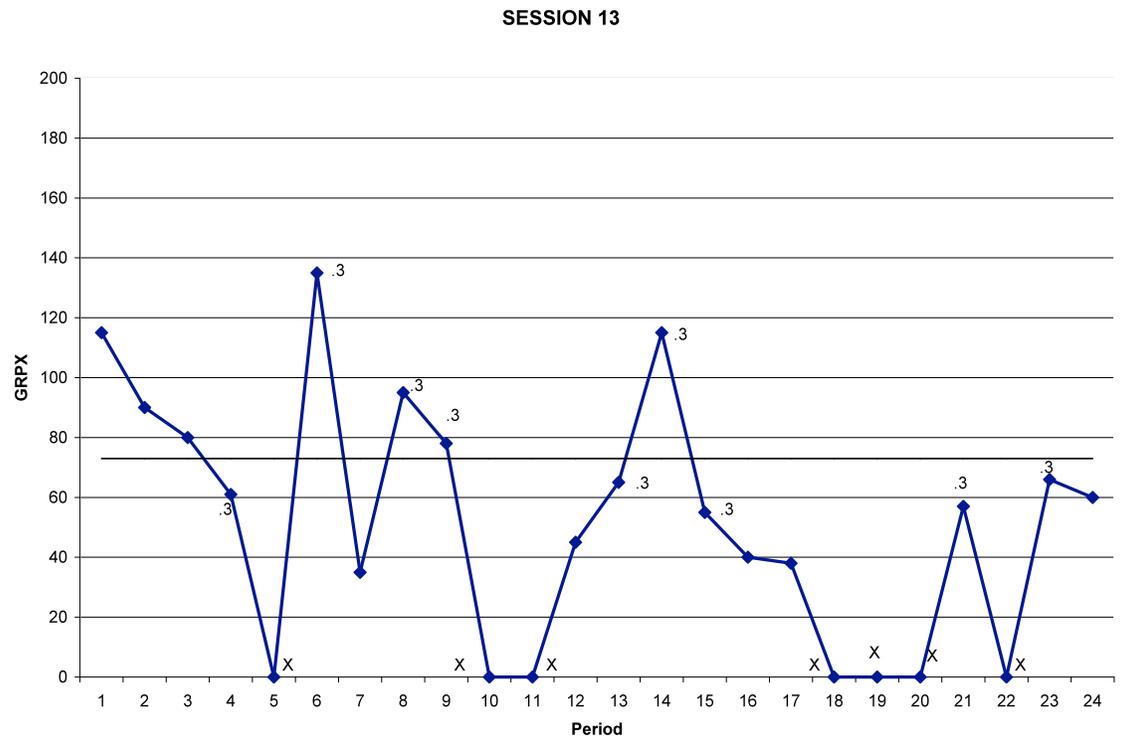
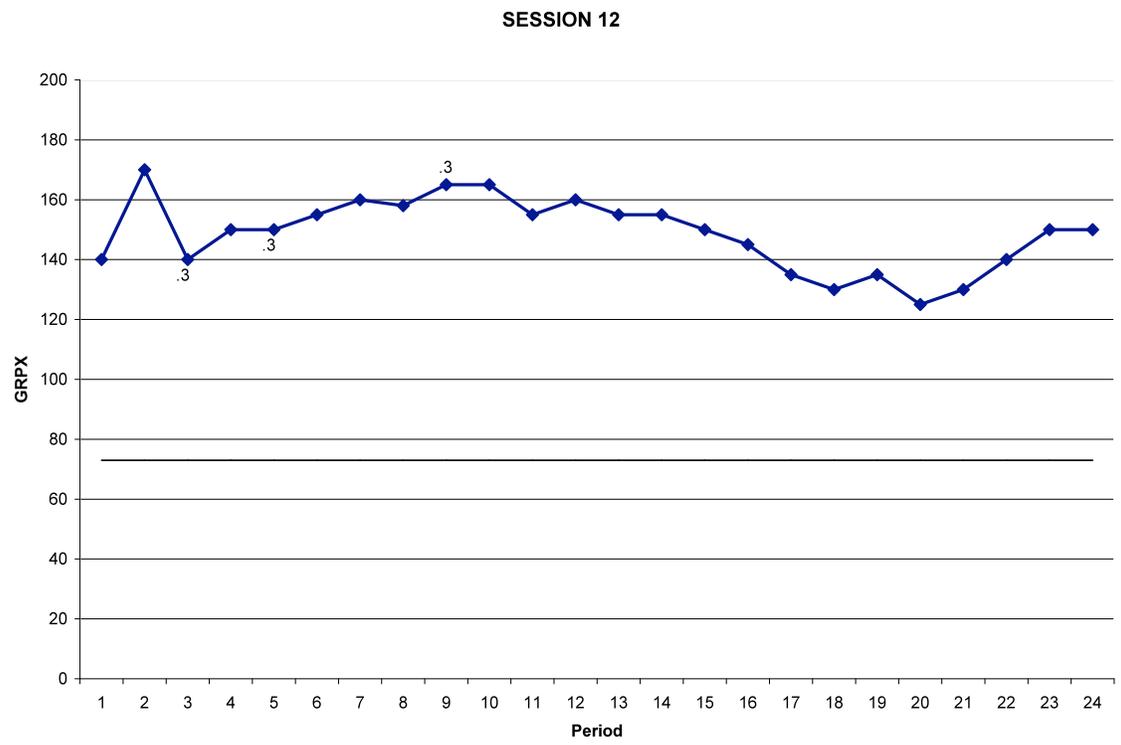


FIGURE 8: SESSION 12 & 13 (NO INFO)

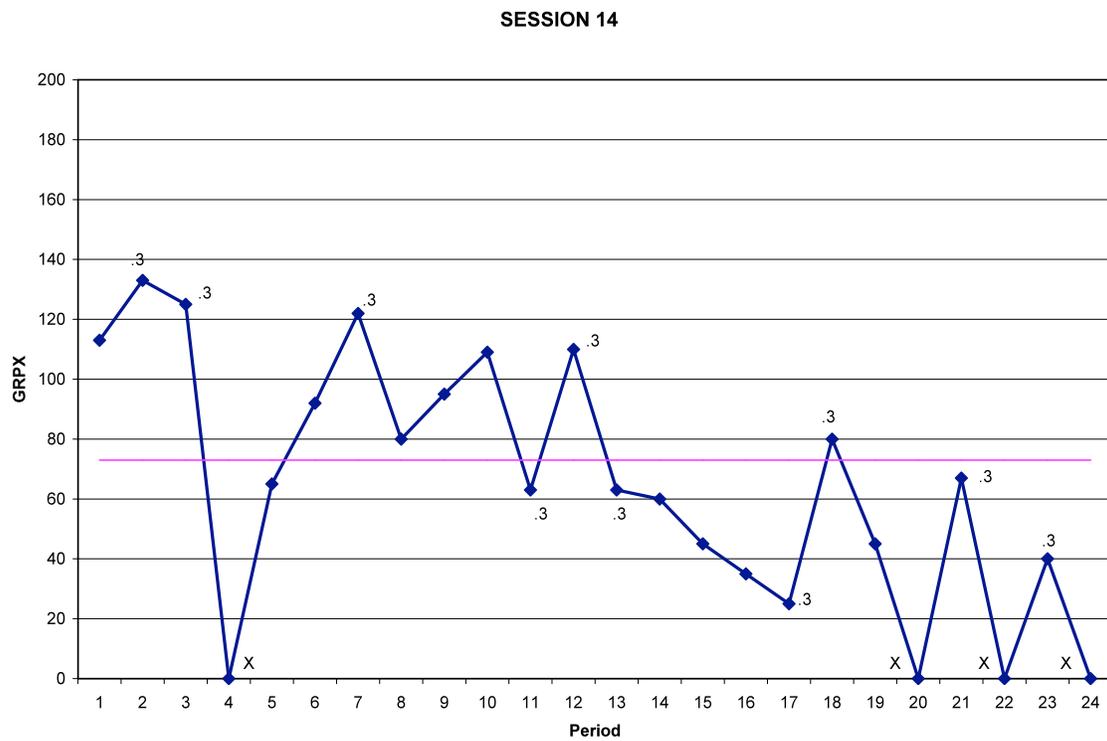


FIGURE 9: SESSION 14 (NO INFO)

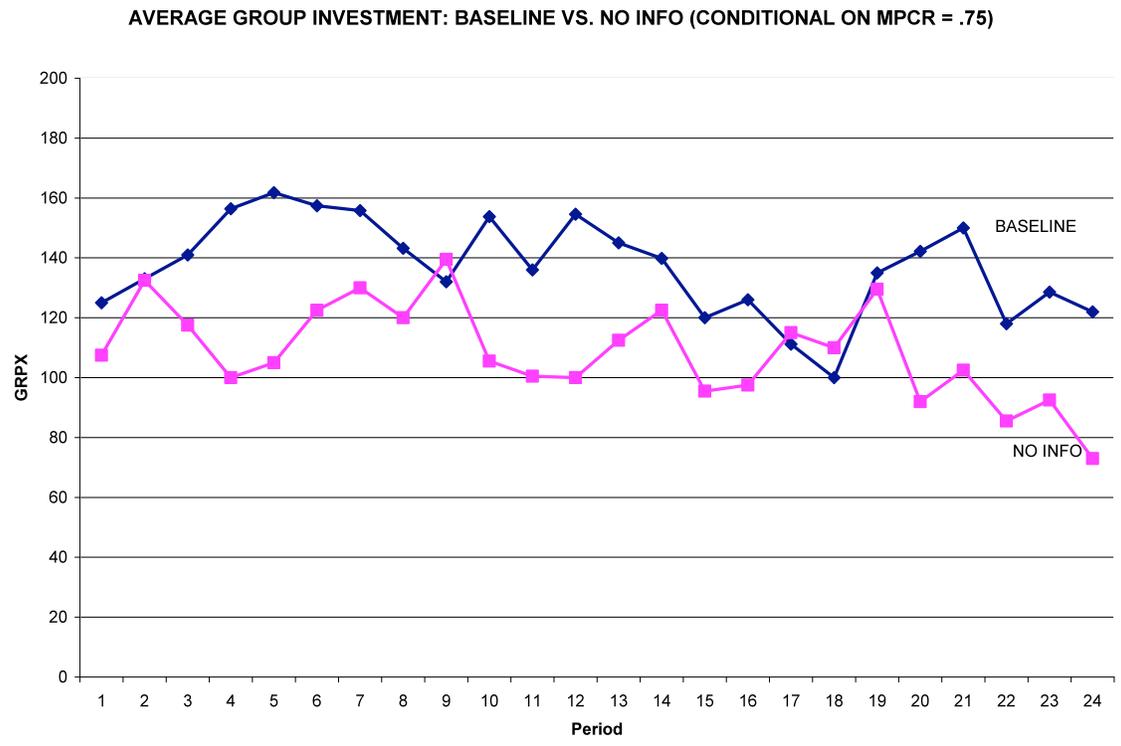
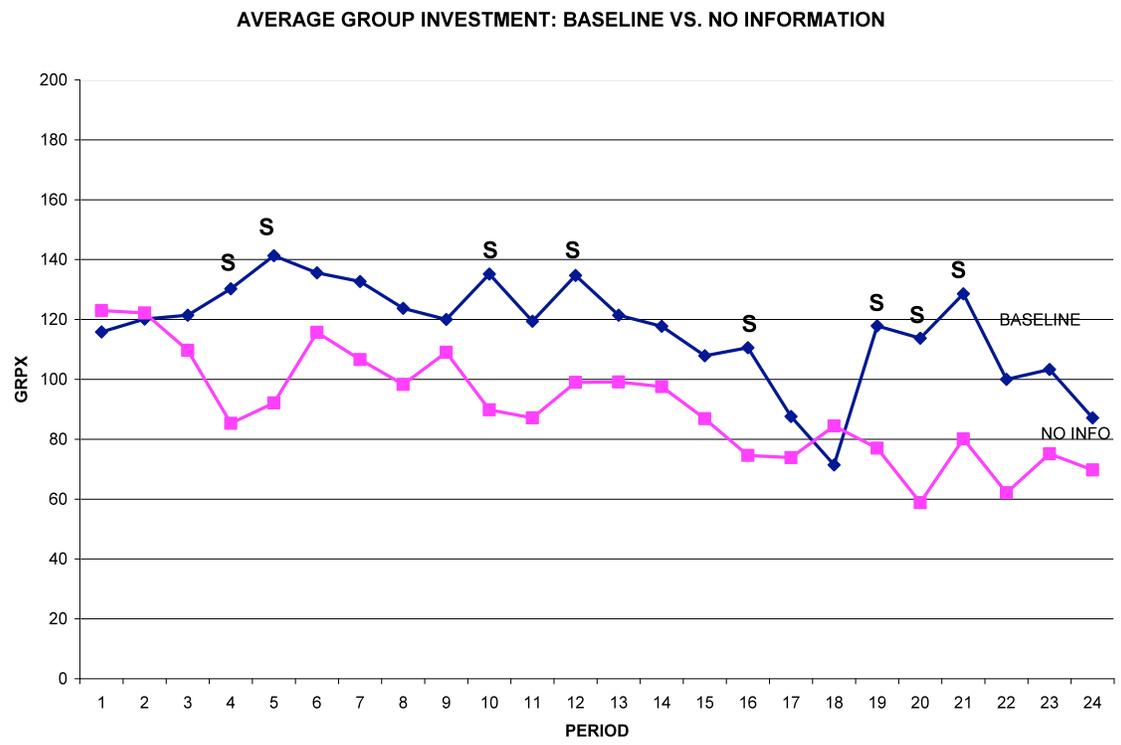
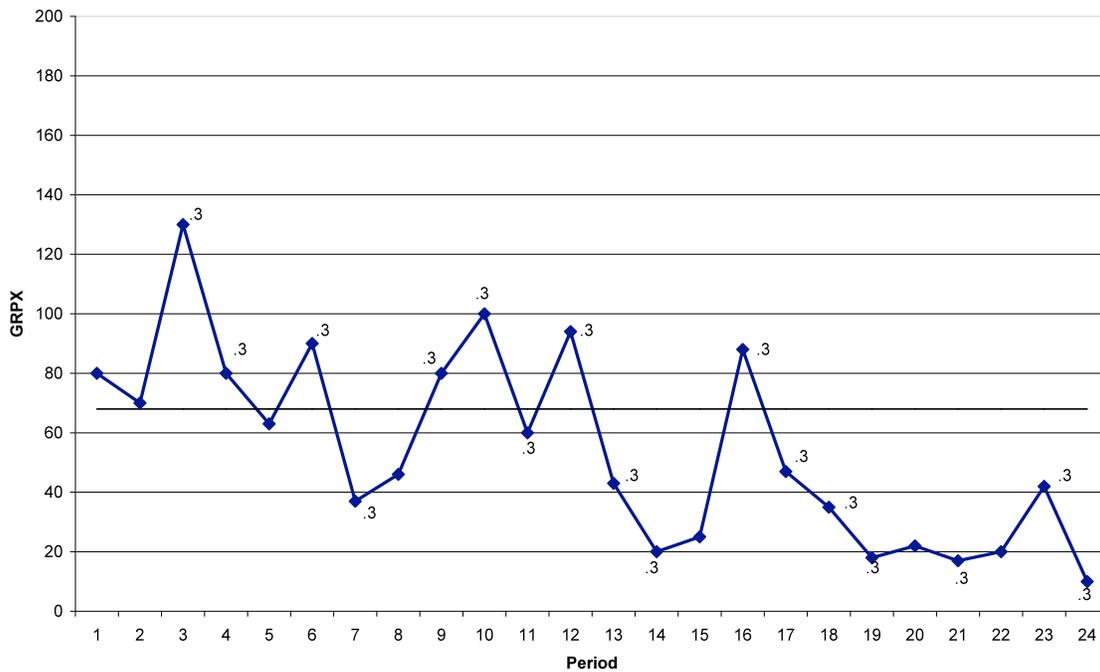


FIGURE 10: MEANS COMPARISONS OF BASELINE VS. NO INFO

SESSION 15: NO OUTSIDE OPTION



SESSION 16

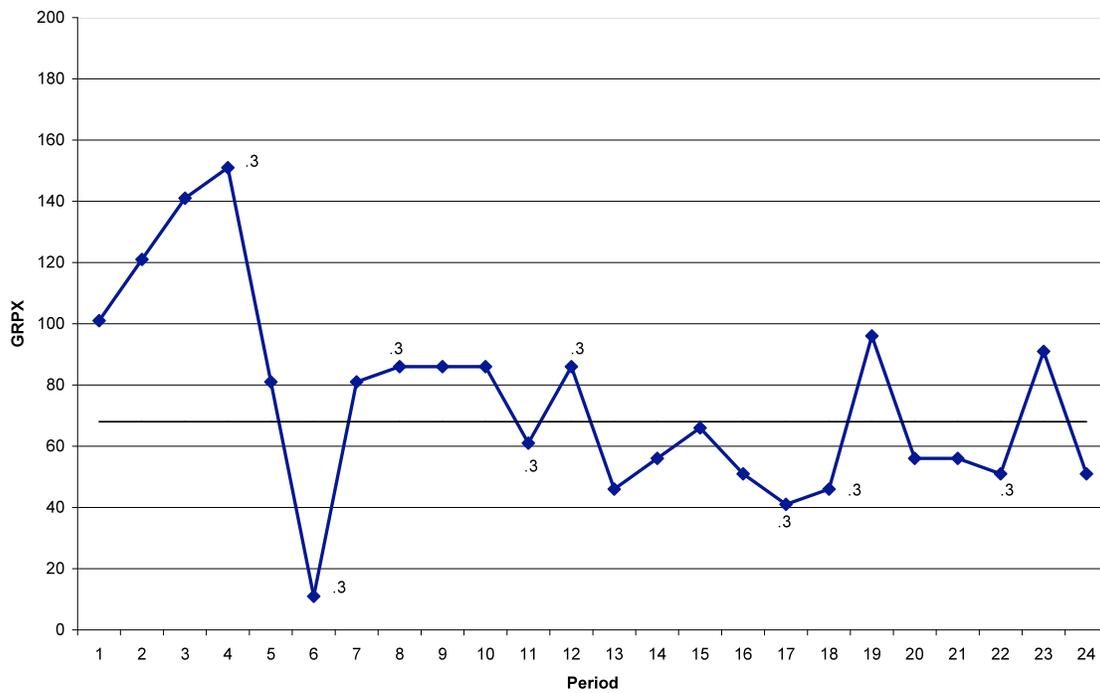
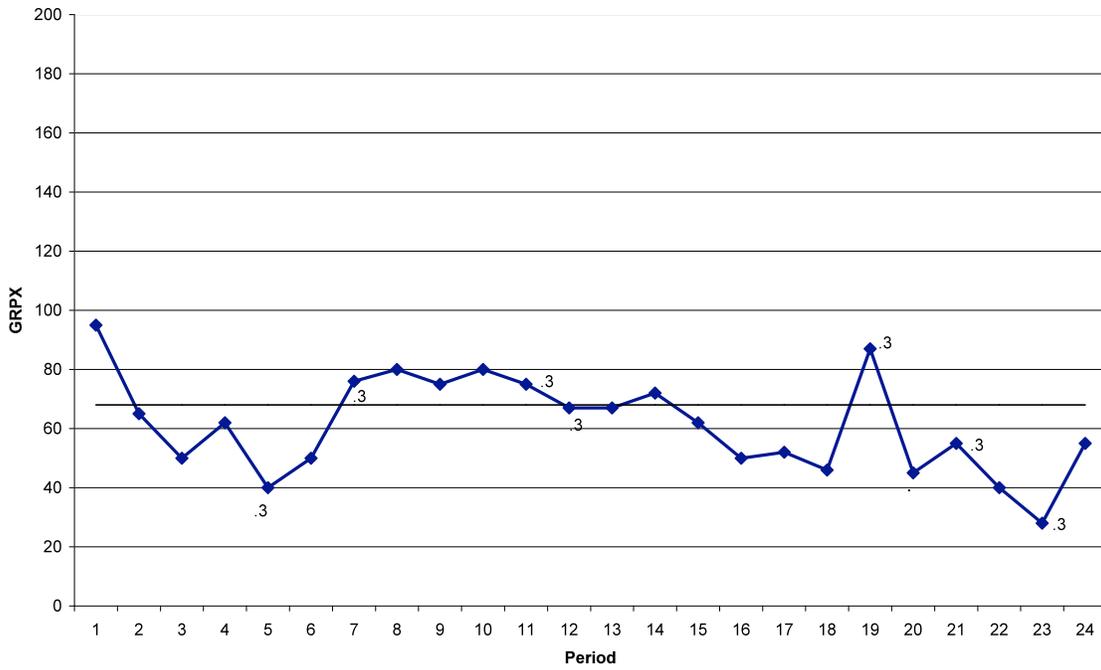


FIGURE 11: SESSION 15 and 16 (NO OUTSIDE OPTION)

SESSION 17



SESSION 18

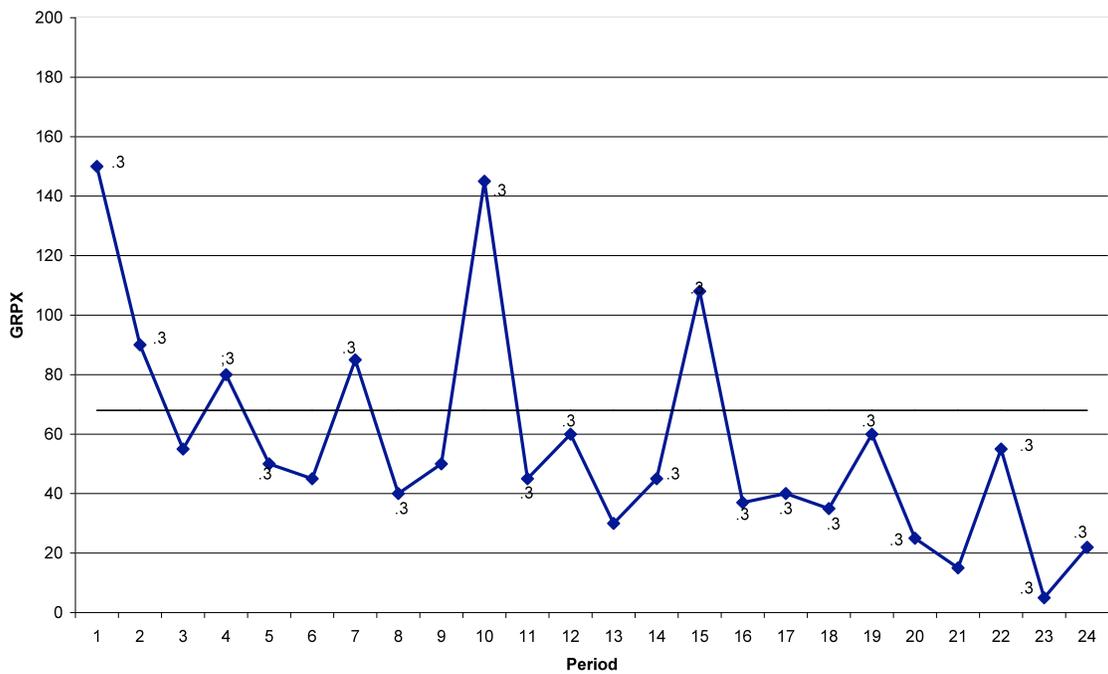


FIGURE 12: SESSIONS 16 and 17 (NO OUTSIDE OPTION)

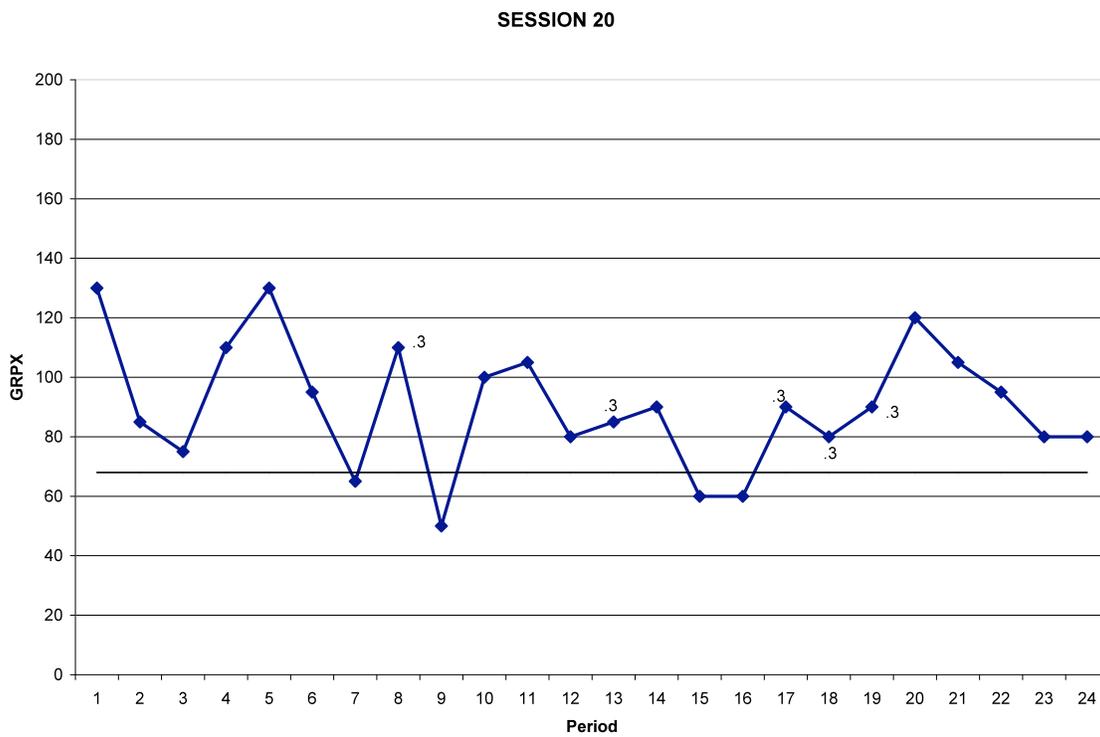
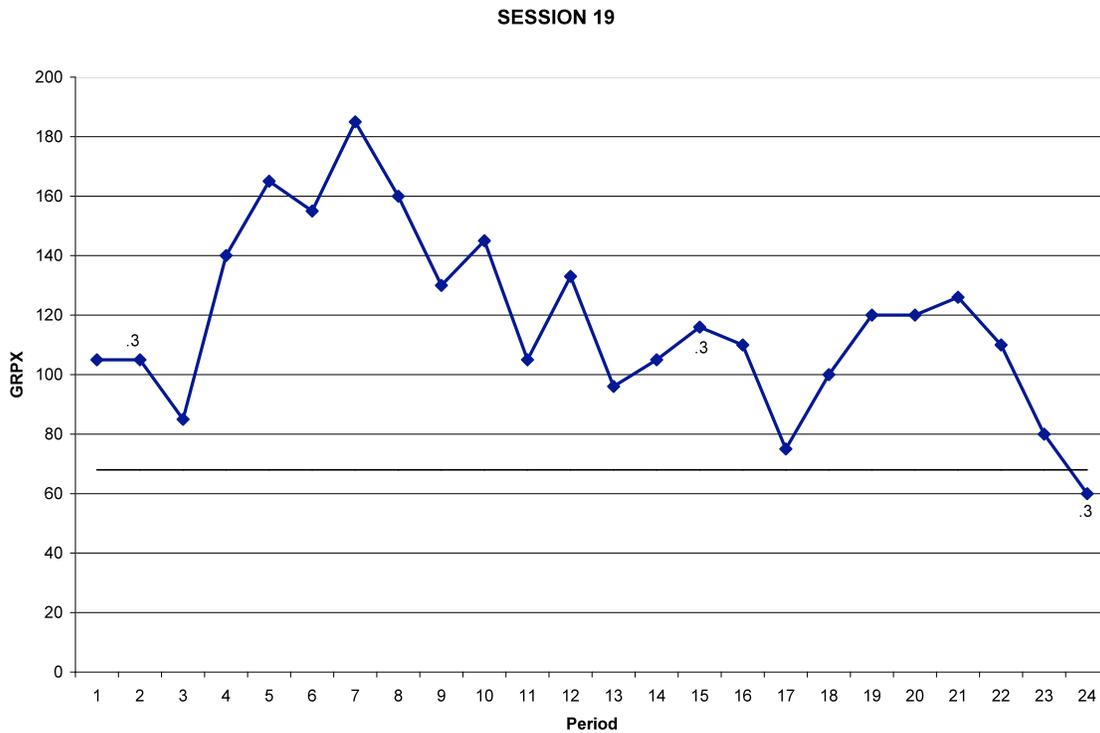


FIGURE 13: SESSIONS 19 and 20 (NO OUTSIDE OPTION)

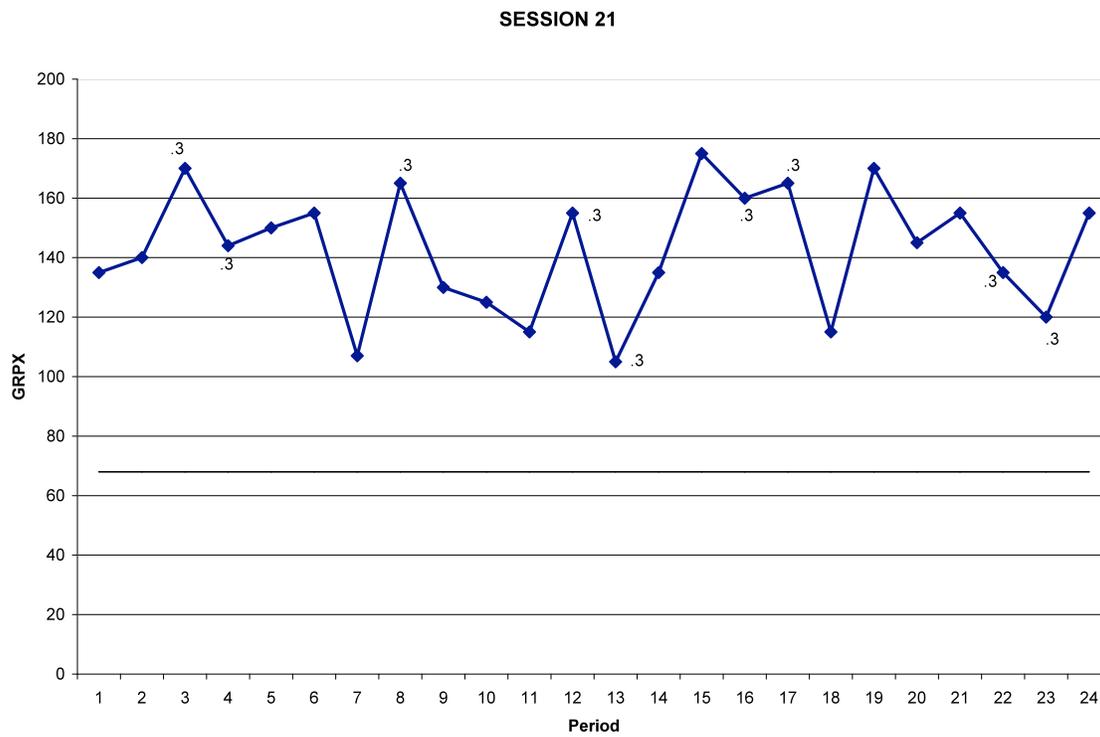


FIGURE 14: SESSION 21 (NO OUTSIDE OPTION)

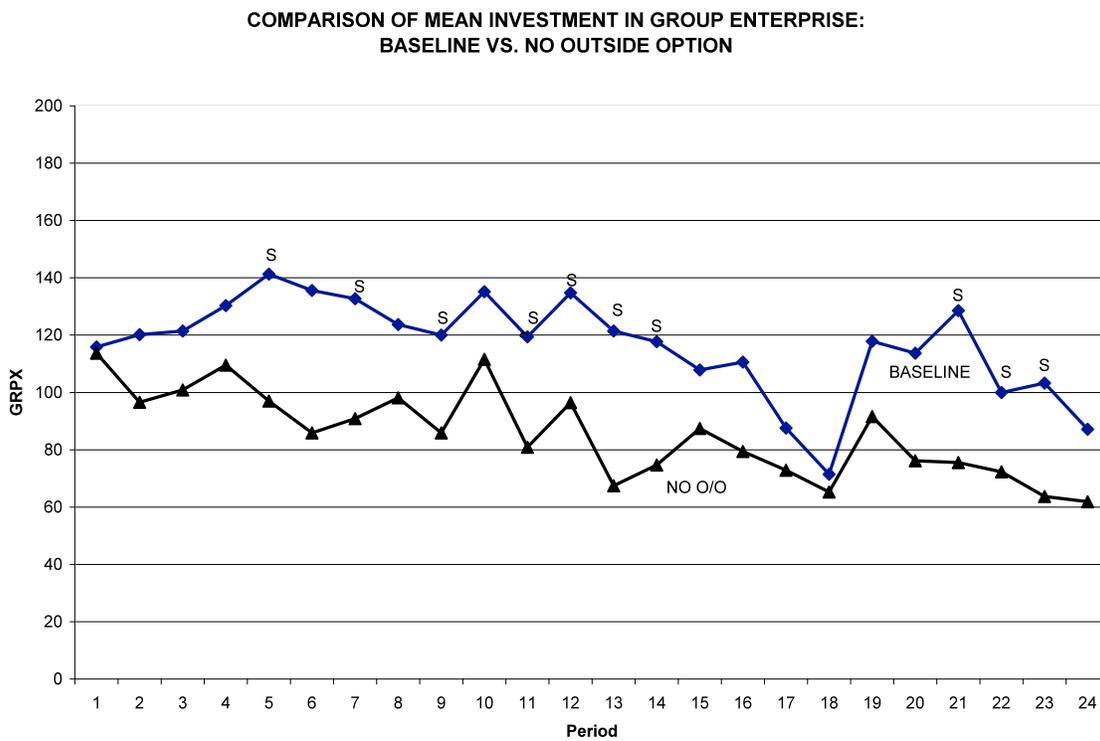
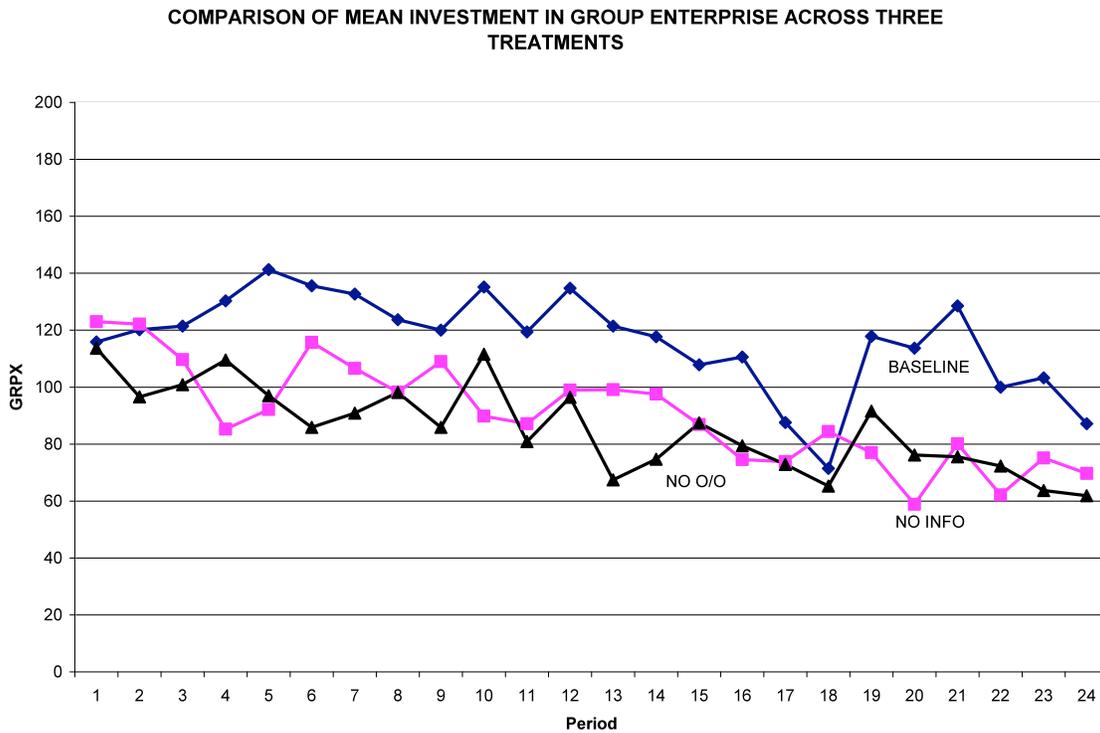


FIGURE 15: COMPARISON OF MEANS

**These sample instructions are from the Baseline condition. The No-Information and No-Outside-Option conditions followed the same pattern, with appropriate modifications. The final version of the instructions also included screen prints, and a one paragraph introduction to the eight practice periods.**

## INTRODUCTION

This is an experiment in the economics of decision making. If you follow the instructions carefully you could earn a considerable amount of money which will be paid to you in a check at the end of the experiment.

You and four other participants are members of a five-person group. Throughout this session, four of you will be *customers* of a group enterprise and one of you will be the *manager* of the same group enterprise. Whether you will be a customer or the manager will be determined randomly by the computer. The profit opportunities for the customers and the manager are different and will be explained in turn. In today's experiments there are 24 periods. From this point on, everything on your screen is your own private information and there should be no communication with any other participant except as you are directed in these instructions.

All costs, profits, and so forth during the experiment today are denominated in experimental dollars. You will be paid one U.S. dollar for every 100 experimental dollars that you earn.

## INSTRUCTIONS FOR CUSTOMERS

Each customer begins each decision period with 50 tokens. The decision for each customer is how many tokens to invest in his/her individual account and how many tokens to invest in the group enterprise. Each customer may invest all 50 of his/her tokens in the individual account, or all 50 tokens in the group enterprise, or any combination in between. The only restriction is that the sum of the two must equal 50 tokens. Tokens may not be carried over from one period to the next.

Tokens invested in a customer's individual exchange earn 1 experimental dollar per token with certainty.

Tokens invested in the group enterprise earn profits for each customer in a different fashion. Each customer earns profits in experimental dollars from the group enterprise based upon the total number of tokens invested by all four customers in the group enterprise, according to the following rule:

$$\text{Customer earnings from the group enterprise} = G \text{ times } S$$

where G will be explained in the next paragraph, and S equals the sum of all of the tokens invested in the group enterprise.

In today's experiment, G will be either .3 or .75, depending upon the decision of the manager. Customers will not know whether G equals .3 or .75 at the time they make their investment decisions.

Notice that this part of each customer's earnings depends only on the *total* of all of the tokens invested by all four customers. Whether a single customer invested zero, one, two...or 50 tokens is irrelevant once the sum is determined. All customers earn an equal amount from the group enterprise.

#### INSTRUCTIONS FOR THE MANAGER

The manager in each group begins a decision period also with 50 tokens. The manager, just as the customers, earns a profit in experimental dollars from the group enterprise based upon the following rule:

$$\text{Manager earnings from the group enterprise} = G * (\text{sum of all tokens invested by customers})$$

It is important to notice that managers do not have the opportunity to invest tokens in the group enterprise. The sum of all tokens invested refers *only* to tokens invested by the customers. What the manager does choose, however, is the value of G, which can be either .3 or .75. If the manager keeps all of his tokens in his/her individual exchange, then the value of G is .3. However, the manager may make a "management investment decision" to increase G to .75. This involves paying 30 tokens out of the manager's individual account. Tokens retained in the manager's individual account earn the manager one experimental dollar per token. The manager has the opportunity to choose G at the beginning of each period.

#### INSTRUCTIONS FOR EVERYONE

Managers have, at the beginning of each period, the option of closing the enterprise for that period. If a manager closes the enterprise, no customer has any opportunity to invest tokens, and no one receives any payment from the group enterprise. Each person, both customer and manager, receives 50 experimental dollars for their stock of tokens which are automatically invested in the private exchange. The manager, however, by closing the group enterprise, also receives a certain "outside salary" of 25 tokens. In such an instance, the manager's total earnings for that period are  $50 + 25 = 75$  experimental dollars.

#### HOW EACH PERIOD PROCEEDS

At the beginning of each period, the manager must decide whether to close or open the enterprise for that period. If the manager decides to close the enterprise and take the additional outside salary of 25 tokens, the customers will be so notified. If the manager decides to open the enterprise he/she will have to choose whether  $G = .3$  or  $.75$ . If the manager chose  $G = .75$ , he/she will be charged 30 tokens. The customers do not initially know whether the G chosen is  $.3$  or  $.75$ , although as we will discuss below, they will be told later.

If the manager chooses to open the enterprise, the customers will make their investment decisions. After all of the investment decisions are made, all participants will be shown their earnings. The customers will be told their earnings from their individual exchange and from the group enterprise. They will not know the total number of tokens invested in the group enterprise. The manager will be told the total number of tokens invested in the group enterprise.

#### ADDITIONAL INFORMATION

Every three periods, the customers will receive a “quarterly report” that reveals the manager’s choice of  $G$  for the previous three periods.

#### FINAL SUMMARY

Customer tokens invested in the individual exchange earn a certain return of one experimental dollar. Customer tokens invested in the group enterprise earn for each customer and for the manager an amount of experimental dollars based upon both 1) whether the manager choose  $G = .3$  or to  $.75$ , and 2) the total number of tokens invested in the group exchange by the customers.

The manager earns one experimental dollar for each token kept in his/her individual exchange. The manager can spend 30 tokens to increase  $G$  from  $.3$  to  $.75$ . The manager has the option of closing the enterprise and taking an additional outside salary option of 25 experimental dollars for that period (which is in addition to the 50 experimental dollars in his/her individual exchange).