# BOTTOM-UP PYGMALION: A FIELD EXPERIMENTAL TEST OF THE EFFECTS OF FOLLOWER EXPECTATIONS ON LEADER PERFORMANCE

by

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Abstract

A model of Pygmalion-in-Reverse is suggested. The hypothesis that raising subordinates' expectations of their immediate supervisors improves the supervisors' leadership and performance was tested in a field experiment. Studying the supervisor as a source of means efficacy, we also examined the effect of subordinates' expectations on their own performance.

The Pygmalion effect occurs when raising supervisors' expectations of their subordinates improves the subordinates' performance (Eden, 1990). The present aim was to test whether the Pygmalion effect can be produced "bottom-up," that is, whether raising subordinates' expectations regarding their supervisors improves supervisors' leadership and performance. According to the classical, top-down Pygmalion model (Figure 1), supervisors whose expectations have been raised provide their subordinates with more effective leadership (Eden, 1984, 2003) that enhances subordinates' self-efficacy. Enhanced self-efficacy in turn boosts performance (Bandura, 1986). Through active communication of high expectations, supervisors enhance self-expectations among those of whom they expect more (Eden, 1984). According to expectancy theory, high expectations motivate effort and performance (Vroom, 1964). Therefore, raising subordinates' self-expectations boosts their motivation, effort, and performance.

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Insert Figure 1 about here

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## Bottom-Up Expectations

The Pygmalion effect has been studied only downward. Our research question was whether followers could fulfill the Pygmalion role vis-à-vis their leaders. Conceiving leadership as mutual exchange, Howell and Shamir (2005) argued that followers' high expectations of their leaders can affect their leaders' self-efficacy and performance and thus enhance charismatic leadership.

### *Means Efficacy*

Means efficacy is one's belief in the utility of the means that are available for performing the job (Eden, 2001). Just as high self-efficacy raises expectations for success and thus increases

motivation (Bandura, 1986), so high means efficacy results in high expectations and motivates more effortful use of such tools or means. A manager can be a crucial means for subordinates to perform successfully. It follows that raising subordinates' means efficacy, a special case of which is their belief in their supervisor, would lead to subordinates to expect more of their supervisor (see Figure 1). This would lead to a greater "use" and acceptance of the supervisor and of the supervisor's leadership.

*Enabling Behavior – Pygmalion Followership as a Mediator*

In the exchange between leaders and followers, leaders provide benefits (e.g., direction) and followers respond with greater responsiveness to their leaders (Hollander & Julian, 1969). Howell and Shamir (2005) argued that followers spark the emergence of charismatic leadership and they response selectively to leaders' influence attempts. Thus, followers can empower their leaders, endorse them and provide them with the energy and power they need to fulfill their roles. Howell and Shamir further argued that followers often control resources leaders need: information, cooperation, and legitimacy. Their support and acceptance of their leader increase the availability of these resources to the leader. It follows that subordinates can provide emotional support (e.g., creating a positive atmosphere); instrumental support (e.g., consenting to the leader's instructions, cooperating, bringing up ideas); informative support (e.g., supplying necessary information and feedback); or evaluative support (e.g., strengthening the leader's self-esteem, expressing respect). Thus, as described in Figure 1, subordinates who expect much of their leaders may engage in supportive behaviors that facilitate leader performance.

*Leadership Self-Efficacy: A Mediator*

Leadership self-efficacy (LSE) may mediate a bottom-up effect, as shown in Figure 1. Howell and Shamir (2005) theorized that the more followers provide leaders with resources and

empower them, the higher the leaders' self-efficacy and the more they engage in charismatic behaviors. Paglis and Green (2002) defined LSE as "a person's judgment that he or she can successfully exert leadership" and found that high LSE managers engage more in attempts to lead compared to those who doubt their ability. They also found a relationship between subordinates' attitudes (e.g., cynicism) and LSE.

These hypotheses mirror the classical top-down Pygmalion hypotheses:

*Hypothesis 1a. Raising subordinates' means efficacy regarding their supervisors improves supervisors' performance.*

*Hypothesis 1b. Raising subordinates' expectations regarding their supervisors improves supervisors' performance.*

*Hypothesis 1c. Subordinates' followership mediates the effect of their expectations on their supervisors' performance.*

*Hypothesis 1d. Supervisors' leadership self-efficacy mediates the effect of subordinates' expectations on their supervisors' performance.*

*Hypothesis 1e. Supervisors' self-expectations mediate the effect of subordinates' expectations on their supervisors' performance.*

## Effect of Means Efficacy on Subordinates

Even individuals with low self-efficacy can expect to perform a task successfully, provided they believe they have high-quality tools or an effective manager (Eden, 2001). The well-known relationship between combat soldiers' confidence in their weapons and commanders and their morale instantiates this (Gal, 1986). Eden, Ganzach, Granat-Flomin, and Zigman (2010) found that a) randomly assigned experimental public-service employees who were told that they were receiving a computer system proven to be the best of its kind improved their

performance more than the controls and that b) randomly assigned experimental students who were told they were getting the best course web site available outperformed controls. By extension, when workers believe in their managers, they are more willing to invest effort to get the job done (Eden, 2001). Higher means efficacy should raise performance expectations. According to expectancy theory (Vroom, 1964), raising expectancy increases motivation, effort, and performance (See connecting line 2 in Figure 1).

*Hypothesis 2a. Raising subordinates' means efficacy regarding their supervisors improves subordinates' performance.*

*Hypothesis 2b. Raising subordinates' expectations regarding their supervisors improves subordinates' performance.*

*Hypothesis 2c. Subordinates' self-expectations for success mediate the effect of their expectations on their performance.*

*Hypothesis 2d. Subordinates' motivation mediates the effect of their expectations on their performance.*

## Method

### *Participants*

We conducted the experiment in a university-based community outreach program called Perach. In Perach, undergraduate students tutor underachieving elementary- and high-school pupils from low socio-economic background. Three team heads report to a regional manager. Each team head supervises a third of the supervisors, who supervise the tutors directly. The supervisors are carefully selected upper-class undergraduates or graduate students who get paid for 20 hours weekly. The tutors get a stipend worth half of their tuition.

The supervisors visit the schools at least once a week for four hours and meet with teachers and tutees. The supervisors meet every tutor face-to-face at least once every two months. They review the tutor's activity report, discuss problems, plan activities, and set goals. The supervisor and tutor can schedule more meetings or talk on the phone. Supervisors also conduct workshops for their tutors.

The supervisors had an average of 36 tutors (*SD* = 11). The regional management included 44 women supervisors and 10 men. Of these 54 supervisors, 26 completed both supervisor questionnaires; 205 tutors of 48 supervisors completed all four tutor questionnaires; 75% of them were women and 25% were men.

*Measures*

Responses were on 5-point Likert scales. We measured *Tutors' expectations of their supervisors* (for the manipulation check) with four items, e.g., "I expect that my supervisor will succeed in his supervisory role," α = .90. *Supervisors' domain self-efficacy* was measured using 11 self-report items written for this experiment, e.g., "I can guide tutors." pretest and posttest, α = .91 and .90. We gauged *Supervisors' self-expectations* using five items, e.g., "I expect to succeed in the supervisor's role," α = .76. Four items measured *Tutors' self-expectations*, e.g., "I expect that my tutee's parents will see the tutorial as a success," pretest and posttest α = .71 and .80. Three items measured *Tutors' motivation*, e.g., "How much effort are you willing to exert as a Perach tutor?" pretest and posttest α = .73 and .76 respectively. *Tutors' means efficacy* was measured by nine items written for this experiment, e.g., "The supervisor is a valuable resource for me," α = .97. *Tutors' followership* was measured by an 18-item index that tapped supervisors' perceptions of their tutors' behavior toward them, e.g., "My tutors create a good atmosphere in my presence," α = .94.

Team heads assessed *Supervisors' performance* using a 9-item index. Sample items are "activates his or her tutors successfully" and "enriches the tutorials with content and depth," $\alpha$ = .92. School counselors, who were in charge of Perach at their schools, rated supervisors' performance using six items, e.g., "His (her) visits at the school facilitated the tutorials," $\alpha$ = .93. School counselors assessed the *Tutors performance* using four items from Natanovich and Eden (2008), e.g., "The tutors functioned to your satisfaction" and "The children benefited from the tutorial," $\alpha$ = .86.

*Design and Procedure*

This was a true field experiment. Table 1 summarizes the timeline. We randomly assigned supervisors to experimental and control conditions. Once a supervisor was assigned to a condition, all of his or her tutors were assigned with him or her. Therefore, the supervisor was the unit of analysis. We administered the experimental treatment and collected the data online.

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Insert Table 1 about here

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At the beginning of the year we met with the supervisors and introduced the research, solicited their participation, and had them complete demographic questionnaires and the pretest domain self-efficacy and self-expectancy measures. Three weeks later we sent the tutors an email encouraging their participation. Tutors submitted informed consent forms and the self-expectations and motivation pretests.

*The experimental treatment.* We delivered the experimental treatment via electronic mail starting two months after the beginning of the tutorial. Only the experimental tutors were informed that "an experimental profile of the ideal Perach supervisor" has proven to "predict

success in supervisory work with 95% accuracy.… We discovered that your supervisor, (supervisor's name), fits the profile almost completely. He (She) is far above the median…. Therefore, you can expect very high performance, as well as quality guidance and leadership, from (first name)." We asked the tutors not to share any of this information with tutors of other supervisors or with their supervisor.

Three months later we sent an email booster reminding the experimental tutors that "our diagnosis maintains that your supervisor is among the most suitable ones for the supervisory job. Therefore, you can expect very high performance from (name) as a supervisor." A link to the manipulation check measure, tutor means efficacy measure, self-expectations, and motivation posttests followed the booster.

*Midway partial debriefing*. About three months after we delivered the treatment, we learned that an experimental tutor had forwarded the treatment message to his or her supervisor, disregarding our request. To prevent rumors or misunderstandings, we decided to conduct a partial midcourse debriefing. We assembled the supervisors and described the study and its aims and gave them the opportunity to ask questions and to comment. To preserve the integrity of the treatment, we didn't reveal the identity of the experimental and control supervisors. We asked for the supervisors' cooperation until the end of the year at which time we would conduct a general debriefing. They expressed interest and agreed to continue cooperating. This session avoided rumors about what we were doing and put the supervisors at ease. Postexperimental debriefing later revealed that it contained the potential damage of the leakage of the treatment.

*Postexperimental debriefing*. Two months later we sent the supervisors the domain self-efficacy and self-expectations posttest and the followership measure. At the end of the semester

the team heads and the school counselors filled out performance questionnaires. We then conducted a full-disclosure debriefing with participants at all organizational levels.

## Results

### *Manipulation Check – General*

The experimental tutors expected significantly more of their supervisors ($M = 4.48$, $SD = 0.38$, $n = 28$) than did the control tutors ($M = 4.12$, $SD = 0.67$, $n = 26$), $t(52) = 2.45$, $p < .01$, one-tailed. We computed $r$ to estimate effect size and the binomial effect size display (BESD) to obtain the success-rate equivalent of $r$ as an expression of the practical importance of the treatment (Rosenthal & Rubin, 1982). For tutor expectations, $r = .32$. The BESD equivalent was 66% in the experimental group with above-median expectations versus only 34% in the control group, highlighting the impact of the treatment. Thus, the treatment succeeded in raising the experimental tutors' expectations as intended. Note that the means in both conditions exceeded 4 on a 5-point scale. Thus, tutors expected a lot from their supervisors regardless of which condition they were in. This reflects Perach's high-expectancy culture. The treatment made the experimental tutors expect even more.

### *Bottom-Up Pygmalion Effect*

When the sample size was small, we also performed a nonparametric test. Row 1 of Table 2 shows that Hypothesis 1 regarding the "bottom-up" Pygmalion effect was not confirmed ($p = .24$). Row 2 shows that there was no difference in the professionalism index ($p = .40$). Row 3 shows that, contrary to the hypothesis, the controls reported greater motivation than did the experimental supervisors ($p = .04$). Row 4 indicates no difference in the school counselors' ratings ($p = .14$ and .13 in the Mann-Whitney and $t$ test, respectively). Because the treatment

didn't affect supervisors' performance, the mediation hypotheses were disconfirmed (Baron & Kenny, 1986).

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Insert Tables 2 - 4 about here

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Row 5 shows no significant difference between experimental and control supervisors' ratings of their tutors' followership. Row 6 shows a marginally significant difference in posttest domain self-efficacy; the experimental supervisors' domain self-efficacy was higher than the controls' domain self-efficacy (one-tailed). However, a two-way repeated-measures ANOVA found that the Treatment-by-Occasion interaction was not significant, $F(1, 23) = 1.67$, $p = .21$, $\eta^2 = .07$. Thus, the increase in ratings among the experimental supervisors was not significantly greater than that of the control supervisors. The last row of Table 2 shows that the experimental supervisors reported higher post-treatment self-expectations compared to the controls (one-tailed). However, the Treatment-by-Occasion interaction was not significant, $F(1, 23) = 36$, $p = .55$, $\eta^2 = .02$. Thus, the increase in experimental supervisors' ratings was not significantly different from the decrease in control supervisors' self-expectations. Therefore, the higher posttest expectations of the experimental supervisors cannot be attributed to the treatment. The treatment did not affect the dependent variables as predicted.

*The Supervisor as a Source of Means Efficacy*

We tested the hypotheses at the supervisor level for the 200 tutors who completed all four questionnaires. We aggregated the data by averaging the tutors' ratings for each of the 48 supervisors. We tested Hypothesis 2 for the 28 supervisors whose tutors had been rated by school counselors. Row 1 of Table 3 shows that neither test of Hypothesis 2 was significant.

Row 2 shows that there was no statistically significant difference between the experimental and control tutors' means efficacy ratings (Mann-Whitney detected a marginally significant effect, $p = .09$, one-tailed). Row 3 shows that there was no significant effect on posttest self-expectancy, nor was the Treatment X Occasion interaction significant, $F(1, 46) = 1.36$, $p = .25$. Thus, the conditions did not differ in the degree of change in self-expectations.

Row 4 of Table 3 shows similarly negative results for motivation, Treatment X Occasion interaction, $F(1, 46) = 1.39$, $p = .24$.

*Supplementary Results*

We analyzed all the data available for each measurement occasion, including also tutors who had not responded on all occasions. For $n = 54$, the experimental supervisors' tutors reported higher means efficacy ($M = 3.68$, $SD = 0.48$, $n = 28$) compared to the control supervisors' tutors ($M = 3.26$, $SD = 0.81$, $n = 26$), $t(52) = 2.29$, $p = .01$, $r = .30$. Table 4 shows that experimental supervisors' tutors reported higher posttest motivation than did the control supervisors' tutors. The Treatment X Occasion interaction was marginally significant, $F(1, 48) = 3.54$, $p = .07$. A pair of $t$ tests for dependent samples showed that the experimental tutors' motivation had not changed, $t(25) = - 0.11$, $p = .91$, $r = .02$, whereas the control tutors' motivation had decreased, $t(23) = 1.97$, $p = .06$, $r = .38$. The experimental tutors' posttest motivation was higher than the controls', $t(48) = 1.71$, $p = .047$, $r = .24$, yielding a BESD of 62% versus 38%.

## Discussion

Neither the Pygmalion-in-Reverse hypothesis nor the rest of the model was confirmed. Similarly, an examination of the effect of subordinates' expectations on their own performance using the manager as a source of means efficacy detected no effect. The rest of the model was

partially supported: raising subordinates' expectations of their supervisors boosted their own means efficacy and motivation.

*Theoretical Implications*

Even if a bottom-up expectancy effect exists, it is probably more complex than the classical top-down effect. One major difference between the two can be explained in terms of Hobfoll's (1989) Conservation of Resources Theory. Raising supervisors' expectations of their subordinates increases subordinates' resources, inasmuch as they receive better leadership, practical tools, and personal resources such as self-efficacy and means efficacy. Conversely, in a bottom-up process, supervisors not only might not gain resources, but might also be required to invest more of their resources in order for the prophecy to be fulfilled. The depletion of resources such as time, energy, and attention might cause increased stress or overload. Our followership measure barely indicated overload or the frequency with which the supervisors were approached by their tutors, the number of demands or calls for help, and the like.

Perhaps the most reasonable implication of our largely negative results is that the Pygmalion effect works in one direction only: downward. This is implicit in the fact that there have been no experimental attempts to create Upward Pygmalion. The Upward Pygmalion hypothesis may simply be invalid, and no methodological finesse will detect an effect that does not exist.

*Strengths and Limitations*

*Statistical power.* The number of supervisors was small to begin with, and we had sufficient data for even fewer. This made it harder to reach statistical significance even when confirmatory trends were in the data; only large effects could be detected. Furthermore, the Upward Pygmalion hypothesis is predicated on the joint effect of numerous subordinates, each

with high expectations of the supervisor. Producing an upward effect may require some minimal number of subordinates. Our tutor response rate may indicate that only a small percentage of the tutors participated actively in the experiment.

*On-line treatment delivery*. This was the first time the Pygmalion treatment was delivered on-line. It is simple and cost-effective. However, it may be weaker and less credible than a face-to-face treatment. Lack of direct contact with participants prevents researchers from using visual and verbal cues to determine whether participants "got" the treatment. Furthermore, the experimenter cannot provide immediate clarification (Barchard & Williams, 2008). Moreover, according to Dandurand, Shultz, and Onishi (2008), the environments in online experiments are more variable and thus add more extraneous variance, rendering it more difficult to detect significant effects. Moreover, self-selection in participation and involvement is greater in online research, including reading stimulus material presented from the beginning to the end (Reips, 2002). We had no way to monitor tutors' understanding of the information conveyed in the treatment. In future experiments it may be better to preserve some of the advantages of face-to-face delivery by delivering the treatment via a video file.

*Midway debriefing*. Because of the leak of the treatment, we had to debrief the supervisors prematurely. However, we believe that as long as they did not share the information conveyed to them with their tutors, the treatment remained valid in the eyes of the tutors. Furthermore, by not disclosing to them during the premature debriefing session who was in which condition, the basic design of the experiment was not compromised.

*One versus many or many versus one*. Whereas in the downward Pygmalion experiments expectations are raised regarding all (or a subgroup) of the supervisor's subordinates, in our case expectations regarding the supervisor were raised among subordinates regarding one supervisor.

When a number of subordinates watch only one supervisor, fewer disconfirming events would suffice to weaken the treatment's effect.

Thus, there are several methodological explanations why most of our results were disconfirming (insufficient power, online treatment, early debriefing). Still, we cannot rule out the null hypothesis. Pygmalion may be a top-down-only phenomenon. Negative findings constitute weak evidence that something does not occur. Nevertheless, Upward Pygmalion may be elusive because it simply doesn't exist.

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Table 1

*Timeline of the Experiment*

| Date | Supervisors | Tutors |
|---|---|---|
| October | Random assignment to conditions | |
| Beginning of November | Introductory session;<br>demographic data collection;<br>pretests: domain self-efficacy and self-expectations | |
| End of November | | Email letter;<br>informed consent;<br>pretests: self-expectations, and motivation |
| End of December to beginning of February | | Delivery of experimental treatment;<br>demographic questions |
| End of March | | Booster;<br>manipulation check;<br>means efficacy data collection;<br>posttests: self-expectations and motivation |
| Beginning of April | Discovery of the leak;<br>midway debriefing | |
| Beginning of June | Posttest: domain self-efficacy and self-expectations;<br>followership data collection | |
| Mid June to July | Performance data collection | |
| Beginning of October | Postexperimental debriefing | |
| March | Full debriefing (including results and conclusions) | |

Table 2

*Descriptive and Inferential Statistics for Testing Hypothesis 1*

| Variable | Occasion | Experimental | | Control | | | | |
|---|---|---|---|---|---|---|---|---|
| | | *M* | *SD* | *M* | *SD* | *U* | *t* | *r* |
| 1. Team heads' evaluations – general (*n* = 53) | After | 3.72 | 0.76 | 3.94 | 0.56 | | -1.19 (*df* = 51) | -.16 |
| 2. Team heads' evaluations – professionalism (*n* = 53) | After | 3.67 | 0.77 | 3.84 | 0.62 | | -0.85 (*df* = 51) | -.12 |
| 3. Team heads' evaluations – motivation (*n* = 53) | After | 3.84 | 0.89 | 4.29 | 0.62 | | -2.22* (*df* = 51) | -.29 |
| 4. School counselors' evaluations (*n* = 28) | After | 4.14 | 0.77 | 4.55 | 0.62 | 65.00 | -1.55 (*df* = 26) | -.29 |
| 5. Tutors' followership (*n* = 26) | After | 4.07 | 0.52 | 4.02 | 0.39 | 69.00 | 0.26 (*df* = 24) | .05 |
| 6. Domain self-efficacy (*n* = 26) | Before | 4.24 | 0.44 | 4.14 | 0.43 | | | |
| | After | 4.56 | 0.36 | 4.31 | 0.35 | 48.50† | 1.66† (*df* = 24) | .32 |
| 7. Self-expectations (*n* = 26) | Before | 4.36 | 0.48 | 4.19 | 0.51 | | | |
| | After | 4.41 | 0.44 | 4.11 | 0.32 | 47.50† | 1.79* (*df* = 24) | .34 |

† $p < .10$, one-tailed.

* $p < .05$, one-tailed.

Table 3

*Descriptive and Inferential Statistics for Testing Hypothesis 2*

| Variable | Occasion | Experimental | | Control | | | | |
|---|---|---|---|---|---|---|---|---|
| | | *M* | *SD* | *M* | *SD* | *U* | *t* | *r* |
| 1. School Counselors' evaluations (*n* = 28) | After | 4.17 | 0.57 | 3.90 | 0.62 | 74.50 | 1.19 (*df* = 26) | .23 |
| 2. Means efficacy (*n* = 48) | After | 3.49 | 0.86 | 3.34 | 0.64 | 224.00 *p* = .09 | 0.68 (*df* = 46) | .10 |
| 3. Self-expectations (*n* = 48) | Before | 4.22 | 0.34 | 4.11 | 0.36 | | | |
| | After | 4.18 | 0.44 | 4.19 | 0.40 | 271.00 | -0.10 (*df* = 46) | -.01 |
| 4. Motivation (*n* = 48) | Before | 4.60 | 0.24 | 4.62 | 0.24 | | | |
| | After | 4.62 | 0.37 | 4.55 | 0.30 | 233.00 | 0.68 (*df* = 46) | .10 |

Table 4

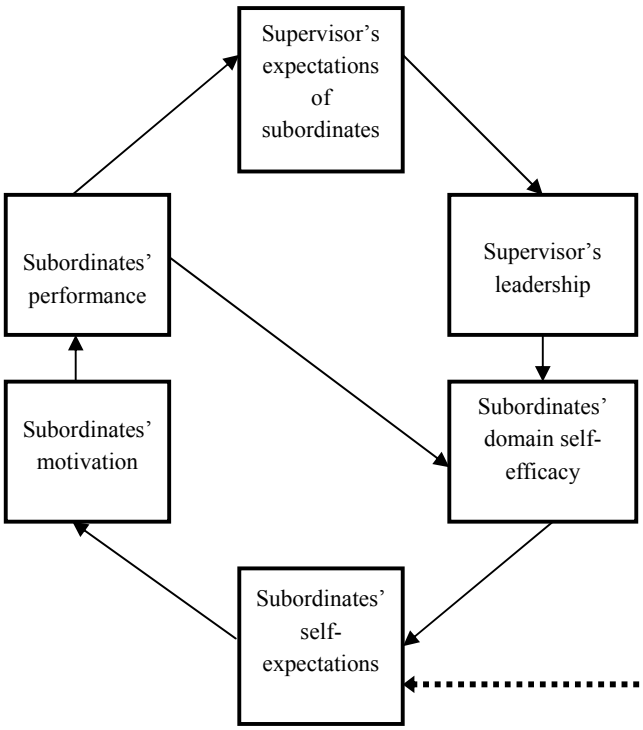
*Means and Standard Deviations of Tutors' Motivation Before and After the Treatment*

| | Experimental ($n$ = 26) | | Control ($n$ = 24) | |
|---|---|---|---|---|
| Occasion | *M* | *SD* | *M* | *SD* |
| Before | 4.62 | 0.20 | 4.62 | 0.21 |
| After | 4.63 | 0.33 | 4.43 | 0.51 |

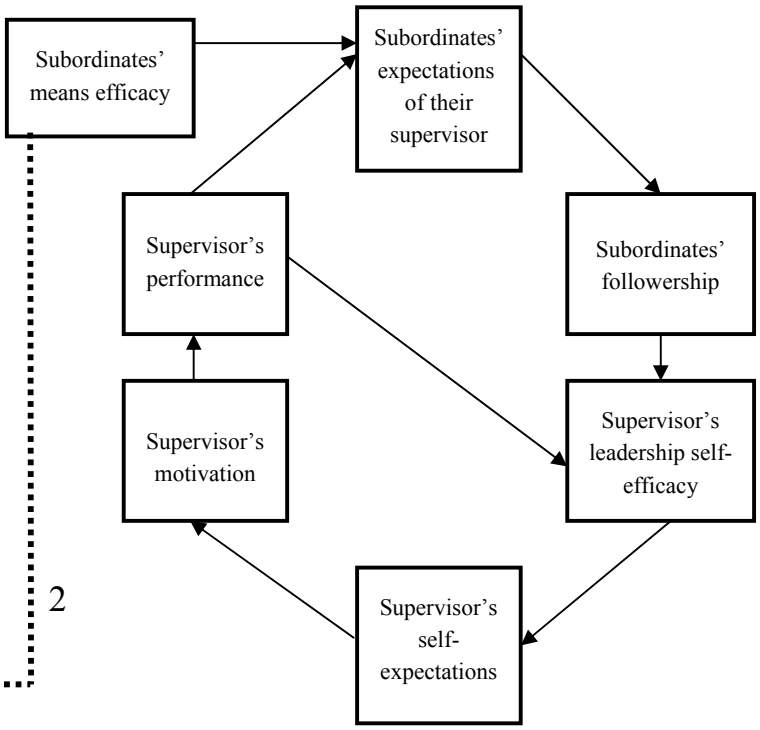
Figure Captions

*Figure 1*. Comparison of Downward and Upward Pygmalion Effects

Downward Pygmalion Effect




Proposed Upward Pygmalion Effect

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