Employee Ownership in the Lab: A Progress Report as of 6/20/19

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BACKGROUND

The first stage of "Employee Ownership in the Lab: A Multi-Level Study" (cf. "Progress Report – Edwards Fellowship" dated 17 June 2017) has morphed from a straightforward social science experiment (or behavioral economics experiment) into an ethnographic or qualitative study. This change has been necessitated by the difficult challenge of measuring *psychological ownership,* one of the two independent variables in the study.

A large number of studies confirm the claim that employee owned companies perform better, on average, than non-employee owned companies, as noted in last year's report to the Edwards Foundation, a claim that raises the question of "why?" A number of theories, well-documented in the literature, have been proposed to explain the performance phenomenon—including the theory that when employees perceive certain conditions as part of their employment, they may experience psychological ownership. The psychological ownership construct is theorized to encompass three components that may be present in the working experience: the ability to influence the object owned, the right to obtain information about the object owned, and the right to any return.

The object of this study is to create different ownership conditions in the laboratory for the purpose of testing whether psychological ownership is associated with collective performance. The reason for choosing a laboratory setting to test the theory is that in order to demonstrate causality i.e., the

[psychological ownership→group performance]

connection, it is necessary to obtain measures at two levels of analysis: the individual level (Level 1) and the collective level (Level 2). Thus, the psychological state of individuals must be measured *simultaneously* with group performance. Simultaneous measures taken in the field is a daunting organizational and financial challenge, requiring, as it were, observations taken from many companies in order to have enough variance in the Level 2 variable. Therefore, numerous laboratory groups substitute for a large number of companies.

PROGRESS TO DATE

Pretest Stage

Five treatments conditions were designed as described in the June 2017 report, consisting of Instructions to Participants, two questionnaires, and a form for recording individual and group performance on the task (making origami figure). Eight experimental sessions have been conducted at this writing, involving 33 participants.

Treatment Condition	Description	Rights	Number of Subjects
Non-Participative ESOP	Stock, plus increase in	Feedback, ROI, No influence	9

	stock value; ownership is granted, no decision-making		
Participative ESOP	Stock, plus increase in stock value; ownership is granted, decide product mix, volume	Feedback, ROI, Influence	6
Piece Rate	Pay is fixed amount per piece produced paid to individuals, not group	Feedback, no influence, no ROI, return on *effort*,	6
Cooperative	Ownership must be purchased	Feedback, ROI, Influence	0
Straight Wage (Control)	Raises, no feedback, no influence, no ROI	None	13
			33

The objective was similar to that of a naval shakedown cruise—to identify problems, errors, unexpected results—and generally to remove obstacles that would make the experimental experience ineffective in answering the research questions.

Students Love Experiments

The first four sessions consisted of two in the Control condition, one in the Non-Participative ESOP condition, and one in the Piece Rate condition. The Level-1 (individual) responses from the total of 22 participants were surprising in that the participants' evaluations of their experience in all the sessions were markedly positive; that is, it appears that students love participating in laboratory experiments regardless of the treatment condition.

Perhaps the effort on the part of UIC faculty to teach the importance of working in groups and imparting group skills has disposed students to perform effectively without having to consciously think about the challenges of working in groups.

Examples of post-test questionnaire items were:

Ownership

O1	**I was able to influence the group's decision-making.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
O5	**The experiment was fair to me.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
O6	**People in my group are supportive of each other**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
O7	**I felt I had control over how we made the origami figures.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**

O9	**I feel a very high degree of personal ownership for this group.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
O11	**I had enough information to make profitable decisions.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
O12	**My share of the compensation was fair.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**

Self-Efficacy/ Expectancy

SE 1	**The case material provided me with the information I needed to succeed in the simulation**.	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
SE 2	**Before the experiment, I was experienced in making origami figures**.	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**

Organizational Commitment

OC1	**During the simulation, I was committed to helping the group achieve its goals.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
OC2	**I tried my best during this simulation.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
OC4	**I was able to influence others to participate in the simulation**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
OC6	**I was able to help others make better figures.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**

Affect

F1	**I liked this simulation.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
F2	**I enjoyed interacting with the members in my team.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
F3	**I am pleased with my performance during this simulation.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
F5	**I am pleased by the outcome of this simulation.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**

Attitude

F8	**I think simulations like this are valuable.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
F9	**I learned from this simulation.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
F10	**To what extent did group members pressure you to work hard?**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**

Motivation

M3	**I would participate in a simulation like this again, even if I don't get paid.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
M5	**I was motivated by the chance to earn money.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
M6	**I was motivated by the chance to have fun**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**

Behavior/Participation

P1	**I worked hard during this simulation.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
P5	**I participated in deciding <u>which</u> figures to make**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
P6	**I participated in deciding <u>how many</u> figures to make.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**

Group Processes

G3	**Morale in my group was high.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
G6	**Team members cooperated with each other.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
G7	**Group members pressured each other to work hard.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
G8	**To what extent did group members pressure each other to produce <u>good-quality</u> figures?**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
G14	**People in my group were supportive of each other**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
G15	**My group's effectiveness was above average.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
G16	**Everyone in my group was working as hard as they could.**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very Great Extent**
G17	**The group encouraged people to**	**Not at All**	**1 2 3 4 5 6 7 8 9 10**	**To a Very**

	participate.			**Great Extent**

Items in the section in in the table labeled "Ownership" (in which the items are marked with an "O") were written to tap into the three components of psychological ownership, as follows:

Psychological Ownership	Item #
Information	O11
Influence	O1, O7
Return	O12

Items in the other sections are exploratory; as additional sessions produce more data, scores on those items may be entered into a principal components analysis to determine if there may be other constructs that explain individual and group behavior.

Surprisingly—and with important implications for the success of the study—answers from the participants were overwhelmingly positive; 8s, 9s, and 10s, for most the questions. Those results defy the logic of the theory—that is, how could boring dumb piece work or straight salary produce positive affect to the same degree as an experience involving mental effort, risk, and excess compensation? One possible answer is that all of the sessions were novel and entertaining regardless of the treatment condition, with the effect of producing positive psychological outcomes across the board. More study—and more participants—are required to clarify this question.

SOLVING THE PUZZLE OF EMPLOYEE OWNERSHIP

Given those results, the focus of the study shifted from testing a theory using a casual questionnaire to discovering the psychological that account for the positive effect of employee ownership on firm performance. Thus, the task is constructing a set of questions that reveal those operative psychological states.

In earlier field studies in employee-owned companies (e.g., the work of Richard Long) workers' responses to questions regarding employee ownership clearly evinced satisfaction with employee ownership. Professor Long's work is regarded by many as a foundational contribution to the understanding of the positive relationship between employee ownership and employee satisfaction. Nonetheless, the questions he wrote pertain to employees working in a particular company, and so are not suitable for a laboratory study. Put another way, the laboratory experience is so unique that an instrument must be crafted specifically to fit its peculiarities.

The next step, therefore, was to make adjustments in light of this (unexpected) outcome. Consequently, I modified the wording of some of the items in the questionnaire to be more open-ended, hoping to capture participants' self-reported perceptions and feelings. Below are some examples of those modifications:

Answer	**Explanation**

Answer	**Explanation**
Compared to other experience you had at UIC, did you work hard? Why or why not?	Yes No Why or why not?
How important was the money in determining whether you worked hard or not? Very important because… Not very important because…	
The feelings I experienced during the simulation include (circle all that apply): angry happy sad bored embarrassed optimistic pessimistic creative frustrated impatient anxious hostile depressed interested entertained judgmental hopeful resourceful excited	Please explain and/or describe other emotions.
How much information do you feel you received about your productivity? I received too little the right amount too much	As a result I…
The best part of the simulation was…	
The worst part of the simulation was…	
In general, I prefer working alone working in a group	…accordingly, during the simulation I felt
Of the _____ (insert number) people working in the simulation with me, I knew _____ before the simulation began.	
In your opinion, how realistic was the simulation?	

I also added some open-ended questions in order to capture perceptions and feelings I hadn't thought of *a priori*. For example,

Compared to other experience you had at UIC, did you work hard?	Yes No Why or why not?	
How important was the money in determining whether you worked hard or not?	Very important because…	Not very important because…
The feelings I experienced during the simulation include (circle all that apply): angry happy sad bored embarrassed optimistic pessimistic creative frustrated impatient anxious hostile depressed interested entertained judgmental hopeful resourceful excited	Please explain or describe other emotions.	
If this simulation were like a full-time job I would feel… (circle all that apply): angry happy sad bored embarrassed optimistic pessimistic creative frustrated impatient anxious hostile depressed interested entertained judgmental hopeful resourceful excited	Please explain or describe other emotions.	
How important were your emotions in motivating you to work hard – or not? Very important because… Not very important because…		
How much information do you feel you received about your productivity? I received too little enough too much	As a result I…	
The instructions were too simple about right too complicated	As a result I…	

The best part of the simulation was…	
The **worst part of the simulation was…**	

Very Preliminary Results

The experimental sessions have produced some data, yet it must be emphasized that they are *very* preliminary, much as a golfer would view his/her practice rounds before a tournament.

Baseline productivity. The first important quantity is the number of origami figures the average person can produce in 20 minutes. The first round (of three rounds) is identical for each of the treatments; this figure sets the baseline for comparing productivity across treatments and over time. At this point in the study baseline average per person productivity has been:

Number of Participants	Number of Figures Made in Round 1	Average
27	378	14

Practice. The next question is: does productivity change over time? Is it different according to treatment, or pretty much the same throughout the three rounds?

Round	Per Person Average Production
1	14.0
2	18.6
3	22.4

As might be reasonably expected, productivity increases with practice, but that is an uninteresting result. The more interesting question is whether *quality* changes over time, and if it does, does that rate of change differ with respect to the treatment group?

Quality. In each session quality was judged by a research assistant (RA) who was seated in a room apart from the participants. When each of the 20 minute sessions was up, the PI collected the origami figures and brought them to the RA, who then sorted them according to quality, and counted them. The data shown in Table 1, summarizing

the results of the experiment so far, are *averages*, not absolute quantities, so as better to compare the differences between groups that were of different sizes.

Table 1

Per Person Number of Figures × Quality × Treatment

Treatment	Excellent	Acceptable	Unacceptable	Average
Ownership with Participation	8.0	40.0	11.0	59.0
Ownership without Participation	8.5	20.4	7.9	36.8
Piece Rate	7.8	30.8	40.5	79.0
No Ownership (Control)	21.1	25.2	24.6	70.9

The first finding is that, unexpectedly, productivity and quality in the control condition were high. One might expect that a simple, repetitive task like making figures would bore the participants, yet it is possible that competitive, eager-to-learn students would find something engaging and entertaining in a laboratory experiment. Better than studying for an exam!

Detailed analyses of participants' responses to the questionnaires may illuminate the inner workings of the control groups and could help explain this surprising result. It will be interesting to see if this outcome holds up as more experimental sessions are executed.

The second finding is that the experimental results are consistent with field research suggesting that employee ownership *per se* is not sufficient to increase productivity.

Third, one would expect that employee ownership combined with a participative management style—as predicted in field studies—would be the most productive, yet here that is not the case.

Fourth, although productivity is lower than expected, *quality* in both ownership conditions is dramatically higher than in either the piece rate groups or the control groups. (Keep in mind that the research assistants did not know which treatment group they were judging, thus reducing if not eliminating the possibility of bias.) This result—if it holds up under further testing—suggests that ownership does have an effect on collective performance.

Fifth, although the frequency of excellent origami figures in the two ownership groups is lower than the control group (!), the frequency of unacceptable figures is dramatically lower. Thus, these data strongly suggest that although raw productivity is lower, *useable* output is much higher. The predominance of quality is clearly associated with ownership in these laboratory experiments. (See Table 2.)

Table 2

Per Person Number of Figures × Quality × Treatment

(Percentages)

Treatment	Excellent	Acceptable	Unacceptable	Total
Ownership with Participation	13.6	67.8	18.6	100.0
Ownership without Participation	23.1	55.4	21.5	100.0
Piece Rate	9.9	39.0	51.1	100.0
No Ownership (Control)	29.8	35.5	34.7	100.0

Table 2 suggests that ownership results in lower quantities, but better quality: useable output (excellent + acceptable) is approximately 80% of the total, in the two ownership conditions, whereas in the other two conditions, scrap is equal to a third or even half of production.

The behavior of the groups in the two ownership treatments might be explained by a heightened sense of caution among the participants. Knowing that they would suffer a financial penalty for poor performance, they adopted quality as their goal rather than quantity. This, and other suppositions will become clearer as more data are collected and the Level-1 (i.e., individual) data are analyzed.

And, the performance of the control groups is again surprising in that almost thirty percent of their output was judged Excellent. In practical terms, this could mean that although an employee-owned firm might produce fewer widgets than a conventionally owned firm, a lower scrap rate could translate into higher profitability. This requires further exploration.

Another question is whether changes in quality differ according to treatment. That is: Does quality go up or down over time depending upon whether the enterprise is employee owned or not? This question could be answered by the data in Table 3, yet we will leave this and other questions unanswered until enough data are gathered to subject the findings to statistical analysis.

Table 3

Average Production × Treatment × Quality × Round

Treatment	Round 1	Round 2	Round 3	
Ownership with Participation				
Excellent	2.5	1.0	4.5	
Acceptable	8.0	15.0	14.5	
Unacceptable	6.0	4.0	1.0	
Ownership without Participation				

Excellent	2.7	6.5	10.5	
Acceptable	26	24.9	27.1	
Unacceptable	16.6	7.7	14.2	
Piece Rate				
Excellent	2.5	4.0	1.3	
Acceptable	2.0	9.3	12.0	
Unacceptable	4.5	15.8	20.5	
No Ownership (Control)				
Excellent	12	14.7	19.4	
Acceptable	9.5	19.8	21.8	
Unacceptable	12.9	16.9	18.2	

LOOKING FORWARD

The Importance of Multi-Level Observations

Abundant empirical evidence supports the claim that, on average, employee owned companies perform better than their counterparts; further, there is equally convincing evidence supporting the claim that individuals' psychological states in employee owned companies are more auspicious than in firms that are not owned by their employees. Taken together, one might reasonably conclude that positive psychological states are associated with firm performance; nonetheless such a relationship has not be rigorously *proven*.

To show causation—or at a minimum, *correlation*—one must measure firm performance *and* individuals' psychological states—two levels—*simultaneously*. Hence, the design of this study is reflected in its title, "a multi-level study."

Level-2 Observations

The Level-2 data from the experimental sessions suggest that collective performance in a laboratory approximation of employee ownership is different from non-ownership conditions. Yet, because the number of observations is small, one might not place a high degree of confidence in this result. Accordingly, additional sessions are required to increase the degree of confidence.

Level-1 Observations

The challenge at this point is to collect enough empirical data to identify those psychological states—whatever they may be and whether they be termed *psychological ownership* or not—that vary under different ownership and non-ownership conditions.

This objective requires a sufficient number of observations to perform a principal components analysis.

Importantly, it must be remembered that at this point the study is exploratory. To my knowledge, no research of this type has been attempted, owing to the difficulty of obtaining Level-1 *and* Level-2 data simultaneously from a large number of companies. Unless it becomes practical to obtain employees' responses from dozens or scores of companies (in order to achieve sufficient statistical power), the laboratory is the place to acquire Level-1 information simultaneously with Level-2 collective performance.

That shall be the object of future experimental sessions.