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Pay cuts and layoffs in an experimental minimum effort coordination game

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Abstract

It is well-documented that during recessions, businesses prefer to lay off workers rather than implement across the board pay cuts. We examine the impact of pay cuts versus layoffs on intra-organization coordination, which is a fundamental problem facing firms involved in team production, by looking at behavior in the minimum effort coordination game following an intervention. Our results suggest that, contrary to received wisdom, both pay cuts and layoffs foster better coordination success. In particular, we do not find that pay cuts are detrimental to intra-organization coordination.

1.   Introduction

It is well documented that during recessions, companies prefer to lay off workers rather than implement across-the-board pay cuts in an attempt to reduce personnel costs (Blinder & Choi, 1990; Agell & Lundborg, 1995, 2003; Campbell & Kamlani, 1997; Bewley, 1999; Du Caju et al., 2015). The reluctance to cut pay stems from a number of factors, including the fear of losing the most productive workers (Spence, 1973) as well as reducing worker morale. Current pay acts as a reference point and cuts to this are resented by loss averse workers (Kahneman & Tversky, 1979). This, in turn, implies that wages tend to be "sticky" and do not adjust downwards; even in the face of wide-spread unemployment.

In this preliminary study, we explore the effect of pay cuts and layoffs on intra-organization coordination, using the minimum effort coordination game (Van Huyck, Battalio, & Beil, 1990). Coordination problems are endemic to any firm involved in team production (Ichniowski, Shaw, & Prennushi, 1997; Knez & Simester, 2001) and such "weak-link" games, that give rise to multiple payoff ranked equilibria, are often used to study coordination problems (Brandts & Cooper, 2006a, 2006b, 2007). We believe such coordination games provide a tractable way of trying to understand the relative efficacy of pay cuts and layoffs.[1]

While there is a voluminous literature that examines the correlation between wages and worker productivity (see, for instance, Dearden et al., 2006, Hellerstein et al., 1999 and Ioannides & Pissarides, 1985), the literature does not directly address the effect on within-worker productivity when their pay falls. Furthermore, it is difficult to disentangle the direction of causality – whether higher wages influence or are influenced by higher productivity. It is difficult to control for confounding factors with field data.

There have been some prior studies looking at various issues relating to pay cuts and layoffs. Ong & Mar (1992) look at the earnings of laid-off workers when they find subsequent employment, while Charness & Levine (2000, 2002) as well as Gerlach, Levine, Stephan & Struck (2008) examine the perceived fairness of hypothetical pay cut and layoff scenarios with survey participants in the United States, Canada and Germany. As far as we are aware, none of the previous studies have directly looked at the effect of pay cuts and layoffs on worker productivity.

The controlled lab environment does offer some advantages: it excludes efficiency-wage or adverse-selection arguments and following a pay cut or layoff in the lab, subjects know for sure that there will be no further pay cuts or layoffs, which may present potential confounds. However, there is also an issue about the generalizability of lab results, particularly with regards to the saliency of pay cuts and layoffs within the lab. To that end, this study is designed to be a first pass at this issue; aimed at developing a tractable way of addressing the effects of pay cuts and layoffs, which could then be complemented by more elaborate lab and field studies.

Our results suggest that, contrary to received wisdom, both pay cuts and layoffs foster better coordination to the payoff dominant outcome; in particular, we do not find that pay cuts are detrimental to intra-organization coordination. We proceed as follows. In Section 2, we present our

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[1] In their pioneering study, Van Huyck et al. (1990) report data for 7 groups ranging in size from 14 – 16 subjects in each group, interacting for ten rounds with the group composition remaining unchanged for the entire time. In each round, each subject chooses a number from the set {1, 2, 3, 4, 5, 6, 7}. A subject's payoff depends on her own choice and the minimum number chosen in the group. There are 7 payoff ranked Nash equilibria in this game with everyone choosing "7" being the payoff-dominant outcome while everyone choosing "1" is the secure outcome. Van Huyck et al. find that none of the groups achieved a minimum higher than 4 in any round or managed to sustain a minimum higher than 1 for more than three rounds, demonstrating a pervasive inability to coordinate to the payoff dominant outcome. However, Devetag & Ortmann (2007), argue that the extent of coordination failure in real-life organizations is likely nowhere near as stark. They suggest that efficient outcomes can be achieved via different means including "various forms of communication or repetition of slightly payoff perturbed games" (p. 341). Among other things, telling subjects only the minimum effort choice for the group in each round, as in Van Huyck et al. (1990), as opposed to showing them the full distribution of effort choices, leads to greater coordination failure. For us, the phrase "coordination failure" refers to a failure to coordinate to the payoff dominant outcome.

experimental design. In Section 3, we present our results. We make some concluding remarks in Section 4.

2. Experimental design

The study involves 290 undergraduate student subjects in Business and Economics at the University of Auckland with no prior experience of this game. All sessions were conducted in the DECIDE Lab, using the Veconlab website developed by Charles Holt (2009). We utilize a modified version of the minimum effort coordination game introduced by Goeree & Holt (2001). In each round, each subject picks a value for $e \in \{1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7\}$, where e represents a particular effort level. The payoff π_i to subject i is determined by that subject's effort level and the smallest effort chosen in the group, including subject i's choice. Specifically, $\pi_i = Min(e_i, e_{-i}) - 0.5(e_i)$ where e_i is the effort chosen by subject i, while e_{-i} is the set of effort choices made by the other group members. At the end of the round, subjects get to see the effort choices of all group members and their own payoffs. All information is displayed using identification numbers only and subjects never learn the identity of other group members.

The payoff matrix generated by this function is shown in **Table 1.** There are seven Pareto-ranked Nash equilibria located on the diagonal, depicted in bold. All subjects choosing 1.1 is the secure, but least efficient, outcome while all subjects choosing 1.7 is the payoff dominant outcome. The payoffs are in actual NZ dollars and cents. A session lasts about 45 minutes. There is quite a bit of variation in subject earnings given that the laid-off workers make less than those not laid off. On average and depending on the particular treatment, subject earnings ranged between approx. NZ $11 and NZ $20, including a NZ $5 show-up fee. Payments are made privately at the end of the experiment.

Table 1: Payoff matrix in our study adopted from Goeree and Holt (2001)

		Smallest Value of Effort Chosen						
		1.7	1.6	1.5	1.4	1.3	1.2	1.1
	1.7	**0.85**	0.75	0.65	0.55	0.45	0.35	0.25
Your	1.6	---	**0.80**	0.70	0.60	0.50	0.40	0.30
Choice of	1.5	---	---	**0.75**	0.65	0.55	0.45	0.35
Effort	1.4	---	---	---	**0.70**	0.60	0.50	0.40
	1.3	---	---	---	---	**0.65**	0.55	0.45
	1.2	---	---	---	---	---	**0.60**	0.50
	1.1	---	---	---	---	---	---	**0.55**

Subjects take part in only one of five treatments: *(1) Pay cut; (2) Layoff-Exit Lab; (3) Layoff (n=4); (4) Layoff (n=5)* and *(5) Control*. Each treatment consists of 20 rounds divided into two parts of 10 rounds each. Subjects are told that they will be interacting for 20 rounds. They are given the instructions to the first set of 10 rounds at the outset and told that they will be given further instructions for the second set of 10 rounds upon the conclusion of the first part. This implies that the first part is identical to all five treatments. In the first part, subjects play the minimum effort game shown in **Table 1** without any interventions. Any treatment intervention is introduced prior to Round 11 at the beginning of the second part of the study. We explain the details for each treatment below.

In the *Pay cut* treatment, following the first 10 rounds, subjects are told that there has been a recession and the organization they work for has decided to reduce pay by 20% across-the-board. See **Appendix B** for specific instructions. This implies that for the second part of the experiment, the payoffs shown in **Table 1** will be scaled by 80%. It is worth noting that even with the pay cut in place, payoffs are still maximized if every subject chooses 1.7.[2]

We implement three different layoff treatments. In the first one, referred to as the *Layoff-Exit Lab* treatment, following the first part, subjects are informed about the recession and are also told that the employer has decided to respond by laying off 5 workers from each session. The workers to be laid off are the ones, across the entire session, who chose the lowest effort level in round 10. If there are ties for the lowest effort, then those to be laid off are chosen by a random draw. These 5 subjects collect their earnings in cash and are asked to leave the lab. Once they depart, the remaining subjects are re-assigned into new 5-person groups and proceed to play for another 10 rounds. Each *Layoff-Exit Lab* session starts with 30 subjects (6 groups of five), which is reduced to 25 (5 groups of five) following the layoff. While there are fewer groups following the layoff, the group size remains unchanged. Therefore, any changes in subsequent behavior cannot be attributed to a change in the group size.

While the *Layoff-Exit Lab* treatment resembles actual layoffs, particularly given that some workers are physically asked to leave the lab, nevertheless, this treatment potentially suffers from three drawbacks. First, given that five workers for the entire session are laid off, it is not clear what happens to the expectations of the remaining workers regarding the likely effort choice of their peers following the layoff. Second, laying off workers and asking them to leave the lab may well cause them a degree of embarrassment and, the survivors, some amount of discomfiture. Therefore, if effort is higher following the layoff, it is not clear whether this is due to changes in subject expectations or the disruption caused by the ouster of less productive workers. Third, the instructions provided at the outset tell the subjects that they will interact for 20 rounds but five of them are let go after 10 rounds. Those subjects, who are let go, may well construe this as a form of deception. In order to address these shortcomings, we implement two additional treatments, in neither of which are subjects asked to leave the lab.[3]

In the next treatment, *Layoff (n=4)*, we start with groups of 5 as in the *Layoff-Exit Lab* treatment. There are two sessions here with 20 subjects in each session to start with. These 20 subjects are formed into 4 groups of 5. At the end of the first 10 rounds, the worst performer from *each of the four groups* is laid off. Instead of being asked to leave, these four subjects are put together into one group, where they play the same game for 10 rounds in the second part, except that their payoffs are only 50% of the payoffs shown in **Table 1**. The remaining four (non-laid off) subjects in each group stay in that same group and continue to interact for another 10 rounds in the second part with the payoff matrix shown in **Table 1**. As noted above, one drawback to the *Layoff-Exit Lab* treatment is that, because we lay off the five worst performers for the entire session and then re-group the rest, it is not clear what impact this has on the expectations of the remaining subjects, regarding future effort choices by their peers. In the *Layoff (n=4)* treatment, the fact that group composition remains unchanged, except for the least productive worker getting laid off, should likely lead to more optimistic expectations regarding the effort choices among the remaining 4 players. However, it is possible to argue, that any changes in behavior in this treatment arise from the fact that groups are smaller in this treatment, 4 subjects as opposed to 5.

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[2] The pay cut is essentially the opposite of the bonus (pay rise) in the turnaround game that Jordi Brandts and David Cooper have studied extensively. Such bonuses, especially, when complemented by exhortative messages, can successfully encourage groups to coordinate to the payoff dominant equilibrium. See Brandts & Cooper (2006a, 2006b, 2007).

[3] We are grateful to two anonymous referees of this journal for highlighting these drawbacks and suggesting potential remedies, which led to the implementation of the three separate layoff treatments to control for various confounds.

Our final layoff treatment is *Layoff (n=5)*, which is designed to address the group size issue. As in *Layoff (n=4)*, following the first ten rounds, the worst performer in each group is laid off and the laid off workers are put into one group by themselves, where they play the same game for 50% of the usual payoff. However, as opposed to *Layoff (n=4)*, the remaining players are then randomly matched into new 5 person groups.[4] By making sure that the worst performer in each group is laid off, the *Layoff (n=5)* treatment most likely also generates more optimistic expectations among the remaining workers as in the *Layoff (n=4)* treatment but unlike the *Layoff (n=4)* treatment, *Layoff (n=5)* keeps the group size unchanged at 5, to make it comparable to the *Layoff-Exit lab* treatment.

Behavior in these four experimental treatments is compared to a *Control* treatment. As in the other treatments, subjects are asked to stop following Round 10. At that point, they are told that there are no further instructions and that they should proceed to play the second set of 10 rounds exactly as the first set. **Table 2** provides an overview of the experimental design, sessions, the procedures implemented in the second part of the session (given that the first part is identical across all treatments) and numbers of subjects (groups) in each treatment.

2.1. Hypotheses

Based on the findings of prior studies, cited in the introduction, we expect that: (1) *Pay cuts will result in lower coordination; the average minimum effort in each group will be lower following a pay cut.* (2) *The average group minima will not be lower following a layoff. In fact, given that workers choosing low effort are laid off, we expect groups to achieve better coordination following layoffs.*

3. Results

Figure 1 provides an overview of minimum effort choices (including 95% confidence intervals) separately for the first and second set of 10 rounds, i.e., prior to and following any potential intervention.[5] We focus on the minimum effort in each group of 5 since this is the first order statistic that tells us about the group's coordination success or lack thereof. Even if only one player in the group chooses 1.1, while others choose higher effort levels, the group minimum will be 1.1. In creating this figure, we treat each group as an independent observation. First, we look at the minimum effort in each group in each round and then, for each group, we take the average of the all the minimum effort choices over the 10 rounds of play for the first and second halves respectively. We then use these averages over rounds as independent observations. For the *Control*, *Pay cut* and *Layoff (n=4)* treatments, the number of groups and, therefore, observations are the same for each of the two halves. We have 11 observations for the *Control* treatment, 12 for *Pay cut* and 8 for *Layoff (n=4)*. For the *Layoff-Exit Lab* treatment, we have 18 groups (observations) prior to layoffs and 15 post-layoff. For *Layoff (n=5)*, we have 9 observations prior to the intervention and 7 after.

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[4] Unfortunately, due to a larger than anticipated no-show rate, in one of the two sessions in this treatment, we had only 20 subjects. So we formed them into 4 groups of 5 and then laid off two people from one of the groups for a total of 5 laid off subjects to get down to 15 subjects so that we could from 3 groups of 5 for the second part of the session. The five laid off subjects were put together into one group, playing for 50% of the usual payoff.

[5] It is noteworthy that even the pre-intervention degree of coordination is generally high, which, as we note in Footnote 1 above, is most likely a function of the fact that subjects get to see the entire distribution of effort choices by group members as opposed to only the minimum effort. Note that for Figure 1, the Y-axis starts at a value of 1.2.

Table 2: Overview of experimental design

Treatment	Sessions/Subjects per session	Procedure for second set of 10 rounds	Subjects (Groups)
Pay cut	Session 1: 20 Session 2: 20 Session 3: 20	5 person groups; payoff reduced by 20% for second part; group composition unchanged	60 (12)
Layoff-Exit Lab	Session 1: 30 (Pre-layoff); 25 (Post-layoff) Session 2: 30 (Pre-layoff); 25 (Post-layoff) Session 3: 30 (Pre-layoff); 25 (Post-layoff)	5 person groups; 5 worst performers for entire session laid off after Round 10; remaining subjects re-matched into new 5 person groups	pre-layoff: 90 (18) post-layoff: 75 (15)
Layoff (n=4)	Session 1: 20 (Pre-layoff); 16 (Post-layoff) Session 2: 20(Pre-layoff); 16 (Post-layoff)	4 person groups; 5 person groups prior to the layoff; worst performing worker from each group in Round 10 laid off; leaving the other 4 players in the same group to play second part	pre-layoff: 40 (8) post-layoff 32 (8)
Layoff (n=5)	Session 1: 25 (Pre-layoff): 20 (Post-layoff) Session 2: 20 (Pre-layoff); 15 (Post-layoff)	5 person groups; worst performing worker from each group in Round 10 laid off; remaining subjects re-matched into new 5 person groups for second part	pre-layoff: 45 (9) post-layoff: 35 (7)
Control	Session 1: 20 Session 2: 15 Session 3: 20	No change from first part	55 (11)
TOTAL			pre-layoff: 290 (58) post-layoff: 257 (53)

Figure 1: Average minimum effort during the first and second halves of a session
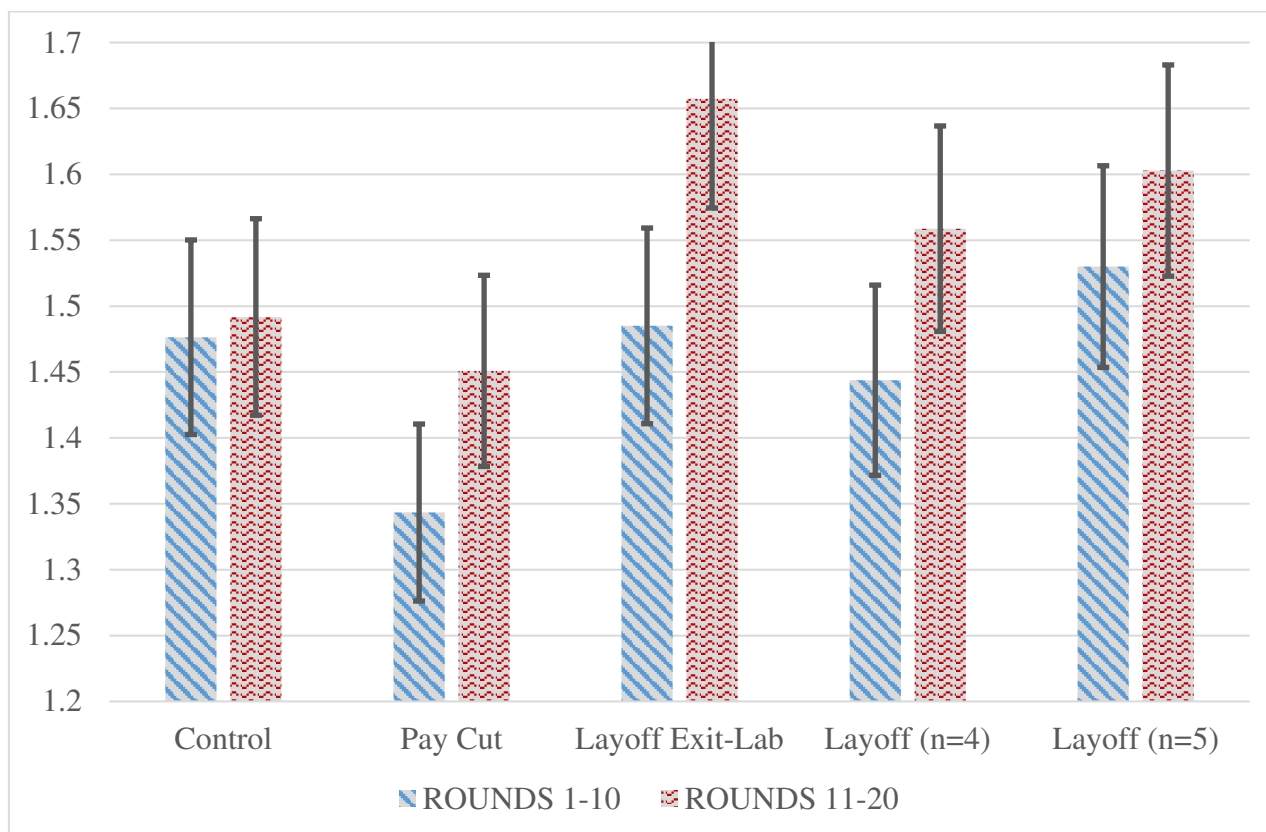
In **Table 3**, we present results for non-parametric Wilcoxon rank-sum tests for differences in means across the five treatments for the first set of 10 rounds. The units of observation are the same as the ones used for creating **Figure 1** above; i.e., one observation per group in each treatment. Prior to the introduction of any intervention, the null hypothesis of equality of distributions of minimum effort choices cannot be rejected at 5% level of significance, except for one pair-wise comparison. Average minimum effort choices during the first 10 rounds are significantly higher in *Layoff (n=5)* compared to *Pay cut*. (z = 2.135; p = 0.03). There is a marginally significant difference between average minima for *Layoff-Exit Lab* and *Pay cut*. (z =1.739; p = 0.08).[6]

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[6] We do not have a ready explanation for these differences. The lower average group minimum effort in the *Pay cut* treatment in the first set of 10 rounds does not appear to be affected by outlier groups. Our experimental protocols were the same in every case and similar to the numerous other experiments we run in our lab. Subjects were recruited from very large first year lectures and given that there are many experiments being run in the lab, they typically do not know which experiment they are showing up for. The sessions for the *Pay cut*, *Layoff-Exit Lab* and *Control* were run within a couple of weeks in 2015, while the sessions for the other two treatments were run in early-2017, again with a two-week period. This should have minimized potential contamination among subjects.

Table 3: Results of rank-sum tests comparing average minima for first set of 10 rounds across treatments

	Pay cut (n=12)	*Layoff-Exit Lab (n=18)*	*Layoff (n=4) (n=8)*	*Layoff (n=5) (n=9)*
Control (n=11)	|z| = 1.633 p = 0.10	|z| = 0.270 p = 0.79	|z| = 0.041 p = 0.97	|z| = 1.027 p = 0.31
Pay cut (n=12)		|z| = *1.739* p = *0.08*	|z| = 1.198 p = 0.23	**|z| = 2.135 p = 0.03**
Layoff-Exit Lab (n=18)			|z| = 0.223 p = 0.82	|z| = 0.722 p = 0.47
Layoff (n=4) (n=8)				|z| = 0.916 p = 0.36

In **Table 4**, in order to study the impact of pay cut or layoffs, for each treatment, we compare average minima between the first half and the second half of the study, i.e., before and after an intervention. In the *Control*, *Pay cut* and *Layoff (n=4)* treatments where group composition remains unchanged, we present results for non-parametric sign-rank tests, comparing group minimum effort before and after the intervention. For the *Layoff-Exit Lab* and *Layoff (n=5)* treatments, where groups are re-constituted, sign-rank tests are not appropriate. For these two treatments, we provide results from rank-sum tests.

The results in **Table 4** show the following. First, comparing between the first and second sets of 10 rounds, average minimum effort does not change in the *Control* treatment. This is what we would expect. Second, average minimum effort is significantly higher in three out of the other four treatments, following an intervention. For the *Pay cut* treatment, the increase in average minimum effort is small; the difference is marginally significant using a sign-rank test (p = 0.08). But more importantly, we do not find evidence that average effort levels are lower following a pay cut. Third, average minima are higher in the *Layoff-Exit Lab* and *Layoff (n=4)* treatments following the layoffs and the differences are significant at 1%. Finally, average minima, following a layoff, are higher in the *Layoff (n=5)* treatment but the difference is not statistically significant. However, as noted above in **Figure 1** and **Table 3**, the average minima in this treatment was high to start with during the first 10 rounds, so the scope for improvement was limited.

Table 4: Results of rank-sum and sign-rank tests comparing average minima between the first and second sets of 10 rounds within each treatment

	Rounds 1-10	Rounds 11-20	Sign-rank test	Rank-sum test
Control *(n=11)*	1.48 (0.205)	1.49 (0.256)	|z| = 0.623 p = 0.533	---
Pay cut *(n=12)*	1.34 (0.235)	1.45 (0.240)	*|z| = 1.768* *p = 0.08*	---
Layoff-Exit Lab *(n=18/15)*	1.49 (0.243)	1.66 (0.118)	---	**|z| = 4.03** **p <0.01**
Layoff (n=4) *(n=8)*	1.44 (0.248)	1.56 (0.212)	**|z| = 2.524** **p = 0.01**	---
Layoff (n=5) *(n=9/7)*	1.53 (0.207)	1.60 (0.174)	---	|z| = 0.53 p = 0.60

Among the three layoff treatments, the degree of coordination success is highest in the *Layoff-Exit Lab* treatment. Eight out of 15 post-layoff groups in this treatment coordinated to the payoff dominant equilibrium, with everyone choosing 1.7, for each of the 10 post-layoff rounds. Another 5 groups managed to coordinate to 1.7 for 9 of the 10 rounds. The degree of coordination success is less pronounced for the other two layoff treatments. Post-intervention minimum effort choices in the *Layoff-Exit lab* treatment is higher than that in *Control* ($z = 1.838$; $p = 0.07$), *Pay cut* ($z = 2.984$; $p < 0.01$) and *Layoff (n=5)* ($z = 2.033$; $p = 0.04$). However, the difference between *Layoff-Exit lab* and *Layoff (n=4)* is not statistically significant at conventional levels ($z = 1.4$; $p = 0.16$).

In **Table 5**, we present results from a random effects difference-in-difference regression to compare the pre- and post-intervention effort levels. Here, we use data for only the 257 post-layoff subjects, each making 20 effort choices for a total of 5140 observations. In the layoff treatments, these subjects are the survivors who were not laid off. The analyses of survivors' effort levels allow us to control for the fact that effort would be naturally higher having removed the low-effort laid off subjects. Regressors include round, a dummy for each of the four treatments (*Pay cut, Layoff-Exit Lab, Layoff (n=4) and Layoff (n=5)*) with the *Control* treatment as the reference category, another dummy for Rounds 11-20 and interaction terms involving the treatment dummies with the Rounds 11-20 dummy. The results suggest that effort levels are higher in each of the four treatments following an intervention. This finding provides support for hypothesis (2) above, that effort is higher following a layoff; but refutes hypothesis (1) above, that pay cuts will result in lower average effort.

Table 5: Random effects regression of difference in differences in effort
Dependent variable: effort choice

Independent variables	Coefficient (Standard errors)
Control (Reference category)	---
Pay cut	-0.122*** (0.030)
Layoff-Exit Lab	0.046** (0.023)
Layoff (n=4)	-0.030 (0.034)
Layoff (n=5)	0.036 (0.028)
Rd 11-20	0.009 (0.018)
Rd 11-20*Pay cut	0.082*** (0.028)
Rd 11-20*Layoff-Exit Lab	0.072*** (0.021)
Rd 11-20*Layoff (n=4)	0.075*** (0.022)
Rd 11-20*Layoff (n=5)	0.051** (0.025)
Round	-0.002** (0.001)
Constant	1.584*** (0.018)
Observations	5140
Participants	257
R^2	0.114

*Note: (i) Standard errors in parentheses; (ii) Round 11-20 interaction terms correspond to DID treatment effects; (iii) *** and ** indicate significant at 1% and 5% respectively.*

4. Conclusion

Using a simple weak-link game involving a numerical effort choice task, we find that both layoffs and pay cuts result in greater coordination success. This contradicts received wisdom that pay cuts will affect coordination adversely. Prior evidence suggests that a variety of interventions, including financial bonuses for successful coordination or exhortative messages (recommending coordinating on the action commensurate with payoff dominance) or a combination of the two can help foster greater coordination. See, for instance, Bangun et al. (2006), Brandts & Cooper (2006a, 2006b, 2007), Brandts & McLeod (1995), Chaudhuri et al. (2009), Chaudhuri & Paichayontvijit (2010) and Hamman et al. (2007). Devetag & Ortmann (2007) provide an overview of this line of work. It appears that, when it comes to pay cuts, there are, at least, two factors at work. First, there is the possibility that pay cuts reduce morale. But, second, a pay cut is also an intervention that reinforces the idea, in subjects' minds, that payoff is maximized by choosing 1.7. It appears that, in the context

of this particular game, the role of a pay cut as a signal to improve productivity outweighs any potential morale reducing impact. It is possible that the relative success of the layoffs in our study arises from the fact that the layoffs were perceived as being fair since clearly the least productive worker was being let go. Identifying the least productive worker may be more difficult in actual work-places and we know that the perceived fairness of an action is critically important to the success of an intervention or lack thereof. (Alesina and Angeletos, 2005; Gerlach et al. 2008). In on-going work, we are analyzing the issue in a similar weak-link set-up but using real effort tasks that require cognitive effort and also involve learning-by-doing to address some of the issues identified in this study. However, to the extent that the minimum effort game represents real life coordination problems faced by firms, we felt that our findings of the impact of pay cuts vis-à-vis layoffs in this game may be of interest to researchers in the area and therefore, worth reporting.

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Appendix: Instructions

General Instructions

[These are the instructions for the first 10 rounds, which are common to all treatments.]

Welcome. The University of Auckland has provided funding in order to conduct this research. The instructions are simple. If you follow them closely and make appropriate decisions, you may make an appreciable amount of money. All earnings are denoted in actual dollars. At the end of the session you will be paid your earnings in cash. This money is in addition to the show-up fee that you get.

You will be playing this game on your computers. In a minute we will give you the instructions for logging in to the server. But first we would like to tell you how the experiment works. You will be able to read some of these instructions again after you have logged in to the computer. But it would be helpful to refer to these written instructions as you play the game.

Specific Instructions

The experiment will consist of two parts. In each part there will be 10 rounds. We will give you the instructions to the first set of ten rounds now. We will give you the instructions to the next set of ten rounds at the conclusion of the first ten rounds.

One way to think about this experiment is that you are an employee of an organization. You will be part of a group consisting of 5 employees, that is you and four other employees. However, you will not learn the identity of the other people in your group in any round. There will be more than one group within the organization, each consisting of 5 employees. The composition of these groups will remain unchanged for the first set of ten rounds. This means that you will be interacting with the same four other people during the first ten rounds.

In each round every employee will decide how much effort to exert. The values of effort you may choose are {1.1, 1.2, 1.3, 1.4, 1.5, 1.6, or 1.7}. Your earnings in each round will depend on the effort level that you pick and the smallest level of effort chosen by any participant in your group, including your own choice of effort.

The payoff table below tells you the potential payoffs you may receive. The earnings in each period may be found by looking across from the value you choose on the left hand side of the table and down from the smallest value chosen by any participant from the top of the table. For example, if you choose an effort of 1.4 and the smallest effort value chosen is 1.3 then ***you*** will earn 60 cents for that round. If you choose 1.5 and the smallest value chosen is 1.2 then you will earn 45 cents for that round.

		Smallest value of effort chosen						
		1.7	**1.6**	**1.5**	**1.4**	**1.3**	**1.2**	**1.1**
Your choice of effort	**1.7**	0.85	0.75	0.65	0.55	0.45	0.35	0.25
	1.6	---	0.80	0.70	0.60	0.50	0.40	0.30
	1.5	---	---	0.75	0.65	0.55	0.45	0.35
	1.4	---	---	---	0.70	0.60	0.50	0.40
	1.3	---	---	---	---	0.65	0.55	0.45
	1.2	---	---	---	---	---	0.60	0.50
	1.1	---	---	---	---	---	---	0.55

Notice: If someone chooses a particular value X as the effort level and others in the group all choose effort levels which are either equal to or higher than X, then the smallest effort level chosen in the group must be X.

As noted above, the experiment will consist of 20 rounds. After we have finished reading the instructions you will proceed to play the first 10 rounds of this game. **The composition of the group you are in will remain unchanged for the first set of ten rounds.**

We will stop at the end of the 10th round. At that point we will give you further instructions about how the next ten rounds (Rounds 11 – 20) will work.

When the first set of ten rounds ends, please make a note of your earnings on the record sheet provided below.

Please do NOT continue on to the 11th round of this game until asked by the experimenter to do so.

We will pay you your earnings from the experiment at the end of the session. You are free to go once you have been paid. Your earnings are private information and we encourage you to keep this information private. If at any point you have any questions or problems, please raise your hand and ask for assistance.

Earnings Record Sheet for the rounds 1 though 10

Line 1: Actual earnings in the first ten rounds   **$_____**

[In the pay cut treatment, the instructions for Rounds 11 through 20 are as follows].

Instructions for Rounds 11 through 20

Unfortunately, the economy has been hit by recession. The business you work for has decided that it needs to cut costs. The employer has decided to do so by cutting the wages of all employees by 20%.

For the next ten rounds, that is Rounds 11 – 20, the game with be played in the exact same manner as during the first ten rounds.

Except the payoff you receive now will be 80% of what you were earning before.

The computer will continue to show you the full payoffs, but at the end of this second set of ten rounds, you will only receive 80% of what you have earned.

Your $5 show up fee and earnings for the first 10 rounds are unaffected.

Are there any questions? If at any point you have any questions or problems, please raise your hand and ask for assistance.

Earnings record sheet for rounds 11 through 20

Line 2: *Experimental* earnings in the second ten rounds $_____

Line 3: *Actual* earnings in the second ten rounds $_____

(Multiply amount in Line 2 by 0.8 and write resulting amount on Line 3)

Line 4: Write amount from Line 1 above here $_____

Line 5: Write amount from Line 3 above here $_____

Line 6: TOTAL $_____

(Add amounts in Line 4 and Line 5 and write the amount here; this is your total earnings for this experiment)

[In the Layoff-Exit Lab treatment, the instructions for Rounds 11 through 20 are as follows].

Instructions for Rounds 11 through 20

Unfortunately, the economy has been hit by recession. The business you work for has decided that it needs to cut costs. The employer has decided to do so by laying-off a portion of the work force.

In a minute we will call out the names of the workers who are being laid off. Today 5 people will be laid off.

The people who will be laid off are the ones in round 10 who chose the lowest effort values amongst all participants. If there are more than 5 people, then we will pick 5 people by drawing subject identification numbers from a box.

If your subject identification number is called, then please pick up all your things and come over to receive your payment. You will receive the amount you have earned during the first ten rounds plus the show-up fee. Once you have been paid please leave the room.

If your subject identification number is not called, then please remain seated for the time being.

Once the laid-off workers have left the room, we will resume playing the game.

For the next set of ten rounds, that is Rounds 11 – 20, the game with be played in the exact same manner as during the first ten rounds.

Except the five person groups will be formed from scratch. Therefore, it is almost certain that you will not be interacting with the same people as in the first set of ten rounds. The composition of the group will remain unchanged from that point on for the rest of the session.

Your earnings will be denoted in dollars and cents as before.

Your $5 show up fee and earnings for the first 10 rounds are unaffected.

Are there any questions? If at any point you have any questions or problems, please raise your hand and ask for assistance.

We will tell you when we are ready to proceed.

Earnings record sheet for rounds 11 through 20

Line 2: *Experimental* earnings in the second ten rounds $_____

Line 3: Write amount from Line 1 above here $_____

Line 4: TOTAL $_____

[In the Layoff (n=4) treatment, the instructions for Rounds 11 through 20 are as follows].

Instructions for Rounds 11 through 20

Unfortunately, the economy has been hit by recession. The business you work for has decided that it needs to cut costs. The employer has decided to do so by laying-off a portion of the work force.

We will lay off one person in each group. The person laid off is the one that chose the lowest effort value in round 10. If there are more than one such persons in a group, then we will select who to lay off via a lottery.

In a moment, we will call out the subject id numbers of workers who are being laid off.

If your subject identification number is called out, you will be formed into a group with other players who have been laid off. For the following 10 rounds, you will be playing the *exact same game* as during the first 10 rounds, except your payoff will be 50% of your on-screen payoffs.

The rest of you, who are not laid off, will play the exact same game with the same payoffs as during the first 10 rounds. Except now you will be playing in groups of four consisting of yourself and 3 other people. These 4 members of the group will be the same as during the first 10 rounds except now the laid-off member is no longer a part of the group. The earnings for this group will be the same as during the first 10 rounds.

You show-up fee and earnings for the first 10 rounds are unaffected.

We will tell you when we are ready to proceed.

We will first call out the subject id numbers for the laid-off workers. We will then tell you how to login to the software for the second set of 10 rounds. You should not identify yourself in any way. **When we call out your subject ids please make a note and then follow the instructions for logging in.**

Following that we will provide login information for the rest of the session participants.

Please pay attention and listen to the instructions carefully. Failure to follow instructions will cause difficulties with the software and will slow things down considerably.

Are there any questions? If at any point you have any questions or problems, please raise your hand and ask for assistance.

Earnings record sheet for rounds 11 through 20

Line 2: *Experimental* **earnings in the second ten rounds** $_____

Line 3: Write amount from Line 1 above here $_____

TOTAL $_____

[In the Layoff (n=5) treatment, the instructions for Rounds 11 through 20 are as follows].

Instructions for Rounds 11 through 20

Unfortunately, the economy has been hit by recession. The business you work for has decided that it needs to cut costs. The employer has decided to do so by laying-off a portion of the work force.

We will lay off one person in each group. The person laid off is the one that chose the lowest effort value in round 10. If there are more than one such persons in a group, then we will select who to lay off via a lottery.

In a moment, we will call out the subject id numbers of workers who are being laid off.

If your subject identification number is called out, you will be formed into a group with other players who have been laid off. For the following 10 rounds, you will be playing the *exact same game* as during the first 10 rounds, except your payoff will be 50% of your on-screen payoffs.

The rest of you, who are not laid off, will play the exact same game with the same payoffs as during the first 10 rounds. Except now you will be playing in newly formed groups of five from among the workers not laid off. The composition of these groups will be different from that during the first 10 rounds and will exclude the workers laid off. The earnings for this group will be the same as during the first 10 rounds.

You show-up fee and earnings for the first 10 rounds are unaffected.

We will tell you when we are ready to proceed.

We will first call out the subject id numbers for the laid-off workers. We will then tell you how to login to the software for the second set of 10 rounds. You should not identify yourself in any way. **When we call out your subject ids please make a note and then follow the instructions for logging in.**

Following that we will provide login information for the rest of the session participants.

Please pay attention and listen to the instructions carefully. Failure to follow instructions will cause difficulties with the software and will slow things down considerably.

Are there any questions? If at any point you have any questions or problems, please raise your hand and ask for assistance.

Earnings record sheet for rounds 11 through 20

Line 2: *Experimental* earnings in the second ten rounds $_____

Line 3: Write amount from Line 1 above here $_____

TOTAL $_____