Study on setting goal difficulty for short non-recurring tasks to maximize performance.

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Abstract

In order to discover how maximum performance could be achieved when setting goals two hypotheses was tested. Higher goal difficulty would increase performance, and too high goal difficulty would result in lowered performance due to goal rejection. In the experiment conducted it was found that goal difficulty had a strong positive correlation to performance, but goal rejection did not occur even with unattainable goals. Recommendations and suggestions when setting goals as a manager are given as well as a discussion on why goal rejection did not occur.

Introduction

Background

Every manager wants to maximize performance for their organization, and one of the most common tasks for a manager is planning and goal setting. Surprisingly there is little research investigating the link between goal setting and performance, and the research that does exist are often contradictions of each other. There is a myriad of variables that effect how goal setting should be done, especially when considering goal setting is not only a cognitive event, but also a social. Much of the research in this area belong o the psychological domain, and is more focused on behaviour than on output. This paper will try to have a strong economical aspect and look at what evidently has an impact on the work efficiency and productivity. One of the variables that are the easiest to change for a manager is goal difficulty, but how difficult should goals be set to attain maximum performance? Two common theories are that easy goals will not motivate employees to perform high, and another contradicting theory states hard goals will be demoralizing as they are difficult to attain. Many theories circulate around these two major standpoints, and some claim there is a golden path in between. But exactly where is this path and how should you find it?

Much has been studied in the areas of employee participation, empowerment and similar, but at the same time have some of the work design tilted towards fast and quick tasks such as hiring a specialist for a short time or working in task groups put together for a short period. Defining general guidelines for specific tasks is a common overzealous belief in your own theories, and although inspiration from this paper can be taken to many areas of goal setting, it is primarily restricted to these single, short and intense tasks.

Purpose

This paper is directed towards managers who are interested in the theories of goal setting and will give an introduction to the area for further reading. It will also more closely investigate goal setting and goal difficulty in short nonrecurring tasks and give direct suggestions when setting goals for similar tasks. This paper should not be seen as a panacea for goal setting in general as much more research has to be done in the area before general directions can be given.

Theory

Seven aspects of goal setting

Earlier research in the area generally examines only a few variables that affect performance, but some research try to incorporate several aspects of what affects performance. A literature study done on several articles showed that the different aspects of goal setting and job design are closely connected and dependent on each other. From these articles seven aspects affecting performance was identified. Each of these seven aspects have occurred in several theories and studies, and as the results often has been contradicting each other the most common and interesting conclusions will be presented. These aspects of goal setting are all closely connected; setting a good goal will increase the learning capabilities and thus increase the cognitive demand etc. Discussing only one of the aspects will miss the whole process of goal setting, and the many variables that will affect the performance outcome.

Goal acceptance

Goal acceptance is the event where a given goal is either rejected or accepted. In older research goal acceptance has been ignored and considered an environmental event, i.e. a task was given and that would then equal the individuals goal. However, when an assigned goal is rejected it would not regulate performance very well. If goal acceptance is considered relevant, the regulating stimulus is a mental event, and the assigned goal may or may not be equal to that of the individuals. (Locke, 1981) Notice that goal acceptance is not the same as working or not, it's the event of turning the given goal in to your own or not. Goal acceptance is of course connected to goal difficulty, increasing the goal difficulty level above a certain threshold could result in goal rejection. Having too high goals will result in negative performance (Erez, 1984).

Goal commitment occurs when an employee accepts a goal and then maintaining the attitude to reach that goal during the task at hand; difficult goals will only lead to higher performance if the person is committed and have accepted the goal (Liu, 1999).

Goal difficulty & task difficulty

Goal difficulty is how hard it is to attain the goal while task difficulty is how hard the task is. The two dimensions will regulate how much intellectual work is required to fulfill the goal or do the task; this is a continuous scale ranging from routine work to problem solving and a

measure of how high the stress level is. High goal difficulty, and thus a higher stress level, can lead to a higher degree of intellectual work in forms of planning and the use of strategies in order to be able to complete the task (Early, Wojnaroski, and Preest , 1987).

Difficult goals will lead to more time spent on the task; it will also lead to people working harder on the task (Early *et al.*, 1987). Goal setting has been well documented in both laboratory experiments and field studies to have positive effects on performance (Locke, Saari, and Latham, 1981). Harder set goals are generally agreed to lead to higher performance, this could be because a harder goal will be more challenging and the employee will be more motivated to achieve over their ability (Liu, 1999). There is research that states that goal difficulty might also lead to a negative outcome over performance when the person has to think more on how to solve the task rather than actually solving it (Mone and Shalley, 1995). Some research discusses a minimum tolerance on task difficulty; this is a threshold value where below the threshold an increase in goal difficulty will result in an increase in performance. Above the threshold a negative effect occurs where the employees become too stressed, a further increase in goal difficulty will result in a negative performance (Erez, 1984).

Goal difficulty can not be constant but has to vary according to recent research. Long periods of time can not have a constant high difficulty level to attain maximum performance; people simply cannot perform at maximum over long periods of time (Lantz, 2006).

When it comes to the degree of specificity more specific goals will lead to a higher degree of intellectual work such as how an employee should proceed with the task, including more planning and creating a more constructive strategy to approach the task (Early *et al.*, 1987). Creating clear and specific goals could be one of the most important aspects of goal setting in terms of performance.

However it is also argued that the opposite of specific goals – so called do-your-best goals – could also lead to a higher performance, these goals have a tendency to feel less critical of the person's mistakes and can therefore lead to the person recognizing and implementing alternative strategies that could lead to an increase in learning and performance (Mone and Shalley, 1995).

Cognitive Demand and Intrinsic motivation

When discussing task difficulty and complexity one aspect that needs to be addressed is the cognitive complexity or the cognitive demand of the task. Cognitive demand is a

measurement on how complex in a cognitive aspect a task is – how much problem solving decision making, and planning that is needed for solving the task. This can be viewed as a scale, the lowest point only requires very low cognitive input (this involves routine work that doesn't demand any type of reflection on what is done). On the highest scale there will be tasks found that requires the establishment of new work processes and tasks that puts a very high demand on planning, decision making, and problem solving (Lantz and Brav, 2005).

Cognitive demand has only recently been thoroughly examined on how it affects performance and it seems it's a very dominant variable (Lantz, 2006). If the employees find the task challenging and mentally stimulating this will be a very strong incentive for a high performance. If the task is interesting enough other aspects have little impact on performance.

While the cognitive demand is an attribute of the task itself so is intrinsic motivation an attribute of the employee. This is when motivation is driven by internal factors, a natural will for high performance regardless of the external rewards (Deci and Ryan, 1991). Intrinsic motivation is one of the strongest motivators in order to increase performance, but it is also one of the hardest to externally control or increase. One of the best ways to increase intrinsic motivation is through creating a fun and challenging task with a high cognitive demand. Another aspect of intrinsic motivation is recognition through completion, i.e. the fact that completing a task gives a sense of self satisfaction. Easier goals will to a larger extent lead to completion as it's easier to attain the given goal, which will then lead to a stronger intrinsic motivation (Shalley and Oldham, 1985., Campbell, *et al.*, 2001). Competition in conjunction with goal setting can also lead to a synergy effect increasing the motivation (Campbell *et al.*, 2001). It is possible that too much focus on external rewards leads to less intrinsic motivation, this is called the overjustification effect and occurs commonly in task design.

Strategies

Higher goal difficulty is argued to result in higher intellectual work and development of strategies. Higher performance can be one result of the use of strategies and the employees applying a smarter way of working, but it's most likely not the only reason for higher performance with higher goals.

The more complex the task is, plans and strategies will have a much greater impact on performance than on simpler tasks. This is mainly because for the simpler task the different strategies that can be applied will be fewer, and mostly known (Liu, 1999). On the other hand, more lenient goals (do-your-best) could result in more effective strategies. Instead of just

finding a strategy that work, do-your-best goals could inspire the employee to test new strategies and discard the ones that are not as effective (Mone and Shalley, 1995).

Setting or accepting more challenging goals or more specific goals will lead to the development of strategies in a much greater extent than people that are meeting easier goals, the use of strategies could be the only way to attain the goal if the task is difficult and complex (Chesny and Locke, 1991). As the task complexity increases the correlation between strategy and performance will strengthen at the same time as the correlation between goal difficulty and performance will become weaker (ibid.). More difficult and challenging goals are associated with selecting more effective strategies and the rejection of ineffective strategies – challenging goals also increases planning activity (ibid.).

Higher goal difficulty and more specific goals will lead to people spending more time thinking ahead – planning and making strategies – about how to proceed (Early *et al.*, 1987). Most people will take additional time to reflect upon the task at hand and how they should resolve it; this could lead to the use of a more elaborate strategy. This will cause a lag in performance increase, in the beginning this extensive planning will cause performance to slow down while in the end performance will be higher after the strategies and plans have been put in to action (Chesny and Locke, 1991).

It seems that most of the research clearly states that a more complex or specific goal will lead to the use of a more complex and elaborate strategy, but at the same time research has shown that a more lenient goal or an open goal could also lead to people daring to approach the problem in a different way. Perhaps people are more inclined to think out-of-the-box with lenient goal, while specific complex goals will make people work hard but according to previous set standards.

Goal specification

Generally this is divided into no goals, do your best onwards to the more specific goals. Specific goals will result in higher performance, better planning and use of strategies. Difficult specific goals could lead to higher performance due to the fact that this will point the person towards what is important for this task (Mone and Shalley, 1995). However, while the use of work focus is heightened, it also hinders the development of new thinking, creativeness and potentially problem solving. A more effective strategy will increase performance; specific goals could hinder the development of these strategies – stifling the process of finding and discarding of different strategies (Mone and Shalley, 1995).

Participation in goal setting

Since it is obvious that, as goal difficulty increases, probability of goal attainment decreases, perceived attainability represents an upper limit on a person's choice of a particular difficulty level. That is, it seems extremely improbable that an individual would choose a goal level which the individual felt was impossible to reach. (Campbell, 1982) If goal acceptance is considered relevant for goal setting to have an effect on performance then it should be noted that goal acceptance depends on the individual's perceived attainability of said goal. This is dependant on previous success in goal attainment and the individuals self assurance. Through discussion and participative goal setting a goal that the individual find challenging but attainable can easier be set.

However, many papers claim there is a very low correlation if any at all between goal acceptance and performance. Many researches have stated that goal acceptance and commitment is higher when the employee and the manager work together on determining the employee's goals, but other research have found no direct correlation between the two but that this collaboration often instead leads to higher set goals than goals just set by the manager (Latham and Saari, 1979). Participation will also often lead to that the employee will perceive the goals as less difficult then goals they have not participated in setting (ibid).

Evaluation/feedback

Since Elton Mayo discovered that people under observation performed better it has been known that attention given by the management and changes done in the work processes have a positive effect on performance and works as strong incentives. Even just the attention in itself and the process of implementing changes that the personnel them selves can influence have a great impact on performance. However continuous evaluations do not have the same effect (Scott, 2003).

It is also apparent that evaluation have little effect on difficult goals, in fact it seems to have a negative effect even. Expecting negative feedback from an external source is more discouraging than motivating (which could probably be expected when the goal or task difficulty is very high), while expecting positive feedback when assigned easy goals works as a strong motivator (Shalley and Oldham, 1985). Many studies in this area have shown various results, possible due to that many have missed the link between evaluation and goal difficulty. Also if the person has power over his own goal setting then continuously receiving negative feedback concerning goal attainment could generally be expected to lead to a decrease in goal

difficulty next time the employee will set goals. Continuous negative feedback generally decreases the willingness to perform better, and the will to set higher goals (Campbell, 1982).

Hypothesis

The theories presented earlier are the basis for the hypotheses that will be tested in this paper. The main focus will be on goal difficulty, but many of the theories presented will be tested indirectly.

One of the variables a manager has strong control over is goal difficulty, it is also a variable that is argued to have a great impact on performance. When it comes to performance, goal difficulty seems to be the major factor. Much of the research presented earlier has stated that goal difficulty has a positive correlation towards performance, but at the same time an extremely high goal difficulty could lead to the opposite (eventually even the total rejection of the goal). Two hypotheses are presented that will test the most debated aspects of goal difficulty:

Hypothesis 1: High goal difficulty leads to higher performance assuming the goal is continually accepted throughout the experiment.

Hypothesis 2: Very high goal difficulty is likely to result in rejection of the goal which will lead to a lower level of performance.

These two hypotheses contradict each other as one argues performance will go up with increasing goal difficulty, and the other performance will go down with higher goal difficulty. Ideally a maximum performance threshold will be found on how difficult goals should be set.

Other aspects that will be investigated are differences in goal difficulty and performance between the sexes, the same will be done for different ages. The thesis is that there will be differences in performance between both gender and age.

Method

Research methods

There are different methods that could be used for testing human behavior; the two main ones are field studies and experiments. Field studies would be more likely to portray a real life situation, on the other hand during a field study the external factors will be very hard to control. For this paper the intention was to, to an as great extent as possible, strip away all the external factors that could influence the outcome – the main focus were set on goal difficulty and performance. An experiment will help in the work of limiting the environmental factors but at the same time while limiting the external factors the experimental setting will distance itself more and more from a real life situation. In order to test the hypothesis there was a need for keeping the environmental factors out of the influence over the outcome, therefore an experiment was chosen as method.

In order to test the hypothesis an experiment was conducted in order to confirm or reject the two given hypothesis. To test if a higher set goal will lead to a higher performance an experiment was chosen where working hard, rather than attributes such as intelligence or physique, would result in high scores. The task was chosen from the theories of cognitive demand; one of the lower levels of cognitive demand is information seeking (Lantz, 2006). In order to test the impact of goal difficulty all other variables but goal difficulty was needed to be kept at a constant level, for the experiment the only variable changed between the different test groups was goal difficulty (ranging from do-your-best to an extremely difficult goal).

Additional differences and factors were examined through an accompanied questionnaire. The questionnaire helped in order to gain information from the participants regarding their view on goal acceptance, use of strategy, and their age and gender.

The aim of the experiment was to find correlation, negative or positive, between goal difficulty and performance. For the questionnaire the aim was to find the correlation between goal difficulty and goal acceptance, commitment, and the use of strategy.

Experiment

Participants

A minimum of one hundred participants was needed, five groups was tested – one control group and four test groups. The participants were students enrolled at Uppsala University;

they were randomly assigned to the different groups. The way the students were assigned randomly to the different groups were done by sorting the experiment papers in such a way that each experiment handed out was different from the participant sitting next to her. For instance, if one participant was handed an instruction that would put that participant in the group to find 5 numbers, then would the next participant be put in a group to find 7. Two different set of numbers were created and every other student was given a different set of numbers to prevent cheating.

The participants were approached in two different ways; the majority of the students were students sitting in the corridors and assembly halls of the Business school. The instructors approached them and asked if they wanted to participate in an experiment. Students were also picked from two seminar groups, they were all student at the Business school taking Organizational Behavior. All the students were asked if they wanted to participate. For participation in the experiment a cinnamon bun or chocolate bar was given. Participants for the pilot test were also students, or friends of the authors.

Task

The people participating in the experiment were asked to find corresponding values for certain indexes from a large list of pairs. The list contained four hundred number pairs (which where generated by a random generator in Microsoft Excel), and from that list the participant's task was to find twenty corresponding numbers (these numbers were also randomly picked in the list by Microsoft Excel). Twenty numbers were given and then the participant's task was to search though the list to find the corresponding number. A pilot test was conducted on a number of students beforehand in order to establish how many pairs that could be found during a set time frame.

Manipulations

The only variable that was changed during the experiment was goal difficulty. The control group's goal was to find as many corresponding values as possible; this is what in the theory part of the paper states as a do-your-best goal. The test groups were instead given a specific number of values to find, ranging from very few (low goal difficulty) to numerous (high goal difficulty). The numbers of pairs to be found were; 3, 5, 7, and 11, where 3 were considered a very low goal and 11 considered an unattainable goal. The different goal levels were established by using a pilot test beforehand. During this pilot test, the average number of pairs that could be found was around 5-6 numbers, which then lead to the different goal levels – 3

being lower then average, 5 on average, 7 being above average, and 11 being seen as an impossible goal to reach.

Procedures

The participants were first handed instructions on what they were supposed to achieve during the experiment, the instructions can be found in Appendix B, the instructions were different for the different goal difficulties. For the do-your-best group the instructions stated that the participants were to find as many pair as possible. For the other groups the instructions stated that the minimum number of pairs to find were 3, 5, 7, or 11 respectively. The importance of this part of the instruction was also given orally, the instructors informed the participants to pay extra attention to the part of the instructions that stated their expected goal. After the instructions all participating in the experiment had the opportunity to ask questions about the instructions. After the opportunity to ask questions the participants were given the signal to turn the page and then start searching for the numbers. The time for completing the task was the same for all groups, five minutes. After the five minutes was up the experimenters gave a signal telling the participant to stop. The participants were then asked if they were willing to fill out a short survey which was found on the last page. The survey contained questions about goal acceptance, goal difficulty, task difficulty, commitment, motivation, performance and strategic choices (the survey can be found in Appendix B). After all the participants had completed the questionnaire the instructor informed that the experiment was over and the participants were given the opportunity to choice if they wanted information about the outcome of the experiment, and of course awarded their reward for participating.

Measures

Performance was measured by how many correct answers the test subject had on the test. The questionnaire that was handed out after the experiment measured the perceived goal difficulty, the participants was also asked to rank how hard they felt the task was. The questionnaire also contained questions regarding the participant's goal acceptance, commitment and motivation. The participants were also asked in what extent they applied some form of strategy in solving the task.

Result

Test participants were very willing to participate and only twelve people rejected to participate, primarily because of time constraints. The participants were very willing to answer the questionnaire and put great effort into answering the questions carefully. More than half the participants filled in the voluntary commentary part of the questionnaire and almost all explained in detail what strategy they used. One person achieved a score of over nine and on person was discovered cheating on the test (copying another person's numbers). Seven answers were removed since they answered they did not fully understand the instructions. The test was evenly distributed regarding age and sex for the different categories.

Result and goal difficulty

The following table shows the mean and standard deviation of the results, sorted on goal difficulty:

Goal	Mean	N	Std. Deviation
Goal of 3	4,79	19	1,843
Goal of 5	5,95	20	1,877
Goal of 7	5,24	17	1,715
Goal of 11	6,06	17	1,983
Do your best	6,53	19	1,611
Total	5,72	92	1,877

Table 1 - Average std. deviation of score, sorted on goal difficulty.

As seen the result increases when the goal difficulty is increased, the mean value for a goal difficulty of three is 4,79 compared to the mean value of 6,06 for a goal difficulty of eleven. The highest score was found for those participants that were given a no-goal (or do-your-best goal), with a mean value of 6,53.

When excluding the participants that gave up at some point during the test a similar result was found, but the average score was higher.

Goal	Mean	N	Std. Deviation
Goal of 3	5,07	15	1,710
Goal of 5	6,47	15	1,598
Goal of 7	5,69	13	1,548
Goal of 11	6,89	9	1,833
Do your best	7,00	13	1,633
Total	6,15	65	1,770

Table 2 - Average and std. deviation of score (excluding those that gave up).

The full table of all the means for the different variables is posted in appendix A.

No significant differences could be found between goal difficulty of 5, 7 and 11. There were differences between 3 to 5, 7 and 11 that showed a strong indication that low goal difficulties would result in a low score. From the results it can be concluded that there is a difference in result between the groups with goal difficulty 3 and 5 with 94.1% certainty. The significance value between the score for goal difficulty level three and five was 94,1%, which is just outside the 95% confidence value.

Similar results were found between the other groups as well. For instance, the differences of score when having a difficulty of 7 and 11 compared to a difficulty of 3 where similar, but here the significance level was even greater but still outside of the 95% confidence interval (94,5%).

For the group that was given a goal difficulty of 3 and the group that was given the do-your-best group the results show a clear correlation between goal difficulty and result. The results show that the significance value was within the 95% confidence value, i.e. with greater then 95% it can be stated that this result is not coincidence.

Result and giving up

98% of the participants had the intention to attain the given goal or higher after reading the instructions but before starting, however 27 participants gave up during the test. Giving up, at any point during the test, had a great impact on the score (the significance was greater then the 95% confidence interval). The mean score value for those that gave up was 4,67, while the mean score value of those that didn't gave up was clearly higher, 6,15 (a total of 65 people did not give up during the test).

When checking if there existed any correlation between giving up and the goal difficulty given it seemed that the rate at which people gave up had a correlation to the given goal difficulty although not very clear. The significance level for giving up between the participants given a goal difficulty of 3 and those given a goal difficulty of 11 was 89,6%, which is outside of the 90% confidence interval, i.e. it can be said with 89,6% accuracy that this was not due to coincidence.

If all participants who gave up (27 out of 92) was removed it became evident that goal difficulty had a great impact on the score. The differences in score when having a goal of 3

versus that of 11, when the participants who gave up is removed is a clear correlation shown, a significant value of 97,8%.

Gender and age

There were no significant differences in score between the male and female participants; the only significant difference was in how hard they said they had worked and how motivated they were to complete the task. Male participants said they made a greater effort compared to the female participants and the female participants seemed to be more motivated to the task then the male participants.

	Gender	N	Mean	Std. Deviation
Result	Male	46	5,70	1,562
	Female	46	5,74	2,165
Hard	Male	43	4,19	,982
	Female	44	3,84	1,119
Motivated	Male	40	3,60	1,277
	Female	46	4,00	1,135

Table 3 – Mean values for gender differences in result, how hard the participant thought they worked, how motivated to the task they felt.

There was a significant difference in age where older participants found the test less exiting and scored lower on average. The participants were analyzed in three different age groups, the first group was those under the age of twenty four, the second group was those between the ages twenty four and twenty nine, and the last group contained the participants that were thirty years old or older. Significance could be found between the first two groups and the last one but no significant differences were found between the first and second group. The tables for both the groups are found in Appendix A.

Strategies

When it comes to the use of strategies no difference in the use of strategies between the different goal difficulties was found, strategies was used in all the different groups (70,7% of the participants stated that they had used some strategy during the task). A number of different strategies that was used was identified (six strategies in total), the strategy that most of the participants was using was looking at the first two numbers (which was implemented by 63,1% of the participants using a strategy). Other strategies that can be mentioned are; looking for numbers starting with the same number, starting with easier numbers (for instance double digits), or memorizing two or more numbers and searching for those simultaneously. Goal difficulty had no correlation to chosen strategy.

Conclusion and Discussion

Hypothesis 1

The first hypothesis was that there exist a positive correlation between goal difficulty and performance. From the results it can be seen that there is indeed a connection between the two. The participants that were given lower set goals clearly performed at a lesser level then those that were given harder set goals, even the participants that were given do-your-best goals clearly outperformed the participants given very low set goals.. From this it can be concluded that setting a very low go will only lower the performance outcome. As the goals became increasingly more difficult after the hard goal (goal of 5) there was a slight improvement in performance. However there was not a strong improvement in performance as the goal difficulty increased from hard to very hard or unattainable goal levels. In order to see if this correlation was disturbed by the fact that people might have given up more frequently on the higher goals those were removed. After excluding the participants that gave up there was indeed a stronger correlation between higher set goals and performance. This indicates that higher goals directly affect how hard a person works if that person tries to pursuit the goal.

Hypothesis 2

Supposedly harder set goals should lead to more participants rejecting the goal and giving up. This was indicated although without a high degree of certainty. Those that gave up achieved a much lower score than those who did not. Very few gave up on the lower set goals while there was an increase in the percentage of those who gave up as goal difficulty increased.

Surprisingly, several of those without a given goal (do your best) gave up too. However this group performed very well on average (although those who did not give up within this group scored even higher). Most likely these people either gave up when they felt they had performed well enough or they gave up for a short moment and then carried on the work after a short break. If they gave up when they felt they had performed well enough they set very high goals for themselves (as most of them scored a very high result), this could be supported by the high willingness to do the test and to work even harder if presented again. The theories concerning the notion that work-intensity and goal difficulty has to vary in order to keep the persons performance at maximum could be supported by that they might have taken a break. By taking a short break the participants regulated their work pace. Although the test was short

and intensive a short break could have been needed for some to stay focused. Many people expressed that the test was demanding and tough.

It is also possible that some of the people misunderstood the question; perhaps they thought the question was if they gave up finding numbers, although the question was if they at any point stopped trying to pursuit given goal. I.e. after finishing the required number of pairs, they stopped searching for number and answered yes to this question. This could explain why some who had low goals and actually did attain them still claimed that they gave up.

Maximum performance

Other research such as Erez (1984) argued there exists a threshold value where an increase in goal difficulty above this threshold value would result in lower performance. This experiment showed no such clear indications even when the goal difficulty was increased from very hard to unattainable. Instead it was found that higher set goals would lead to people working harder, although the number of participants giving up would increase too, but not at a pace so high it would lower the average result.

The increase in those who did give up with increased goal difficulty lowered the average result of those who tried to attain the very hard- or unattainable goals though. Because of this maximum performance was found where the participants were encouraged to work as hard as possible but not feeling the pressure of failing or inability to attain the given goal, i.e. the do-your-best goals. This is of course only possible when the participants have the intrinsic motivation to perform at their maximum.

Intrinsic motivation

In the experiment the willingness to perform well was very high, and many competed with their friends sitting next to them, further increasing the motivation to perform. Many participants also expressed that they felt the task to be interesting, fun and challenging, this lead to the conclusion that intrinsic motivation was high. Also the amount of people expressing willingness to participate again and work even harder next time supported this conclusion.

When intrinsic motivation is high, the best goal seems to be those that do not put pressure on the people to succeed (or pressure on them to not fail), but has no point where the participant can consider them to be done - the do-your-best goals. The performance is closely followed by the goal difficulties of unattainable, very hard and hard goals.

Initially it was thought the intrinsic motivation would rapidly fade and was primarily because it was a change to the normal day routines and something new, but the majority of the participants expressed they would work harder. Even if intrinsic motivation will fade over time so might it be high for this kind of intense, non-recurring tasks researched in this paper. It is not unlikely that this kind of work generally will spur a high intrinsic motivation naturally as it's a break to the day routines.

Goal acceptance

Almost all participants had the intention to reach the given goal when they started, however it was indicated that goal difficulty had an influence over if they gave up during the test or not. This test showed no link between goal acceptance and performance. What did influence performance was if they gave up or not during the test, not if they initially accepted the goal or not. It seems much more important to give support during the task so participants do not give up than for the participants to accept the given goal from the beginning. Giving up could of course result from that they did not know how hard their goals was, and only after realizing how hard they actually were they gave up. But support from the managers, to try to reach the goal or to perform as well as possible, would probably have a greater impact than just making sure the goal was accepted from the start. Again this relies on the cognitive demand and intrinsic motivation, if these are low the goal will be rejected from the start, but then there is a flaw in the overall job design and can hardly be solved solely by goal setting; participative or not.

Goal difficulty scales with cognitive demand

Although more research has to be done in the area before any real conclusions can be drawn, it seems that goal setting difficulty scales closely with cognitive demand of the task. That is, interesting and mentally stimulating tasks that feels important to the employee can be given harder goals while tasks the employee do not experience as stimulating will result in goal rejection if given hard goals.

Cognitive demand also increases the intrinsic motivation which is closely related to if a person gives up or not.

Ethics of goal setting

During the experiment the participants was told when there was one minute left on the test, the responses from the participants varied greatly; from moaning, cursing, other reactions of

stress, concentrated work, to people seemingly relaxed, taking a look over the classroom. It seems likely that those who had goals they could not obtain felt more stressed than those who already had reached their goals or knew they had time to reach them, especially if they still had the ambition to succeed in obtaining given goal. If the intrinsic motivation is high and very hard, or unobtainable, goals are given it will put a high amount of stress on the participants. While giving unobtainable goals might increase performance as the participants will try very hard to reach them, it could also lead to a lot of unnecessary stress, especially if these kinds of goals are given frequently.

When giving very hard goals or above while there is a high intrinsic motivation the participants are likely not to give up. Because of this, managers have to be very careful when setting goals, especially if the employee inhibits a high intrinsic motivation or the task is highly cognitive.

Recurring goal setting

This paper is limited to goal setting for quick and intensive task and should not be seen as a panacea for general goal setting. It cannot be seen as the solution for sub goals in a large task either, or at least this have not been tested.

This is a common mistake in the economical research of goal setting; it's often isolated to one task and one goal. In the psychological school of job design it's more commonly talked about work flow and rhythm rather than the impact of specific single goals. Knowing how single set goals is of course important and when talking about single non recurring tasks this research is directly applicable, but transferring this research in to general goal setting in continuous work tasks is not recommended.

Setting goals is of course important in continuous work too, but the acceptance of those goals and the results and variables affecting are most likely different from the results found in this experiment.

Differences in sex and age

There was no significant difference in performance between male and female participants, the only difference indication is that female participant expressed they felt more motivated to do the task while male participants expressed they worked harder.

Older participants reported a lower interest in the task and performed worse than younger participants. Many explanations to why older participants expressed lower interest could be

discussed but more importantly the strong link between interest in the task and performance was highlighted.

Recommendations

How to set goals in quick tasks

Goal setting has to match the intrinsic motivation of the employee. If the willingness to work is high it's generally better to set high goals for maximum performance. There seem to be no threshold on "too difficult goals", as higher goals lead to higher performance. Managers should be aware that high set goals will cause a lot of stress on the employee and will most likely have negative effects if applied continually. If the employee is highly motivated to do the task, then goal setting is a negative event in general, low goals will stop the employee from working hard on the task after the goal is reached, while too high goals will cause some to give up and feel inadequate for the work. If intrinsic motivation is high, do your best or high goals should be set.

If the intrinsic motivation to do the task is not high this experiment cannot tell for sure how goal setting should be done, but there was no indication that low goals could lead to higher performance. However goal rejection, especially with high goals, is more likely to occur when there is little interest in doing the task. This indicates high set goals will cause many to give up if the intrinsic motivation is low. If intrinsic motivation is low, easy to medium and clear goals should be set.

It was also found that initial goal acceptance had little impact on the results, while giving up during the test had a huge impact on result. Goal setting participation, if used, should not be limited to the beginning of the process but is as important, if not more important, to continually giving support to the employee during the task. Initially accepting the given goal does not mean the employee will feel the same enthusiasm for the whole task.

Future research

Low intrinsic motivation

The intrinsic motivation and cognitive demand was two variables that had a greater impact on goal setting than initially expected and is closely connected. More research, especially on participants with low intrinsic motivation towards the task should be studied.

Recurring goal setting

How does goal setting work as a continuous incentive? Does do-your-best goals work in long projects too or do people loose focus of where they want to go? Previous goal setting will most likely play a major part in the acceptance of new goals.

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Appendix

Appendix A

Statistics: means for different variables sorted on goal difficulty

Mean Values	Do-your-Best	Goal of 3	Goal of 5	Goal of 7	Goal of 11	Total
Result	6,53	4,79	5,95	5,25	6,07	5,72
Intention[1]	1	80%	100%	88%	94%	92%
Gave Up[2]	-	21%	25%	24%	47%	29%
Attainable[3]	-	3,89	3,85	2,88	2	3,07
Challenging[4]	3,67	2,95	3,55	3	3,38	3,3
Exiting[5]	3,37	3,26	3,47	3,76	3,59	3,48
Hard	4,12	3,56	3,83	4,41	4,18	4,01
Hard more	2,92	3,42	4	4,24	3,63	3,81
Motivated	3,79	3,42	4	4,24	3,63	3,81
Motivated more	2,79	3,58	4	3,65	2,76	3,4
Again	1,16	1,11	1,05	1,18	1,12	1,12
Work Harder	4,06	4,18	4,32	4,43	4	4,2
Gender	1,37	1,58	1,45	1,47	1,65	1,5

Statistics: results for goal of 3 vs. goal of 5

		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Result	Equal variances assumed	,059	-1,161	,596
	Equal variances not assumed	,059	-1,161	,596

Statistics: results for goal of 3 vs. goal of 11

		Sig. (2-tailed)	Mean Difference	Std. Error Difference
_Result	Equal variances assumed	,055	-1,269	,638
	Equal variances not assumed	,056	-1,269	,640

---

[1] The participants intention to attain the goal (1 – attain the goal, 2 – not attaining the goal).

[2] Did the participant give up reaching the goal (1 – gave up, 2 – did not give up).

[3] Was the goal attainable (1 – not at all, 5 – very).

[4] Was the goal challenging (1 – not at all, 5 – very).

[5] Did the participants find the task to be exiting (1 – not at all, 5 – very).

Statistics: result and giving up

	Gave_up	N	Mean	Std. Deviation	Std. Error Mean
Result	Yes	27	4,67	1,732	,333
	No	65	6,15	1,770	,220

		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Result	Equal variances assumed	,000	-1,487	,403
	Equal variances not assumed	,000	-1,487	,399

Statistics: giving up for goal of 3 vs. goal of 11

	Goal	N	Mean	Std. Deviation	Std. Error Mean
Gave_up	Goal of 3	19	1,79	,419	,096
	Goal of 11	17	1,53	,514	,125

		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Gave_up	Equal variances assumed	,104	,260	,156
	Equal variances not assumed	,109	,260	,157

Statistics: results for goal of 3 vs. goal of 11 after removing those giving up

		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Result	Equal variances assumed	,022	-1,822	,740
	Equal variances not assumed	,028	-1,822	,754

Statistics: results and excitement sorted on age

	Age group	N	Mean	Std. Deviation	Std. Error Mean
Result	under 24	49	6,24	2,057	,294
	30 and over	7	4,00	1,633	,617
Exiting	under 24	48	3,69	1,055	,152
	30 and over	7	2,00	1,155	,436

		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Result	Equal variances assumed	,008	2,245	,814
	Equal variances not assumed	,010	2,245	,684
Exiting	Equal variances assumed	,000	1,688	,432
	Equal variances not assumed	,007	1,688	,462

	Age_grp	N	Mean	Std. Deviation	Std. Error Mean
Result	between 24-29	36	5,33	1,331	,222
	30 and over	7	4,00	1,633	,617
Exiting	between 24-29	36	3,50	,941	,157
	30 and over	7	2,00	1,155	,436

		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Result	Equal variances assumed	,024	1,333	,570
	Equal variances not assumed	,078	1,333	,656
Exiting	Equal variances assumed	,001	1,500	,403
	Equal variances not assumed	,013	1,500	,464

Statistics: One way ANOVA by goal difficulty

		Sig.
Result	Between Groups	,034
	Within Groups	
	Total	
Intention to reach goal	Between Groups	,164
	Within Groups	
	Total	
Attainable goal	Between Groups	,000
	Within Groups	
	Total	
Challenging goal	Between Groups	,398
	Within Groups	
	Total	
Exiting test	Between Groups	,700
	Within Groups	
	Total	
Hard goal	Between Groups	,144
	Within Groups	
	Total	
How hard would you try again	Between Groups	,139
	Within Groups	
	Total	
Motivated to do the task	Between Groups	,300
	Within Groups	
	Total	
Motivated to find more	Between Groups	,039
	Within Groups	
	Total	
Would you do the task again?	Between Groups	,793
	Within Groups	
	Total	
Would you work harder?	Between Groups	,695
	Within Groups	
	Total	

Appendix B

Instructions for the experiment.

Thank you for participating in this experiment! In this experiment your ability to search for numbers in an unordered list will be examined. This experiment is one of the fundamental parts in a report for the Institute of Economics at Uppsala Universitet, supervisor for the paper is Christina Hultbom. Additional help with experiment design have been given by Annika Lantz and Tiimo Hursti from the Department of Psychology at Uppsala University. If you are interested in reading the paper in its completed form simply write down your e-mail at the list that will be presented to you after the experiment. Participation in this experiment is done anonymously and you can choose to not participate or abort at any time during the experiment. If you choose to not participate or abort the experiment please write so clearly on the answer-sheet.

In this experiment you will be given 20 numbers and a list with 420 pairs of numbers. Your task is to find the pair-numbers for in the list and write it in the space provided. All numbers can be found in the list and no number occurs more than once.

Example:

11420	

23054	143
10009	227
77562	874
34055	312
11420	776
51731	120

(Example of a number to find, in the actual test you are given a list with 20 of these)

(example of list of paired numbers, in the actual test there is 420 pairs listed)

Searching for the number 11420 in the list of pairs the number 776 is found and should be written in the white space provided next to 11420.

- Do not start the test or turn this page until signal is given.
- Your task is to find as many matching numbers as you can.
- You have 5 minutes to search and enter your answers. You will be told when to start and stop.
- After doing the experiment please answer the questionnaire on the last page. Do not answer the questionnaire until after the experiment is over.

Do you agree to participate in this experiment?   Yes   No

Once again; thank you for participating in this experiment. As a small token of appreciation you will be given a cinnamon bun and drink.

Christian Linde
Erik Scholander

List of number pairs used in the experiment.

12641	713	21673	396	78019	449	43421	167	59438	780	76997	634
74066	890	60847	278	31425	920	52487	577	42314	977	54308	903
97261	192	52279	923	80955	404	72874	465	56433	226	88106	356
71576	441	24962	192	31998	956	82773	973	49133	953	13365	259
79610	464	34209	248	78930	639	26924	185	52516	707	10277	964
74675	173	26764	509	49769	862	30414	969	74763	647	42093	179
56683	841	18013	729	78950	963	79860	545	99580	274	86635	625
53684	170	98486	941	11524	417	28743	559	28011	196	73831	438
54421	720	26172	577	14695	697	44671	569	40662	851	16658	745
86985	154	64816	470	37504	832	92321	545	63359	352	31719	104
38192	946	32057	222	38697	722	24880	516	41029	364	66096	413
41321	976	59056	648	73893	843	97691	464	13348	949	66845	299
64316	689	48281	327	27115	335	55559	652	66855	467	51966	434
65345	250	77886	515	20905	881	49936	995	52740	897	33148	969
80871	630	61659	706	28843	768	37430	536	96097	629	60373	818
31742	957	65569	805	88536	824	21628	171	52188	157	62861	949
68271	837	42435	347	26548	720	87991	286	93734	396	65243	472
15075	529	47897	657	13093	911	98298	687	81783	284	51761	246
40454	886	20470	580	61990	602	77194	483	26350	773	38286	873
56327	592	65062	783	38526	766	82448	752	61433	606	19732	543
23865	488	35886	950	38828	122	63862	837	29709	796	94525	983
71654	771	71865	531	25068	690	73325	607	58218	137	42958	297
97363	333	75078	695	72804	794	85459	134	69996	430	10299	714
80345	827	18553	918	72811	847	99867	195	57616	668	72274	199
54786	921	29128	746	78116	195	90979	189	40906	861	30693	784
38880	466	88823	518	73442	399	40882	524	20645	970	92968	270
54838	491	70999	861	26564	818	73616	572	39972	429	65867	409
17491	542	64281	171	13961	438	28256	767	40065	357	21986	377
18061	487	47845	184	51139	345	73239	194	14789	701	35396	445
26841	460	91348	695	77543	150	60101	838	25275	390	76659	826
26746	916	18188	177	67889	818	49682	645	61944	215	90631	755
17632	775	18520	215	61507	760	73945	908	48705	371	50137	741
11607	534	19504	503	18961	183	14787	165	85451	224	24929	738
13795	493	68968	134	64963	268	96094	670	52110	471	13797	562
19275	334	96741	799	20669	783	59736	304	32266	783	24315	171
98710	341	20075	195	67246	328	53757	183	80753	186	49463	377
23130	480	18119	406	36328	790	39040	665	56448	774	34288	109
60950	648	43872	980	55771	799	72658	700	53160	732	88877	155
52835	602	91518	368	41125	682	57222	524	74803	514	99531	336
59719	362	96573	505	21785	109	78880	415	80410	438	52763	870
18538	658	14302	290	44173	812	97668	138	19193	961	62525	614
82423	315	10861	383	79966	949	35791	225	11221	938	82725	928
85754	496	63121	997	91851	161	35957	680	12014	206	26541	726
49943	225	81125	483	42933	950	33688	579	99304	249	88587	930
41478	273	34469	813	29483	495	56945	914	27728	888	19529	851
51931	223	24285	599	58335	763	84569	229	47534	366	33944	705
91035	257	95754	447	41475	135	29773	598	63517	435	23311	637
92856	352	47329	116	69695	397	90941	968	92963	902	49902	812
67869	432	91786	558	14697	517	88858	122	28786	876	80961	814
87092	200	90630	336	78787	798	82463	225	45825	348	46768	949

(Note: the numbers are the size to fit an A4 page and were clearer, because of formatting they have been reduced in size and are a little fuzzy above, there are also two different versions, but only one is shown above)

Answer list used in the experiment.

72804			71576	
40882			35396	
21673			90631	
78116			56448	
86985			13795	
55771			68271	
19732			41321	
66855			63359	
72274			29128	
40454			88106	

Survey

Thank you for participating in the experiment. Please take time to complete this survey. If you do not wish to answer some of the questions, you do not have to. If you have any comments or would like to elaborate some of your answers further, there is room to do so in the end.

Sex: Male   Female
Age: _____ years old

Did you have accurate vision (or accurate vision using visual aids) during the test?	Yes	No	
Did you fully understand the instructions for the test?	Yes	No	
Was your intention to find the required number of pairs when you started the test?	Yes	No	
Did you give up on finding the number of required pairs during the test	Yes	No	
Do you think the required number of pairs to find was an attainable goal?	Not at all	O O O O O	Very
Did you find the test exiting to do?	Not at all	O O O O O	Very
Did you find the minimum number of required pairs to find a challenging goal?	Not at all	O O O O O	Very
Did you try hard to find the required number of pairs?	Not at all	O O O O O	Very
Did you try hard to find more pairs than required?	Not at all	O O O O O	Very
Did you feel motivated to find the minimum required number of pairs?	Not at all	O O O O O	Very
Did you feel motivated to find more than the required number of pairs	Not at all	O O O O O	Very
If you were offered to participate in this experiment again tomorrow would you do it?	Yes	No	
If yes, would you work less, as hard or harder compared to today's effort to find pairs?	Not as hard	O O O O O	Harder
Did you use any strategy when searching for the numbers?	Yes	No	

If yes, how? _____
_____
_____

Comments: _____
_____
_____

Appendix C

Definitions

- Cognitive demand: the cognitive input required to solve a task (ranging from pure routine work to very complex work processes and problem solving).

- Goal

    o Acceptance: the event of a person taking a given goal and making it their own.

    o Clarity: clear goals are those that are direct and non arguable, clear instructions on what is needed in order to fulfill the goal (could be a set number of papers to file). Unclear goals are goals that could be interpreted differently from person to person.

    o Commitment: the degree of how committed a person is towards the goal, i.e. how willing the person is to complete the task.

    o Complexity: the degree of complexity (closely related to difficulty), a more complex goal could contain a number of sub goals, or goals of different nature.

    o Difficulty: the degree of how hard the goals are, ranging from very easy goals to very hard (this could be number of tasks to fulfill in order to reach the goal).

    o Do-your-best: this is a low level and unclear goal.

    o Participation: to what degree the person feel involved in setting the goal (often results from a discussion between the employer and the employee and they together setting a common goal).

- Performance: the measured outcome of an individuals work given a specific task and goal.

- Task

    o Complexity: very similar to cognitive demand, this is the degree of how complex the task is to perform – how much effort is needed to solve the task (planning, problem solving, and so on).

    o Difficulty: the degree of how hard the task is to fulfil, this could be an increase number of subtask to solve or because of high intellectual demands.