

# Gender differences in reaction to public achievement feedback

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## Abstract

In this series of studies the author examined achievement and interest of 226 first-grade pupils /6-7-years-olds/ in performing task and the changes in achievement and interest interventions including various rewards. The children's task was to put a circle round the differences on the drawings they were given. The task was the same for all the children, but they were divided into four groups in respect of reward: Group 1= not rewarded, Group 2= rewarded by token, Group 3= rewarded by a "lucky dip" (contingent, salient, tangible reward), Group 4= rewarded by public achievement feedback. After completing the first task the children could choose whether to go to play in the school-yard or to ask for another similar exercise. The degree of intrinsic motivation is shown by the spontaneous activities performed without any rewards. The achievement was the number of correctly identified details in the first task. The results showed that in the Group 3 and Group 4 the intrinsic motivation was significantly reduced while the quantitative indices of achievement rose. The series of experiments revealed gender differences: public feedback on achievement brought about a significant increase in achievement of both boys and girls, while if feedback was withdrawn the boys lost interest in the task to significantly more than the girls. The author interprets this as being due to the greater social inclination and empathy typical of females, in contrast with males' typically greater inclination towards facts and higher motivation to achieve.

The study of effects of reward, incitement and extrinsic motivation is one of the basic issues of pedagogical psychology. The findings of experimental psychology concerning rewards (for example, operant conditioning - Skinner, 1953) usually emphasise the effect of positive reinforcement in increasing the probability of a certain behaviour expected by the experimenter, in increasing the effort and achievement of the subjects, and in increasing the efficacy of learning and teaching. At the same time the behaviourist learning-theory model pays little attention to the relationship between external stimuli and intrinsic motivation.

The other line of research examining the effects of reward (Deci and Ryan, 1971, 1978; Lepper Green and Nisbett, 1973; Ransen, 1980; Lepper, Keavey and Dark, 1996; Ryan, Deci, 1996 etc.) has provided academic support for the theory that motivation and interest in performing a task can be manipulated by initiating extrinsic rewards in such a way that intrinsic motivation and interest in the task will be reduced. These findings led researchers to the conclusion that the application of extrinsic rewards is harmful, for example in a pedagogical situation, since it reduces students' intrinsic motivation.

These studies demonstrated that the above effects depend not only on the size of the reward but on the way in which it is given. They found that rewards which are tangible, expected, salient are especially likely to reduce intrinsic motivation. However there is no decrease of intrinsic motivation, in the case of verbal feedback or a reward that is not announced beforehand.

## ***Gender as an independent variable***

The studies concerning gender differences generally found no significant differences except for the results of Deci (1971, 1975), that women react differently to positive verbal feedback. Deci (1971), in the above arrangement, examined the effect of positive feedback on intrinsic motivation. The verbal reinforcement consisted of comments made by experimenter, for example: 'Very good, that was the quickest so far', 'better than average', etc. The control group did not receive any verbal reinforcement. Deci found that the men who received verbal reinforcement showed significantly higher intrinsic motivation compared to the control group. However, to the greatest surprise, the women did not behave as expected, i.e. they reacted to positive verbal feedback with a decrease in intrinsic motivation<sup>i</sup>. The findings suggested some gender differences in the effect of positive feedback on intrinsic motivation. However, it is important to note that on the one hand the above authors only found gender differences in the decrease in intrinsic motivation when positive feedback was applied interpersonally, and on the other hand that the males and females reacted differently only in situations where the feedback was positive; negative feedback led to a decrease in intrinsic motivation in both sexes.

Ransen (1980) also found differences in the decrease in intrinsic motivation of boys and girls. Applying Lepper's experimental construct, he rewarded children who liked drawing, for drawing with colour felt-tip pens. The reward was given just for participation, independently of achievement, and consisted of a little picture stuck in the children's school report. Intrinsic motivation was measured by the time the subjects spent drawing in a free, rewardless situation.

The average decrease shown by the whole sample did not differ significantly from zero; however, the decrease showed expected characteristics in the case of the boys, but not of the girls: the boys showed a significantly greater decrease than the girls<sup>ii</sup>.

## ***Scientific explanations***

Several results of the concerning literature suggest that in a competitive situation boys and girls react differently to the feedback of their achievement

Deci, Casio and Krusell (1971) ascribe this phenomenon to the socialization processes of traditional culture. "Girls are taught to be more dependent than boys. Girls, and later women, often define themselves in men's terms... In addition, girls are taught to be more sensitive to interpersonal matters, and to pay more attention to feedback from others"<sup>iii</sup>

Ransen suggests various explanations: girls like drawing much more anyway, or they are more sensitive to the expectations of adults. Ultimately he interprets the findings as follows: he maintains that girls are more conformist than boys, and obedience thus generates psychic tension in boys, which may lead to a decrease in intrinsic motivation.

To summarise the finding cited so far: the various authors agree that women show a greater orientation towards any social and interpersonal, and also a greater conformism, in contrast to men's greater drive for achievement and lesser conformism.

It is considered an established fact both in everyday thinking and in the field of research on personality that women are more sensitive to social stimuli, they have greater empathy, and they want primarily to live up to the expectations of their social environment.

Ranschburg (1981) emphasises the differences in socialisation of boys and girls as far as, parents punish aggressive, achievement-oriented and competitive behaviour less in boys than in girls, and expect more sociable and deferential behaviour from girls.

Largely based on Mead's (1949) research, differences between sexes were considered to be a question of socialization until the mid-1960s. However, Beach and Diamont's (1965) genetic, physiological and endocrinological research has led to the attribution of differing social behaviour and the emergence of different gender roles to biological differences demonstrable from the moment of birth. Whiting et al. (1963) examined children aged between 3 and 10 from six cultures. The boys in all six cultures showed more physical aggression, while the girls were more sociable and helpful. Barry, Bacon and Child (1957) compared child-rearing traditions in 110 cultures. The analysis

of the data led them to conclude that each culture shows a consistent difference in the socialisation of boys and girls from the age of four: girls are taught to be caring, responsible and obedient, whereas boys are taught to be self-confident and achievement-oriented. Buss (1963) demonstrated in an experimental situation that men were more aggressive, and also that women felt more guilty after an aggressive act than men. The opinion that females are emotionally more expressive and less aggressive than males are quite widely held (Brody & Hall, 1993; Dember, Melton, Nguyen, & Howe, 1993; Fabes & Martin, 1991, Briton & Hall, 1995; Brody, 1997). McClelland (1953) was the first to state that women's motivation for achievement is slighter and different in character from men's. Women's self-esteem is more socially based, while that of men's is more material.

On the basis of the reviewed literature we can state that high and primarily object-oriented achievement motivation is a masculine characteristic, while social orientation is a more feminine one. Whether we consider this to be either an effect of socialisation or an innate characteristic trait, the greater interpersonal orientation clearly plays a part in women's fear of social conflicts, and their more developed empathetic abilities also make them more sensitive to conflicts. Nor can it be considered a coincidence that the competitive situation is largely regarded as masculine in the first place. Ahlgren (1983) found consequently a stronger competitive behaviour in girls than in boys. Ranschburg (1983) demonstrated in an experimental situation that girls are significantly more generous than boys, which can be interpreted, besides other explanations, by the fact that girls are less involved in competitive situations (where generosity would mean risking their victory).

We can draw general conclusion from the results listed above boys very clearly want to win, and enjoy competition in itself; consequently the competitive situation is more likely to distract their attention from the interesting features of the basic task, and they will also more often respond to the withdrawal of the stimulation by abandoning the task. The possibility to win does not, however, necessarily give rise to positive feelings in girls. For them, defeating somebody may mean a social danger, besides pride, and may give rise to anxiety, so that the withdrawal of feedback is partly a relief and they are therefore less likely to react to it by abandoning the task.

In the next section we will discuss our study series, paying special attention to situations where the behaviour of boys and girls showed a significant difference.

## Methods

Aim of the study: to examine the effect of reward

- on interest,
- on task achievement.

Hypothesis

- Reward decreases intrinsic motivation and improves achievement. These effects are strengthened by the salience and desirability of the reward.
- In the groups stimulated by public achievement feedback the girls lose their interest in the task and positive attitudes towards it to a significantly smaller extent than the boys.

Subjects: 226 six and seven-year-old (first-grade) children, pupils of nine classes selected randomly. The experiments were made in two villages nearby Budapest. The whole first-grade population of the two settlements was included.

Study material: A set of hand-drawings (fig. 1.) They were designed to include eight easily identifiable and eight not so easily identifiable differences in each. A score of more than eight thus required a greater effort.

Procedure: The children's task was to put a circle round the differences they found. The task was the same for all the children, but they were divided into four groups in respect of rewards:

- The first group was not given any rewards. (control)
- The second group received token for each correct answer. (The disks used at the lessons of mathematics were applied as.)

- The third group also received plastic counters, but after every five counters they could draw from a “lucky dip” which was a covered basket on the teacher’s desk with strings hanging out of it. (It contained little presents: balloons, toy figures, pencils.).
- The members of the fourth group got feedback on their achievement. The results were written in red felt-tip pen on an 'A0'-size piece of paper fixed to the black-board.

We carried out the study with all four groups in sunny weather in the long break after lunch. The children were in “napközi” (day-care centre).

After completing the first task the children could choose whether to go to play in the school-yard or to ask for another similar exercise. The children were told that no reward would be given for further correct solutions.

Measurements: The degree of intrinsic motivation is shown by the spontaneous activities performed without any reward, i.e. how many tasks the children wanted to do after finishing the first one. Our measure of achievement was the number of correctly identified details in the first (rewarded) task.

## Results

### *Intrinsic motivation*

Intrinsic motivation is expressed by the number of spontaneously completed tasks without reward. All three external stimuli used - plastic counters, achievement feedback and the 'lucky dip' - decreased intrinsic motivation to a remarkable extent  $\chi^2(6) = 60.52627$ ,  $p < 0.00000$ . However, we found significant differences between the effects of the different stimuli: the token reward resulted in a smaller decrease in intrinsic motivation: odds ratio=3,47,  $p < 0.05$ ; the effect of achievement feedback was that significantly more children abandoned the task than in the rewardless situation: odds ratio=6.89,  $p < 0.05$ ; and significantly less than in the case of the 'lucky dip'. The 'lucky dip' resulted in a dramatic decrease in intrinsic motivation: odds ratio=11.49,  $p < 0.05$ .

We present our results in the following tables and diagrams (table 1, fig. 2)

### *Achievement*

We evaluated achievement by registering the scores of the groups in the first round. We made analysis of variance (independent samples of single-aspect ANOVA), which demonstrated a marked difference in the achievement of groups:  $F(3,222)=10.8454$ ,  $p < 0.0001$

We then compared the samples in pairs (Tukey  $\alpha$  procedure) and found that there was no significant difference between the results of the first and second samples, or between the third and fourth, but that both the third and the fourth groups showed significant deviation from both the first and the second groups. The children in the third and fourth groups achieved much higher scores. The scores of the first two groups were clustered around the 7 mark, the third and fourth groups scored around 10 (table 2, fig. 3).

### *Gender differences in changes of the achievement and of the intrinsic motivation, caused by rewards*

When checking our results we excluded out all the factors - the place and date of recording and the subjects` sex - which might influence the achievement and/or the intrinsic motivation of a certain group or person apart from the type of rewarding.

We found that the type of rewarding clearly emerges as the strongest determining factor. However, achievement has only one significant determinant - the type of rewarding - ,intrinsic motivation is also influenced by the subject's sex.

Gender correlates with the change in intrinsic motivation caused by rewarding, as is shown by the fact that in the group with public achievement feedback; the girls lost their interest in the task and their positive attitude to wards it to a lesser extent than the boys:  $\chi^2(1) = 7.76770$ ,  $p < 0.00532$

(table 3, fig. 4). Achievement, however, is not influenced by the sex. No other significant difference was found either in the 'lucky dip', 'rewardless' or 'token' situations.

### ***A complex examination of the change in behaviour and attitude caused by external stimuli***

We applied cluster analysis to determine the complex relationship between achievement during task performance and intrinsic motivation. We searched for answers to the following questions: Are subjects who perform better in the first round more likely to abandon the task in rewardless situations than those who perform less well? How does achievement in the first round influence the scores of the other rounds? Are there any groups who behave typically, and what factors influence group identity the most? Are there any significant differences between boys and girls in these respects?

The cluster-grouping was based on achievements in the four rounds one after the other. The achievement of those abandoning the task was considered zero, so the extent of below average achievement in the second, third and fourth rounds correlates with the tendency to task-abandonment; it gave us the possibility to examine the correlation between achievement and intrinsic motivation in a complex manner.

Eight groups were created based on the above criteria (table 4)

In order to examine the complex reward-related change in behaviour and attitude among boys and girls, we applied the cluster analysis described above, examining the effect of the subject's sex as an independent variable on the dependent variable of belonging to a particular cluster-group.

According to our results there is a significant correlation between being a member of a particular cluster-group and the gender of the subjects:  $\chi^2(7) = 16.96611$ ,  $p < 0.01762$ , which we present in the cross-table below (table. 5)

The data show a correlation between belonging to a particular cluster-group and sex in the first, second, fourth and sixth cluster-groups, as follows:

The first cluster-group includes considerably more girl pupils (14:5). They show a considerable decrease in intrinsic motivation in addition to a fairly low achievement.

The second cluster-group has a greater number of boys (29:14). They are high achievers, but abandon the task after the first round.

The fourth cluster-group has more girls (19:9). They are characterised by a relatively low achievement and a high and stable intrinsic motivation.

Finally, the sixth cluster-group is also dominated by girls (12:4), where besides a fairly high achievement a high intrinsic motivation can be perceived, although its intensity slightly decreases.

To sum up: It is especially characteristic of the boys' behaviour that after a high achievement in the first round they immediately abandon the task in a rewardless situation. This behaviour was typical of 45.3% of the boys. In contrast, the girls worked with little effort but high intrinsic motivation in a rewardless situation; otherwise, when achievement was typically lower, they were more inclined to abandon the task, while high achievement in the first round influenced their inclination to continue to a significantly greater extent.

There was a considerable difference in the behaviour and intrinsic motivation of boys and girls, or rather in changes in these variables in the groups stimulated by public achievement feedback: both girls and boys reacted to conspicuous achievement feedback in public with a significantly higher achievement in the first round; the boys, however, reacted to the withdrawal of feedback by abandoning the task, while the girls responded by maintaining their intrinsic motivation.

### ***Typical behaviour of the groups stimulated by public achievement feedback***

We recorded the events in the classroom by means of a video camera. We tried to reconstruct the effects of rewards on behavioural patterns, which were significantly different by group, on the basis

of the recorded material and with the observations and notes of the person in charge of the experiment.

The group getting public achievement feedback was characterised by initial atmosphere lacking anxiety. The children listened to the instructor calmly, talked and asked questions. However the public display of the result caused an important increase of the agitation. The children started competing. They could hardly wait till the performance was calculated and shown on the 'tacepao'. Meanwhile the performance points shown on the 'tacepao' kept rising since the goal is always to overcome the others which is possible only by higher and higher scores. Some who handed in the paper too early tried to get it back so as to surpass their new rivals.

The children reacted very differently to the withdrawal of the evaluation and public feedback:

- some stopped the activity immediately,
- some tried to maintain the possibility of feedback showing their results to the adults being present and tried to get some appreciation, evaluation,
- and some went on with there work undisturbedly

## Discussion

According to the data of the literature presented in the introduction, our results support the finding that boys and girls react differently in a competitive situation. This difference appeared not in achievement, but in the changes in attitudes towards the task performance. It seems that a public achievement feedback of the performance scores is more stressful for girls than for boys. They respond to it by higher achievement, similarly to boys, but in condition of withdrawal of the feedback they abandon the task less than boys.

First of all we should examine the situation where there was the difference in intrinsic motivation between female and male subjects. In our experimental procedure the main characteristics of the rewarding were as follows: achievement feedback was presented in the form of an A0 poster stuck on a board (with the result written next to the children's names with a thick, red felt-tip pen), and the experimenter drew the subjects' attention well in advance to the fact that their results would be made public and that this kind of reward would be only given after the first round. The stimulus we used was thus not of a material nature, was an evaluation made in public, was performance dependent, was both expected and salient<sup>iv</sup>, and it also stimulated subjects to compare themselves and compete with others. We should also consider one more factor, which has not yet been mentioned in the literature: in our case not only the rewards but the withdrawal of rewards was also conspicuous, since the experimenter remained in the children's social space (in contrast with Deci's and Ransen's arrangement), but nevertheless refused to give any further feedback. Boys and girls reacted differently to this, depending on the extent to which they considered competition important and enjoyable, and consequently on the extent to which they resented the withdrawal of feedback.

We should thus assume that since boys definitely enjoy competing, striving with maximum concentration and skill to achieve the best possible results and to defeat everyone else, withdrawal of the opportunity to measure their skill and to compete deprives them of both the chance of an exciting and serious game and the chance of winning. The competition distracts their attention from the original interest of the task, since for them the excitement comes from the competition in the feedback situation, so it is natural that if the experimenter withdraws his or her attention and does not give feedback on their achievement they lose interest in the situation and are significantly more inclined to abandon it. In fact, it is typical of their disappointment that in three instances the children (boys in all three cases) their scored themselves and asked the director to put them on the board, and when this did not happen they left disappointedly.

For girls, public comparison and participation in a competitive situation produce ambivalent feelings. While getting attention and a positive evaluation of good results are also a reward for girls, the possibility of winning also entails the possibility of social conflict. Defeating somebody definitely

means a success for boys, but for girls the pleasure is mixed with anxiety: I have defeated them, so I have hurt them, so they may be angry with me, so they will not love me; in some cases this anxiety can be very strong. Empathy towards the defeated person is much less characteristic of boys in a competitive situation. Men's goal is usually to win, to achieve the best possible result, to outdo others or themselves - success in a material sense. Women do not primarily want to win, they want to win others over, to please, to achieve popularity, i.e. success in a social sense.

The boys who achieved above average were significantly more inclined to abandon the task than the girls who achieved good results. This is because the withdrawal of reward brought about definite negative feelings and disappointment for boys who performed well, which resulted in their abandoning the task, while for girls the chance of competing, even when they performed well, had less reward-value, so a significantly greater number of them continued the task even without any feedback.

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## Figure captions

Figure 1. Caption: Find and encircle in the illustration on the right hand side the details which are different from the ones on the left.

Figure 2. The decrease in intrinsic motivation among the four groups

Figure 3. The achievement of the first round in the differently rewarded groups.

Figure 4. Effects of the sex, as an independent variable, on the intrinsic motivation,

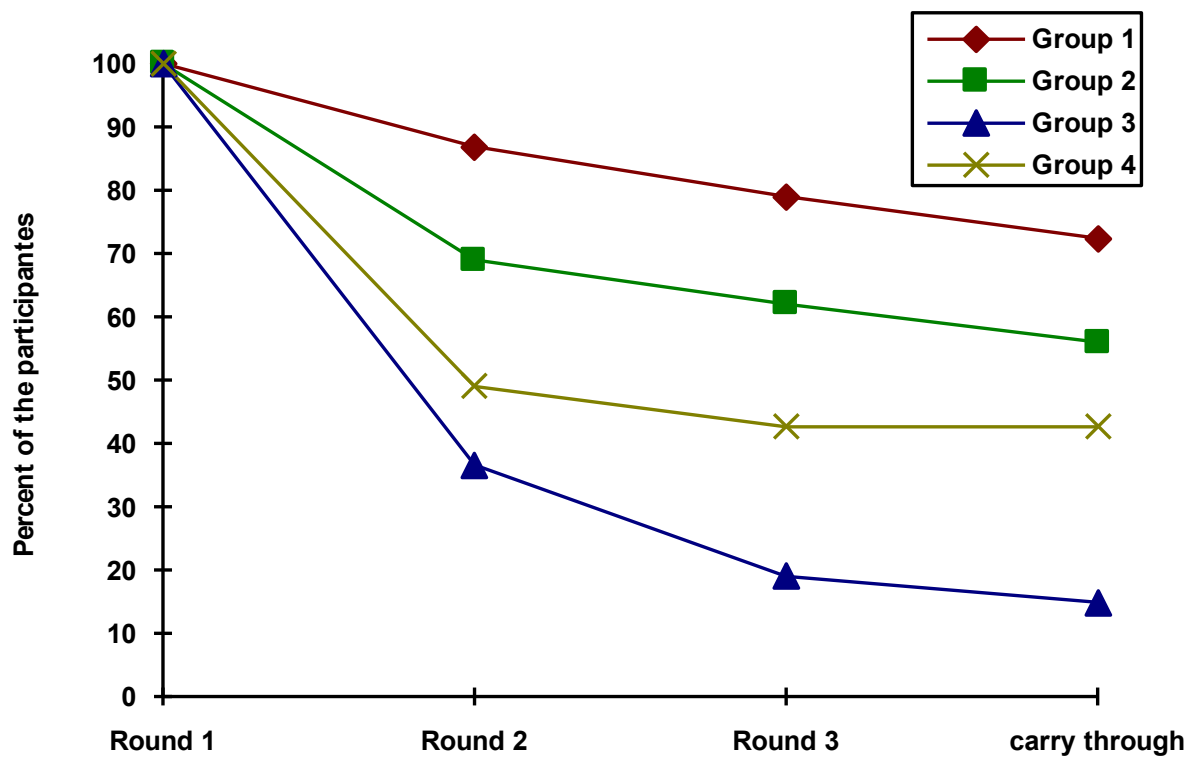
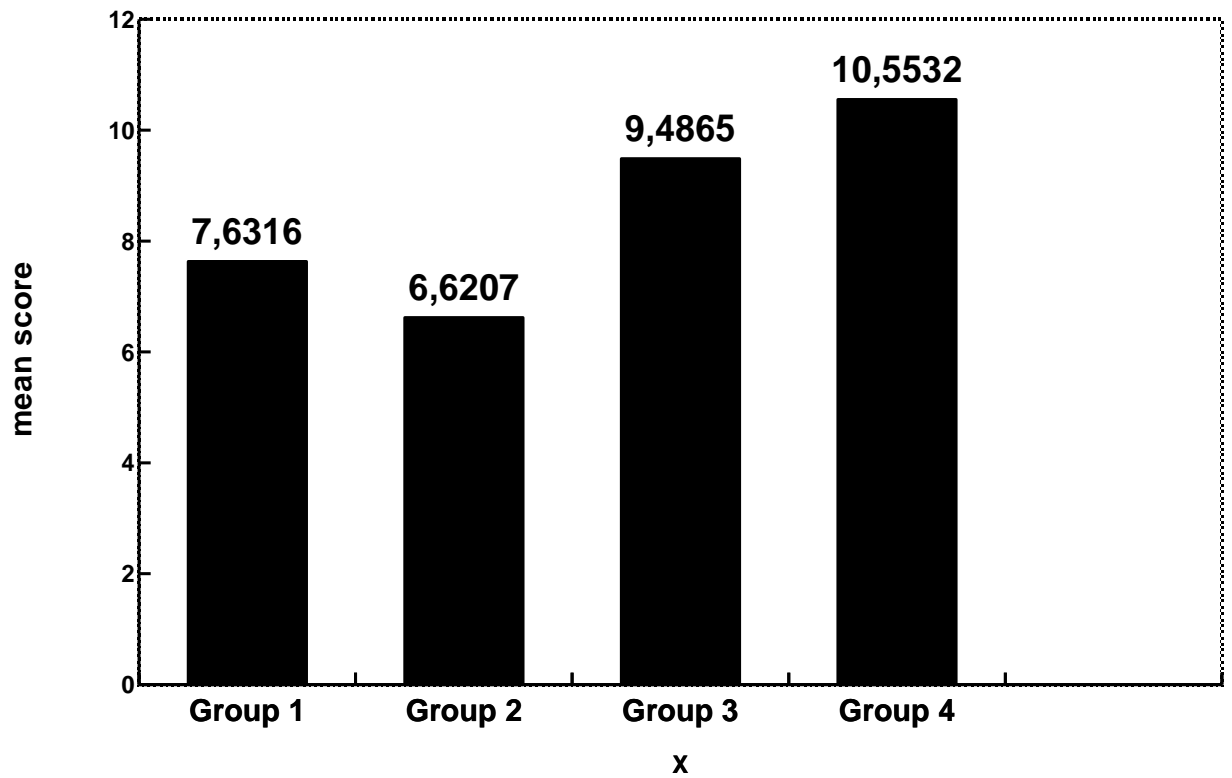


Figure 2.

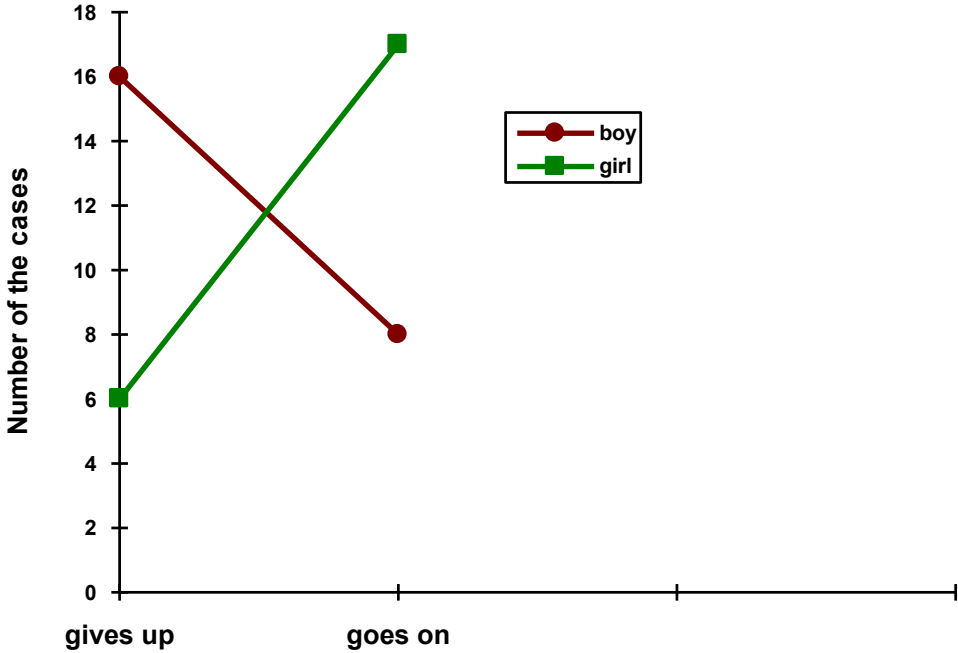
Note. Group 1: not rewarded, Group 2: rewarded by token, Group 3: rewarded by 'lucky dip', Group 4: rewarded by feedback

figure 3.



Note. Group 1: not rewarded, Group 2: rewarded by token, Group 3: rewarded by 'lucky dip', Group 4: rewarded by feedback

figure 4



Note. In the Group 4 = rewarded by public achievement feedback

table 2

The decrease in intrinsic motivation among the four groups

Groups	Percent of the participant			
	Round 1	Round 2	Round 3	carry through
Group 1	100	86,9	79	72,4
Group 2	100	69	62	49
Group 3	100	36,6	19	14,9
Group 4	100	49	42,6	42,6

Note. Total sample (N: 224). Group 1: not rewarded; Group 2: rewarded by token, Group 3: rewarded by 'lucky dip'; Group 4: rewarded by feedback

table 2

The achievement of the first round in the differently  
rewarded groups.

Type of the rewarding	mean	S. D.	n	S. E.
not rewarded	7.6316	3.5622	76	0.41
token	6.6207	3.2087	29	0.47
'lucky dip'	9.4865	3.9457	74	0.46
feedback	10.5532	3.2669	47	0.60
population:	9.0254	3.8031	224	0.27

table 3

Effects of the sex, as an independent variable, on the  
intrinsic motivation,

Giving up after the first round	Gender	
	boy	girl
Gives up		
n	16	8
%	66.7%	33.3%
Goes on		
n	6	17
%	26.1%	73.9%

Note. In the Group 4 = rewarded by public achievement feedback. N=47

table. 4

Cluster-grouping

Cluster groups	Mean achievements			
	Round 1	Round 2	Round 3	Round 4
1	4.5556	.8056	.2500	.3056
2	10.5373	.1045	.0299	.0597
3	24.0000	23.0000	18.0000	10.0000
4	6.4688	6.5469	6.5469	5.0313
5	9.8261	8.4783	.7391	.2174
6	13.6667	10.0556	7.0556	7.1667
7	14.0000	21.0000	13.5000	21.0000
8	10.8000	10.4667	14.6000	8.4000



table. 5

Interdependencies between being a member of a particular  
cluster group and the subject`s sex

Cluster groups	Gender	
	boy	girl
Cluster group 1		
n	5	14
%	7.8%	17.7%
Cluster group 2		
n	29	14
%	45.3%	17.7%
Cluster group 3		
n	0	1
5	.0%	1.3%
Cluster group 4		
n	9	19
%	14.1%	24.1%
Cluster group 5		
n	10	10
%	15.6%	12.7%
Cluster group 6		
n	4	12
%	6.3%	15.2%
Cluster group 7		
n	1	1
%	1.6%	1.3%
Cluster group 8		
n	6	8
%	9.4%	10.1%

## ***Notes***

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<sup>i</sup> The extent of the decrease in motivation was measured by the time spent on spontaneous puzzle-solving activity in subjects' free time.

<sup>ii</sup> Ransen's results should be regarded with caution, as he worked with a relatively small number of subjects, with a fairly wide range of ages: 20 boys and 25 girls between the ages of 4 and 10. Nevertheless, the above correlation proved to be significant irrespective of the age differences.

<sup>iii</sup> Cognitive evaluation theory. In: Deci, E.L., *Intrinsic motivation*. New York, Plenum Press, 1975, ch.5, pp. 129-159.

<sup>iv</sup> Lepper et al. (1996) draw attention to the fact that it is not only in the case of material stimuli that it is important whether the reward is expected or not or conspicuous or not, or to what extent the reward is in proportion to the performance of the task.