AN EXPERIMENTAL STUDY OF THE ROLE OF THE EGO IN WORK. II. THE SIGNIFICANCE OF TASK-ORIENTATION IN WORK

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In a previous paper (5), an experiment was reported in which it was demonstrated that the resolution of tension-systems in work can occur as a result of another person' activity as well as one's own. Recall of interrupted (partner-completed) and self-completed tasks performed in a coöperative work relationship was equally frequent. In Zeigarnik's experiment (10), which was the prototype for our Coöperative Work Experiment (CW), interrupted tasks were recalled about 60 percent more often than completed ones.

Four additional experiments, ramifying from the results of the CW Experiment, will be reported in this paper. For a detailed description of the tasks used, and of general procedure, the reader is referred to the preceding paper (5) in this series.

Experiments I and IA

In the Coöperative Work Experiment, a ratio of 0.88 was obtained between average recall of interrupted (partner-completed) and self-completed tasks. This ratio was in striking contrast to Zeigarnik's (corrected) ratio of 1.61 (see Marrow, 6). The possibility arose that the ratio of 0.88 was a function of something unknown about our experimental conditions at Brooklyn College. It became necessary to repeat Zeigarnik's experiment in our laboratory, using 18 tasks nearly identical with those employed in the CW experiment.[1] The repetition of Zeigarnik's experiment in Experiment I was designed, then, not so much to check on her results (which have been many times substantiated), but rather on our own tasks and conditions.

A. *Procedure*

In Experiments I and IA, each *S* worked alone, to perform the same 18 tasks described in the preceding paper. Nine tasks were interrupted by *E*'s saying: "I'll take that now," or "We'll do the next one now"; nine tasks were completed by the *S* without interruption. As previously, of course, the tasks were rotated between the interrupted and completed conditions.

It quickly became apparent that the attitude of the *S* toward the experiment was of prime importance in recall. Two sets of preliminary instructions were therefore developed in an at-

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[1] Perfect identity was not always possible. Some tasks which took two people five minutes to do had to be cut in half so that one person would not need more than five minutes for completion. A smaller jig-saw was used, for example, half the number of sets of papers for stapling, etc. Only one task had its character changed—the Limerick (see 5, p. 120).

tempt to govern the *S*'s attitude. In Experiment I, an intense effort was made to disabuse the *S* of any notion that a 'test' of him was being performed. The instructions ran:

> "I am planning some experiments for next semester, and would much appreciate your help in finding out something about the materials I want to use. You are a kind of preliminary 'guinea pig' who will tell me something about these materials. Just do the tasks I have prepared so that I can find out about them. You see, of course, that this isn't at all a test of *you*. It's a test of the tasks. You are in no sense on the spot."

In Experiment IA, these instructions were considerably less pointed:

> "I have some tasks here which I should like to have you do. Please work any way you like. This is in preparation for some experiments I want to perform next semester. This is a kind of preliminary."

B. *Results*

The differences in attitude apparent in the first few *S*s were accentuated by these instructions. *S*s in Experiment I were more at ease, talked during the work, expressed keen interest in some of the tasks and were disappointed at interruption. They were task-oriented. *S*s in Experiment IA, on the other hand, were obviously ill at ease and much more silent except for occasional outbursts of self-derogatory comments at the time of interruption. "How did I do?" was their most frequent and insistent question during the interview. They reported feeling 'self-conscious,' wondering what the *E* was really testing and felt keenly their inability to complete such 'simple' tasks. "If it wasn't a test of intelligence, then surely [the *E*] must be testing some important aspect of [their] personality." "Please tell me my results and tell me I'm not a complete moron," said one subject. "Every time you took it away," said another subject, "I felt: 'why couldn't I finish'? Because I'm such a poke." Another subject reported feeling a great deal of 'pride in completion,' because that meant he had done well 'on the test.' These subjects were not task-, but ego-oriented.

The recall ratios in Tables I and II show these differences clearly. It will be seen at once that the subjects in Experiment I recall more interrupted tasks, while the subjects in Experiment IA recall more completed than interrupted tasks. The ratio between the average number of interrupted tasks and the average number of completed tasks recalled in Experiment I is 1.74, which compares favorably with Zeigarnik's (corrected) ratio of 1.61 and with Marrow's obtained ratio of 1.57. If we assume that 1.60 is the 'true' ratio which occurs in recall when task-completion tension systems are interrupted (this is, in fact, Marrow's median ratio), then we may expect that, if this factor is operating in our results, our distribution around 1.60 should not be different from Marrow's. In 30 cases Marrow obtained 19 ratios of 1.60 or above, and 11 ratios below. We obtained, in 12 cases, 8 ratios of 1.60 or above and 4 ratios below. Applying

TABLE I

SHOWING RI, RC, RT, RI/RT, RI/RC FOR EACH *S* IN EXPERIMENT I

Subj.	RI	RC	RT	RI/RT	RI/RC
1	8	2	10	.80	4.00
2	6	2	8	.75	3.00
3	8	4	12	.75	2.00
4	4	2	6	.67	2.00
5	6	3	9	.67	2.00
6	6	3	9	.67	2.00
7	7	4	11	.64	1.75
8	8	5	13	.62	1.60
9	6	4	10	.60	1.50
10	8	6	14	.57	1.33
11	4	4	8	.50	1.00
12	4	4	8	.50	1.00
Means	6.25	3.58	9.83	.64	1.93

RI = number of interrupted tasks recalled.
RC = number of completed tasks recalled.
RT = total number of tasks recalled.

$$\text{Ratio}\,\frac{\text{ave. RI}}{\text{ave. RC}} = 1.75.$$

$$\text{Ratio}\,\frac{\text{ave. RI}}{\text{ave. RT}} = 0.64.$$

TABLE II

SHOWING RI, RC, RT, RI/RT, RI/RC FOR EACH *S* IN EXPERIMENT IA

Subj.	RI	RC	RT	RI/RT	RI/RC
1	4	4	8	.50	1.00
2	4	5	9	.44	.80
3	4	5	9	.44	.80
4	4	5	9	.44	.80
5	3	4	7	.43	.75
6	5	7	12	.42	.71
7	5	8	13	.38	.63
8	4	7	11	.36	.57
9	4	7	11	.36	.57
10	4	9	13	.31	.44
11	2	5	7	.29	.40
12	2	6	8	.25	.25
Means	3.75	6.00	9.75	.39	.64

$$\text{Ratio}\,\frac{\text{ave. RI}}{\text{ave. RC}} = 0.625.$$

$$\text{Ratio}\,\frac{\text{ave. RI}}{\text{ave. RT}} = 0.38.$$

the chi-square test to this difference, we find a chi-square of 0.0415, which, with one degree of freedom, yields a *P*-value between 0.80 and 0.90. Our distribution does not differ significantly from Marrow's.

The recall results in Experiment IA are, on the other hand, radically different from Zeigarnik's, Marrow's and the results of Experiment I. Here the ratio between the average number of interrupted and the average number of completed tasks recalled is

0.625. Applying the chi-square test to the difference between the distribution of ratios in Experiment IA and Marrow's distribution yields a *P*-value of <0.01, indicating that the difference is significant. The difference between Experiments I and IA also yields a *P*-value <0.01, indicating a significant difference.

Analysis of the recall ratios for individual tasks in Experiment I and IA shows clearly that the results of both experiments are not a function of the particular tasks used. Table III shows that in Ex-

TABLE III

SHOWING TASK-ANALYSIS OF RECALL IN EXPERIMENT I

No.*	Task	C	RC/C	I	RI/I	RT/T
3	Clay House	5	.80	7	1.00	.92
12	Jig-saw	6	.83	6	1.00	.92
8	Packing	6	.67	6	1.00	.83
1	Winding	6	.67	6	.83	.75
15	Rearranged Sentences	3	.67	9	.78	.75
2	Anagrams	6	.50	6	.83	.67
5	Cutting and Pasting	7	.43	5	1.00	.67
7	Map	6	.33	6	.83	.58
10	Stick Problem	6	.50	6	.67	.58
18	Letter	4	1.00	8	.38	.58
6	Adding	6	.50	6	.50	.50
4	Limerick	6	0.00	6	1.00	.50
9	Alphabetizing	6	.33	6	.67	.50
16	Braiding	6	.50	6	.33	.42
17	List	5	.20	7	.57	.42
13	Vowels	6	0.00	6	.33	.17
14	Stapling	9	0.00	3	.33	.08
11	College Plan	7	0.00	5	0.00	0.00

* The tasks have been arranged in order of recall value. The numbers are simply the arbitrary number assigned to the tasks. They do not represent serial order of presentation.

$$C = \text{Number times presented as completed tasks.}$$

$$RC/C = \frac{\text{Number completed tasks recalled}}{\text{Number completed tasks presented}}.$$

$$I = \text{Number times presented as interrupted task.}$$

$$RI/I = \frac{\text{Number interrupted tasks recalled}}{\text{Number interrupted tasks presented}}.$$

$$RT/T = \frac{\text{Total number tasks recalled}}{\text{Total number tasks presented}}, \text{ i.e., recall value of task.}$$

periment I, the majority of tasks were recalled more often in the interrupted than in the completed condition. Table IV shows that in Experiment IA, the identical tasks were recalled more often in the completed than in the interrupted condition.

One may postulate that for the *Ss* in Experiment I tension systems were aroused to complete the tasks. Interruption left unresolved some of these task-completion tension systems. For the *Ss*

TABLE IV

SHOWING TASK-ANALYSIS OF RECALL IN EXPERIMENT IA

No.*	Task	C	RC/C	I	RI/I	RT/T
3	Clay House	7	.72	5	1.00	.83
8	Packing	7	1.00	5	.60	.83
2	Anagrams	5	1.00	7	.57	.75
15	Rearranged Sentences	4	.75	8	.75	.75
18	Letter	8	.63	4	1.00	.75
12	Jig-saw	6	.67	6	.67	.67
16	Braiding	6	1.00	6	.33	.67
1	Winding	6	.83	6	.33	.58
9	Alphabetizing	6	.83	6	.17	.50
10	Stick Problem	4	.50	8	.50	.50
4	Limerick	6	.50	6	.33	.42
7	Map	7	.57	5	.20	.42
13	Vowels	6	.83	6	0.00	.42
14	Stapling	7	.57	5	.20	.42
17	List	6	.50	6	.33	.42
6	Adding	5	.20	7	.43	.33
11	College Plan	9	.33	3	.33	.33
5	Cutting and Pasting	6	.33	6	0.00	.17

* See Footnote to Table III.

in Experiment IA, on the other hand, tension systems were aroused to do well, to protect their ego-status by performing the tasks. Interruption meant, primarily, a loss of ego-status, and only secondarily a suspension of the tension-system for task-completion.

The results of these two 'control' experiments show, then, that interruption does result in recall advantage for interrupted tasks when the tension-systems aroused by the entire experimental situation are predominantly task-completion tension-systems and not ego-enhancement systems.

The relatively great frequency of ego-enhancement cases in Experiment IA was not only a function of our instructions, since some of these cases appear in Experiment I (*Ss* No. 11 and 12). It was undoubtedly a function of the strong system of reward for personal achievement in which Brooklyn College students have for the most part been bred. It was for this reason that special instructions were necessary to keep our *Ss* focussed on the tasks rather than on their own IQ's.

Zeigarnik reports finding some occasions on which the *S* felt he could not complete a task and that interruption signified his 'inferiority' or failure. All Zeigarnik tells us about these occasions is that out of 40 such tasks, only 32 percent were recalled, a much lower percentage than the usual 60 percent recall of interrupted tasks. Zeigarnik believes that a 'quasi-need' to complete such a task did exist, so that it would be recalled if it were not subject to 'repression.' "One cannot escape the conclusion," she writes, "that

a special encapsulation, a repression, . . . made recall more difficult." (**10**, p. 77, present authors' translation.)

Abel's (1) study of the relation of the Schneider index to recall of interrupted and completed tasks also revealed that *S*s with low Schneider index (usually associated with neurosis) recalled completed rather than interrupted tasks. She suggests that these *S*s were ego- rather than task-oriented, and hints that repression may be at work to prevent recall of interrupted (failure) tasks. Rosenzweig, in a series of papers (**7**, **8**, **9**), especially his most recent report, has also advanced experimental evidence in support of the thesis that failure experiences are repressed in recall when the person is 'defending his ego.'

Special Forces of Repression?

Experiment I showed that we could obtain in our laboratory results similar to those obtained by Zeigarnik. These results are radically different from the results of the CW experiment. The chi-square test applied to the difference between distributions yields a *P*-value of <0.01. Now the question arises whether the factors operating to create a ratio of 0.88 in the CW Experiment were not the same factors operating in Experiment IA to create a ratio of 0.625. The median ratio in Experiment IA is 0.67. If we assume that 0.67 is the 'true' ratio obtained when ego-enhancement tension-systems have been disturbed, then if this factor were operating in the results of the CW Experiment, we should expect similar distributions of ratios in both Experiment CW and Experiment IA. The chi-square test applied to the difference between the two distributions yields a *P*-value of 0.05, which indicates that there are only five chances in 100 that the difference between the two experiments is not significant.

The protocols of the *S*s make perfectly clear the real difference between the two experiments. In the CW Experiment, most of the *S*s were simply not concerned with questions of their own personal success or failure in performing the tasks. In Experiment IA, this was the most pressing question for the majority of *S*s. Most of the *S*s in Experiment IA were behaving, in other words, like *S* No. 14 in the CW Experiment, and presumably like Zeigarnik's 'special forces' *S*s. This leads directly to the following series of hypotheses.

1. Whenever the person is using tasks as a means of ego-enhancement, whenever the relation between the task and the goal is *P*——task——→ ego-status, then interruption of the tasks is more likely to be regarded as a blow at ego-status. Since the goal is enhanced ego-status, and interruption prevents fulfillment of that goal, interruption is likely to give rise to feelings of failure.

2. In such cases, the goal is not task-completion, which is, rather, a means to the goal; therefore interruption should not result in a difference in magnitude between the task-completion tension-systems for interrupted and completed tasks. In Lewin's terms, (4) $ts_c = ts_i$, when ts_c represents tension-systems to recall completed tasks and ts_i represents tension-systems to recall interrupted tasks. The recall of interrupted tasks and of completed tasks should therefore occur equally, by chance, for ego-oriented *S*s. That is, more precisely, if the average total number of tasks recalled is about nine, or 50 percent of all tasks presented, then by chance interrupted tasks should contribute half to this total and completed tasks should contribute half to this total, for ego-oriented *S*s. In our Experiment IA we should expect a ratio of 1.00, resulting from about 4.5 interrupted and 4.5 completed tasks being recalled, and depending upon the equivalence of the task-completion tension-systems in the interrupted and completed conditions.

3. (*a*) But interruption is more likely to result in feelings of failure than is completion. (*b*) Conversely, completion is more likely to result in feelings of success, of ego-enhancement, than is interruption. Two possible explanations for the obtained ratio of 0.625 in Experiment IA are thus possible from this point on. The Freudian view and presumably Zeigarnik's "special forces of repression" would postulate that ego-wounding failure experiences would be avoided (repressed) resulting in the non-appearance of failure (interrupted) tasks in recall. In fact, one minimum condition set down by Freud (3) as required for the appearance of repression does exist in Experiment IA—the situation affords a threat to self-esteem. Obviously, the converse of this view would hold that the difference in recall arises not because ego-wounding experiences do *not* appear in recall, but because ego-satisfying experiences *do*.

Now, if ego-wounding experiences are being avoided, or pushed aside (repressed) in recall, then one should expect very few of the failure tasks to appear in the recall ratio. In other words, if repression is occurring in Experiment IA, then one should expect an 'abnormally' low percentage of interrupted (failure) tasks in recall. Such an abnormally low percentage of interrupted tasks is at least a minimum *statistical* criterion for the existence of repression.

If, on the other hand, repression is not at work, then one should expect a percentage of interrupted tasks which is only 'relatively' low— that is, relative to a higher percentage of completed tasks in recall. The recall ratio should, in other words, show a preponderance of ego-satisfying, i.e., completed tasks, without a serious absence of interrupted tasks.

The question immediately arises: what shall be considered evidence of 'abnormally' low percentage of interrupted tasks, of 'serious absence' of interrupted tasks in recall? We propose to use the pattern of recall in Experiment I as a statistical standard by which to judge the recall pattern in Experiment IA.

In Experiment I, 54.6 percent, or roughly speaking, 50 percent of all tasks presented were recalled. This is a characteristic finding in the Zeigarnik experiment. Of the actual total of 118 tasks recalled, 75 or 64 percent were interrupted tasks, while 43 or 36 percent were completed tasks. These figures agree well with both Zeigarnik and Marrow's independent findings. Marrow (6) found that 61 percent of all recalled tasks were interrupted and 39 percent completed. Zeigarnik's (10) results show 62 percent of interrupted and 38 percent of completed tasks recalled. Roughly speaking, then, interrupted and completed tasks stand to each other in the ratio of 6 : 4. The appearance of approximately 40 percent of completed tasks in recall can be regarded as a 'normal' or 'usual' occurrence in the Zeigarnik experiment.

In our Experiment IA, the ratio of incompleted to completed tasks recalled is exactly the reverse of Experiment I. Out of a total of 117 tasks recalled in Experiment IA, 72, or 62 percent, were completed tasks, and 45, or 38 per cent were interrupted tasks. The statistical magnitudes are obviously the same, only their positions are reversed. If we are justified in regarding roughly 40 percent of completed tasks as a 'normal' percentage in recall, then by the same token, 40 percent of interrupted tasks can be regarded as equally 'normal.' Judged by this standard, the recall of interrupted tasks in Experiment IA is not abnormally low.

Our data, then, do not offer any direct evidence for the existence of any "special forces of repression" operating on failure tasks in Experiment IA. They cannot, of course, be regarded as conclusive evidence against the existence of repression. It is theoretically quite possible that quite different processes at work in Experiments I and IA could still yield similar statistical magnitudes. But the data do suggest that extreme caution is necessary before the concept of repression is invoked to explain what is essentially a greater recall of success tasks rather than an actual absence of failure tasks in recall.

Our interpretation of the results of Experiment IA favors an hypothesis which suggests that the greater recall of completed tasks reflects a tendency for ego-enhancement experiences to appear in the recall of ego-oriented *Ss*. We are unable to discover any special forces of repression in these *Ss*. Rather, the *Ss* appear to be geared to success, and so to recall more successful (completed) tasks.

This raises a question about 'pride in completion' which can be only very briefly treated here. It would be a mistake to assume that taking personal pride in task completion is *always* a reflection of ego-orientation. Ego-orientation is likely to bring with it pride in personal success, but pride in personal success can also occur without ego-orientation. A person who has just solved a difficult problem will feel pride in his success, although he did not attack the problem to win this 'pride.' What is important in this case is that so much of the person was involved in his struggle with the difficult problem—his intelligence, his emotions, his energy—the problem, in other words, was so central to the person, that solution results in satisfaction with the competent self. This self was, however, not necessarily focal in the person's activity—rather, the problem was focal.

Experiment II

It was possible, also, that the ratio of 0.88 obtained in the CW Experiment was simply a function of the failure of specific tension-systems to arise at all in our coöperative work. Zeigarnik found that when *S*s performed the tasks on a tour of the laboratory, just to see what sorts of things were done in a psychological laboratory, an average ratio of 1.03 was obtained. It might be argued that working jointly with another person prevents the assumption of responsibility for any particular task on the part of either worker, and particularly on the part of our *S*s in Experiment CW who felt slightly subordinate to the planted co-worker. It became necessary, therefore, to study the fate of tension-systems in coöperative work when both *S* and co-worker were interrupted and the tasks left incomplete.

A. *Procedure*

In Experiment II, the *S*s worked together with a planted co-worker on the identical 18 tasks used in Experiment CW. An attempt was made to conduct this experiment in as friendly and informal a work-atmosphere as had obtained in Experiment CW. This was not altogether successful, since the interruption was done by the *E* who was a teacher, rather than by the co-worker, a fellow-student, but it was, by and large, successful. The tasks were announced as in preparation for an experiment next semester, and the *S*s were obtained by asking them to help the planted co-worker "go through them." Both workers were interrupted by the *E*, who said: "I'll take that now." Half the tasks were thus left incomplete.

B. *Results*

Table V shows clearly that the recall ratios favor the recall of interrupted tasks. The ratio between the average number of interrupted and the average number of completed tasks is 1.50, as compared to 1.74 obtained in Experiment I. The *S*s in Experiment II obviously did not behave the way Zeigarnik's 'tourist' *S*s did. The difference between the distributions in Experiment I and Experi-

TABLE V

SHOWING RI, RC, RT, RI/RT, RI/RC FOR EACH *S* IN EXPERIMENT II

Subj.	RI	RC	RT	RI/RT	RI/RC
1	6	1	7	.86	6.00
2	7	2	9	.78	3.50
3	6	2	8	.75	3.00
4	5	2	7	.71	2.50
5	4	2	6	.67	2.00
6	5	3	8	.63	1.67
7	5	4	9	.56	1.20
8	5	4	9	.56	1.20
9	6	6	12	.50	1.00
10	2	4	6	.33	.50
11	3	6	9	.33	.50
Means	4.91	3.27	8.18	.60	2.10

$$\text{Ratio } \frac{\text{ave. RI}}{\text{ave. RC}} = 1.50.$$

$$\text{Ratio } \frac{\text{ave. RI}}{\text{ave. RT}} = 0.60.$$

ment II is not significant: $P > 0.75$. The task analysis presented in Table VI likewise shows a recall advantage for the interrupted condition in the majority of tasks.

TABLE VI

TASK-ANALYSIS—EXPERIMENT II

No.	Task	C	RC/C	I	RI/I	RT/T
2	Anagrams	4	1.00	7	.71	.82
3	Clay House	5	.40	6	1.00	.73
16	Braiding	7	.71	4	.75	.73
5	Cutting and Pasting	7	.71	4	.50	.64
14	Stapling	4	0.00	7	1.00	.64
17	List	7	.71	4	.50	.64
1	Winding	6	.17	5	1.00	.55
12	Jig-saw	5	.40	6	.67	.55
9	Alphabetizing	7	.71	4	.25	.55
15	Rearranged Sentences	4	.50	7	.56	.55
18	Letter	5	.20	6	.67	.45
6	Adding	8	.25	3	.67	.36
8	Packing	4	0.00	7	.56	.36
10	Stick Problem	5	.20	6	.33	.27
13	Vowels	5	.20	6	.17	.18
11	College Plan	6	0.00	5	.20	.09
7	Map	5	0.00	6	.17	.09
4	Limerick	5	0.00	6	0.00	0.00

The protocol of one *S* makes it clear that interruption operated in Experiment II in much the same way that it operated in Experiment I, or in the main body of Zeigarnik's experiment. This *S* said: "It made me sore when you interrupted me. It gave me such an unfinished feeling."

It is interesting that the ratio between average recalls should be slightly lower in this Experiment than in Experiment I. While the difference is not statistically significant, the pattern of difference in recall between the two experiments repays closer examination. In the first place, it is apparent that two cases of reversal of ratio, i.e., more completed than interrupted tasks, appear in Experiment II, while there are no such cases in Experiment I. These two *Ss* were, as far as could be determined from their protocols, quite ego-oriented, behaving, in other words, like the *Ss* in Experiment IA. Their presence in Experiment II would account for the lowered average recall ratio.

Now suppose these two *Ss* are eliminated from the computation of results in Experiment II. The ratio between average recall of interrupted and average recall of completed tasks is now 1.88, a ratio even larger than that obtained in Experiment I.

One other difference between Experiment II and Experiment I is striking: fewer tasks are recalled in Experiment II than in Experiment I. The average number of tasks recalled in Experiment II is 8.18, while in Experiment I it was 9.83. In this respect, Experiment II resembles the CW Experiment in which only 7.92 tasks were recalled in all.

We may postulate that the tasks in Experiments II and CW were part of a total job—to help the co-worker. Since they were part of a total job, being done in a friendly and informal work-atmosphere, it is possible that a greater coalescence of tasks took place in Experiments II and CW than in Experiments I and IA. The boundaries between individual tasks were perhaps less rigid and the memory traces less distinct.[2] It thus became more difficult to recall the individual tasks and a lower total recall figure was obtained.

At any rate, then, coöperative work does not engender such an irresponsible attitude that no tension-systems to complete tasks are aroused. The recall ratio in the CW Experiment cannot be accounted for in this way. The crucial factor in the CW Experiment seems to have been that the interrupted tasks were completed by the coöperating worker and so regarded as finished.

Experiment III

This raises immediately the question of the role of task-completion in determining recall. If the concept of objective orientation has any meaning, if it is true that in some situations the goal of the individual is task-completion so that the completion of the task directly brings fulfillment of the goal, then the resolution of such task-com-

[2] Zeigarnik, it will be remembered, found that when the individual tasks became part of a larger whole, the ratios were reduced.

pletion tension-systems ought to be effected by *someone else's* completion of an interrupted tasks, *even in a non-coöperative situation.* Coöperative situations are simply situations in which it is easier for the objective orientation to occur. Or, put in another way, coöperative situations need as minimum requirement, objective orientation, but the effects of objective orientation ought to be clearly demonstrable in non-coöperative situations as well.

The problem raised here, of course, touches at the heart of motivation theory. The separateness of the person from the world around him is so obvious and axiomatic a fact about human beings that we naturally speak of a man's personal needs, wishes, or tension-systems, meaning by 'personal' just simply 'of the person.' But perhaps under some conditions, the needs of a person structure themselves to correspond with the structure of the objective situation, just as in perception what we see corresponds directly to the organization of the objective field. This is like a translation of Wertheimer's principle of isomorphism into the field of motivation. This interaction between personal needs and the external situation is quite direct, involving no intermediate step of referring the person's needs to the consideration of the person's ego.

Adler and Kounin (2) performed an experiment some years ago in which they attempted to show that the tension-system aroused by the assignment and assumption of a task is a *personal* tension-system. So they confronted a child with the alternative of resuming a task which he had begun and had not completed, or an identical task which he had not begun, but which was in an identical state of objective incompletion. The children chose to complete first the tasks which they had begun themselves.

Actually, this experiment of Adler and Kounin missed the crucial point. Their results do not demonstrate that a person's needs may not directly conform to the objective requirements of the situation, but only that when the objective requirements are *identical*, a greater need arises to complete a task which one has personally begun. I think there is a good chance that if Adler and Kounin had faced a child with an alternative of completing a task which he had begun and some different task requiring immediate action—such as righting a falling chair—the non-personal task might have won out.

Our experiment was designed to see what the effect of objective completion by another agent is upon recall of tasks.

A. *Procedure*

In this experiment, the person, working alone, performed the 18 tasks of Experiments I, IA, and II. Interruption was effected by *E*'s saying, "I'll take that now." *E* then moved the task from the *S*'s place at the work table and completed it while the *S* watched. Instructions for this experiment were otherwise identical with the instructions for Experiment I.

B. *Results*

Table VII shows the recall ratios for 23 Ss. It will be seen at once that the recall ratios are smaller than the ratios in Experiment I,

TABLE VII

SHOWING RI, RC, RT, RI/RT, RI/RC FOR EACH S IN EXPERIMENT III

Subj.	RI	RC	RT	RI/RT	RI/RC
1	7	3	10	.70	2.50
2	6	3	9	.67	2.00
3	7	4	11	.64	1.75
4	7	4	11	.64	1.75
5	5	3	8	.63	1.67
6	6	4	10	.60	1.50
7	7	5	12	.58	1.40
8	7	5	12	.58	1.40
9	4	3	7	.57	1.33
10	5	4	9	.56	1.25
11	5	4	9	.56	1.25
12	5	4	9	.56	1.25
13	6	5	11	.55	1.20
14	6	5	11	.55	1.20
15	6	5	11	.55	1.20
16	6	5	11	.55	1.20
17	7	6	13	.54	1.16
18	6	6	12	.50	1.00
19	4	4	8	.50	1.00
20	5	6	11	.45	.83
21	4	6	10	.40	.67
22	4	6	10	.40	.67
23	4	8	12	.33	.50
Means	5.60	4.70	10.30	.55	1.28

$$\text{Ratio}\,\frac{\text{ave. RI}}{\text{ave. RC}} = 1.20.$$

$$\text{Ratio}\,\frac{\text{ave. RI}}{\text{ave. RT}} = 0.54.$$

although the advantage in recall consistently favors the interrupted tasks. The ratio between the average number of interrupted tasks recalled and the average number of completed tasks recalled is 1.20. Table X shows a recall advantage for the interrupted condition in the majority of tasks.

The difference between the distribution of ratios in Experiment III and Experiment I is statistically significant: $P < 0.01$. The distribution of ratios is also significantly different from a distribution which might have been obtained if only chance factors were operating: P here is 0.02. The distribution is also most significantly different from the CW distribution of ratios: P is <0.04. In other words, the results in this experiment parallel the results of the CW Experiment more than the results of Experiment I.

Several possibilities can account for the fact that the ratio in Experiment III is slightly more than 1.00, but much lower than 1.74. The protocols of the *S*s make it clear that different types of forces were at play in different *S*s, so that 1.20 is a reflection of several different types of process.

For example, *S* No. 13 (ratio 6I/5C) seemed to feel that he was helping the *E* to finish the tasks. This *S* had actually to be prevented from physical participation in the *E*'s task completion. When he was thus physically prevented, he issued verbal instructions to the experimenter. In fact, when the *E* finished the clay house he said: "Oh, I was going to make a verandah, but our joint house is O.K." This *S* was annoyed by interruption and tried to 'race' the *E* to the point where she interrupted him. He had, he said, to "keep himself from being annoyed by interruption by remembering that it was part of the game." But once interruption did occur, he managed a vicarious completion by participating in the *E*'s work. Another *S* also makes this point. She said: "When you (the *E*) started to do them, I more or less did them with you and in a way completed them" (No. 14, 6/5).

Another *S* reveals a quite different process. She says: "I felt you were completing a task of your own. I did want to finish, but felt from the fact that it was an experiment that it was more important that you finish. I felt subordinate to whatever occurred" (No. 8, 7/5). Here the interruption is apparently not resolved by the *E*'s completion because at the point of interruption the task is no longer the *S*'s, but the *E*'s. The completion is not of one's own task, but of someone else's. More interrupted than completed tasks are therefore recalled.

For most *S*s, protocols show that interruption was an annoyance and that the *E*'s completion was unsatisfactory. The *S*s indicated that they would have preferred to finish themselves, but, as one *S* put it: "Your (i.e., the *E*'s) finishing was better than letting things hang in mid-air."

One group of three *S*s, finally, found the *E*'s completion not only unsatisfactory but a period of discomfort. For example, *S* No. 20 was so restless and ill-at-ease that he tried to leave the experiment on three separate occasions. He said: "I didn't feel natural when you interrupted me. Maybe it was because you saw I wasn't doing it right."

When the *S* is task-oriented, then, objective completion may offer some release of the task-completion tension-system. This release is effected either by actual vicarious experience, or because completion is "better than letting things hang in mid-air." In other cases, interruption signifies such a break in the task that it changes 'owner-

ship' and completion by another is not completion of my task, but of his. These two factors, together with three ego-oriented *Ss*, account for the obtained ratio of 1.20.

It is likely that objective completion is satisfactory for certain tasks and not for others. Task analysis for this Experiment (Table VIII) shows that there is some tendency for greater recall of self-

TABLE VIII

SHOWING TASK-ANALYSIS FOR EXPERIMENT III

No.	Task	C	RC/C	I	RI/I	RT/T
12	Jig-saw	10	.80	13	1.00	.92
2	Anagrams	13	.85	10	.90	.87
3	Clay House	13	.77	10	.90	.83
16	Braiding	12	.75	11	1.00	.83
8	Packing	11	.91	12	.75	.78
1	Winding	10	.90	13	.54	.70
15	Rearranged Sentences	6	.67	17	.65	.65
5	Cutting and Pasting	10	.40	13	.77	.61
6	Adding	11	.45	12	.75	.57
9	Alphabetizing	13	.54	10	.60	.57
18	Letter	13	.39	10	.70	.52
17	List	10	.50	13	.39	.44
4	Limerick	12	.33	11	.45	.39
7	Map	12	.42	11	.27	.35
10	Stick Problem	11	.27	12	.42	.35
13	Vowels	10	.30	13	.39	.35
11	College Plan	14	.29	9	.33	.30
14	Stapling	15	.20	8	.50	.30

completed tasks among the routine tasks; i.e., of five tasks which show greater recall of self-completed tasks, four are routine as against one non-routine. On the other hand, there is a greater difference in favor of recall of interrupted tasks among routine than among non-routine tasks. This may be purely a chance function of the greater number both of routine tasks and of tasks which were more often recalled in the interrupted condition. The relation of the potency of objective completion in effecting release of tension to type of task is a most important question for further experimentation.

It would seem reasonable to suppose that externally produced completion would be most difficult to produce satisfactorily with non-routine tasks, where the conclusion of the task was least rigidly defined by the nature of the task itself. In such a task, it might be almost impossible for the person who completed the task to hit upon exactly the same kind of solution which the task-performer had in mind. Next in order of difficulty would be routine tasks with an unstructured, arbitrary outcome, since external completion would not really matter, being only an additional number of lines added, or vowels crossed out, etc. Easiest tasks for the production of satis-

factory external completion would be the tasks where the outcome was both well-structured and clearly defined.

Experimental 'Controls'

Before final conclusions can be fully drawn there remain certain technical considerations about the conduct of the experiments which should be cleared away.

A. *Task Analysis*

As indicated in the discussion of each experiment, both in the preceding paper (5) and in this report, task analysis shows that the results obtained in each condition were not a function of the particular tasks used, but of the experimental conditions. In each condition the majority of tasks show the results of that condition. Thus, there is recall advantage for interruption in the majority of tasks in all conditions except Experiment IA and Experiment CW (see preceding report, Table II). In Experiment IA the same tasks show recall advantage under the completed conditions; in Experiment CW, the same tasks show recall advantage equally distributed between the interrupted and the completed conditions.

It was not always possible rigidly to adhere to a fixed plan of task presentation. If an *S* began to take an inordinately long time over a to-be-completed task it might have had to be converted on the spot to an interrupted one, and readjustment in plan made all along the line of tasks. Or a task being finished very quickly might have had to be converted into a completed task or else the *S* would have spent only a few seconds on it before interruption. This is a familiar mechanical difficulty with the Zeigarnik technique. By and large, however, tasks were presented as completed and interrupted an equal number of times.

B. *Serial Order of Presentation*

Four serial orders of presentation were developed:

Serial Order A	Tasks 1–18
Serial Order B	Tasks 18–1
Serial Order C	Tasks 9–1; 10–18
Serial Order D	Tasks 10–18; 9–1

Of these four serial orders, only two were carried through with sufficient frequency. C and D were not used often enough because the original number of subjects scheduled for each experiment was unexpectedly curtailed. For this reason, B and C have been combined to create serial order I, and A and D have been combined to create

serial order II. A and D have half the series in common; B and C have half the series in common.

Table IX shows the effects of serial order of presentation upon recall of tasks, combining all experiments except the CW Experiment.

TABLE IX

SHOWING EFFECT OF SERIAL ORDER OF TASK PRESENTATION ON RI, RC, RT FOR EXPERIMENTS I, IA, II, III COMBINED

Serial Order	N	Ave. RI	% RI (RI/I)	Ave. RC	% RC (RC/C)	Ave. RI/ Ave. RC	Ave. RT
A	21	4.90	.55	4.40	.49	1.11	9.30
B	23	5.69	.63	4.32	.48	1.32	10.01
C	7	4.70	.52	4.60	.51	1.02	9.30
D	7	5.14	.57	4.71	.52	1.09	9.85
	58						
Serial Order							
1. B–C	30	5.40	.60	4.40	.49	1.22	9.80
2. A–D	28	4.95	.55	4.46	.49	1.11	9.41

Ave. RI = average number interrupted tasks recalled.
Ave. RC = average number completed tasks recalled.
Ave. RT = average total number tasks recalled.

$$\%\,\mathrm{RI} = \frac{\text{total number interrupted tasks recalled}}{\text{total number interrupted tasks presented}}.$$

$$\%\,\mathrm{RC} = \frac{\text{total number completed tasks recalled}}{\text{total number completed tasks presented}}.$$

TABLE IXA

SHOWING EFFECT OF SERIAL ORDER OF TASK PRESENTATION WHEN EXPERIMENT IA IS OMITTED

Serial Order	N	Ave. RI	% RI (RI/I)	Ave. RC	% RC (RC/C)	Ave. RI/ Ave. RC	Ave. RT
A	13	5.70	.63	4.00	.44	1.43	9.70
B	22	5.71	.63	4.16	.46	1.37	9.87
C	5	4.80	.53	3.20	.35	1.50	8.00
D	6	5.67	.63	4.68	.52	1.21	10.35
	46						
Serial Order							
1. B–C	27	5.56	.62	4.00	.44	1.39	9.56
2. A–D	19	5.70	.63	4.20	.47	1.36	10.00

It will be seen that the difference between %RI recalled in series I and II is small (five percent) while the difference between %RC

recalled in Series I and II is zero. The difference between %RI recalled in the two serial orders is statistically unreliable—D/σ_D is 1.00, and is accounted for by the accidental preponderance of 'A' serial orders in Experiment IA. If the results of Experiment IA are excluded (Table IXA), then no difference whatever between serial orders exists.

C. *Memory Ability of Ss*

Zeigarnik and Marrow both found that the ratio of recalled interrupted to recalled completed tasks declined as the memory ability of the *S*s increased. This is to be expected on a chance basis, since the more tasks recalled altogether the greater the chance of representation from both interrupted and completed tasks. If, therefore, an *S* recalls all 18 tasks, his ratio is bound to be 1.00; if he recalls 16, it can be no greater than 1.29 (9/7); if 14, no greater than 1.80 (9/5), etc.

We also found that the ratio of recalled interrupted to recalled completed tasks declined with increased memory ability of the *S*s (Table X). We also see from this table that the distribution of total

TABLE X

ANALYSIS OF RI IN TERMS OF MEMORY ABILITY OF *S*s

Experiment	No. Tasks Recalled	No. of *S*s	Ratio RI/RT	Ave. RT
I	6–9	6	.66	10.70
	10–14	6	.63	
IA	6–9	7	.37	9.80
	10–14	5	.40	
II	6–8	6	.66	8.20
	9–12	5	.55	
III	6–10	11	.56	10.30
	11–14	12	.53	

number of tasks recalled (memory ability of *S*s) is not unduly weighted either in the low recall or high recall direction under any experimental condition. This rules out the possibility that this factor is operating to produce our results.

DISCUSSION

One final table (Table XI) throws light on the nature of the forces operating in the various experiments. In a sense, Experiments I, II and III can be considered as 'controls' for Experiment CW. An

TABLE XI

COMPARISON OF CW WITH ALL OTHER EXPERIMENTS

Experiment	N	Ave. RI	Ave. RC	Ave. RI / Ave. RC	% RI (Ave. RI/Ave. RT)	% RC (Ave. RC/Ave. RT)	Ave. RT
CW*	14	3.71	4.21	0.88	0.47	0.53	7.92
I	12	6.25	3.58	1.75	0.64	0.36	9.83
IA	12	3.75	6.00	0.63	0.38	0.62	9.75
II	11	4.91	3.27	1.50	0.60	0.40	8.18
III	23	5.60	4.70	1.20	0.54	0.46	10.30
I, II, III	46	5.60	4.07	1.38	0.58	0.42	9.67

* These results from Table I of preceding paper (5).

objective orientation existed in all these experiments, coöperation existed in one, and objective completion in another. Only in the CW Experiment were the tasks completed by the coöperating partner. If the results of the CW Experiment are placed side by side with the results of Experiments I, II and III combined, it is strikingly clear that the difference between CW and the others is in recall of *interrupted* tasks. The average number of completed tasks recalled is the *same*, the average number of interrupted tasks is greater in the combined 'controls' than in CW. Quite obviously, then, completion by the coöperating partner did effect a release of the task-completion tension-systems in the CW Experiment.

It is interesting, also, to see how clearly the recall ratio reflects the conditions prevailing in each of the several experiments. When the person works alone, and half the tasks he is doing are interrupted, then recall favors interrupted rather than completed tasks in the ratio of nearly 1.75 to 1 (Experiment I). When the person works in coöperation with someone else, and half the tasks are interrupted, interrupted tasks are again recalled better than completed, this time in the ratio of 1.50 to 1 (Experiment II). When the person works alone and half the tasks are interrupted and completed by someone else, interrupted tasks are recalled in the ratio of only 1.20 to 1—still favored slightly in recall, but not nearly to the extent found without external completion (Experiment III). When the person works in coöperation with someone else, and half the tasks are interrupted by the partner and completed by the partner, then interrupted (partner-completed) and completed (self-completed) tasks are equally recalled (Experiment CW).

All of these results depend upon the existence of task-orientation in work. That is, these results are obtained only if the S's main concern seems to be to complete his work, rather than to enhance his ego. For, when the person is ego-oriented, and half the tasks (at which he is working alone) are interrupted, recall favors completed

rather than interrupted tasks (Experiment IA). Complicated questions of 'success' and 'failure' enter here, as soon as the task-goal becomes a means for the satisfaction of an ego-goal.

The implications of this experimental demonstration of the results of task and ego-orientation are quite far-reaching. Particularly do the results of the CW experiment and of Experiment III offer support to the thesis that man's motivation in work is often a direct function of the requirements of the task he has undertaken. Experiments CW and III make it apparent that, on certain occasions, man's selfish needs are so little a part of the motivational system which guides him that participation of his 'self' in a task is not even necessary for the achievement of his goal. The goal is reached when the task is done; the agency of doing need not be the self.

In this light, a revised concept of the 'ego' might be introduced. For purposes of clarity in the development of these experiments, we have limited the term 'ego' to the meaning, 'selfish' or 'egotistical.' Actually, we have been describing, by this restriction of meaning, the type of situation in which man's personal needs are so narrow that they encompass only what relates to himself. This is the type of behavior which prevailed in Experiment IA. In contrast, we have also described experimentally, some situations in which man's personal needs are broad enough to encompass the needs of others, needs arising from the world around him. One can think of rigid and narrow 'ego-boundaries' in contrast to flexible and broad 'ego-boundaries.' In the latter case, the 'ego-boundaries' may include the needs of other selves or 'egos,' of groups, of ideals.

Experimental study of the consequences of narrowing of ego-boundaries, that is, of ego-orientation in work, is also needed. The senior author has undertaken some experiments in this field which will shortly be reported.

Summary and Conclusions

1. The greater recall of interrupted tasks found by Zeigarnik and others depends upon the existence of task-orientation. When the person is ego-oriented, then recall favors the completed (ego-enhancing, 'success') tasks (Experiments I and IA).

2. Interrupted tasks are better recalled in coöperative as well as in isolated work (Experiment II).

3. Completion of a task by another person (objective completion) may be as satisfactory as personal completion, even when the person is working alone. This depends upon task-orientation and upon the nature of the task (Experiment III).

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References

1. Abel, T. M. Neuro-circulatory reaction and the recall of unfinished and completed tasks. *J. Psychol.*, 1938, 6, 377–383.
2. Adler, D., & Kounin, J. Some factors operating at the moment of resumption of interrupted tasks. *J. Psychol.*, 1939, 1, 255–267.
3. Freud, S. Repression. *In: Collected Papers*, 1915, IV, 85–97.
4. Lewin, K., Lippitt, R., & Escalona, S. Studies in topological and vector psychology. I. *Univ. Iowa Stud. Child Welf.*, 16, No. 3.
5. Lewis, H. B. An experimental study of the role of the ego in work. I. The role of the ego in cooperative work. *J. exp. Psychol.*, 1944, 34, 113–126.
6. Marrow, A. J. Goal tensions and recall. I and II. *J. gen. Psychol.*, 1938, 19, 3–35; 37–64.
7. Rosenzweig, S. Preference in the repetition of successful and unsuccessful activities as a function of age and personality. *J. gen. Psychol.*, 1933, 42, 423–441.
8. Rosenzweig, S., & Mason, G. An experimental study of memory in relation to the theory of repression. *Brit. J. Psychol.*, 1934, 24, 245–265.
9. Rosenzweig, S. An experimental study of "repression" with special reference to need-persistive and ego-defensive reaction to frustration. *J. exp. Psychol.*, 1943, 32, 64–74.
10. Zeigarnik, B. On the recall of completed and incompleted tasks. *Psychol. Forsch.*, 1927, 9, 1–85.