CATEGORIZATION EFFECT IN PERSON PERCEPTION

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The present study was carried out to investigate the cognitive efficiency effect of categorization in the person perception. Categorization effect (facilitation of rating speed) occurred in the mildly ambiguous information condition, but not in the obvious condition and two extremely ambiguous (neutral and conflicting) conditions. These results indicate that the ambiguity of information was not always a determinant factor to produce the categorization effect. Somewhat reasonable relation between a categorical label and the original information was necessary to produce the effect, as well as some ambiguity of information. The results also indicate that subjects dared not ignore contradictory elements to integrate SP in the conflicting information condition.

Information stimuli of a social object are usually complex, conflicting and ambiguous. Therefore, we must actively categorize an object in order to reduce the diversity of stimuli and find a simplified standard of judgments. Categorical cognition is efficient and essential (Allport, 1958; Bruner, Goodnow, & Austin, 1956; Secord, 1959; Secord & Backman, 1974). Categorization gives a frame of reference about a cognitive object. We can recognize an object on the basis of the frame of reference which we already have as a set of judgments. We need not necessarily recognize it on the basis of its uniqueness. Consequently, we can respond to an object more readily and consistently.

Such a cognitive efficiency of categorization is an old problem, but it has not always been investigated systematically. Our knowledge about it does not go beyond the plausible and commonsense proposition, such as the principle of the least effort (Allport, 1958).

Therefore, the first purpose of the

present study is to verify the proposition itself that categorical cognition is efficient. And the further purpose is to investigate systematically the relation between the ambiguity of an object and the occurrence of categorization effect.

In past studies the main interests lie in the phenomenon of cognitive distortion caused by categorizing a cognitive object (Allport, 1958; Luchins, 1945; Sherif, 1935). These studies suggest that ambiguity is the most important information factor to produce the distortion. The author's interests lie in the phenomenon of cognitive efficiency. The important question is, "Under what information condition does the greatest categorization effect (cognitive efficiency) occur?" Past studies suggest simply that the effect increases in proportion to the degree of ambiguity of information. However, some studies (Birch, 1945; Lewis, 1941; Secord, 1959; Wyatt & Campbell, 1951) indicate that unreasonable categorization, which is obviously contradictory to the original object, is useless. Secord has mentioned, "The mere knowledge that a person is Negro is not in itself sufficient to produce stereotyping (Secord, 1959, p. 313)." It seems that only reasonable categorization which is to some degree

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relevant to the original object can exert its effect. An interesting problem is whether categorization of an extremely ambiguous object can exert its effect. For example, there seems to be a considerable gap between the categorization of a neutral object, whose information elements are almost neutral, and the original object itself. A categorical label used in the categorization seems unreasonable, since the original information contains no cues relevant to the label. Can such a gap between the label and the object be neglected in categorical cognition? Therefore, the further question is, "What role does categorization play when an object is extremely ambiguous?"

Various types of ambiguous objects can be assumed, that is, an object whose information elements are almost neutral, an object whose information elements are obviously conflicting with each other, an object whose information elements have variety of implications, an object with a large number of information elements and an object with few number of information elements.

In the present study, the author will deal with the neutral and the conflicting types of ambiguous information conditions in approaching the problem about the relation between the ambiguity and the occurrence of categorization effect. The main indices of the cognitive efficiency are the rating speed and the rating consistency. The cognitive situation used is the person perception, in which the degree of ambiguity of a stimulus person (SP) is manipulated according to an extroversion-introversion dimension.

GENERAL OVERVIEW

The subjects are first given a descriptive information about SP. Secondly, they are asked to judge SP using the Personality-trait Adjectives Rank Assignment (PARA) Method which has been designed originally for the present study. This PARA task is

called the pre-test. Thirdly, subjects in the experimental group are forced to categorize SP. Lastly, all subjects are given the PARA task (the post-test) again and asked to judge SP.

PARA Method

Subjects are given a series of trials of the PARA task respectively in the pre-test and the post-test. For example, one trial of the PARA task contains 16 sets of personality-trait adjectives and each set is constituted of 4 adjectives. Such a trial is called '[4×16] trial'. A set of 4 adjectives is an unit of judgment, that is, subjects are asked to number each adjective in the set in order of its fitness to characterize SP.

Subjects start and stop each trial simultaneously according to the experimenter's sign. Subject responds to the sets in a trial one by one in the order of presentation. When experimenter makes a sign to stop the trial, subject must stop his responding even if he has not finished all the sets in the trial.

Categorization Procedure

The categorization procedure used in the present study is as follows. Subjects in the experimental group are asked to answer a questionnaire, "If you are to determine what type of man Mr. K (SP) is, which will you select, 'he is an extrovert' or 'he is an introvert'?", while subjects in the control group are given a different questionnaire, "Is your image about Mr. K clear or unclear?" All subjects are asked to write down their own categorical selection. Of course, the latter alternative seems meaningless, subjects in the control group does not experience any active categorization procedure.

Indices

The PARA Method gives the two indices which are used to analyze the cognitive efficiency of categorization.

Rating speed. The rating speed of subject is measured by counting how many sets in the trial he can finish within the time limit. A trial in the pre-test gives

the pre-score which expresses the rating speed before the questionnaire. A trial in the post-test gives the post-score which expresses the rating speed after the questionnaire. Provided that such two trials are homogeneous, the effect score is obtained by subtracting the pre-score from the post-score. The effect score expresses the degree of facilitation of each subject's rating speed after the questionnaire.

Rating consistency. A retest trial which is almost identical with a post-test trial comes last in the PARA task. The retest and the post-test trials are constituted of common sets of adjectives, but are different as to the positioning of the sets and the arrangement of adjectives in each set. The rank correlation coefficient between judgments of each pair of common sets is calculated according to Spearman's Rank Correlation Coefficient. Of course, the calculation is conducted only when subject has finished both common sets. The consistency score of subject is obtained by taking the average of the rank correlation coefficients and multiplying it by 100.

MEASUREMENT OF EXTROVERSION-INTROVERSION SCORES OF STATEMENTS AND ADJECTIVES

Pre-Investigation was performed for the purpose of obtaining the extroversion-introversion score for each statement and adjective used in the present study. Eighty statements and 120 adjectives were prepared. The statements were selected from Japanese CPI by Wagatsuma et al. and Ko-shiki Extroversion-Introversion Test by Sakakibara, and the adjectives were selected from Self-Differential Scales (Nagashima, Fujiwara, Harano, Saito, & Hori, 1967). Twenty-five students at the Psychology Department of University of Tokyo were subjects. They were given a booklet containing statements, adjectives and judgment scales and asked to judge to what degree each statement (or adjective) fits the characteristics of an extrovert

TABLE 1
Classification of statements

Class†	Number	Range of scores	
H	6	+2.28	+2.00
M	6	+1.32	+0.68
N	8	+0.44	-0.32
$\bar{M}$	6	-0.80	-1.32
$\bar{H}$	6	-1.68	-2.08

† H : highly-extroversion class
M : mildly-extroversion class
N : neutral class
 $\bar{M}$: mildly-introversion class
 $\bar{H}$: highly-introversion class

TABLE 2
Classification of adjectives

Class†	Number	Range of scores	
H	16	+2.32	+1.48
M	16	+1.20	+0.72
L	16	+0.44	0.00
$\bar{L}$	16	0.00	-0.52
$\bar{M}$	16	-0.72	-1.28
$\bar{H}$	16	-1.36	-2.48

† H : highly-extroversion class
M : mildly-extroversion class
L : low-extroversion class
 $\bar{L}$: low-introversion class
 $\bar{M}$: mildly-introversion class
 $\bar{H}$: highly-introversion class

or an introvert. Seven-point rating scales were used—from 'the most extroversion' (+3) to 'the most introversion' (-3).

Each extroversion-introversion score was obtained by taking the average over subjects. Based on such scores, 32 statements were classified into 5 classes—highly-extroversion, mildly-extroversion, neutral, mildly-introversion and highly-introversion ones—, and 96 adjectives were classified into 6 classes—highly-extroversion, mildly-extroversion, low-extroversion, low-introversion, mildly-introversion and highly-introversion ones. The descriptive information is constituted on the basis of the classification of statements. And the adjectives in the PARA task are arranged

on the basis of the classification of adjectives. Table 1 and Table 2 show the number of statements or adjectives in each class and the range of their extroversion-introversion scores.

EXPERIMENT I

The degree of ambiguity of information is manipulated according to extroversion-introversion. Three information conditions are prepared in this experiment, that is, a highly-extroverted (H), a mildly-extroverted (M) and a neutral (N) ones. The number of total information elements (statements) is constant, and the degree of extroversion-introversion is manipulated by varying the proportion of prominent elements (highly-extroverted statements). If the active categorization procedure produces some cognitive efficiency, the effect score and the consistency score of the experimental group are higher than those of the control group. The purpose of Experiment I is to examine whether the categorization procedure produces such efficiency effect and whether the occurrence of categorization effect is dependent on the three information conditions.

Prior to Experiment I, a preliminary experiment (Pre-Experiment) was performed. The information condition was the M condition, and the PARA trials were $[4 \times 16]$ and $[6 \times 12]$ ones. Subjects were 101 students at Seijo University. The mean effect scores of the experimental group were significantly higher than those of the control group: For $[4 \times 16]$ trial, $t=2.52$, $df=99$, $p<.01$ and for $[6 \times 12]$ trial, $t=2.41$, $df=99$, $p<.01$ (with one-tailed t -test). But there were no differences between the consistency scores of the two groups.

Method

Information. Three information lists which corresponded to the three information conditions were prepared. They contained 12 statements about SP respectively. Their

constitution is presented in Table 3. For example, H condition list was constituted of 6 highly-extroverted (class H) statements, 4 mildly-extroverted (class M) ones and 2 neutral (class N) ones. These information lists were assumed to express respectively a highly-extroverted man, a mildly-extroverted man and a neutral man. In addition, the statements in each list were arranged randomly but the first and the last were neutral ones.

PARA task. The constitution of PARA trials is presented in Table 4. The second and the fifth were main trials, on the basis of which the pre-score and the post-score were obtained respectively. The last was a retest trial which was almost identical with the fifth trial. Four adjectives of each set of the two main $[4 \times 16]$ trials were randomly selected from each of the four adjective classes—highly-extroverted, low-extroverted, low-introverted and highly-introverted ones. Sixty-four types of adjectives were used in the main trials. They were randomly divided into half, 32 adjectives for the pre-test $[4 \times 16]$ trial and other 32 ones for the post-test $[4 \times 16]$ trial. Each of them appeared twice. Therefore, the pre-test and the post-test trials were independent of each other but considered to be homogeneous.

Procedures. Subjects were 337 students at Tokyo Institute of Technology. The experiment was performed as a part of the psychological lecture. Subjects were randomly assigned to the three information conditions. Furthermore, subjects of each condition were randomly divided into experimental and control groups. The first experimental booklets which contained one of the three information lists and three PARA trials (the pre-test) were given to subjects. Subjects were asked to read statements about "Mr. K" carefully (within 4 min). Next they were instructed how to perform the PARA task in detail. Experimenter said in addition, "You must do the task as soon as possible and as accurately and consistently as possible. If you do it only hastily, you will obtain a bad score. Please do your best!" After these instructions subjects began the first trial of the

TABLE 3
Constitution of information conditions (Exp. I)

Statement class	Condition		
	H	M	N
H	6†	2	
M	4	4	3
N	2	6	6
$\bar{M}$			3
$\bar{H}$			

† Number of statements

TABLE 4
Constitution of PARA trials (Exp. I)

Trial	Construction of adjective sets	Time limit
pre-test		
1	5 × 8	1 min
2†	4 × 16	1 min
3	5 × 6	30 sec
post-test		
4	5 × 8	30 sec
5††	4 × 16	1 min
6	5 × 8	30 sec
7†††	4 × 16	2 min

† the main pre-test trial

†† the main post-test trial

††† the retest trial

pre-test at experimenter's signal. When the pre-test trials were finished, the booklets were withdrawn at once, and the second booklets which contained a questionnaire and 4 PARA trials (the post-test) were given to subjects. Then experimenter instructed, "Before you begin the latter tasks, a brief questionnaire is prepared. Please answer it first." The questionnaire of the experimental group was different from that of the control group. The former contained the categorization procedure as mentioned before. After answering the questionnaire subjects began the post-test trials. The time limit of each trial is presented in Table 4. Lastly, subjects were asked to judge SP using the 52 seven-point rating scales of

the Semantic Differential Method. Adjective scales were chosen from the Self Differential Scales (Nagashima et al., 1966).

Results

Effect score. Table 5 shows the mean effect scores over subjects for the 6 conditional groups and statistical comparisons between the experimental and control groups of each information condition with *t*-test (one-tail). In the H condition there was no difference between the two groups. In the M condition there was a statistically significant difference between the two groups. The categorization effect occurred, and this confirmed the results of Pre-Experiment. In the N condition there was no difference between the two groups. These results indicate that the categorization effect does not increase in proportion to the degree of ambiguity of information.

Consistency score. Table 6 shows the mean consistency scores over subjects for the 6 conditional groups and statistical comparisons between the two groups of each condition with *t*-test (one-tail). There was no difference between the two groups of each condition. On the other hand, subjects' levels of the rating consistency had a remarkable tendency to rise in proportion as the degree of extroversion of information increased. The analysis of variance indicates that only the main effect of information was significant ($F = 14.61$, $df = (2, 331)$, $p < .001$). The relation between categorization and the rating consistency could not be observed in this experiment as well as in Pre-Experiment. The results were not sufficiently interpreted by the data obtained. In the present PARA Method procedures, there was a possibility that subject's attention was paid to the rating speed more consciously rather than the rating consistency. If so, the PARA Method seems insensitive to the rating consistency and the consistency scores seem to have been dependent on the information condition which

TABLE 5
Effect scores (Exp. I)

Condition (group)	N	Mean	SD	t-test†
H Exp.	50	1.38	1.45	$t = -0.25$ ($df = 100$)
Con.	52	1.46	1.83	
M Exp.	64	2.66	1.97	$t = 1.85^*$ ($df = 118$)
Con.	56	2.04	1.64	
N Exp.	52	1.92	1.75	$t = 0.50$ ($df = 113$)
Con.	63	1.76	1.65	

† one-tail * $p < 0.05$ TABLE 6
Consistency scores (Exp. I)

Condition (group)	N	Mean	SD	t-test†
H Exp.	50	79.2	10.4	$t = 0.05$ ($df = 100$)
Con.	52	79.1	12.2	
M Exp.	64	73.5	13.7	$t = -0.67$ ($df = 118$)
Con.	56	75.3	15.4	
N Exp.	52	68.4	14.7	$t = -0.37$ ($df = 113$)
Con.	53	64.4	15.3	

† one-tail

TABLE 7
Pre-scores (Exp. I)

Condition (group)	N	Mean	SD	t-test†
H Exp.	50	8.26	2.30	$t = 0.33$ ($df = 100$)
Con.	52	8.12	2.11	
M Exp.	64	7.45	1.95	$t = 0.02$ ($df = 118$)
Con.	56	7.45	2.21	
N Exp.	52	7.17	1.92	$t = -0.47$ ($df = 113$)
Con.	63	7.35	2.07	

† two-tail

TABLE 8
Extroversion-introversion scores (Exp. I)

Condition (group)	N	Mean	SD	t-test†
H Exp.	50	2.38	0.44	$t = 0.58$ ($df = 91$)
Con.	52	2.31	0.64	
M Exp.	64	1.73	0.83	$t = -0.60$ ($df = 118$)
Con.	56	1.83	0.87	
N Exp.	52	-0.45	1.16	$t = -0.59$ ($df = 113$)
Con.	63	-0.32	1.12	

† one-tail

was an extremely influential factor.

Pre-score. Table 7 shows the mean pre-scores over subjects for the 6 conditional groups and statistical comparisons between the two groups of each condition with t -test (two-tail). There was no difference between the two groups of each conditions. Subjects' levels of the rating speed were the same in the two groups of each condition before the categorization procedure. On the other hand, subjects' levels of the rating speed had a tendency to rise in proportion as the degree of extroversion of information increased. The analysis of variance indicates that only the main effect of information was significant ($F = 5.64$, $df = (2, 331)$, $p < .005$).

The degree of extroversion-introversion of SP. Principal Factor Analysis was applied to the matrix of 52×52 correlations between the 52 adjective scales. Seven adjective scales had extremely high factor

loadings in the first factor which was interpreted as Extroversion-Introversion Factor. This Factor explained 49.6 per-cent of the total variance. The absolute values of the factor loadings of these 7 scales ranged between .861 and .894. The raw scores on the 7 scales were first adjusted for the direction and then averaged to obtain subject's judgment score of the degree of extroversion-introversion of SP.

Table 8 shows the mean extroversion-introversion scores of SP over subjects for the 6 conditional groups and statistical comparisons between the two groups of each condition with t -test (one-tail). There was no difference between the two groups of each condition, while there were significant differences between the conditions (H mean = 2.34, M mean = 1.78, N mean = -0.32; H vs. M, $t = 5.93$, $df = 206$, $p < .001$; M vs. N, $t = 16.32$, $df = 211$, $p < .001$).

EXPERIMENT II

In Experiment I, the active categorization procedure exerted its cognitive facilitation effect only in the M condition. Categorization effect occurred neither in the extremely obvious (H) information condition nor in the extremely ambiguous (N) one. The result in the H condition is consistent with the results in past studies. The result in the N condition suggests that the ambiguity of information was not always a determinant factor to produce the categorization effect. The N information was almost irrelevant to a categorical label selected (an extrovert or an introvert). It seems necessary that the original information is somewhat relevant to a categorical label to produce some categorization effect.

In the present experiment a new information condition called the Conflicting (C) condition is designed. The C information list contains some highly-extroverted elements as well as equal number of highly-introverted ones, and there is an over all balance. The C and M information lists contain all common highly-extroverted elements. The C condition is similar to the M condition partially.

An investigation of such a conflicting information condition is very meaningful and interesting. First, the C information is surely another important type of ambiguous one, and more or less inconsistent information seems to happen frequently in various actual occasions. Moreover, it is very interesting that the C information is partially relevant to a categorical label. If the partial relevancy is sufficiently useful in recognizing SP, the C condition approximates to the M condition and the categorization effect will be observed. In this case subjects must neglect one aspect of SP's traits in order to integrate him. This investigation will make more clear the factor of information which produces categorization effect.

TABLE 9
Constitution of information conditions (Exp. II)

Statement class	Condition		
	M	N	C
H	2†		2
M	4	3	3
N	8	8	4
$\bar{M}$		3	3
$\bar{H}$			2

† Number of statements

TABLE 10
Constitution of PARA trials (Exp. II)

Trial	Construction of adjective sets	Time limit
pre-test		
1	5×12	1 min 30 sec
2†	4×16	1 min
3	5×6	30 sec
post-test		
4	5×12	1 min
5††	4×16	1 min
6	5×6	30 sec

† the main pre-test trial

†† the main post-test trial

Method

Information. Three information lists which corresponded to the M, N and C information conditions were prepared. Each list contained 14 statements about SP. Their constitution is presented in Table 9.

PARA task. The constitution of PARA trials is presented in Table 10. The second and the fifth were main trials on the basis of which the pre-score and the post-score were obtained respectively. These main trials were identical to those used in Experiment I. But a retest trial for measuring the rating consistency was excluded. Other details were the same as in Experiment I.

Procedures. Subjects were 545 students at Senshu University. The experiment was

TABLE 11
Effect scores (Exp. II)

Condition (group)	N	Mean	SD	t-test†
M Exp.	83	2.53	1.67	$t=2.54^{**}$ ($df=182$)
Con.	101	1.92	1.55	
N Exp.	98	1.99	1.65	$t=0.22$ ($df=170$)
Con.	74	1.93	1.74	
C Exp.	91	1.81	1.86	$t=0.36$ ($df=187$)
Con.	98	1.72	1.55	

† one-tail ** $p < 0.01$

performed as a part of the psychological lecture. Subjects were randomly assigned to the three information conditions. Furthermore, subjects of each condition were randomly divided into experimental and control groups. They were given one of the three information lists, 6 PARA trials and the same 52 adjective scales as in Experiment I. Details were almost similar to those of Experiment I.

Results

Effect score. Table 11 shows the mean effect scores over subjects for the 6 conditional groups and statistical comparisons between the experimental and control groups of each information condition with *t*-test (one-tail). The significant difference between the two groups was found in the M condition and no difference in the N condition. This confirmed the results in Experiment I. And no difference was found in the C condition. This supported the second assumption about the C condition. The partial cues alone in the conflicting information were not enough to produce the effect. And subjects did not take any narrow-minded reactions, such as neglecting one aspect of the conflicting information.

Pre-score. Table 12 shows the mean pre-scores over subjects for the 6 conditional groups and statistical comparisons between the two groups of each condition with *t*-test (two-tail). Subjects' levels of the rating speed were the same in the two groups of

TABLE 12
Pre-scores (Exp. II)

Condition (group)	N	Mean	SD	t-test†
M Exp.	83	6.42	1.83	$t=1.16$ ($df=182$)
Con.	101	6.11	1.80	
N Exp.	98	6.12	1.90	$t=1.16$ ($df=170$)
Con.	74	5.78	1.87	
C Exp.	91	6.48	2.04	$t=0.59$ ($df=187$)
Con.	98	6.31	2.07	

† two-tail

TABLE 13
Extroversion-introversion scores (Exp. II)

Condition (group)	N	Mean	SD	t-test†
M Exp.	83	1.63	0.72	$t=0.43$ ($df=182$)
Con.	101	1.58	0.76	
N Exp.	98	0.46	1.18	$t=-1.85$ ($df=170$)
Con.	74	0.77	1.06	
C Exp.	91	0.38	1.09	$t=0.17$ ($df=187$)
Con.	98	0.35	1.18	

† one-tail

each condition before the categorization procedure.

The degree of extroversion-introversion of SP. Subject's judgment score of the degree of extroversion-introversion of SP was obtained on the basis of the same 7 scales as in Experiment I. Table 13 shows the mean extroversion-introversion scores of SP over subjects for the 6 conditional groups and statistical comparisons between the two groups of each condition with *t*-test (one-tail). There was no difference between the two groups of each condition. The M information was more extroverted than the N and C informations (M mean = 1.60, N mean = 0.59, C mean = 0.37; M vs. N, $t=14.37$, $df=319$, $p < .001$, one-tail; M vs. C, $t=17.72$, $df=325$, $p < .001$). There was no difference between the N and C informations ($t=1.87$, $df=359$, $p > .05$, two-tail).

DISCUSSIONS

Efficiency effect of categorization was found consistently in the M condition (in which the information was assumed mildly ambiguous) of Pre-Experiment, Experiments I and II. The post-scores were almost higher than the pre-scores in all the conditions of these experiments. One factor of the facilitation of rating speed seems a practice effect. But in the M condition the degree of facilitation in the experimental group was greater than that in the control group. This difference can be regarded as a result of the categorization procedure which only the experimental group experienced. On the other hand, there was no difference between the consistency scores of the two groups of each information condition. The results of consistency scores, however, indicate that the categorization procedure was effective to facilitate the rating speed maintaining the level of rating consistency.

The data also indicate that the occurrence of categorization effect was dependent on the degree of ambiguity of original information. However, the relation between them was not linear. Significant categorization effect was found neither in the H condition (in which the degree of ambiguity was assumed lowest) nor in the N and C conditions (in which the degree of ambiguity was highest).

The H information was extremely obvious. Subjects could easily recognize SP as an extrovert (all 50 subjects selected a category "extrovert" and no subjects selected a category "introvert" in the categorization procedure. Such a result is expressed: E/I selection was 50/0). The pre-score of the H condition was significantly higher than that of the M and N conditions in Experiment I (H vs. M, $t = 2.55$, $p < .01$, one-tail; H vs. N, $t = 3.19$, $p < .001$). These results indicate that it was relatively easy for subjects in the H condition to judge SP even before the cat-

egorization procedure. In the H condition, it seems easy to form a frame of reference on the basis of the original information itself. Therefore, no external aid (giving a categorical label) was necessary to form a frame of reference. In the H condition, a categorical label was unnecessary rather than useless, and consequently no categorization effect occurred.

The N information was relevant neither an extrovert nor an introvert. The C information was relevant to both an extrovert and an introvert partially, but its information elements were contradictory to each other as a whole. Surely it was difficult to categorize SP in these information conditions. In the N condition, E/I selections were 15/37 (in Experiment I) and 54/44 (in Experiment II). In the C condition, E/I selection was 42/49 (in Experiment II). There was a considerable gap between the original information and a categorical label. A categorical label selected forcedly in such a situation seems incredulous and unreasonable. Results that no effect occurred in the N and C conditions indicate that unreasonable categorization is useless. Subjects were forced to categorize SP but they could not accept a categorical label. They could not use the label to organize the ambiguous information. The N and C informations are different types of ambiguous one. But the C information seems functionally identical with the N information.

Moreover, the fact that no effect occurred in the C condition is very important. The result indicates that subjects dared not ignore contradictory elements.

The M information was more ambiguous than the H one, but more obvious than the N and C conditions. Most subjects could recognize SP as an extrovert in the categorization procedure. E/I selections were 60/4 (in Experiment I) and 78/5 (in Experiment II). Results of extroversion-introversion score also indicate that the information was relevant to a categorical

label. A categorical label selected seemed in some degree reasonable. But results of the pre-score indicate that it was difficult to form a frame of reference on the basis of the original information itself. The pre-scores of the M, N and C conditions were almost on the same level in Experiment I (M vs. N, $t=0.67$, *n.s.*, two-tail) and Experiment II (M vs. N, $t=1.38$, *n.s.*; M vs. C, $t=-0.70$, *n.s.*; N vs. C, $t=-1.98$, $p>.05$; the analysis of variance for testing the main effect of information, $F=2.13$, *n.s.*). These results suggest that it was originally difficult to judge SP in the M condition as well as in the N and C conditions. Therefore, some external aid (giving a categorical label) was necessary and useful to form a frame of reference. Consequently, existence of the active categorization procedure caused a significant difference in the facilitation of rating speed between the experimental and control groups.

A frame of reference about an object is necessary for us to respond to it efficiently. If an information contains many prominent traits of an object and they are well structured, it is easy to form a frame of reference on the basis of the original information itself. If an information does not contain well-structured prominent traits sufficiently, some external aid is necessary to form a frame of reference. Active categorization exerts its effect in the latter situation. But if the categorization is unreasonable, it can not exert its usefulness. It seems necessary that the original information contains some effective cues which suggest and support the

reasonability of a category (categorical label) selected forcedly. Categorization can not by itself cause any cognitive efficiency.

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