METHODS & DESIGNS

Comparisons between 25 reversible and ambiguous figures on measures of latency, duration, and fluctuation

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Data are presented for 16 reversible and 9 ambiguous figures on measures of latency and duration of the initial response and total number of fluctuations during a 30-sec interval by 42 Ss. Of particular interest are the magnitudes, correlations, and factor analysis of eight widely used figures (e.g., Necker cube). The methodological advantages, theoretical ambiguities, and further research possibilities of this information are discussed.

Reversible and ambiguous figures are often used to demonstrate and test interesting and essential qualities of perception, especially those related to the Gestalt interpretation of figure-ground (Bouman, 1968; Zusne, 1970, pp. 113-124). The figure-ground phenomenon has been subject to theoretical controversy, mainly between positions that emphasize cortical satiation as opposed to those that focus on learned determinants. These opposing conceptions are represented by the extensive research that began with Köhler and Wallach (1944) and Shafer and Murphy (1943), respectively. However, an explanation is not yet close to resolution (Attneave, 1971; Hochberg, 1962; Lie, 1965; Sadler & Mefferd, 1971). Investigations of more general empirical interest have manipulated the sequence of presentation (Lindauer, 1969) and other stimulus parameters [e.g., brightness relationships (Lindauer & Lindauer, 1970)], and the response has been correlated with personal dimensions (Lindauer & Reukauf, 1971).

However, theoretical and empirical generalizations about figure-ground in general, and reversible and ambiguous figures specifically, are limited by the small number of stimuli used—usually one, sometimes three. There has been considerable reliance, in particular, on the reversible (or geometric) Necker cube and the ambiguous vase-face. The same dependence on a few stimuli, with the inevitable consequence of restricting generalizations, is found among studies of illusions, e.g., an almost exclusive preoccupation with the Mueller-Lyer illusion (Lindauer, 1973).

Fisher (1967a, b, 1968a, b) has contributed many new and unfamiliar figure-ground examples, mostly of the ambiguous and meaningful type, but he has been primarily interested in the number of percepts evoked (especially those that evoke three or more). Porter (1938) studied 14 figure-ground stimuli, and Donahue and Griffitts (1931) investigated eight figures, mainly of the reversible type, but in both studies, only fluctuation was measured. Price (1969) has been critical of those who rely on this frequently used index because of their neglect of its temporal course and the use of only the total number of reversals. An additional criticism is that reliance on only one response omits two other essential properties of the figural response: the time it takes to organize the initial percept (latency), and the stability of this first percept prior to subsequent fluctuation (duration).

The purpose of this study was to meet the need for substantial parametric data on ambiguous and reversible figures: firstly, by using a large number of stimuli, of both the reversible and ambiguous types; and secondly, by obtaining multiple measures of the response, including latency, duration, and fluctuation. Such basic and descriptive data would serve both methodological and theoretical purposes. In terms of experimental design, information on whether various figures arouse high, medium, or low latency, duration, and fluctuation would enable researchers to select those stimuli most suitable for their purposes. For example, a figure that evokes relatively few fluctuations would not be appropriate for conditions that required short presentations. In theoretical terms, if reversible and ambiguous stimuli (and variations of each type) share similar mechanisms and processes (whether physiological or psychological), differences between them should be minimal, responses to them should be correlated across different measures, and Ss should respond to them consistently. To answer these methodological and conceptual questions, a repeated measures analysis of variance of the latency, duration, and fluctuation responses to 25 stimuli, 15 reversible and 9 ambiguous, was undertaken; Pearson correlations within and between the three measures, as well as a factor analysis of the data, were also carried out.

METHOD

Twenty-five stimulus forms, all but a few with minimal meaningfulness (e.g., vase-face), were taken from a wide variety of sources; some were original (Fig. 1). There were 16 of the reversible or geometric type, e.g., Necker cube (Stimulus 12). Their changing near-far relationships were identified by the location of a dot on the figure. Nine stimuli were ambiguous, e.g., vase-face (Stimulus 24), and their dominant figural effects were identified in terms of whether the white or black areas were seen first. Eight figures, four of each type, were classified (by Es) as highly familiar or well known because of their frequent use in studies and texts: Stimuli 6-7, 10, 12, 18, 20-21, and 24. One

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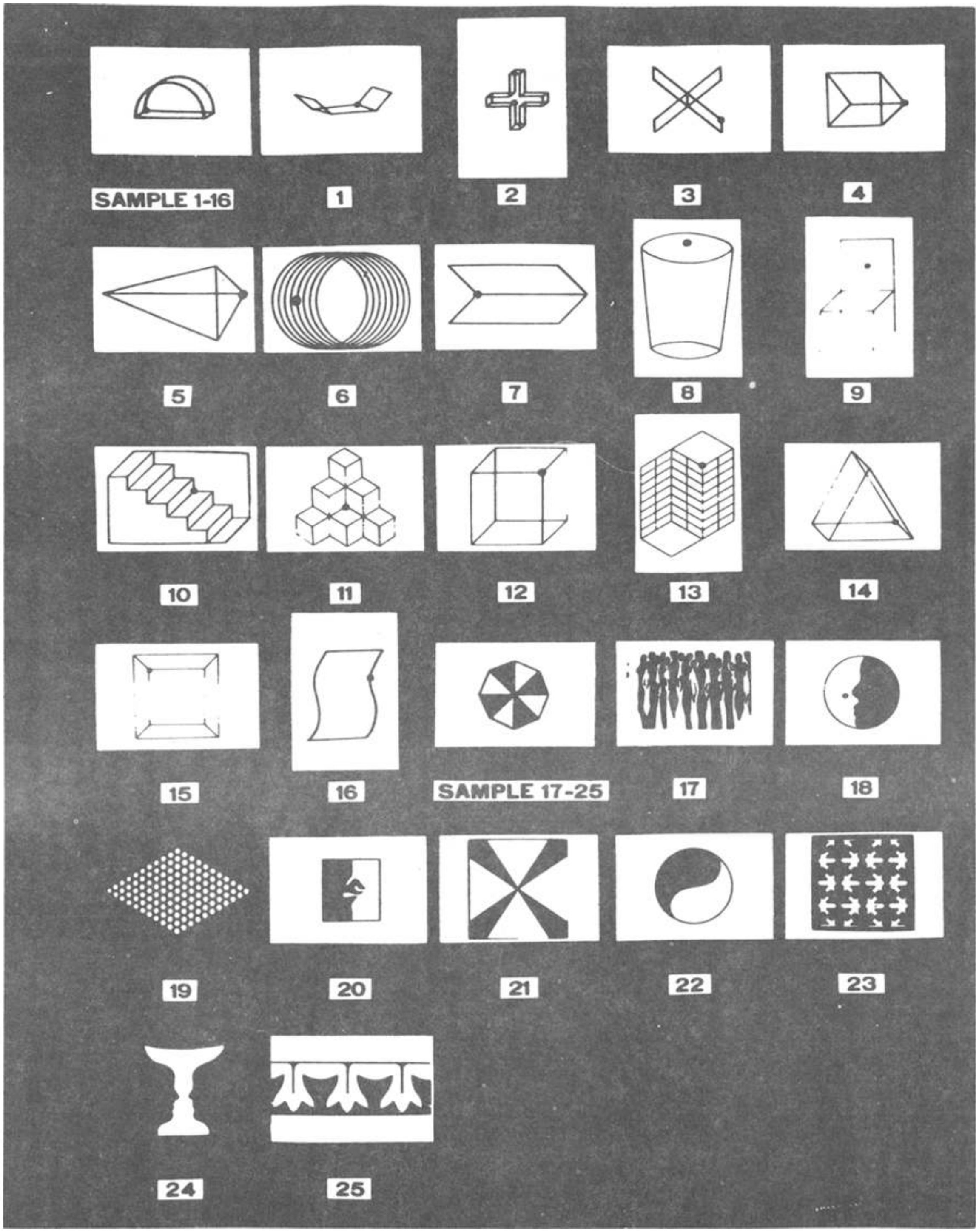

Fig. 1. Figure-ground stimuli used (with samples): reversible (Stimuli 1-16) and ambiguous (Stimuli 17-25).

sample of each type was shown first for several minutes in order to acquaint S with the phenomenon and train him on the experimental procedures. Instructions were extensive and repeated in order to insure Ss' understanding of what would happen and what was to be done. Although Ss thus knew what to expect (and most were familiar with the figure-ground phenomenon from their psychology courses), instructions emphasized a phenomenological or natural attitude (Lindauer & Baust, 1970). However, instructions were neutral regarding whether Ss should force or inhibit their response. Each set of stimuli was presented in a completely counterbalanced order. Either the ambiguous or reversible set was shown first, following several trials with the sample stimulus. The general procedure was identical to that used by Lindauer and Lindauer (1970).

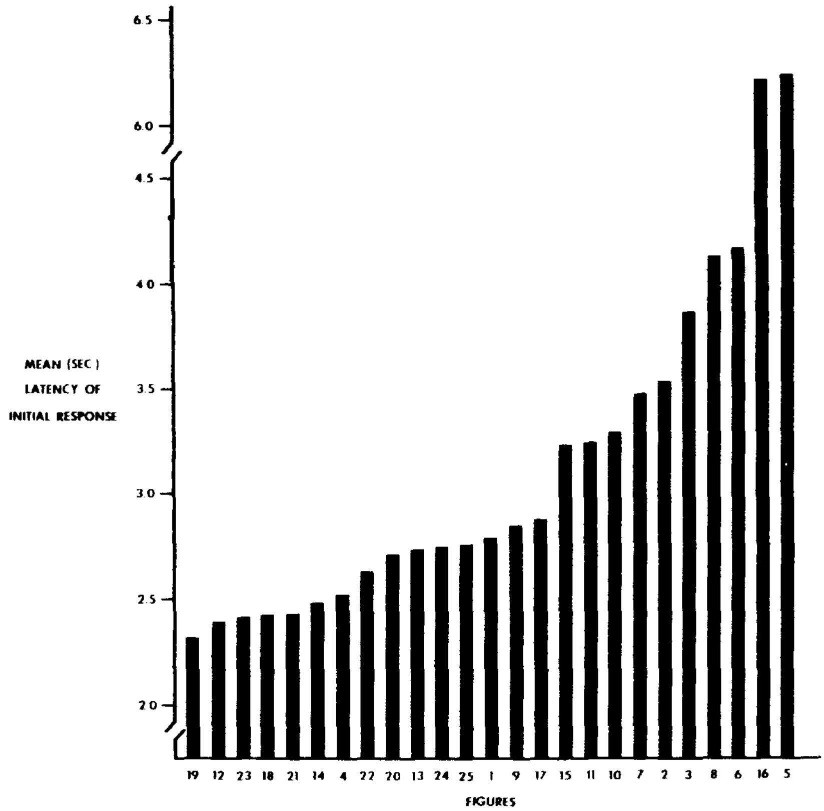

Fig. 2. Latency of initial response to figures.

Black and white slides of the stimuli (35-mm) were projected (300-W) in a well-lit room (six 40-W fluorescent bulbs produced over 75 fc of light), centered 305 cm in front of S, just about filling a 41 x 23 cm screen (visual angle = 7 deg 36 min) surrounded by a 69 x 28 cm illuminated border. Each stimulus was shown once for 30 sec, during which time S responded, followed by a 30-sec interstimulus interval when the screen was illuminated. S pressed a key to indicate when he first saw a figure-ground pattern or near-far relationship emerge (latency); this key was held down for as long as that percept persisted (duration); and alternate keys under each hand were pressed to indicate fluctuation as it occurred. Ss were instructed to look (binocularly) straight ahead at the center of the screen. There were 42 volunteers, drawn from several undergraduate psychology courses, about equally divided by sex.[1]

RESULTS

Responses to the 25 stimuli on the three measures--latency and duration of the initial percept and fluctuation--are shown in Figs. 2-4. It is apparent that the figures differed widely from one another on each measure. On latency, the means were distributed over almost a threefold range, from 2.32 to 6.27 (M overall = 3.23 sec; SD = 1.04); duration indicated an almost sixfold difference, from 3.87 to 22.86 (M overall = 9.09 sec; SD = 3.92); and with fluctuation, there was slightly more than a fourfold difference, from 2.37 to 9.63 (M overall = 5.42; SD = 2.03). These differences on latency, duration, and fluctuation measures were significant, $F(24/960) = 6.25$, 13.53, and 9.84, $p < .01$, respectively. Specific comparisons between the figures on each measure (according to a Newman-Keuls analysis, MS error = 734.53, 4,857.30, and 12.72, respectively) indicated that most figures significantly ($p < .05$) differed from one another. Table 1 (under "Mean Differences") summarizes the frequency with which each figure significantly differed from all other figures (maximum = 24). The greatest number of significant differences were found among the latency and duration measures, 83% and 97% (of 600 comparisons), respectively. In contrast, only 33% of the fluctuation comparisons were significant. Of these, 95% were accounted for by the low rates for Stimuli 19, 5, and 8 and the high rates for Stimuli 7, 24, and 18. There were some notable differences between the fluctuation rates for the more well-known figures: relatively low fluctuations (i.e., under or at the median = 5.50) for Stimuli 6, 10, 12, 20, and 21, and high fluctuations for Stimuli 7, 18, and 24.

A *median test*, comparing the three measures on the number of significant findings, indicated that the differences were significant, $\chi^2(2) = 25.77$, $p < .01$. Comparisons between the reversible (Stimuli 1-16) and ambiguous (Stimuli 17-25) figures indicated that they differed from one another on latency only, M = 3.59 and 2.60 sec, respectively, $t = 3.25$, $p < .01$. (On duration, M = 9.80 and 7.83 sec, for reversible and ambiguous figures, respectively, $t = 0.97$, $p > .05$; on fluctuation, M = 4.89 and 6.36, respectively, $t = 1.69$, $p > .05$.) A *median test* of the number of significant differences for the two types of figures paralleled the above findings: the reversible figures had a greater number of significant differences than the ambiguous figures on latency only, $\chi^2(1) = 4.99$, $p < .05$.

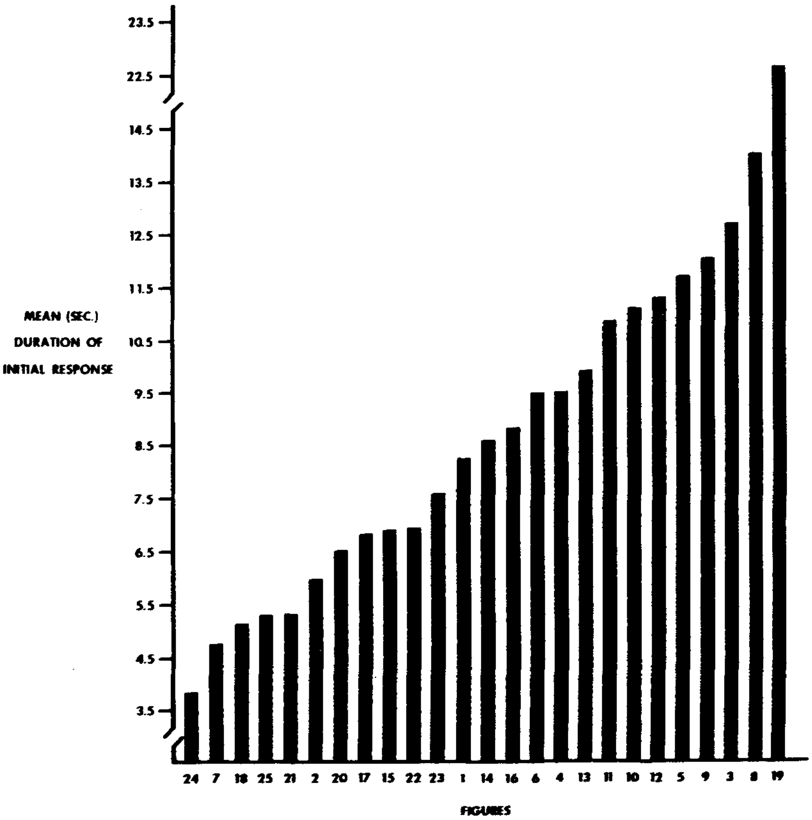

Fig. 3. Duration of initial response to figures.

The response to each figure (combined for all Ss) was correlated with responses to the others on each of the three measures. The number of significant correlations ($r = .31$, $p < .05$), all positive, are summarized in Table 1, under "Correlations"; specific correlations are noted in Tables 2a-2c. The correlations within the fluctuation measure showed the greatest number of significant relationships (61% of 600 comparisons), with duration and latency 26% and 39%, respectively. A *median test* indicated that these differences between the number of significant correlations on each measure were significant, $\chi^2(2) = 28.91$, $p < .01$. (Note that fluctuation measures had the highest number of significant correlations. This is the reverse of the analysis of the differences between

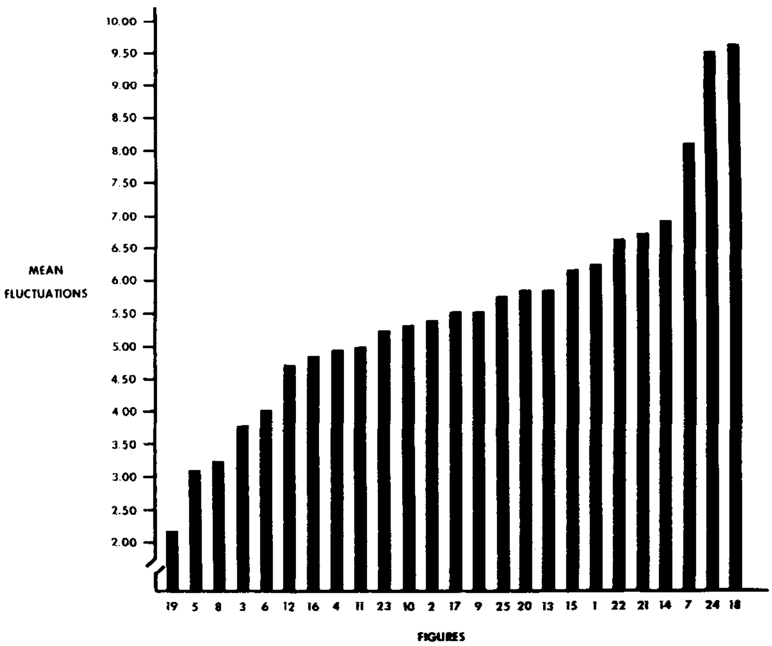

Fig. 4. Fluctuation rates for figures.

means, in which fluctuations resulted in the lowest number of significant differences and latency and duration showed the higher.) Among the latency correlations, 61% of those that were significant were between Stimuli 1, 6, 8, 15, and 19. Of the eight well-known figures, three were above the median (= 9.50) number of significant correlations; the largest number (15) was found for Stimulus 6, and the lowest number (4) was for Stimulus 20. Among the duration correlations, 46% of those significant were found for Stimuli 7, 13, and 16; and among the popular figures, only two were above the median (= 6.00) number of significant correlations, ranging from a low of 1 (Stimuli 6 and 12) to a high of 12 (Stimulus 7). Among the fluctuation correlations, in which most figures were correlated with one another (median = 16.25), four of the eight popular figures were at or below the median: Stimuli 10, 12, 21, and 24. With respect to the ambiguous and reversible types of figures, a *median test* indicated no differences between them on the number of significant correlations on any of the measures, $\chi^2(1) \leqslant 0.32$, $p > .05$.

The consistency of the three sets of responses to the 25 figures was obtained by correlating the three means with one another (Ss' scores were combined for each figure). Latency and fluctuation responses to the stimuli were negatively correlated, $r = -.40$, $p < .05$, as were duration and fluctuation measures, $r = -.78$, $p < .001$; however, latency and duration responses were not correlated, $r = .19$, $p > .05$. Another measure of response consistency was obtained by combining each S's scores across 25 figures and correlating these over the three measures. These correlations between Ss largely paralleled the correlations found between figures. There was a significant negative correlation between duration and fluctuation, $r = -.79$, $p < .01$, and no significant correlation between duration and fluctuation, $r = .20$, $p > .05$; however, while the relationship between latency and fluctuation was also negative, as earlier, it was not significant, $r = -.25$, $p > .05$. These correlational data indirectly attest (in part) to the absence of individual differences in Ss' responses across figures and response measures.

Table 1
Frequency of Significant Results (p < .05)

	Mean Differences			Correlations		
Figure	L	D	F	L	D	F
1	18	24	5	13	6	20
2	23	24	4	9	5	18
3	24	24	6	3	3	11
4	18	23	4	10	6	15
5	23	24	11	5	5	10
6*	23	23	5	15	1	19
7*	23	24	15	6	12	20
8	24	24	12	13	1	4
9	18	24	4	11	7	17
10*	22	23	4	9	5	16
11	22	23	4	11	9	17
12*	18	23	4	10	1	13
13	17	24	5	7	12	16
14	18	23	7	4	8	3
15	22	22	6	14	5	14
16	23	24	4	7	12	17
17	18	23	5	8	8	14
18*	18	22	22	11	9	17
19	19	24	20	14	3	10
20*	17	24	5	4	5	19
21*	18	22	7	9	5	15
22	18	22	6	10	9	7
23	17	24	4	9	8	18
24*	17	24	22	8	5	16
25	17	22	6	11	8	18
Percent of Total	83	97	33	39	26	61

Note–L = latency, D = duration, F = fluctuation.
*Relatively familiar figures.

Table 2a
Correlations Between Figures: Latency*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1		51	17	25	34	64	14	63	59	64	44	30	19	34	43	03	04	34	34	05	15	08	32	40	06
2			07	48	47	43	12	16	51	59	45	05	05	17	60	32	20	27	10	25	23	02	05	-02	21
3				12	03	16	-03	32	35	08	77	-01	10	15	12	19	-11	-03	15	07	-07	-03	04	-03	08
4					18	36	-07	14	38	20	30	11	22	31	31	34	31	07	14	50	15	33	19	03	49
5						29	05	14	47	45	32	00	00	09	27	18	21	28	02	11	01	09	00	02	08
6							14	71	47	49	48	40	24	33	41	49	01	42	35	20	08	28	55	59	27
7								06	-05	30	07	69	89	06	38	-01	08	27	33	08	37	06	03	01	32
8									46	35	56	33	13	32	18	08	07	45	44	-01	12	39	74	80	11
9										60	60	10	15	28	38	17	41	26	29	25	19	29	27	20	23
10											44	21	35	09	51	-05	03	14	04	01	05	04	-02	02	06
11												20	26	23	50	32	05	28	18	28	19	16	24	19	33
12													71	30	43	11	06	44	62	00	35	22	38	31	24
13														18	38	05	18	22	34	30	38	24	13	03	47
14															18	03	-04	25	29	03	15	-02	27	20	-02
15																45	20	51	43	19	54	07	05	-02	29
16																	20	42	16	30	19	07	13	07	31
17																		33	41	45	46	53	28	15	42
18																			63	00	61	36	46	48	12
19																				22	70	51	59	57	32
20																					26	54	25	08	89
21																						36	27	17	35
22																							61	56	42
23																								90	35
24																									20
25																									

Decimals omitted; p = .05, r = .31

Table 2b
Correlations Between Figures: Duration*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1		24	10	32	20	−08	37	24	12	21	51	−07	52	34	30	18	26	21	21	−15	12	25	59	08	34
2			07	27	−17	00	22	16	20	09	23	−03	09	05	05	45	20	31	08	−06	63	19	34	09	31
3				−14	19	28	30	22	41	10	34	−01	19	41	11	20	22	14	−02	08	−12	19	−05	−10	−01
4					31	−05	05	−05	26	26	13	22	29	06	10	18	34	−01	37	16	05	06	44	15	34
5						11	31	18	44	23	28	25	15	36	16	12	53	04	27	30	−13	13	−05	17	−13
6							18	36	26	11	06	−02	−06	26	03	03	22	13	22	21	12	11	−06	−01	−04
7								27	38	10	51	20	39	43	26	32	32	44	13	42	36	39	21	12	17
8									15	−15	−11	−10	01	13	23	19	22	08	−19	−03	19	21	01	−07	02
9										53	23	21	30	33	14	44	35	15	28	22	24	20	15	−03	20
10											18	13	46	10	01	42	24	15	31	30	09	−06	21	04	40
11												−04	52	57	18	22	35	41	23	21	15	38	18	12	41
12													27	19	16	14	04	−08	06	38	−10	01	03	21	−16
13														37	50	59	28	40	18	51	07	40	41	39	45
14															14	31	17	27	02	24	05	12	00	−08	14
15																35	40	16	06	10	05	52	48	47	22
16																	30	58	05	44	41	35	21	04	32
17																		31	24	29	10	41	30	07	27
18																			−11	37	40	46	18	11	22
19																				17	14	25	34	13	21
20																					04	23	−02	19	16
21																						33	14	36	28
22																							35	41	28
23																								22	26
24																									40
25																									

*Decimals omitted; $p = .05$, $r = .31$

Table 2c
Correlations Between Figures: Fluctuation*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1		60	41	49	22	54	68	23	73	46	49	36	61	23	51	50	30	54	27	49	39	55	59	66	60
2			54	65	62	65	44	10	60	56	44	43	42	35	50	45	26	35	27	26	29	17	37	32	35
3				20	21	58	32	38	52	26	62	08	29	47	27	63	26	29	27	22	11	25	11	35	50
4					70	53	33	−02	39	53	27	53	34	22	47	30	34	30	52	29	40	23	37	29	29
5						52	22	−16	29	54	24	35	21	20	42	22	38	12	52	13	35	−02	40	−03	15
6							43	20	55	48	41	38	49	38	60	36	27	36	41	33	33	01	45	29	27
7								21	50	35	47	34	48	15	59	53	46	60	13	45	57	41	46	63	47
8									16	−09	23	11	23	15	08	29	19	16	−13	42	−06	24	−16	39	34
9										50	57	26	62	28	42	60	21	51	24	38	46	25	42	52	51
10											37	53	59	26	44	36	27	42	43	49	22	11	50	13	30
11												25	53	25	28	56	47	50	38	52	36	44	28	45	65
12													49	19	57	35	23	34	05	46	22	11	33	18	06
13														24	62	51	12	68	09	49	27	05	50	48	32
14															22	30	12	08	13	07	09	09	05	13	11
15																46	19	48	10	39	27	−06	49	24	−01
16																	33	62	14	38	31	21	27	43	43
17																		32	66	55	36	51	44	34	60
18																			20	62	53	18	57	69	52
19																				34	36	29	46	19	50
20																					33	40	53	47	56
21																						10	48	46	45
22																							21	51	73
23																								31	40
24																									68
25																									

*Decimals omitted; $p = .05$, $r = .31$

A principle components factor analysis followed by an orthogonal rotation to a varimax criterion was also performed on the correlational data. Table 3 indicates the loadings on four factors for each figure on the three measures. These data are summarized in Table 4 for those figures that received high loadings (= .50) on the factors on each response measure. Nineteen figures (excluding "others") could be placed in five groups on the basis of similar physical appearance. These groupings were reversible plane surfaces (Stimuli 1-3 and 15), reversible triangles (Stimuli 4-5 and 7), and reversible cubes (Stimuli 9-13 and 15); and ambiguous faces (Stimuli 18, 20-21, and 24-25) and ambiguous black-white patterns (Stimuli 19 and 23). Nearly all figures had a high loading on at least one factor in each measure. Reversible figures as a group had the highest loadings on Factors I and II, while ambiguous figures were highest on Factors I and III. However, few of the sets of figures in any one of the five similar physical groups showed a consistent pattern of loadings either within or across measures.

DISCUSSION

The hallmark of both reversible and ambiguous figures is their fluctuation, or shifts in the location of the contour lines, i.e., the near-far relationship and the belongingness of the contour edges, respectively. The distinctiveness of this measure, compared to those of latency and duration, was reflected in this study. Fluctuation responses to 25 figures had the lowest number of significant differences in the magnitude of the response and the highest number of correlations. This similarity of response indicates an essential communality between the processes underlying reversible and ambiguous stimuli. However, not all studies have found this consistency among fluctuation rates. A rank-order correlation performed on the data of Donahue and Griffitts (1931), using six of eight stimuli also used in the

Table 3
Factor Loadings*

Figs.	Latency I	Latency II	Latency III	Latency IV	Duration I	Duration II	Duration III	Duration IV	Fluctuation I	Fluctuation II	Fluctuation III	Fluctuation IV
1	42	69	16	20	29	21	62	32	63	15	42	33
2	06	76	26	04	54	06	19	40	37	51	08	56
3	03	47	02	12	04	68	04	01	09	07	29	86
4	02	42	58	01	04	06	74	11	32	71	15	20
5	01	58	13	04	23	60	37	30	12	86	01	19
6	57	59	08	15	01	52	10	02	40	48	04	54
7	03	05	01	92	47	55	10	13	67	07	40	17
8	84	40	08	03	20	47	14	34	15	43	28	47
9	25	73	26	01	11	56	36	19	55	17	27	48
10	01	75	12	30	07	16	52	32	47	58	06	21
11	20	74	18	09	36	44	36	01	32	12	53	47
12	35	06	03	80	01	02	08	69	60	33	10	10
13	01	11	19	84	56	15	43	45	81	07	04	27
14	32	29	11	17	14	66	11	15	03	18	04	66
15	03	57	22	57	51	04	24	16	74	32	18	23
16	04	31	42	05	62	32	12	23	51	01	25	53
17	15	01	70	10	24	44	43	06	08	40	72	04
18	53	19	16	43	68	31	09	06	79	01	37	06
19	62	03	30	52	02	04	64	09	09	70	55	04
20	02	09	89	02	29	26	01	75	56	10	52	03
21	20	01	43	57	69	03	03	25	45	32	39	10
22	55	08	61	06	67	18	12	04	03	04	80	12
23	90	01	27	04	39	13	65	17	58	48	31	17
24	96	01	08	01	59	37	11	28	53	19	61	19
25	07	10	80	25	51	08	45	03	20	06	89	24

Decimals and negative signs omitted

Table 4
Summary of High (≥.50) Factor Loadings for Groups of Two Types of Stimuli on Three Measures

Figures		Latency				Duration				Fluctuation			
Reversible													
Planes	1		II					III		I			
	2		II			I					II		IV
	3						II						IV
	15		II		IV					I			
Triangles	4			III				III			II		
	5		II				II				II		
	7				IV		II			I			
	14						II						
Cubes*	9		II				II			I			
	10		II					III			II		
	11		II									III	
	12				IV				IV	I			
	13				IV	I				I			
Others	6	I	II				II						IV
	8	I											
	16					I				I			IV
Ambiguous													
Faces	18	I				I				I			
	20			III					IV	I		III	
	24	I				I				I			
	25			III		I							IV
Black-White	19	I			IV			III			II	III	
	23	I						III		I			
Others	17			III								III	
	21				IV	I							
	22	I		III		I						III	

See also No. 15

present study, indicated a negative correlation between the figures' fluctuation rates, but this was not significant, rho = −.83; p = .05 at .89. On the other hand, Axelrod and Thompson (1962) found no correlation between two reversible figures. However, Porter (1938), using a large number of stimuli (14, 8 of which were included in this study), found that fluctuation rates were highly correlated.

Although the fluctuation magnitudes did not differ between most figures, a substantial number of the comparisons (39%) did significantly differ from one another. Among these were several forms frequently used in studies or as illustrations. Three had exceptionally high fluctuations which significantly differed from most other stimuli: book, Shafer-Murphy face, and vase-face (Stimuli 7, 18, and 24, respectively). The other five popular figures, with low to moderate fluctuation rates, did not differ from most other stimuli: spiral, staircase, Necker cube, Rubin face, and cross (Stimuli 6, 10, 12, 20, and 21, respectively).

The dominance of the fluctuation measure across most stimuli was also seen in the similarity between the reversible and ambiguous types of figures on this measure. This is surprising, since one might expect, on the basis of their labels at least, that reversible figures would fluctuate more than ambiguous ones. However, the two types of figures differed only in the onset of figure organization (latency); reversible figures initially took longer to reverse. Since their overall fluctuation rates (and duration) did not differ, reversible figures presumably fluctuated more than ambiguous figures over the 30-sec interval in order to catch up with ambiguous figures. The available data do not support this interpretation, since the ambiguous figures had a higher (although not significant) number of fluctuations after 30 sec of exposure. This question can only be resolved by obtaining fluctuation data throughout the test period or perhaps by extending the time period beyond 30 sec.

The factor analysis did suggest a tendency for the two types to differ in their loadings on two of four factors. However, the considerable inconsistency of loading values between figures within and across response measures makes it difficult to identify these loadings with any certainty. Fisher (1968b) is one of the few who has attempted to carefully define the difference between reversible and ambiguous types of figures, but in phenomenological terms, i.e., the former refers to where the figure is and the latter to what it is. At most, the present data support the use of the term "geometric" for the reversible type of stimuli, at least until their distinctiveness from ambiguous figures in reversibility can be more clearly determined.

Another indication of the power of the fluctuation measure was its generally consistent negative correlation with the other two measures (which were not correlated with one another) across both Ss and figures. It may not be surprising to find a high fluctuation rate when the initial response is both fast and of short duration, since such brevity would allow more time for fluctuation to occur, or for the reverse to take place when fluctuation was low. A more subtle process is represented by the unrelatedness of the latency and duration data. The independence between the time it takes to initially organize a figure and its persistence is a finding that should encourage the increased use of these measures in subsequent studies. Each measure is evidentally sensitive to previously untapped, different, and so far unexplained aspects of the figural response. The usefulness of these two measures is also reflected in the wide range of differences between figures in the magnitudes of their latency and duration responses and the general noncorrespondence between the responses to the figures on these two indices. The distinctiveness of the latency and duration measures can also be used to describe the response to the eight well-known figures. The fastest response was to the Necker cube and cross (Stimuli 12 and 21), followed by the Rubin face and vase-face (Stimuli 20 and 24); three other popular figures were among the slowest in latency. The longest durations among the well-known figures were found for the spiral, staircase, and Necker cube (Stimuli 6, 10, and 12); the four others were very brief.

In methodological terms, these results indicate the importance of stimulus selection, the number of stimuli used, and the type of response obtained in studies of ambiguous and reversible figures. Thus, some figures and responses may be "better" than others depending upon one's purpose. For example, the widely used Necker cube reflected a surprisingly low fluctuation rate, but a fast latency and high duration. In contrast, the similarly widely used vase-face showed a high fluctuation rate and a fast-to-moderate latency and short duration. In theoretical terms, the data are also a challenge to any attempt to apply one explanation for either reversible or ambiguous figure perception, or both. It would be difficult for one theory to account for the large disparities between the magnitude of response differences to various figures (especially on latency and duration); these differences suggest distinctive reactions to the figures. Similarly, it would also be difficult for one explanation to account for the low number of significant correlations between figures (especially on the above measures); this suggests the unrelatedness of the responses within or across types of stimuli. What seems to be needed next is not more theorizing, but further systematic examination of the parameters of a wide range of reversible and ambiguous stimuli across several measures in order to arrive at a better conception of their similarities and differences. Possibilities include manipulating the figures' orientations or adding or subtracting information (e.g., lines, angles, brightness) in order to describe consistent effects on the response, if any. Studies of individual differences in the sensitivity to figure-ground could also be improved by the use of more than one or two examples of figure-ground; and the use of many rather than a few stimuli could benefit correlational studies between ambiguous and reversible stimuli and related phenomena, e.g., illusions. In general, previous empirical and theoretical investigations should be replicated, with the advantage of now having many figures whose sensitivity to more than one response measure is known.

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NOTE

1. Few studies of figure-ground have specifically investigated sex differences; Lindauer (1973) found none for illusions. In a pilot study using 23 meaningful ambiguous figures from Fisher (1968a), 17 males and 20 females described the meaningful shapes they saw, if any, during a 1-min interval. Males and females did not differ in the total number of meaningful objects reported, M = 46.00 and 44.15, respectively, $t = 0.95$, $p > .05$; nor did the frequency of the first two responses for each figure differ between males and females, $\chi^2(1) = 0.19$, $p > .05$. It was assumed that the effect of other individual differences, e.g., in introversion-extroversion, were nullified because of the homogeneity of the population from which the sample was drawn.

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