Table 3. Per cent of Judgments of Each Emotion for Each Photograph*
(Based on 10 second exposures)

Photograph No.	ID	Hap	Sad	Fear	Ang	Sur	Disg	Neu*
Happy Photos								
1	A-1-06	100	0	0	0	0	0	-
7	C-2-18	99	0	0	1	0	0	-
14	EM-4-07	100	0	0	0	0	0	0
22	GS-1-08	96	0	0	0	4	0	-
29	JB-1-09	100	0	0	0	0	0	0
34	JJ-4-07	100	0	0	0	0	0	0
35	JJ-4-08	97	0	0	0	3	0	0
42	JM-1-04	100	0	0	0	0	0	-
48	MF-1-06	100	0	0	0	0	0	0
57	MO-1-04	100	0	0	0	0	0	-
66	NR-1-06	92	0	4	0	4	0	-
73	PE-2-06	97	0	0	0	0	0	3
74	PE-2-12	100	0	0	0	0	0	0
84	PF-1-05	96	0	0	0	4	0	-
85	PF-1-06	100	0	0	0	0	0	-
93	SW-3-09	100	0	0	0	0	0	-
100	WF-2-11	97	0	0	0	0	3	0
101	WF-2-12	100	0	0	0	0	0	0
Sad Photos								
2	A-2-06	0	90	6	3	0	0	-
8	C-1-18	2	90	5	1	0	2	-
15	EM-4-24	0	97	0	0	3	0	0
23	GS-2-01	0	71	3	13	0	13	-
36	JJ-5-05	3	93	0	3	0	0	0
43	JM-3-11	0	96	0	0	0	4	-
49	MF-1-30	0	90	3	0	0	6	-
58	MO-1-30	0	87	4	0	0	8	-
67	NR-2-15	0	94	0	3	3	0	-
75	PE-2-31	0	74	16	3	0	6	-
76	PE-5-07	0	92	8	0	0	0	-
77	PE-5-10	0	83	0	4	0	13	-
86	PF-2-12	0	100	0	0	0	0	-
87	PF-2-16	0	100	0	0	0	0	-
94	SW-2-16	0	92	0	0	0	8	-
102	WF-3-28	7	79	0	3	3	7	0
103	WF-5-06	0	88	0	4	0	8	-
Fear Photos								
9	C-1-23	0	0	87	13	0	0	-
16	EM-5-21	0	0	92	0	8	0	-
17	EM-5-24	0	10	83	3	3	0	-
24	GS-1-25	0	0	77	0	19	3	-
37	JJ-5-13	0	4	96	0	0	0	0
50	MF-1-26	0	4	87	0	8	0	-
51	MF-1-27	0	0	83	0	17	0	-
59	MO-1-23	0	0	88	0	13	0	-
60	MO-1-26	0	0	88	8	4	0	-
68	NR-1-19	0	10	84	0	3	3	-
78	PE-3-16	0	0	91	2	7	0	-
79	PE-3-21	0	0	92	4	4	0	0
88	PF-2-30	0	0	100	0	0	0	-
95	SW-2-30	4	0	79	0	8	8	-
104	WF-3-16	0	4	88	0	4	4	0
Anger Photos								
3	A-1-14	0	3	0	97	0	0	-
10	C-2-12	3	0	0	74	3	19	-
18	EM-5-14	0	0	0	83	3	13	-
25	GS-2-08	0	0	4	70	0	26	-
30	JB-1-23	0	7	0	81	0	11	0
Anger Photos (Cont'd.)								
38	JJ-3-12	0	0	15	76	3	6	-
44	JM-5-03	0	4	4	92	0	0	-
52	MF-2-05	0	3	3	84	6	3	-
53	MF-2-07	0	0	0	100	0	0	-
61	MO-2-11	0	0	0	100	0	0	-
62	MO-2-13	0	0	0	96	0	4	-
69	NR-2-07	0	0	0	100	0	0	-
80	PE-2-21	0	3	0	83	7	7	0
89	PF-2-04	0	0	0	79	0	21	-
96	SW-4-09	0	0	0	100	0	0	-
105	WF-3-01	0	0	0	100	0	0	0
106	WF-3-04	0	0	2	96	0	2	-
Surprise Photos								
4	A-1-24	0	0	3	0	97	0	-
11	C-1-10	1	0	5	1	94	0	-
19	EM-2-11	3	0	0	0	91	3	3
26	GS-1-16	0	0	0	0	100	0	-
31	JB-1-12	0	3	3	0	93	0	0
39	JJ-4-13	0	0	3	0	97	0	0
45	JM-1-16	0	0	4	0	96	0	-
54	MF-1-09	0	0	0	0	96	4	-
63	MO-1-14	0	0	6	3	90	0	-
70	NR-1-14	0	0	16	0	81	3	-
81	PE-6-02	0	0	23	0	74	3	-
90	PF-1-16	7	0	0	0	93	0	-
97	SW-1-16	0	0	0	0	100	0	-
107	WF-2-16	0	0	9	0	91	0	-
Disgust Photos								
5	A-1-25	1	0	0	6	0	93	-
12	C-1-04	1	1	0	2	0	96	-
20	EM-4-17	0	0	0	3	0	97	0
27	GS-2-25	0	3	0	13	0	84	-
32	JB-1-16	0	0	0	0	0	100	-
40	JJ-3-20	0	12	0	0	0	88	-
46	JM-2-08	0	0	0	3	0	97	-
55	MF-2-13	0	0	0	10	0	90	-
64	MO-2-18	0	0	0	0	0	100	-
71	NR-3-29	0	0	0	17	0	83	-
82	PE-4-05	0	0	0	10	0	90	0
91	PF-1-24	4	0	0	0	0	96	-
98	SW-1-30	0	0	0	6	0	94	-
108	WF-3-11	0	0	0	3	0	97	0
109	WF-4-22	0	0	0	20	0	80	-
Neutral Photos								
6	A-1-02 F	14	30	11	30	2	13	-
13	C-2-03 F	6	35	0	26	0	32	-
21	EM-2-04 M	25	3	3	0	0	0	69
28	GS-1-04 M	13	21	0	21	4	42	-
33	JB-1-03 m	0	13	3	3	0	3	78
41	JJ-3-04 M	17	47	0	17	0	20	-
47	JM-1-09 F	63	21	8	0	0	8	-
56	MF-1-02 F	16	68	3	0	3	10	-
65	MO-1-05 F	26	61	0	3	0	10	-
72	NR-1-03 F	17	29	0	13	4	38	-
83	PE-2-04 M	16	16	3	0	3	0	63
92	PF-1-02 F	47	30	7	3	7	7	-
99	SW-3-03 F	25	46	0	0	0	29	-
110	WF-2-05 M	0	7	0	28	0	7	59

* Where a dash appears in the Neutral column, the judges did not have "Neutral" as an alternative choice in the study (see text).

Table 2. Per cent of Judgments of Each Emotion for Each Photograph
(Asterisk shows intended emotion for each picture)

Photograph No.	ID	Hap	Sad	Fear	Ang	Sur	Disg	Neu°	N
1	A-1-06	100*	0	0	0	0	0	0	31
2	A-2-06	0	90*	6	3	0	0	0	31
3	A-1-14	0	3	0	97*	0	0	0	31
4	A-1-24	0	0	3	0	97*	0	0	31
5	A-1-25	1	0	0	6	0	93*	0	146
6	A-1-02	14	30	11	30	2	13	0*	141
7	C-2-18	99*	0	0	1	0	0	0	147
8	C-1-18	2	90*	5	1	0	2	0	145
9	C-1-23	0	0	88*	13	0	0	0	24
10	C-2-12	3	0	0	74*	3	19	0	31
11	C-1-10	1	0	5	1	94*	0	0	147
12	C-1-04	1	1	0	2	0	96*	0	147
13	C-2-03	6	35	0	26	0	32	0*	31
14	EM-4-07	100*	0	0	0	0	0	0	32
15	EM-4-24	0	97*	0	0	3	0	0	31
16	EM-5-21	0	0	92*	0	8	0	0	24
17	EM-5-24	0	10	83*	3	3	0	0	30
18	EM-5-14	0	0	0	83*	3	13	0	30
19	EM-2-11	3	0	0	0	91*	3	3	32
20	EM-4-17	0	0	0	3	0	97*	0	30
21	EM-2-04	25	3	3	0	0	0	69*	32
22	GS-1-08	96*	0	0	0	4	0	0	24
23	GS-2-01	0	71*	3	13	0	13	0	31
24	GS-1-25	0	0	77*	0	19	3	0	31
25	GS-2-08	0	0	4	70*	0	26	0	23
26	GS-1-16	0	0	0	0	100*	0	0	24
27	GS-2-25	0	3	0	13	0	84*	0	31
28	GS-1-04	13	21	0	21	4	42	0*	24
29	JB-1-09	100*	0	0	0	0	0	0	32
30	JB-1-23	0	7	0	81*	0	11	0	27
31	JB-1-12	0	3	3	0	93*	0	0	29
32	JB-1-16	0	0	0	0	0	100*	0	30
33	JB-1-03	0	13	3	3	0	3	78*	32
34	JJ-4-07	100*	0	0	0	0	0	0	31
35	JJ-4-08	97*	0	0	0	3	0	0	31
36	JJ-5-05	3	93*	0	3	0	0	0	30
37	JJ-5-13	0	4	96*	0	0	0	0	25
38	JJ-3-12	0	0	15	76*	3	6	0	33
39	JJ-4-13	0	0	3	0	97*	0	0	30
40	JJ-3-20	0	12	0	0	0	88*	0	33
41	JJ-3-04	17	47	0	17	0	20	0*	30
42	JM-1-04	100*	0	0	0	0	0	0	24
43	JM-3-11	0	96*	0	0	0	4	0	23
44	JM-5-03	0	4	4	92*	0	0	0	24
45	JM-1-16	0	0	4	0	96*	0	0	24
46	JM-2-08	0	0	0	3	0	97*	0	31
47	JM-1-09	63	21	8	0	0	8	0*	24
48	MF-1-06	100*	0	0	0	0	0	0	31
49	MF-1-30	0	90*	3	0	0	6	0	31
50	MF-1-26	0	4	88*	0	0	8	0	24
51	MF-1-27	0	0	83*	0	17	0	0	24
52	MF-2-05	0	3	3	84*	6	3	0	31
53	MF-2-07	0	0	0	100*	0	0	0	24
54	MF-1-09	0	0	0	0	96*	4	0	24
55	MF-2-13	0	0	0	10	0	90*	0	30
56	MF-1-02	16	68	3	0	3	10	0*	31
57	MO-1-04	100*	0	0	0	0	0	0	24
58	MO-1-30	0	88*	4	0	0	8	0	24
59	MO-1-23	0	0	88*	0	13	0	0	24
60	MO-1-26	0	0	88*	8	4	0	0	24
61	MO-2-11	0	0	0	100*	0	0	0	24
62	MO-2-13	0	0	0	96*	0	4	0	24
63	MO-1-14	0	0	6	3	90*	0	0	31
64	MO-2-18	0	0	0	0	0	100*	0	24
65	MO-1-05	26	61	0	3	0	10	0*	31
66	NR-1-06	92*	0	4	0	4	0	0	24
67	NR-2-15	0	94*	0	3	3	0	0	31
68	NR-1-19	0	10	84*	0	3	3	0	31
69	NR-2-07	0	0	0	100*	0	0	0	31
70	NR-1-14	0	0	16	0	81*	3	0	31
71	NR-3-29	0	0	0	17	0	83*	0	24
72	NR-1-03	17	29	0	13	4	38	0*	24
73	PE-2-06	97*	0	0	0	0	0	3	32
74	PE-2-12	100*	0	0	0	0	0	0	31
75	PE-2-31	0	74*	16	3	0	6	0	31
76	PE-5-07	0	92*	8	0	0	0	0	24
77	PE-5-10	0	83*	0	4	0	13	0	24
78	PE-3-16	0	0	91*	2	7	0	0	44
79	PE-3-21	0	0	92*	4	4	0	0	25
80	PE-2-21	0	3	0	83*	7	7	0	30
81	PE-6-02	0	0	23	0	74*	3	0	31
82	PE-4-05	0	0	0	10	0	90*	0	31
83	PE-2-04	16	16	3	0	3	0	63*	32
84	PF-1-05	96*	0	0	0	4	0	0	24
85	PF-1-06	100*	0	0	0	0	0	0	31
86	PF-2-12	0	100*	0	0	0	0	0	24
87	PF-2-16	0	100*	0	0	0	0	0	31
88	PF-2-30	0	0	100*	0	0	0	0	31
89	PF-2-04	0	0	0	79*	0	21	0	24
90	PF-1-16	7	0	0	0	93*	0	0	30
91	PF-1-24	4	0	0	0	0	96*	0	24
92	PF-1-02	47	30	7	3	7	7	0*	30
93	SW-3-09	100*	0	0	0	0	0	0	24
94	SW-2-16	0	92*	0	0	0	8	0	24
95	SW-2-30	4	0	79*	0	8	8	0	24
96	SW-4-09	0	0	0	100*	0	0	0	30
97	SW-1-16	0	0	0	0	100*	0	0	31
98	SW-1-30	0	0	0	6	0	94*	0	31
99	SW-3-03	25	46	0	0	0	29	0*	24
100	WF-2-11	97*	0	0	0	0	3	0	32
101	WF-2-12	100*	0	0	0	0	0	0	31
102	WF-3-28	7	79*	0	3	3	7	0	29
103	WF-5-06	0	88*	0	4	0	8	0	24
104	WF-3-16	0	4	88*	0	4	4	0	25
105	WF-3-01	0	0	0	100*	0	0	0	30
106	WF-3-04	0	0	2	96*	0	2	0	45
107	WF-2-16	0	0	9	0	91*	0	0	69
108	WF-3-11	0	0	0	3	0	97*	0	29
109	WF-4-22	0	0	0	20	0	80*	0	30
110	WF-2-05	0	7	0	28	0	7	59*	29

○ In all cases where a zero appears in this column for a photo intended as neutral, neutral was not an available choice in the study (see text).

Procedure 2. Each slide was shown for 10 seconds to small groups of U.S. born college students. Again the number of male and female observers was approximately equal. The answer sheet listed the same six emotion words, but each emotion word was presented on a seven point scale, with neutral or no emotion at one end, and the intended emotion at the other. The observers rated every slide on each of the six emotion scales, i.e. they could rate a slide as showing maximum happiness and neutral on all other scales, or maximum on all six emotions, or some degree between the extremes.

To convert these data to a format comparable to the first procedure, each observer's ratings were reduced to a single judgment for each slide, i.e. the emotion to which he gave the highest rating. If he gave the same intensity rating to more than one emotion, or there was not a difference of at least two points between his ratings of two emotions expressed in a picture, his data were deleted from the analysis for that slide. (This procedure required deleting the data from less than 5 per cent of the observers.)

Procedure 2 was used in only one experiment. It is the only data source where observers could give "neutral" as a judgment choice (by circling the zero-point on all six emotion scales.)

The following table summarizes the results of these studies. All photographs in the present set were judged to show the intended emotion by at least 70 per cent of the observers. All but 11 were correctly rated more than 80 per cent of the time; 59 were correctly judged by more than 90 per cent of the raters.

Investigators using the slides may, of course, w to gather judgment norms using their own instru tions, response sheets, exposure times, experimenta procedure and subject populations to confirm selection of subsets of pictures, for any particular study.

Description of the Set of Slides

The present set of 110 35mm black and white slides are cardboard-mounted and numbered from 1 to 110, as listed in Table 2. Code numbers unique to each slide also appear in the picture with the poser identified by one or two letters. There are 14 different slides for all emotions except sadness (13) and fear (11). With three exceptions*, there are six male and eight female photographs for each emotion.

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Table 1. No. of Photographs Achieving Various Levels of Correct Judgments

Percent of correct judgments	Happy M	Happy F	Sad M	Sad F	Fear M	Fear F	Anger M	Anger F	Surprise M	Surprise F	Disgust M	Disgust F
71-80%			3		1	1	2	2	1		1	
81-90%			2	4	2	6	3	1		2	3	2
91-100%	9	9	3	5	4	1	2	7	· 5	6	3	6
TOTALS*	9	9	8	9	7	8	7	10	6	8	7	8

* Photos intended to pose a neutral face (N=14) were not included in this table as some were not used in the experiment which allowed neutral as a choice.

Complete data for each photograph are provided in Tables 2 and 3 at the end of this report. Table 2 is organized by poser, Table 3 by the six emotions expressed (plus "neutral"), but the data are identical in the two tables. The last column (N) showing number of judges appears only in Table 2.

* Anger and fear, 5 males each; Fear, 6 females.

Pictures of Facial Affect

For more than fifty years psychologists have explored relationships between facial expression and emotions. What emotions can be judged from viewing a face? How reliable are such judgments? How much does context influence judgments of emotion in faces? At what ages can children judge facial expressions of feelings? Do people of different cultures interpret facial expressions differently?

A review of this research can be found in Ekman, Friesen and Ellsworth (1972). Recently studies have addressed questions of personality differences in the ability to judge emotions and the relationship of brain hemisphere laterality to judgments of emotion from faces. Another interest in facial expressions has been to teach the accurate interpretation of the emotions expressed on the face. Allport in 1924 did one of the earliest of such studies. Presently, professionals in a number of fields are seeking to teach skills in interpreting emotions from facial expressions. Recently Ekman and Friesen (1975) published an extensively illustrated text designed to help those wishing to improve their skills in judging emotional reactions from facial expressions.

A major obstacle to all such research and training has been the lack of a comprehensive set of photographs of different people expressing the different emotions, yielding high inter-rater reliability, and widely available in pictures of consistently high technical quality. Frois-Wittman (1930) pioneered a set of photographs still in use. Unfortunately, the pictures are all posed by one person and they lack the quality which modern photographic technology can provide. The more recent Lightfoot Series (Schlosberg, 1954) suffers from the same defects. Both series have many photos that fail to produce satisfactory consensus among subjects in many studies.

The present set of 110 pictures represents a serious attempt to overcome the limitations of earlier efforts. With the aid of the best current technology in lighting and photography, more than a dozen persons were photographed repeatedly while attempting to express one of six emotions. Hundreds of photographs were studied over a period of several years to obtain a series which yielded consistent agreement among viewers about the emotion being expressed. The result is the *Pictures of Facial Affect*.

Development of the Pictures

Six frequently-experienced emotions believed to yield characteristic facial expressions were chosen for study. These were: happiness, sadness, fear, anger, disgust, and surprise. Posers were trained to contract or relax different facial muscles associated with various facial expressions. Generally, posers were instructed to activate certain muscles rather than to pose a particular emotion.

From hundreds of photographs, the present set was finally chosen on the basis of empirical studies which measured the consistency of judgments of the various pictures. Photographs which yielded highly consistent judgments and which fit the authors' theory of facial expressions of affect were finally selected for inclusion in the set, which now provides 14 posers for the six emotions (plus one photograph of each poser in a "neutral" expression).

Reliability Studies

The pictures of each person which the authors thought best represented the expressions of the six emotions were shown to groups of observers. They judged which of six emotion words best described each photograph. There were two variations in the judgment procedure and the norms were calculated differently for the two procedures to provide comparable normative data across all photographs in this set.

Procedure 1. Each slide was shown for 10 seconds to small groups of U.S. born college students. The number of male and female observers was approximately equal. The answer sheet provided a choice of six emotions: happy, sad, fear, anger, surprise and disgust. The observers selected the *one* word which best described the emotion expressed in each slide. The percentage of observers judging each of the six emotions was calculated for each slide.