

Picture database of emotional facial expressions: Technical Report

Anne-Cécile Treese, Michael Brinkmann & Mikael Johansson

Experimental Neuropsychology Unit, Department of Psychology, Saarland University,
Saarbrücken, Germany

Address correspondence to:

Anne-Cécile Treese

Experimental Neuropsychology Unit

Department of Psychology, Saarland University

66123 Saarbrücken, Germany

phone: ++49-681-302-64366

fax: ++49-681-302-6515

e-mail: annececile@genion.de

December, 09, 2003

Abstract

The objective of the present study was to develop a set of pictures with different emotional facial expressions to be used in empirical studies. The photographs included in the database were chosen from six face databases on the basis of empirical studies in which 1) a large student sample judged the pictures on emotional category, expressiveness and quality of the photograph and 2) trained experts judged the pictures based on the facial action coding system (FACS), (Ekman & Friesen, 1978). Based on the two ratings, three categories of facial expressions were formed for 204 pictures: positive, negative and neutral with 68 picture in each category.

1. Introduction

Research on the effects of emotion on various cognitive processes has re-emerged into prominence in the field of psychology. The manipulation of emotion using facial expressions as stimulus material seems evolutionary valid since research suggest that facial expressions represent the most potent emotionally relevant stimuli that humans respond to (Kolb & Taylor, 2000) and people across cultures categorize emotional faces in a similar way (Ekman & Friesen, 1975). Furthermore, emotional faces give rise to specific physiological responses that can be used as dependent variables when investigating the effects of emotion empirically, for example, in neuropsychological studies.

A major problem in research using emotional facial expressions is the lack of a large standardized set of pictures of different persons expressing emotions. Problems of existing face databases are 1) standardization (i.e. ratings etc.), 2) that photographs are predominantly of persons showing neutral expressions, and 3) there is a limited number of different persons displaying different facial expressions. The present database was formed in an attempt to provide a larger pool of photographs of three different emotional expressions (positive, negative and neutral) standardized according to the type of emotion, expressiveness and quality.

2. Methods**2.1 Participants**

Participants in the first rating were 85 undergraduate students (65 female; mean age: 23.8 years) at Saarland University. Two trained experts on the Facial Action Coding System (FACS) from the Clinical Psychology Unit, Department of Psychology at Saarland University participated in the second rating.

2.2 Stimulus materials

315 pictures were collected from various databases of faces: the Psychological Image Collection at Sterling (PICS), the AR face database (Martinez & Benavente, 1998), the University of Essex face database, Pictures of facial affect (Ekman & Friesen, 1975), Pictures from the Clinical Psychology Unit, Department of Psychology at Saarland University and pictures from the MPI of Cognitive Neuroscience, Leipzig. All pictures were cropped to show the face in frontal view and to exclude shoulders and clothes of the person. Furthermore, the pictures were standardized with respect to size (9 x 12 cm), color (grayscale), background (black) and contrast.

2.3 Student rating

The student sample rated each picture on the dimensions of: a) type of emotion, b) emotional expressiveness and c) picture quality. The pictures were presented by a video projector in a lecture room and controlled by the ERTS software package (Beringer, 1992). Each picture was shown for 5.5 s and the participants were asked to rate each picture on three dimensions (see Figure 1 in the Appendix for the questionnaire). The dimension “*type of emotion*” comprised nine categories (“happiness”, “anger”, “fear”, “sadness”, “disgust”, “contempt”, “surprise”, “neutral” and “other”). The second dimension “*emotional expressiveness*” had a four-point-scale (from 1 = “very expressive” to 4 = “not at all expressive”), and the third dimension “*picture quality*” also consisted of a four-point-scale (from 1 = “very good” to 4 = “bad”).

2.4 FACS rating

The trained FACS raters categorized the photographs into positive, negative, and neutral facial expressions according to the FACS criteria. In this coding schema, a specific expression is not labeled as “happy” or “sad”, but as a combination of observed action units. A defined action unit always represents one specific face muscle movement and if an expression consists of several movements it is coded as a combination of action units.

Furthermore, the FACS experts categorized the pictures into two additional categories. In the first category were pictures that did not correspond to FACS criteria, but were acceptable with respect to the rating they received by the students. Pictures in that first category were kept in the emotional category they had received by the students but coded for the different FACS rating (see column “FACS coding” in Table 1). A total of 41 photographs of the database belong to that category. For example, picture number 80 (ID: nm698a) was

rated as neutral (69,8%) by the student sample. However, according to FACS criteria, it contains action unit 12, which is a component of the expression “happiness”. A face coded as “happiness” is a composite of action units 6 and 12: the corners of the lips are drawn back and slightly up (action unit 12) and the cheeks are raised (action unit 6) (Ekman & Friesen, 1975). As this picture contains only one component of a “happy” face, we decided to keep it as a neutral picture. The second category comprised pictures for which no readily apparent FACS interpretation was available, even though they were rated as belonging to one of the emotional categories by the student sample. Seven photographs were in that second category and were excluded from further analysis.

3. Results

The evaluation of the student ratings for each picture was done in three steps. The ratings of “picture quality” was examined at first. The criterion for excluding a picture was more than 35% in the category “bad”. 20 Pictures were excluded based on this criterion. In a second step, ratings of “emotional expressiveness” were examined. The criterion for excluding a picture was 20% or more in the category “not at all expressive”. 22 pictures were excluded based on this criterion. In a last step the assignments for “type of emotion” were pooled into three categories: positive, negative and neutral. Positive pictures consist of pictures belonging to the category “happiness”, negative pictures consist of pictures rated as “anger”, “fear”, “disgust”, “sadness” or “contempt” and neutral pictures consist of pictures rated as “neutral” or “surprise”. The minimum percentage for a positive picture was 60% in the category “happiness”, (e.g. picture No.137 (ID: pm884a): 88,4% in the category happiness). The required minimum percentage for a negative picture was 40% for the sum of the five negative expressions (anger, fear, disgust, sadness, contempt), (e.g. picture No.32 (ID: em895a): 20,9% disgust + 12,8% sadness + 45,3% anger + 9,3% fear + 1,2% contempt =89,5% > 40%). The minimum percentage for a neutral picture was 50% for the sum of the two neutral expressions (neutral, surprise), (e.g. picture No. 129 (ID: nm909a): 90,9% neutral). Table 1 summarizes the results of the two ratings where the mean type of emotion rating is given for each photograph. The ID of each picture indicates the type of emotion (“e” for negative, “n” for neutral and “p” for positive), sex (“m” for masculin and “w” for feminin) and the rating value (e.g. 709 for 70,9 percent of rating). A, b, c are used to separate items with same rating values.

4. Discussion

Based on the two ratings, a picture database was formed comprising 204 pictures of unknown faces (50% female) with either positive (68), negative (68) or neutral (68) facial expressions that can be used as stimulus material in empirical research.

5. Acknowledgements

We wish to thank Anke Kirsch and Jörg Merten from the Clinical Psychology Unit, Department of Psychology, Saarland University for the expert rating and for productive discussions during this project.

6. Appendix

Bild Nr.: (Picture number)	Welche Emotion würdest Du zuordnen? (Which emotion would you assign to the picture?)	Wie eindeutig ist der Gesichtsausdruck? (How expressive is the face?)	Wie gut ist die Bildqualität? (How good is the picture quality?)
1	<input type="checkbox"/> Freude (<i>happiness</i>) <input type="checkbox"/> Ekel (<i>disgust</i>) <input type="checkbox"/> Trauer (<i>sadness</i>) <input type="checkbox"/> Ärger (<i>anger</i>) <input type="checkbox"/> Angst (<i>fear</i>) <input type="checkbox"/> Überraschung (<i>surprise</i>) <input type="checkbox"/> Verachtung (<i>contempt</i>) <input type="checkbox"/> Neutral (<i>neutral</i>) <input type="checkbox"/> Andere: (<i>other</i>)	<input type="checkbox"/> sehr eindeutig (<i>very expressive</i>) <input type="checkbox"/> eindeutig (<i>expressive</i>) <input type="checkbox"/> weniger eindeutig (<i>less expressive</i>) <input type="checkbox"/> uneindeutig (<i>not expressive</i>)	<input type="checkbox"/> sehr gut (<i>very good</i>) <input type="checkbox"/> gut (<i>good</i>) <input type="checkbox"/> weniger gut (<i>less good</i>) <input type="checkbox"/> schlecht (<i>bad</i>)

Figure 1. Example of the student rating questionnaire. Literal English, translations in parenthesis.

Table 1. Percent of ratings for each type of emotion and for each picture

No.	ID	Basic emotion	FACS coding	Emotion	Hap	dis	sad	ang	fear	sur	con	neu	oth
1	em709a	dis, ang, con	-	negative	0	20	2,3	20	9,3	8,1	20	17	1,2
2	em779a	anger	-	negative	0	1,2	7	49	9,3	8,1	12	7	2,3
3	em535a	neutral	-	negative	8,1	4,7	27	7	3,5	0	12	37	0
4	ew523a	surprise	-	negative	0	5,8	17	8,1	11	30	11	14	1,2
5	em535b	neutral	-	negative	0	0	22	14	11	2,3	7	36	1,2
6	em605a	anger	-	negative	0	2,3	2,3	26	14	19	16	19	1,2
7	em616a	neutral	neutral	negative	0	0	44	4,7	2,3	1,2	11	35	2,3
8	em512a	neutral	-	negative	0	2,3	20	12	3,5	7	14	37	3,5
9	ew593a	neutral	-	negative	0	7	15	3,5	29	9,3	4,7	28	0
10	ew523a	neutral	-	negative	1,2	0	29	13	0	1,2	11	42	2,3
11	ew802a	sadness	neutral	negative	0	1,2	50	12	4,7	0	13	17	1,2
12	ew698a	contempt	-	negative	2,3	1,2	8,1	20	2,3	2,3	38	22	3,5
13	ew523b	neutral	neutral	negative	0	0	35	5,8	8,1	0	3,5	45	1,2
14	ew919a	anger	-	negative	1,2	3,5	30	50	0	0	8,1	3,5	2,3
15	ew640a	neutral	neutral	negative	0	1,2	26	9,3	11	2,3	17	30	1,2
16	ew872a	sadness	neutral	negative	0	2,3	52	11	8,1	0	14	9,3	1,2
17	ew884a	sadness	-	negative	2,3	2,3	54	19	8,1	0	5,8	8,1	0
18	em872a	anger	-	negative	1,2	5,8	2,3	43	2,3	1,2	34	4,7	2,3
19	em872b	anger	-	negative	0	0	5,8	56	11	1,2	15	4,7	3,5
20	em814a	anger	-	negative	3,5	3,5	4,7	47	1,2	4,7	26	2,3	4,7
21	em814b	anger	-	negative	0	3,5	3,5	36	8,1	4,7	30	8,1	5,8
22	em872c	anger	-	negative	1,2	4,7	13	44	8,1	2,3	17	7	1,2
23	em767a	anger	-	negative	8,1	9,3	0	48	19	7	1,2	1,2	4,7
24	em663a	anger	-	negative	3,5	15	3,5	40	7	11	1,2	4,7	3,5
25	em826a	anger	-	negative	7	3,5	4,7	64	9,3	2,3	1,2	0	7
26	em779b	anger	-	negative	3,5	9,3	0	52	12	2,3	4,7	4,7	4,7
27	em744a	anger	-	negative	9,3	5,8	4,7	42	21	2,3	1,2	0	11
28	em930a	anger	-	negative	0	1,2	5,8	69	1,2	5,8	16	0	1,2
29	em872d	anger	-	negative	0	5,8	4,7	61	11	4,7	5,8	1,2	3,5
30	em663b	contempt	-	negative	7	0	22	14	5,8	4,7	24	15	2,3
31	em663c	anger	-	negative	0	14	3,5	33	14	5,8	2,3	7	15
32	em895a	anger	-	negative	3,5	21	13	45	9,3	0	1,2	1,2	1,2
33	em698a	anger	-	negative	0	4,7	13	27	15	1,2	11	21	3,5
34	em663d	anger	-	negative	5,8	7	2,3	36	17	7	3,5	1,2	15
35	em930b	anger	-	negative	0	13	2,3	65	0	3,5	13	0	1,2
36	em791a	anger	-	negative	0	1,2	3,5	54	11	15	11	3,5	0
37	em895b	anger	-	negative	0	2,3	2,3	72	1,2	3,5	12	4,7	1,2
38	em767b	anger	-	negative	0	8,1	0	52	15	21	1,2	1,2	1,2
39	em930c	anger	-	negative	0	4,7	1,2	79	1,2	3,5	7	0	2,3
40	em826b	anger	-	negative	0	2,3	0	74	1,2	4,7	4,7	3,5	2,3
41	em895c	anger	-	negative	0	0	30	40	7	0	13	1,2	7
42	ew849a	anger	-	negative	0	8,1	11	44	11	0	12	8,1	1,2
43	ew663a	anger	-	negative	2,3	13	2,3	26	3,5	14	22	7	5,8
44	ew860a	anger	-	negative	0	1,2	0	80	3,5	3,5	1,2	1,2	2,3
45	ew895a	anger	-	negative	2,3	7	2,3	72	8,1	0	0	2,3	4,7
46	ew523c	neutral	-	negative	1,2	0	20	15	4,7	2,3	13	37	3,5
47	ew686a	anger	-	negative	1,2	8,1	7	28	23	9,3	2,3	7	11
48	ew523d	neutral	-	negative	0	0	27	17	3,5	0	4,7	43	1,2
49	ew709a	sadness	-	negative	0	2,3	29	15	4,7	1,2	20	26	0

Table 1 continued.

No.	ID	Basic emotion	FACS coding	Emotion	Hap	dis	sad	ang	fear	sur	con	neu	oth
50	ew802b	sadness	neutral	negative	5,8	3,5	41	16	1,2	1,2	19	8,1	1,2
51	ew779a	anger	-	negative	0	1,2	7	55	5,8	2,3	9,3	12	0
52	ew756a	anger	neutral	negative	0	14	1,2	37	22	8,1	1,2	2,3	12
53	ew907a	sadness	-	negative	0	1,2	31	28	24	3,5	5,8	2,3	1,2
54	ew942a	anger	-	negative	0	0	0	76	2,3	0	16	1,2	1,2
55	ew767a	anger	-	negative	4,7	3,5	2,3	56	7	5,8	8,1	3,5	5,8
56	ew930a	anger	-	negative	0	4,7	8,1	57	17	5,8	5,8	0	1,2
57	ew814a	anger	-	negative	1,2	2,3	1,2	76	0	2,3	2,3	4,7	0
58	ew930b	anger	-	negative	0	8,1	3,5	54	20	2,3	8,1	1,2	1,2
59	ew977a	anger	-	negative	0	0	0	88	0	0	9,3	0	1,2
60	ew884b	anger	-	negative	0	7	1,2	72	0	0	8,1	1,2	4,7
61	ew907b	anger	-	negative	1,2	2,3	2,3	78	1,2	0	7	3,5	1,2
62	em593a	contempt	-	negative	3,5	5,8	3,5	13	7	3,5	30	19	13
63	em663e	neutral	neutral	negative	0	0	50	2,3	11	5,8	3,5	24	1,2
64	em826c	anger	-	negative	0	4,7	22	27	9,3	1,2	20	14	0
65	em618a	neutral	neutral	negative	0	0	22	24	1,8	1,8	15	33	3,6
66	ew745a	anger	neutral	negative	1,8	1,8	33	18	0	1,8	22	20	0
67	ew727a	anger	neutral	negative	0	1,8	60	3,6	1,8	0	5,5	26	1,8
68	ew636a	anger	-	negative	0	0	40	15	5,5	1,8	3,6	31	1,8
69	nm663a	neutral	negative	neutral	17	0	3,5	8,1	1,2	4,7	2,3	62	1,2
70	nm686a	neutral	-	neutral	1,2	1,2	5,8	4,7	13	23	1,2	45	2,3
71	nm779a	neutral	-	neutral	14	0	1,2	1,2	1,2	14	2,3	64	1,2
72	nm640a	neutral	-	neutral	1,2	1,2	7	2,3	9,3	4,7	12	59	1,2
73	nm535a	neutral	-	neutral	0	0	3,5	8,1	1,2	0	28	54	0
74	nm721a	neutral	-	neutral	1,2	0	2,3	12	1,2	0	11	72	0
75	nm616a	neutral	-	neutral	2,3	0	19	5,8	8,1	12	1,2	50	0
76	nm721b	surprise	-	neutral	1,2	0	1,2	0	23	63	1,2	9,3	1,2
77	nm547a	neutral	-	neutral	3,5	1,2	19	2,3	3,5	1,2	12	54	1,2
78	nm756a	neutral	hap+sad	neutral	0	0	12	3,5	0	1,2	7	74	0
79	nm814a	neutral	surprise	neutral	1,2	0	3,5	3,5	2,3	4,7	3,5	77	3,5
80	nm698a	neutral	positive	neutral	8,1	0	15	0	1,2	5,8	0	64	1,2
81	nm791a	neutral	-	neutral	0	0	3,5	5,8	0	1,2	2,3	78	0
82	nm686b	neutral	positive	neutral	1,2	0	5,8	4,7	1,2	11	4,7	58	0
83	nm791b	neutral	-	neutral	0	0	8,1	3,5	1,2	1,2	7	78	1,2
84	nm512a	neutral	-	neutral	3,5	0	16	13	5,8	5,8	8,1	45	2,3
85	nm581a	neutral	-	neutral	0	0	15	13	1,2	0	4,7	58	3,5
86	nm767a	neutral	-	neutral	14	0	1,2	0	1,2	2,3	4,7	74	2,3
87	nm674a	neutral	-	neutral	0	1,2	9,3	3,5	5,8	11	3,5	57	4,7
88	nm558a	neutral	-	neutral	4,7	1,2	9,3	9,3	4,7	2,3	3,5	54	0
89	nw744a	neutral	-	neutral	3,5	0	1,2	2,3	7	14	2,3	61	3,5
90	nw628a	neutral	positive	neutral	0	1,2	11	2,3	2,3	21	19	42	1,2
91	nw547a	neutral	positive	neutral	15	2,3	5,8	3,5	2,3	19	14	36	1,2
92	nw744b	neutral	-	neutral	2,3	0	11	3,5	1,2	3,5	5,8	71	1,2
93	nw849a	neutral	-	neutral	1,2	0	5,8	2,3	2,3	3,5	2,3	81	0
94	nw581a	neutral	-	neutral	13	5,8	4,7	0	1,2	2,3	14	56	1,2
95	nw767a	neutral	-	neutral	19	0	2,3	0	1,2	15	0	62	1,2
96	nw536a	neutral	-	neutral	16	2,3	13	1,2	3,5	4,7	11	41	4,7
97	nw570a	neutral	negative	neutral	3,5	0	24	3,5	5,8	3,5	4,7	54	1,2
98	nw860a	neutral	-	neutral	5,8	0	2,3	1,2	1,2	8,1	1,2	78	0

Table 1 continued.

No.	ID	Basic emotion	FACS coding	Emotion	Hap	dis	sad	ang	fear	sur	con	neu	oth
99	nw535a	neutral	negative	neutral	3,5	1,2	19	1,2	14	8,1	3,5	45	3,5
100	nw593a	neutral	sadness	neutral	3,5	0	12	0	1,2	4,7	14	55	3,5
101	nw721a	neutral	-	neutral	1,2	0	9,3	1,2	1,2	4,7	9,3	67	4,7
102	nw686b	neutral	-	neutral	2,3	0	12	0	5,8	2,3	3,5	66	2,3
103	nw686c	neutral	positive	neutral	9,3	2,3	4,7	0	3,5	30	7	38	2,3
104	nw488a	neutral	-	neutral	11	0	12	0	1,2	3,5	26	45	2,3
105	nm686c	surprise	negative	neutral	0	3,5	1,2	3,5	19	42	1,2	27	2,3
106	nm674b	neutral	neg (sad)	neutral	0	0	14	7	3,5	8,1	4,7	59	0
107	nw698a	neutral	positive	neutral	0	0	19	2,3	1,2	1,2	8,1	69	0
108	nw640a	neutral	-	neutral	0	0	14	7	5,8	1,2	5,8	63	2,3
109	nm523a	neutral	positive	neutral	37	0	1,2	0	0	13	0	40	0
110	nw512a	neutral	positive	neutral	36	0	2,3	0	2,3	7	3,5	44	2,3
111	nw547b	neutral	positive	neutral	33	0	0	1,2	0	1,2	0	54	2,3
112	nw686d	neutral	-	neutral	14	1,2	8,1	0	1,2	3,5	1,2	65	3,5
113	nm523b	neutral	-	neutral	0	0	33	2,3	9,3	1,2	1,2	51	1,2
114	nm721c	neutral	-	neutral	2,3	1,2	3,5	7	2,3	31	7	41	4,7
115	nm616b	neutral	-	neutral	2,3	0	8,1	7	9,3	17	8,1	44	2,3
116	nm674c	neutral	-	neutral	0	0	8,1	5,8	1,2	0	16	67	0
117	nm581b	neutral	-	neutral	4,7	1,2	8,1	7	5,8	3,5	9,3	55	1,2
118	nm663b	neutral	-	neutral	9,3	0	2,3	3,5	2,3	2,3	5,8	64	3,5
119	nm529a	neutral	-	neutral	3,5	0	14	15	1,2	0	13	52	0
120	nm674d	neutral	-	neutral	1,2	0	3,5	5,8	2,3	2,3	7	65	1,2
121	nm547b	neutral	-	neutral	0	0	16	2,3	7	3,5	14	51	4,7
122	nm535b	neutral	negative	neutral	1,2	1,2	12	17	2,3	0	9,3	54	1,2
123	nm837a	surprise	-	neutral	1,2	1,2	0	3,5	8,1	47	0	37	0
124	nm837b	neutral	-	neutral	2,3	1,2	3,5	2,3	3,5	21	2,3	63	0
125	nw593b	neutral	-	neutral	1,2	1,2	9,3	9,3	9,3	5,8	7	54	1,2
126	nm673a	neutral	positive	neutral	22	0	3,6	1,8	3,6	1,8	0	66	0
127	nm800a	neutral	-	neutral	1,8	0	13	0	3,6	0	1,8	80	0
128	nm673b	neutral	positive	neutral	0	0	20	0	5,5	0	1,8	67	1,8
129	nm909a	neutral	-	neutral	0	0	7,3	0	0	0	1,8	91	0
130	nm727a	andere	-	neutral	0	3,6	5,5	7,3	3,6	3,6	3,6	69	0
131	nm545a	neutral	-	neutral	5,5	0	1,8	29	1,8	0	0	55	0
132	nw782a	neutral	-	neutral	3,6	0	5,5	7,3	0	1,8	1,8	76	0
133	nw836a	neutral	-	neutral	3,6	0	1,8	9,1	0	1,8	1,8	82	0
134	nw800a	neutral	-	neutral	11	0	3,6	1,8	0	0	1,8	80	1,8
135	nw673a	neutral	-	neutral	0	5,5	1,8	11	3,6	3,6	9,1	64	0
136	nw709b	neutral	-	neutral	0	0	5,5	13	0	0	9,1	71	0
137	pm884a	happiness	-	positive	88	0	0	0	0	4,7	0	2,3	1,2
138	pm802a	happiness	-	positive	80	0	0	0	0	15	0	4,7	0
139	pm942a	happiness	-	positive	94	0	1,2	0	0	2,3	0	1,2	1,2
140	pm640a	happiness	-	positive	64	0	0	0	1,2	34	0	0	1,2
141	pm767a	happiness	-	positive	77	3,5	1,2	2,3	3,5	3,5	2,3	2,3	3,5
142	pm988a	happiness	-	positive	99	0	0	0	0	0	0	0	0
143	pm826a	happiness	-	positive	83	0	1,2	0	0	5,8	0	5,8	0
144	pm872a	happiness	-	positive	87	0	1,2	1,2	0	1,2	2,3	1,2	0
145	pm733a	happiness	-	positive	73	1,2	0	0	1,2	20	0	3,5	0
146	pm930b	happiness	-	positive	93	0	2,3	0	0	1,2	1,2	0	1,2
147	pm977a	happiness	-	positive	98	0	0	0	0	2,3	0	0	0

Table 1 continued.

No.	ID	Basic emotion	FACS coding	Emotion	Hap	dis	sad	ang	fear	sur	con	neu	oth
148	pm965a	happiness	-	positive	97	0	0	0	0	3,5	0	0	0
149	pm674a	happiness	-	positive	67	0	0	0	0	20	2,3	4,7	2,3
150	pm814a	happiness	-	positive	81	0	1,2	3,5	0	7	1,2	4,7	1,2
151	pm872b	happiness	-	positive	87	0	0	1,2	0	3,5	1,2	2,3	1,2
152	pm895a	happiness	-	positive	90	0	0	0	0	0	1,2	0	0
153	pm767b	happiness	contempt	positive	77	1,2	1,2	0	0	4,7	2,3	9,3	3,5
154	pm826b	happiness	-	positive	83	0	1,2	0	0	5,8	2,3	5,8	1,2
155	pm884b	happiness	controlled	positive	88	0	1,2	0	1,2	4,7	0	0	0
156	pm953b	happiness	-	positive	95	0	0	0	0	3,5	0	1,2	0
157	pm930c	happiness	-	positive	93	0	0	0	1,2	0	0	0	1,2
158	pm965b	happiness	-	positive	97	0	0	0	0	1,2	2,3	0	0
159	pm651a	happiness	-	positive	65	0	0	0	0	2,3	7	21	2,3
160	pm953c	happiness	-	positive	95	0	0	0	0	2,3	1,2	0	0
161	pm628a	happiness	sadness	positive	63	1,2	0	0	0	0	8,1	27	0
162	pm733b	happiness	-	positive	73	2,3	0	2,3	0	12	1,2	3,5	1,2
163	pm895b	happiness	-	positive	90	0	0	0	0	0	0	1,2	0
164	pm767c	happiness	controlled	positive	77	3,5	0	3,5	0	5,8	2,3	2,3	1,2
165	pm849a	happiness	-	positive	85	0	1,2	2,3	1,2	4,7	0	3,5	1,2
166	pm872c	happiness	-	positive	87	0	0	0	0	0	2,3	5,8	2,3
167	pm826c	happiness	-	positive	83	0	0	1,2	1,2	4,7	2,3	1,2	2,3
168	pw674a	happiness	controlled	positive	67	0	0	0	0	4,7	2,3	21	0
169	pw733a	happiness	-	positive	73	0	1,2	0	0	21	0	4,7	0
170	pw674b	happiness	surprise	positive	67	0	0	0	4,7	15	0	8,1	2,3
171	pw953a	happiness	-	positive	95	1,2	0	0	0	0	0	2,3	1,2
172	pw942a	happiness	-	positive	94	0	0	0	0	0	0	4,7	1,2
173	pw860a	happiness	-	positive	86	0	0	0	0	2,3	0	8,1	2,3
174	pw884a	happiness	-	positive	88	0	0	0	0	0	0	4,7	1,2
175	pw953b	happiness	-	positive	95	0	0	0	0	3,5	0	0	1,2
176	pw884b	happiness	-	positive	88	0	0	0	0	5,8	0	0	1,2
177	pw849b	happiness	controlled	positive	85	1,2	1,2	0	0	5,8	0	3,5	0
178	pw884c	happiness	-	positive	88	0	0	0	0	7	1,2	2,3	1,2
179	pw686a	happiness	contempt	positive	69	1,2	1,2	1,2	1,2	4,7	2,3	16	1,2
180	pw872a	happiness	-	positive	87	0	0	1,2	0	0	0	2,3	0
181	pw837a	happiness	-	positive	84	0	0	0	0	1,2	3,5	11	1,2
182	pw791a	happiness	-	positive	79	1,2	1,2	1,2	1,2	2,3	1,2	12	1,2
183	pw953c	happiness	-	positive	95	0	0	1,2	0	1,2	0	1,2	0
184	pw791b	happiness	-	positive	79	0	0	0	0	2,3	0	3,5	0
185	pw965a	happiness	-	positive	97	0	0	0	0	0	0	0	1,2
186	pw884d	happiness	-	positive	88	0	0	0	0	0	2,3	7	2,3
187	pw849c	happiness	-	positive	85	0	0	1,2	0	3,5	2,3	7	0
188	pw860b	happiness	-	positive	86	2,3	0	0	1,2	3,5	0	2,3	0
189	pw756a	happiness	-	positive	76	0	0	0	2,3	2,3	0	17	1,2
190	pw779a	happiness	-	positive	78	0	0	0	0	14	1,2	0	1,2
191	pw907a	happiness	-	positive	91	1,2	0	0	0	2,3	3,5	1,2	0
192	pw965b	happiness	-	positive	97	0	0	0	0	1,2	0	0	1,2
193	pw930a	happiness	-	positive	93	0	1,2	1,2	0	0	1,2	1,2	0
194	pw942b	happiness	-	positive	94	0	0	0	1,2	0	0	0	0
195	pw860c	happiness	-	positive	86	0	0	2,3	0	0	2,3	5,8	2,3
196	pw849d	happiness	-	positive	85	0	0	1,2	0	1,2	1,2	3,5	0

Table 1 continued.

No.	ID	Basic emotion*	FACS coding**	Emotion	Hap	dis	sad	ang	fear	sur	con	neu	oth
197	pm982a	happiness	-	positive	98	0	0	0	0	1,8	0	0	0
198	pm982b	happiness	-	positive	98	0	0	0	0	0	0	1,8	0
199	pw782a	happiness	-	positive	78	0	0	0	0	15	0	5,5	1,8
200	pw909a	happiness	-	positive	91	0	1,8	0	0	1,8	1,8	1,8	1,8
201	pw927a	happiness	-	positive	93	0	0	0	0	3,6	0	1,8	1,8
202	pw873a	happiness	-	positive	87	0	0	0	0	3,6	9,1	0	0
203	pw927b	happiness	controlled	positive	93	0	0	0	0	0	0	5,5	1,8
204	pw964a	happiness	controlled	positive	96	0	0	0	0	0	0	1,8	1,8

Note: hap = happiness, sad = sadness, ang = anger, sur = surprise, disg = disgust, neu = neutral, oth = other (Ekman & Friesen, 1976). The column "FACS coding" indexes pictures belonging to the category that are not positive, negative or neutral based on FACS criteria but that are still acceptable.

7. References

- Ekman, P. & Friesen, W. V. (1978). *Facial action coding system: A technique for the measurement of facial movement*. Palo Alto, Calif.: Consulting Psychologists Press.
- Ekman, P. and Friesen, W.V. (1984) *Unmasking the Face* Palo Alto, Calif.: Consulting Psychologists.
- Ekman. P. (1994). Strong evidence for universals in facial expressions: a reply to russell's mistaken critique. *Psychological Bulletin*, 115(2), 268-287.
- Lane. R. D.. Nadel. L. (2000). *Cognitive neuroscience of emotion*. New York: Oxford University Press.
- Martinez. A.M. & Benavente. R. *The AR Face Database*. CVC Technical Report. 24. June 1988.
- Pictures of facial affect*. Developed by DRS. Ekman. P. & Friesen. Human Interaction Laboratory. University of California Medical Center. San Francisco – 1976.
- The Psychological Image Collection at Stirling (PICS)*. University of Stirling Psychology Department. Retrieved November 5. 2001. from <http://pics.psych.stir.ac.uk/>.
- University of Essex face database*. Retrieved November 5. 2001. from [http:// hp1.essex.ac.uk/projects/vision /faces/](http://hp1.essex.ac.uk/projects/vision/faces/).