Adding support to cross-cultural emotional assessment: Validation of the International Affective Picture System in a Chilean sample[*]

Un apoyo a la evaluación transcultural de la emoción: validación del International Affective Picture System en una muestra chilena

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ABSTRACT

The present study aimed to obtain a valid set of images of the International Affective Picture System (Lang, Bradley & Cuthbert, 2005) –a widely used instrumentation in emotion research- in a Chilean sample, as well as comparing these results with those obtained from the US study in order to con tribute to its cross-cultural validation. A sample of 135 college students assessed 188 pictures according to standard instructions in valence and arousal dimensions. The results showed the expected organization of affectivity, with variations between sex in valence judgments, and differences between countries in the arousal dimension. It is concluded that the Chilean adaptation of the IAPS is consistent with the previous evidence, adding support to it cross-cultural validity.

Key words authors
Affective Valence, Arousal, Cross-Cultural Differences, Emotional Assessment.
Key words plus
Psychological Research, Psychological Tests, Social Behaviour, Interpersonal Relations, Emotions, Cultural Interaction.

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RESUMEN

El presente estudio tiene como objetivo validar un conjunto de imágenes del International Affective Picture System (IAPS) de Lang, Bradley y Cuthbert (2005) –un instrumento ampliamente utilizado en investigación afectiva– en una muestra chilena, así como comparar sus resultados con aquellos obtenidos en el estudio estadounidense, en vistas a contribuir a su validación intercultural. Se utilizó una muestra de 135 estudiantes universitarios, quienes evaluaron 188 imágenes en las dimensiones de valencia y *arousal*, de acuerdo con instrucciones estándar. Los resultados muestran la organización esperada de la afectividad, con variaciones entre sexos en la valoración de valencia, y diferencias entre países en la dimensión de *arousal*. Se concluye que la adaptación chilena del IAPS es consistente con los estudios previos, lo cual añade evidencia a favor de su validez intercultural.

Palabras clave autores
Arousal, diferencias interculturales, evaluación afectiva, valencia afectiva.
Palabras clave descriptores
Investigación psicológica, test psicológico, comportamiento social, relaciones interpersonales, afectividad, interacción cultural.

Introduction

The scientific study of emotions has been an emblematic topic for psychology. In fact, considerable conceptual and methodological challenges have been posed by diverse authors from the beginnings of the discipline to nowadays to uncover the quintessence of emotion. Modern techniques have confirmed and refined what was already stated by pioneers like James, Lange and Wundt: emotions are by definition adaptive body responses that activate the organism in response to environmental stimuli. There is no doubt that with the advent of psychophysiology and neuroscience a deeper understanding of the biological and neurophysiological basis of the emotional phenomenon has been achieved (for example, see Carretie, 2001; Davidson, 2003). At the present time, there is a vast consensus that emotions are action dispositions that have been modeled throughout evolution, with a high degree of phylogenetic conservation (Lang, 1995).

Several authors have argued for the existence of a biphasic structure of affectivity that accounts for two motivational systems: one appetitive and another aversive (Davidson, 2003; Lang, 1995; Lang, Bradley & Cuthbert, 1990). The first of these systems is responsible for approaching behaviors, attachment and consummatory acts when safety is perceived, whereas the activation of the latter allows withdrawal, escape and defense in threatening situations. Any emotional reaction can be placed in the approach-avoidance continuum and this defines a specific action pattern that is consistent with the underlying state of the central affect-motivational organization. This motivated behavior has an evolutionary basis that has shaped both central (cerebral) and peripheral (somatic and autonomic) components that account for each motivational system, that have been specified by diverse studies with animals (Fanselow, 1994; Kapp, Frysinger, Gallagher & Haselton, 1979; LeDoux, 1990) and humans (Bradley, Codispoti, Cuthbert & Lang, 2001a; Bradley, Codispoti, Sabatinelli & Lang, 2001b; Palomba, Sarlo, Angrilli,

Mini & Stegagno, 2000; Schupp, Cuthbert, Bradley, Birbaumer & Lang, 1997).

Based on the revision of diverse theorists of emotions, Bradley and Lang (2007) propose that affective motivational activation can be judged by two dimensions: the hedonic valence that indexes which motivational system is engaged, and the arousal dimension, which expresses its activation degree. Also, they highlight the need to rely on valid and standardized metrics in emotion research, considering the diversity of physical parameters by which the emotional stimuli can be defined and emotional states can be induced, leading to incomparability of results among different studies. Thus, the authors have made an important effort in order to collect and standardize pictures that represent a wide spectrum of experiences linked to human life, which have been arranged in a large database named the International Affective Picture System (IAPS), (Lang, Bradley & Cuthbert, 2005).

The IAPS pictures depict emotional situations that are rated in valence, arousal and dominance dimensions using the Self-Assessment Manikin (SAM), (Lang, 1980), a 9-point analogue scale, for both men and women. An "affective space" with a boomerang shape appears when the total ratings for each image are plotted according to the valence and arousal dimensions in the Y and X axis, respectively. The characteristics of the affective space are consistent with the theoretical organization of affectivity: hedonic ratings become more positive and negative as arousal levels increase, revealing that the amount of arousal reflects the degree of activation in both appetitive and defensive systems. The psychometric properties of the IAPS have been optimal in both reliability and validity (Bradley & Lang, 2007; Lang, 1995).

Diverse studies have shown the robustness of the primary motivational systems. Electrophysiological results tend to be replicated across studies (e.g. Amrhein, Mülberger, Pauli & Wiedemann, 2004; Bradley et al., 2001a; see also Olofsson, Nordin, Sequeira & Polich, 2008, for a detailed event-related potential's review). Standardization reports for the IAPS have been also conducted in

different countries, such as Brazil, Spain, and the US, as well as validation and adaptation studies in Germany and Belgium. A comparative reading of this evidence shows similarity among methodological aspects, with main variations in the number and extraction procedure of pictures as well as the inclusion, or not, of the dominance dimension of the SAM. This allows relative consistence between studies, thus, a considerable degree of comparability between results.

In the Brazilian validation of the IAPS (Lasaitis, Ribeiro & Bueno, 2008; Ribeiro, Pompéia & Bueno, 2004, 2005) results in the valence dimension are equivalent to the US standardization, whereas arousal scores are higher in Brazil. Also, and for the same pictures set, Brazilian students reveal a stronger linear association between valence and arousal ($r = -0.82$) than the US normative ($r = -0.25$), which is explained by the authors by the tendency of Brazilians to nominate positive pictures as less arousing. In the German adaptation (Grühn & Scheibe, 2008) a strong negative correlation between valence and arousal is emphasized ($r = -0.79$), whereas this association in the US study was smaller ($r = -0.47$). Although erotic pictures were perceived as more positive and less arousing by the US sample, Spanish results (Moltó et al., 1999; Vila et al., 2001) are comparable in valence to the US study but with lower arousal scores; while the Belgium data (Verschuere, Crombez & Koster, 2007) shows similar results for both dimensions when compared to the US norm.

In sum, results are consistent across the different standardization and validation studies of the IAPS, pointing to a high conservation in the predicted organization of affectivity. Variations in the association between valence and arousal dimension are observed across some countries, which can be in part due to methodological or conceptual issues related to the understanding of the meaning of the dimensions (e. g., arousal dimension, Ribeiro et al., 2005). Alternatively, differences might be consistent with the observation that the IAPS can be sensitive to detect cultural differences in emotion disposition (Bradley & Lang, 2005).

The present study was aimed to attain a valid set of the IAPS pictures in a Chilean sample. Also, due to the relevance in obtaining cross-cultural information regarding the validity of affectivity assessment by the IAPS, a comparison between US and Chilean results was made. It was expected that the judgment of the pictures would follow previous findings in the structure of the affective space, and more arousing scores were hypothesized to emerge from negative pictures in relation to positive ones. Some studies have shown that the arousal dimension is sensitive to cultural differences among countries, wherein the IAPS has been validated (i.e. Grühn & Scheibe, 2008; Ribeiro, Pompéia & Amodeo, 2004, 2005). Therefore, possible discrepancies in the arousal dimension between the Chilean and the US studies were expected to occur.

Method

Participants

A total sample of 135 psychology college students were recruited, with a mean age of 20.13 (*SD* = 2.29) and from which 65% were women. All the participants participated voluntarily in the research.

Stimuli

One hundred and eighty eight colored pictures were selected from the IAPS database. Since this study was part of a broader research, slides were intentionally extracted and picture content was chosen to depict household objects or people in diverse social situations. The picture numbers are presented in Appendix 1

Procedure

Data collection was carried out during classroom hours in an introductory psychology course. Pictures were assessed by two subsamples of 68 and 67 participants each; the first one rated 105 pictures and, the second one, 83 pictures. In a first step,

the class instructor agreed to provide 45 minutes approximately for the pictures assessment. Due to time restrictions, groups of participants were conformed according to the number of students attending the class, ranging from 10 to 40 participants per group, with a total number of five groups. The researcher then introduced herself and briefly exposed the aim of the study, as part of a broader research aimed to obtain valid material for laboratory assessment. Voluntary participation was required, allowing anyone who wished to refrain from participating at that moment to leave the classroom. Afterwards, an informed consent was provided and the classroom was arranged in order to optimize the visual access of each participant to the screen of 2 mts. x 2 mts., where images were going to be projected, and booklets with the paper and pencil version of the SAM were distributed among participants. Only valence and arousal dimensions were assessed, as they are major factors that account for the most part of the variance in emotion (Lang, 1995).

In order to adjust the procedure as much as possible to the original protocol of application, a bilingual psychologist translated the English version of instructions to Spanish, and they were literally read in each assessment session. Only the section referred to dominance scale was omitted and application timings were adjusted to the original procedure. The slides presentation was performed with MS Power Point 2000, three example slides were presented (#4601, #2222 and #2799) and any question concerning the procedure to work on the booklets was clarified.

At the beginning of the assessment, pictures were presented in a pseudo-randomized order, with the restriction of no more than two consecutive pictures of the same valence category appearing simultaneously. Before the picture presentation, a warning slide of one second informed the number of pictures that were coming in the next slide, and then each picture was presented for a six-second period followed by a ten-second black screen. At that moment the participants proceeded to give the SAM ratings. Once the picture assessment was completed, booklets were collected and participants were thanked for their collaboration.

Individual scores were coded and analyzed in SPSS 15.0. In order to gain comparability between Chilean and US results, comparisons between both countries considered judgments for the same pictures dataset by participants from both countries.

Results

Reliability

Internal consistency was performed on the total number of pictures rated by each participant. Cronbach's *alfa* was 0.976 for the valence dimension, and 0.979 for the arousal dimension.

Descriptive results

Table 1 shows the main descriptive statistics obtained for this study, as well as the results of the US standardization in order to facilitate their comparability. Scores for valence dimension in the Chilean sample tended to be lower than the US sample, but no significant difference was obtained, t (1, 368) = -1.212, p = 0.227. However, Chilean scores in the arousal dimension were significantly higher than US scores, t (1, 360.5) = 5.342, p = 0.000.

Affective space

A very similar distribution to the original plot of the affective space in the US was obtained in the Chilean sample, with valence and arousal scores in the vertical and horizontal axis, respectively. The linear regression model between valence and arousal was significant (r = 0.62), but a better adjustment was observed for the quadratic function (r = 0.69), revealing that at higher amounts of arousal, both positive and negative valence become more robust (see Figure 1). This result was consistent with those observed for the US study, in which linear and quadratic values were r = 0.28 and 0.54, respectively. However, the higher linear association between valence and arousal observed

Table 1
Means (and standard deviations) for the selected IAPS pictures in Chile and the US

	Valence				Arousal			
	Pos	Neg	Neu	Total	Pos	Neg	Neu	Total
Chile	7.04 (0.50)	2.47 (0.79)	4.91 (0.50)	4.70 (2.00)	4.88 (0.79)	6.64 (1.09)	4.09 (0.60)	5.28 (1.38)
US	6.97 (0.84)	2.97 (1.10)	5.18 (0.64)	4.95 (1.90)	4.74 (0.93)	5.26 (0.92)	3.37 (0.83)	4.51 (1.20)

Note. Pos: positives; Neg: negatives; Neu: neutrals.

Source: own work.

in the Chilean sample could be explained for the incremented scores in the arousal dimension, in comparison with the US sample.

Also, the total correlation between valence and arousal in Chile was $r = -0.62$, $p = 0.000$, indicating that higher levels of arousal are related to a more negative perception of the pictures. When compared to the US correlations among dimensions for the same subsample of pictures ($r = -0.23$, $p = 0.001$), a similar trend is observed among countries.

In order to compare the association between the valence and arousal dimension among Chile and US, a correlation between each dimension for each country was performed. High levels of consis-

tency were obtained for both dimensions (valence $r = 0.94$, $p = 0.001$; arousal $r = 0.78$, $p = 0.001$). However, the lower magnitude of the association between Chile and US in the arousal dimension can be explained for the higher scores observed in this dimension for the Chilean sample.

Valence comparisons

The correlation between valence and arousal was $r = 0.36$ ($p = 0.001$) for positive pictures, $r = -0.83$ ($p = 0.001$) for negative pictures and $r = 0.13$ ($p = 0.177$) for neutral pictures. That means that the association between valence and arousal is higher in magnitude for the negative when compared to the

Figure 1
Scatterplot of valence and arousal and their correlation in a linear and quadratic model for the Chilean sample
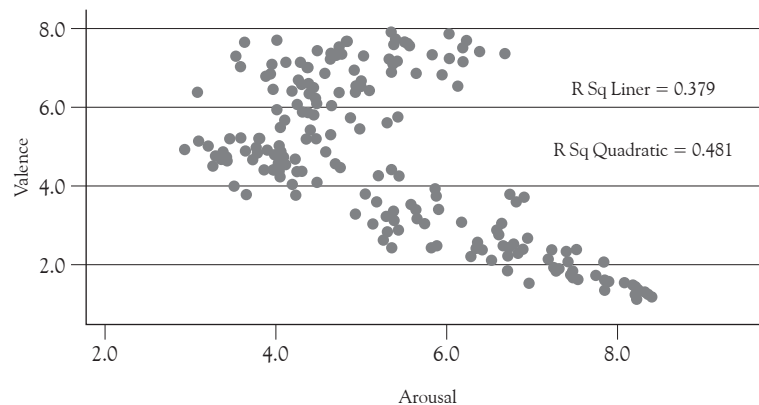
Source: own work.

positive category, whereas neutral pictures showed no association between dimensions, consistent with the US study results ($r = 0.33$, $p = 0.006$; $r = -0.56$, $p = 0.000$; $r = 0.07$, p = 0.596, for positive, negative and neutral pictures, respectively).

Sex differences

Figure 2 shows the distribution adopted by the pictures in the affective space according to sex, depicting a very similar shape to the US results (women positive and negative $r = 0.20$ and -0.77; men r

$= 0.68$ and -0.55, respectively). That is, the correlation between valence and arousal was higher for negative pictures when compared to positive pictures; nevertheless, higher scores were observed for the negative category in the Chilean sample. Also, for the Chilean sample, a higher correlation between valence and arousal was observed for men, showing that they perceive positive pictures as more exciting, when compared to women. For the negative category, the association between valence and arousal tended to be higher for women.

FIGURE 2
Affective space adopted by positive, neutral and negative pictures in women (left panel) and men (right panel). Correlations between arousal and valence for both positive and negative pictures are showed by upper and lower arrows within each panel, respectively
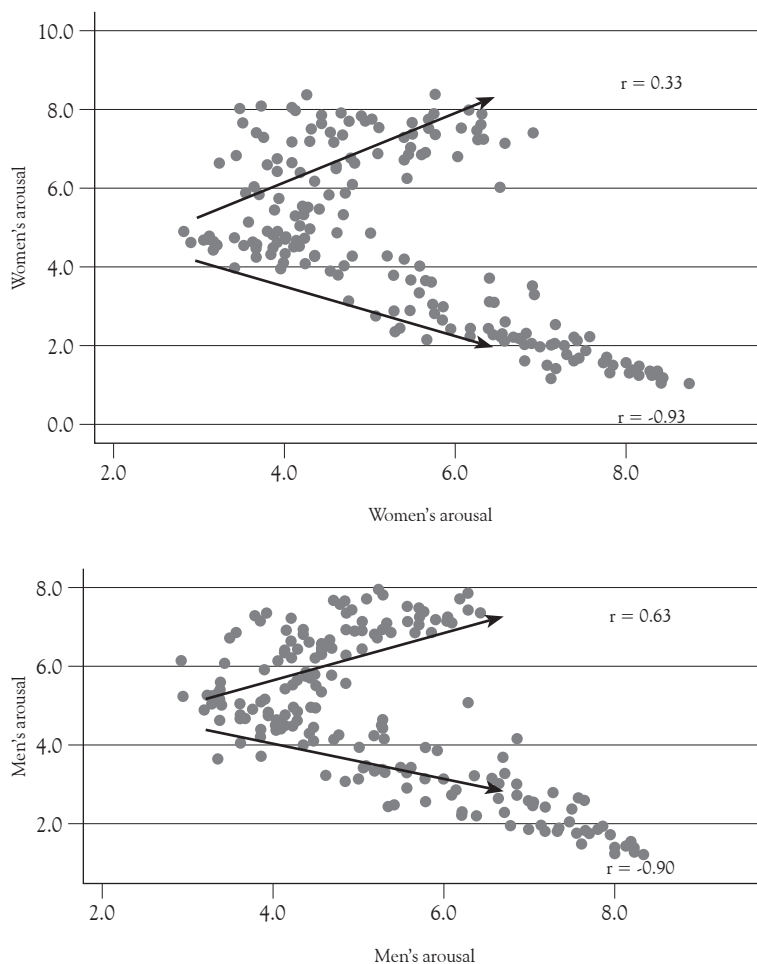
Source: Own work.

Discussion

The IAPS has shown to be a reliable and valid method to assess affectivity in a variety of research, including psychiatric illness (e.g., Miltner et al., 2005; Quirk & Strauss, 2001), cognitive neuroscience (Hot, Saito, Mandai, Kobayashi & Sequeira, 2006; Junghöfer, Bradley, Elbert & Lang, 2001; Schupp et al., 2006) and psychophysiology (Bradley et al., 2001a; 2001b), among many others. Also, validation measures of the IAPS have been obtained in different countries with an important level of consistency, pointing to the robustness of the bi-dimensional structure of affectivity (Davidson, 2003; Lang, 1995; Lang, et al., 1990). The present study was aimed to validate the IAPS in a Chilean sample in order to obtain a first account of the method in the local context, as well as to contribute to its cross-cultural validation.

The results show appropriate reliability of the selected pictures, indexed by high levels of internal consistencies for both the valence and arousal dimensions. The affective space that emerges follows the expected "boomerang" shape, confirming the fundamental affective structure of the motivational systems, as has been observed across the various validation studies (Bradley & Lang, 2007; Grühn & Scheibe, 2008; Moltó et al., 1999; Ribeiro et al., 2004, 2005; Verschuere et al., 2007; Vila et al., 2001). Also, the strong and negative relationship between arousal and valence reveals that negative pictures are perceived as more arousing than positive pictures.

An interesting finding involves the significant differences in arousal scores among the US and the Chilean data that emerged for the total correlation between valence and arousal ratings within each country, pointing to a higher association between valence and arousal in the Chilean sample. Also, the comparison of arousal scores between both countries shows that emotional pictures are appreciated as more arousing in the Chilean sample. Such discrepancies in the arousal ratings have been also seen in previous studies, such as those conducted in Spain (Moltó et al., 1999; Vila et al., 2001), Germany (Grühn & Scheibe, 2008) and Brazil (La-

saitis et al., 2008; Ribeiro et al., 2004, 2005). Those differences have been explained in two ways, first, in the Brazilian standardization of the IAPS a possible semantic and conceptual variation between languages and populations has been highlighted, which could result in a different understanding of what the arousal dimension means. On the other hand, Bradley and Lang (2007) have also noted the variability in the arousal ratings among countries, assuming that the IAPS can be sensitive to intercultural differences in emotion disposition, so it can reliably be used for detecting cross-cultural affective experience. Furthermore, at a theoretical level it can be noted that whereas both the appetitive and defensive systems behave in a more robust way, supported by the high consistency of findings across studies in the valence dimension, the arousal sensitivity can be more dependent on cultural aspects. This kind of explanation for the cross-cultural differences have also been stressed in the Spanish adaptation of the IAPS, assuming that the higher arousal scores for the Latin samples are coherent with the cultural stereotypes of emotional expressivity.

Another theoretical aspect concerning the readiness of each motivational system to be activated is confirmed by the finding that the valence-arousal correlations are stronger in magnitude for the negative than for the positive picture categories. That means that the association between valence and arousal is greater for aversive information, which could be owed to the lack of stimuli that fulfill the negative low arousing portion of the affective space, as has been stated by Bradley and Lang (2007). Another possibility is to assume that there is an adaptive value in having a higher sensitivity to aversive information in relation to pleasant contents, which could explain this "negativity bias". In any case, the stronger association between negative valence and arousal is well replicated across studies (Bradley & Lang, 2007; Grühn & Scheibe, 2008; Moltó et al., 1999; Ribeiro et al., 2004, 2005; Verschuere et al., 2007; Vila et al., 2001), becoming a robust result across countries.

Sex differences in the Chilean sample show that men are more excited than women by positive

pictures, whereas women tend to be more aroused than men by negative stimuli. This finding is in line with previous evidence, both in the US (Bradley et al., 2001b), and Spanish studies (Moltó et al., 1999; Vila et al., 2001), although it has not been seen in all the studies wherein sex differences were analyzed (e.g. Ribeiro et al., 2004). However, sex differences have been found in studies where electrophysiological variables were assessed, allowing a higher reliability of the differences between men and women, as those parameters are more robust and less susceptible of variations derived from subjective appraisal. Bradley et al. (2001b) have seen that facial EMG, skin conductance and heart rate have distinct activation patterns by emotional stimuli in both men and women, with women showing a higher electrophysiological reactivity in all parameters in face of unpleasant material, and men being more reactive to pleasant pictures, particularly erotica. Thus, our results are also consistent with this more reliable assessment of sex dependent reactivity to emotional pictures.

Some limitations of the study may arise from the intentional extraction of the sample and the reduced participation of men, affecting the generalization of the present findings. We encourage further studies to address those restrictions and also to incorporate populations with diverse characteristics that may affect emotional responding, as clinical populations or different age ranges, in order to extend the validity of the IAPS.

In conclusion, the Chilean adaptation of the IAPS show consistent results with previous evidence, particularly with the US validation study with which comparative statistical analysis was performed, adding support to the validity of the methodology and the system's picture content. Variations in the procedure of selection and administration of pictures seem to be minor in face to the robustness of results obtained across countries wherein the IAPS has been validated. The main variations are found in the arousal dimension, with valence results tending to be more consistent between studies, pointing to possible cross-cultural variations in arousal sensitivity.

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Appendix 1

IAPS slide #	Description	Valence		Arousal		IAPS slide #	Description	Valence		Arousal	
		Mean	SD	Mean	SD			Mean	SD	Mean	SD
2000	Adult	5.89	1.44	4.30	2.08	2455	Sad Girls	3.40	1.72	5.63	2.10
2005	Attractive man	6.39	1.35	4.92	2.21	2480	Elderly man	4.55	1.67	4.69	2.26
2010	Adult	5.80	1.46	4.45	1.98	2490	Man	3.13	1.41	5.37	1.98
2037	Woman	7.68	1.08	4.83	2.48	2491	Sick Man	4.05	1.61	4.19	1.91
2053	Baby	1.86	1.66	7.26	2.04	2493	Neutral male	4.38	1.22	4.24	2.01
2070	Baby	7.51	1.47	6.17	2.41	2495	Man	4.80	1.35	3.98	1.84
2071	Baby	7.72	1.30	5.39	2.59	2500	Man	6.35	1.51	4.38	2.23
2095	Toddler	1.14	0.35	8.21	1.13	2512	Man	4.74	1.03	4.07	1.92
2100	Angryface	3.30	1.36	4.92	1.93	2515	Harvest	6.48	1.58	3.97	2.06
2102	Neutral Man	5.22	1.43	3.80	1.89	2520	Elderly Man	3.80	1.81	5.04	2.11
2104	Neutral wo-man	4.44	1.30	3.95	1.94	2530	Couple	7.65	1.51	5.50	2.44
2120	Angryface	2.42	1.16	6.33	2.11	2550	Couple	7.59	1.17	5.39	2.38
2130	Woman	2.49	1.40	6.65	2.07	2570	Man	4.88	1.26	4.04	1.98
2141	Grievingfem	2.25	1.33	6.70	1.82	2579	Bakers	5.37	1.40	4.39	1.81
2150	Baby	7.02	1.77	4.36	2.68	2590	Elderly Wo-man	3.54	1.50	5.57	2.03
2152	Mother	7.33	1.53	5.82	2.62	2594	City	6.11	1.85	4.47	1.96
2165	Father	7.14	1.74	4.28	2.65	2598	Family	6.95	1.36	4.91	2.20
2190	Man	4.67	1.21	4.05	2.07	2600	Beer	5.03	1.96	4.02	1.70
2200	Neutral face	4.41	1.17	4.02	1.87	2630	Male	4.57	1.83	4.04	1.99
2205	Hospital	2.61	1.69	5.25	2.49	2650	Boy	6.23	1.78	4.46	2.19
2208	Bride	6.85	1.27	5.63	1.99	2655	Child	7.54	1.51	4.73	2.84
2209	Bride	6.90	1.59	5.34	2.22	2683	War	1.73	1.08	7.73	1.72
2210	Neutral face	4.47	1.45	4.74	1.96	2691	Riot	3.05	1.86	6.63	1.75
2214	Neutral man	4.90	1.10	3.89	1.76	2700	Woman	2.89	1.26	5.42	2.18
2215	Neutral man	4.67	1.04	3.73	1.88	2703	Sad children	1.39	0.73	7.83	1.57
2216	Children	6.55	1.45	4.98	2.07	2704	Soldiers	3.71	2.27	6.89	1.83
2221	Judge	3.78	1.35	4.22	2.13	2710	Drug Addict	3.08	1.70	6.16	2.21
2230	Sad face	4.11	0.99	4.47	1.96	2718	Drug addict	1.90	1.28	7.30	1.54

IAPS slide #	Description	Valence		Arousal		IAPS slide #	Description	Valence		Arousal	
		Mean	SD	Mean	SD			Mean	SD	Mean	SD
2272	Lonely Boy	4.25	2.09	5.43	2.03	2749	Smoking	5.21	1.84	3.46	1.82
2276	Girl	2.49	1.29	5.86	2.14	2750	Bum	2.38	1.52	6.40	2.40
2278	Kids	2.57	1.30	6.35	2.10	2751	Drunk Dri-vng	3.80	1.93	6.73	1.93
2280	Boy	4.39	1.09	4.29	1.87	2753	Alcoholic	3.37	1.82	5.38	2.05
2303	Children	7.35	1.33	4.77	2.42	2800	Sadchild	1.44	0.78	8.19	1.06
2304	Girl	6.70	1.74	4.25	2.31	2810	Boy	3.61	1.70	6.80	1.78
2306	Boy	7.69	1.52	4.84	2.60	2850	Tourist	4.91	1.41	3.64	1.99
2310	Mother	7.26	1.27	3.53	2.21	2870	Teenager	6.08	1.93	4.25	1.92
2311	Mother	7.17	1.76	5.40	2.11	2900	Cryingboy	2.21	1.30	6.28	1.85
2312	Mother	3.16	1.69	5.65	1.98	2900.2	Smiling girl	6.38	1.37	4.73	1.78
2320	Girl	5.67	1.52	4.10	1.84	3016	Mutilation	1.31	0.64	8.31	0.99
2331	Chef	6.41	2.06	4.18	2.47	3030	Mutilation	1.20	0.42	8.37	1.15
2332	Family	7.70	1.58	4.00	2.48	3180	Battered fem	1.68	1.09	7.47	1.94
2340	Family	7.70	1.42	6.22	2.48	3181	Battered fem	1.25	0.84	8.35	1.16
2341	Children	7.14	1.58	4.11	2.34	3220	Hospital	2.30	1.36	6.82	2.03
2344	Children	7.37	1.53	4.65	2.39	3230	Dying Man	1.54	0.75	6.95	2.17
2345	Children	7.59	1.45	5.53	2.15	3280	Dental exam	3.04	1.62	5.73	2.36
2346	Children	7.34	1.58	4.69	2.74	3300	Disabled child	2.44	1.10	5.80	2.07
2357	Man	6.38	1.72	3.08	2.04	3301	Injured child	1.27	0.56	8.19	1.25
2358	Family	5.94	1.57	4.01	1.93	3350	Infant	1.55	0.98	8.06	1.36
2360	Family	7.65	1.27	3.62	2.55	3500	Attack	1.62	0.84	7.83	1.90
2381	Girl	5.49	1.53	4.06	1.96	3530	Attack	1.38	0.73	8.21	1.05
2387	Kids	6.87	1.52	4.57	2.02	3550	Injury	1.59	0.86	7.87	1.41
2391	Boy	5.87	1.71	4.37	2.11	4141	Erotic female	5.75	2.05	5.42	2.27
2395	Family	7.10	1.21	3.95	1.98	4142	Erotic female	5.44	2.19	4.98	2.45
2398	Boat	7.06	1.49	3.58	2.16	4150	Attractive fem	6.05	1.42	4.65	2.24
2399	Woman	3.04	1.19	5.13	1.94	4180	Erotic female	5.61	2.28	5.30	2.36
2410	Boy	3.60	1.77	5.17	2.02	4220	Erotic female	6.42	1.59	5.08	2.26
2435	Mom/Son	5.23	1.08	4.35	2.07	4535	Weight-lifter	4.87	1.72	4.58	1.92

IAPS slide #	Description	Valence		Arousal		IAPS slide #	Description	Valence		Arousal	
		Mean	SD	Mean	SD			Mean	SD	Mean	SD
2440	Neutral girl	4.26	1.08	4.04	2.03	4537	Attractive man	5.31	1.78	4.64	2.12
2441	Neutral girl	4.26	1.39	5.19	1.87	4538	Erotic male	5.74	1.90	4.87	2.25
2442	Drying Hair	6.61	1.43	4.37	2.32	4574	Attractive man	7.11	1.49	5.36	2.24
4598	Romance	3.93	2.36	5.85	2.21	7030	Iron	4.43	1.19	3.96	2.28
4599	Romance	7.22	1.51	4.62	2.63	7035	Mug	5.23	1.28	3.58	2.20
4603	Romance	6.53	1.49	4.93	1.99	7040	Dust pan	4.00	1.34	3.51	2.17
4607	Erotic couple	7.42	1.70	6.38	2.12	7056	Tool	4.52	1.20	3.26	1.90
4608	Erotic couple	7.24	1.35	6.02	2.16	7057	Coffee cup	5.23	1.68	4.35	2.05
4611	Erotic couple	7.55	1.56	5.55	2.36	7080	Fork	4.68	1.06	3.35	2.18
4614	Romance	6.48	1.37	4.44	2.25	7090	Book	5.22	1.25	3.80	2.37
4617	Erotic female	6.66	1.26	4.99	2.05	7100	Fire hydrant	4.86	1.23	3.78	2.15
4621	Embarasse-ment	2.87	1.55	6.58	2.06	7150	Umbrella	4.97	1.10	3.77	2.05
4623	Romance	7.22	1.42	5.32	2.22	7170	Light-bulb	4.56	1.38	4.11	2.01
4626	Wedding	6.85	1.69	3.93	2.48	7175	Lamp	4.93	1.07	2.92	1.83
4641	Romance	7.03	1.57	4.37	2.55	7190	Clock	4.69	1.14	4.22	2.41
4660	Erotic couple	6.82	1.92	5.94	2.18	7211	Clock	4.42	1.32	3.85	2.08
4687	Erotic couple	6.53	1.99	6.11	1.88	7217	Clothes rack	4.65	1.15	3.41	1.96
4689	Erotic couple	7.15	1.61	6.18	1.93	7235	Chair	4.78	1.29	3.3	2.11
5410	Violonist	6.60	1.92	4.30	2.55	7325	Watermelon	7.86	1.16	6.02	2.53
5875	Bicyclist	6.81	1.80	3.89	2.20	7550	Office	3.79	1.51	3.65	2.20
6010	Jail	2.83	1.47	5.30	2.36	8120	Athlete	7.45	1.36	4.49	2.60
6212	Soldier	1.50	1.07	8.17	1.31	8461	Happy Teens	7.31	1.44	5.02	2.61
6213	Terrorist	2.38	1.25	6.87	1.93	8490	Roller Coas-ter	7.38	1.76	6.67	2.16
6350	Attack	1.86	1.11	7.46	1.76	8496	Water Slide	7.90	1.61	5.34	2.86
6540	Attack	2.33	1.85	7.38	1.86	9041	Scared Child	2.12	1.16	6.51	1.82
6550	Attack	1.76	1.02	7.44	1.86	9050	Plane Crash	2.38	1.78	7.50	1.75
6560	Attack	1.65	1.03	7.52	1.60	9070	Boy	4.42	2.21	5.34	2.42
6562	Attack	3.24	1.27	5.28	1.99	9160	Soldier	2.66	1.49	6.93	1.82
6570	Suicide	1.96	1.16	7.24	1.85	9190	Woman	3.41	1.52	5.89	1.80

IAPS slide #	Description	Valence		Arousal		IAPS slide #	Description	Valence		Arousal	
		Mean	SD	Mean	SD			Mean	SD	Mean	SD
6821	Gang	2.07	1.43	7.82	1.86	9210	Rain	5.25	2.27	4.46	2.01
6825	Military	2.45	1.29	6.72	1.93	9220	Cemetery	2.44	1.38	5.35	2.10
6838	Police	2.37	1.31	7.22	1.84	9421	Soldier	1.84	1.04	6.69	2.10
7002	Towel	4.79	1.01	3.40	2.06	9429	Assault	2.06	1.15	7.40	1.86
7009	Mug	5.14	1.13	3.09	1.91	9520	Kids	3.76	1.95	5.87	1.93
7010	Basket	4.90	1.24	3.37	2.12	9530	Boys	2.53	1.63	6.76	2.00
7020	Fan	4.76	1.29	3.40	2.20	9582	Dental Exam	2.14	1.47	7.18	1.94
7025	Stool	5.02	0.96	3.20	1.96	9592	Injection	2.76	1.71	6.59	2.20