Affective ratings of sound stimuli

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This article presents the Spanish assessments of the 111 sounds included in the International Affective Digitized Sounds (IADS; Bradley & Lang, 1999b). The sounds were evaluated by 159 participants in the dimensions of valence, arousal, and dominance, using a computer version of the Self-Assessment Manikin (Bradley & Lang, 1994). Results are compared with those obtained in the American version of the IADS, as well as in the Spanish adaptations of the International Affective Picture System (P. J. Lang, Bradley, & Cuthbert, 1999; Moltó et al., 1999) and the Affective Norms for English Words (Bradley & Lang, 1999a; Redondo, Fraga, Padrón, & Comesaña, 2007).

As has been recently stated (Spreckelmeyer, Kutas, Urbach, Altenmüller, & Münte, 2006), evaluation of emotional scenes most frequently requires integration of information from auditory and visual channels. More specifically, Spreckelmeyer et al. found different patterns of cross-modal influences, which varied depending on the emotional valence of the stimuli. In an affect rating task, responses to voice stimuli were more likely to be modulated by the affective valence of a picture concomitantly presented than vice versa. In another recent article, Baumgartner, Lutz, Schmidt, and Jäncke (2006) suggested that the presentation of emotional pictures evokes a more “cognitive mode” of emotion perception, whereas when those pictures are accompanied by congruent musical stimuli, they seem to evoke strong “emotional feelings.”

These theoretical considerations highlight the need for normalized and well-adapted databases of stimuli from the different modalities. Thus, in line with our previous work—the Spanish adaptation of the Affective Norms for English Words (ANEW; Bradley & Lang, 1999a; Redondo, Fraga, Padrón, & Comesaña, 2007)—we now present the evaluations of emotional sounds from the International Affective Digitized Sounds (IADS; Bradley & Lang, 1999b) in Spanish participants. Since 1999, the Center for Research in Psychophysiology has been developing these databases of emotional stimuli, as well as the IAPS (International Affective Picture System; P. J. Lang, Bradley, & Cuthbert, 1999), also adapted for use with Spanish people by Moltó et al. (1999). Therefore, our primary goal is to expand the IADS for use in a Spanish sample population. This will make it possible to investigate cross-cultural differences between North Americans’ and Spaniards’ sounds affective ratings.

With regard to our first aim, the necessity and usefulness of normalized stimuli databases are obvious, since they allow the direct comparison of different categories of stimuli and sensorial modalities, as well as different ex-

perimental results. Over the past few years, the processing of emotional pictures and its physiological correlates have been broadly investigated (e.g., Bradley & Lang, 2000b). In many of these works, either the IAPS or its adaptations have been employed (e.g., Buodo, Sarlo, & Palomba, 2002; Cándido et al., 2006; Schimmack, 2005). However, less research has been done with the aim of measuring cognitive, behavioral, and physiological reactions to affective words and sounds—that is, research using the ANEW and the IADS. In fact, some researchers have studied the effects of different kinds of emotional sound stimuli, such as music (Khalfa, Peretz, Blondin, & Manon, 2002) or nonlinguistic human affective sounds (e.g., Fecteau, Armony, Joannette, & Belin, 2005), but all of these investigations have used different materials; and although some of them employed sets of sounds previously evaluated by the participants (e.g., Pollak, Holt, & Wismer-Fries, 2004), results are too heterogeneous to be compared.

If we consider auditory stimuli in isolation, there is no doubt that there are quite a lot of pleasant versus unpleasant/arousing versus nonarousing sounds in everyday contexts (e.g., laughing, car wreck/scream, yawn, etc.). Therefore, although humans are thought to be a profoundly visual species, it is also true that sometimes a rapid response to an emotional sound may be necessary in terms of welfare and survival. Fortunately, a line of systematic research has been initiated in the past decade, including some experiments that employed the IADS (e.g., Anttonen, 2005; Bradley & Lang, 2000a; Seifritz et al., 2003). In sum, it is the availability of the IAPS, ANEW, and IADS—three emotional stimulus databases built on the twin bases of identical theoretical perspective and methodological procedure—that makes it possible to compare experiments and results. With the study presented here, at last three normalized instruments will be available for investigating reactions to emotional stimuli in any of their modalities (pictures, words, and sounds) in Spanish people.

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The collection of the emotional sound ratings in Spanish people will allow us to make a direct comparison between these data and those from Bradley and Lang's (1999b) American sample. Thus, it will be of great interest to test whether international differences previously found in IAPS and ANEW assessments hold for the IADS as well (Redondo, Fraga, & Padrón, 2006; Redondo et al., 2007).

The theoretical background that supports this work is the dimensional perspective of emotions (e.g., Bradley, 1994; A. Lang, Dhillon, & Dong, 1995; P. J. Lang, 1995), which originates in Wundt (1896) and Osgood (Osgood, Suci, & Tannenbaum, 1957) and which conceptualizes emotion as having three basic underlying dimensions along which the entire range of human emotions can be arranged. The two primary dimensions are valence (which ranges from *pleasant* to *unpleasant*) and arousal (which ranges from *calm* to *excited*); the third dimension is dominance or control (ranging from *in control* to *out of control*). The present study assessed all three dimensions of emotion using a single measure: the Self-Assessment Manikin (SAM; Bradley & Lang, 1994).

METHOD

Participants

A total of 159 students of psychology (135 women and 24 men) at the University of Santiago, ranging from 19–32 years old ($M = 22.85$, $SD = 1.78$), enrolled voluntarily and contributed to the final data. The ratings of the sounds were obtained throughout November and December, 2006.

Materials

The sounds employed in this study were the same as those employed by Bradley and Lang (1999b) in their normative study.¹ In order to automate the assessment process, experimental sessions were programmed with the SuperLab Pro (Abboud & Sugar, 1997) software. This software controlled the presentation of instructions and practice sounds at the computer display, as well as the presentation of sounds via headphones, and it also registered the ratings that participants entered using the keyboard.

The 111 sounds obtained from the IADS were divided into three blocks of 37 sounds each. Thus, during the experimental session, each participant rated one of these three blocks of sounds (altogether, 53 participants rated one of the three blocks), because the assessment of all 111 sounds would have been too exhausting.

The duration of each sound was the same as that in the original normative study (Bradley & Lang, 1999b)—that is, 6 sec—and its intensity was measured using a PCE-322A sound level meter and the values of reference provided by Bradley and Lang (2000a). The last column of the Appendix shows the maximum peak of intensity registered during each 6-sec presentation.

Procedure

During the rating session, each participant was seated in a sound-proof experimental booth facing a computer monitor screen. Participants could initially read the instructions on the screen and rate three practice sounds.² After reading the instructions and before evaluating the experimental sounds, any questions were resolved. In order to avoid order effects, the presentation of sounds was randomized for each participant. Ratings were made using a computer version of the SAM. Thus, participants could rate each sound on a 9-point scale for each affective dimension (valence, arousal, and dominance; for more details on the use of the SAM, see, e.g., Bradley & Lang, 2000a; Redondo et al., 2007). Each rating session lasted approximately 25 min.

The ratings of the sounds in each of the three affective dimensions are included in the Appendix.

RESULTS AND DISCUSSION

Spaniards' IADS Ratings

The sound rating distribution in the affective space defined by the dimensions of valence and arousal can be seen in Figure 1. This distribution shows the boomerang shape also found by Moltó et al. (1999) and Redondo et al. (2007) in the corresponding Spanish adaptations of the IAPS and ANEW. In fact, although the linear correlation between valence and arousal ($r = .453$, $p < .001$) accounted for 20.5% of the variance, the quadratic correlation between the two dimensions ($r = .687$, $p < .001$) accounted for 47.2% of the variance. This quadratic correlation was higher than that found in the Spanish adaptations of the IAPS ($r = .64$) and ANEW ($r = .522$).

Spain–U.S.A. Comparisons

Global comparisons. The distribution of the ratings in the affective space is virtually identical to that found in the original normative study of the IADS (Bradley & Lang, 1999b, Figure 3, p. 17). In fact, a very high Pearson correlation was obtained between the affective ratings of Spanish and North American people: $r = .918$ for valence, $r = .903$ for arousal, and $r = .914$ for dominance ($p < .001$ in all cases). These Spain–U.S.A. correlations are even higher (in all three dimensions) than those obtained in our recent adaptation of the ANEW ($r = .916$, $r = .746$, and $r = .720$ for valence, arousal, and dominance, respectively; see Redondo et al., 2007).

Therefore, as was the case with words, globally Americans and Spaniards rated the sounds of the IADS in a similar way. This also happens when picture ratings made by American participants are compared with those made by Spanish and other European people (see Bradley, Codispoti, Sabatinelli, & Lang, 2001; Moltó et al., 1999).

Figure 1. Distribution of the mean values corresponding to the ratings of the 111 sounds in the dimensions of valence and arousal.

Dimensional analyses. Despite the above general similarities, in the Spanish adaptations of the IAPS and ANEW, some differences between the Spanish and the North American assessments were found when the three affective dimensions were compared with each other. That is why we carried out a comparative analysis between the values obtained in the present study and those found by Bradley and Lang (1999b) with American people. Means of both the Spanish and American ratings for each affective dimension are shown in Table 1.³

The comparisons of the means revealed significant differences in the valence [$t(220) = 2.998, p = .003$] and arousal [$t(220) = -2.406, p = .017$] dimensions. However, no significant differences were found in the dominance dimension [$t(220) = 1.353, p = .177$].

Thus, as can be seen in Table 1, Americans tended to rate IADS sounds with a more positive mean valence than did the Spaniards. The same result had been found by Redondo et al. (2007) using ANEW words as stimuli, but not by Moltó et al. (1999) using IAPS images; these authors failed to find significant differences between those two populations in the valence dimension. Also, when responding in this dimension, Spaniards used a wider range of values than that used by Americans in the SAM scale, the difference being slightly higher than 1.

In the arousal dimension, Americans used a wider range of values in the SAM scale, rating the IADS sounds as being less activating than did Spanish participants. This result was also obtained with ANEW words and IAPS images (see Redondo et al., 2007, and Moltó et al., 1999, respectively).

Finally, the absence of statistically significant differences between the American and Spanish populations for the dominance dimension differs from results found in the Spanish normative studies of the ANEW and IAPS. Thus, both Redondo et al. (2007), using words, and Moltó et al. (1999), using images, found that American participants obtained significantly higher values in the dominance dimension than did the Spanish participants. As can be seen in Table 1, the ranges used by both populations differed very little (the difference being .13).

In order to explore differences found between Americans and Spaniards in valence and arousal ratings, sound assessments in both dimensions were dichotomized. In valence ratings, the above-mentioned global tendency for all 111 sounds was maintained when Spain–U.S.A. ratings for both the 55 most unpleasant sounds [low valence: mean Spain = 2.33, mean U.S.A. = 3.47; $t(108) = -5.59, p = .008$] and the 56 most pleasant sounds [high valence: mean Spain = 5.96, mean U.S.A. = 6.44; $t(110) = -2.22, p = .012$] were compared. Nevertheless, when Spain–U.S.A. ratings for the 55 most nonarousing sounds were compared, no significant differences were found [mean Spain = 5.21, mean U.S.A. = 4.69; $t(108) = 3.47, p = .007$], but those differences again followed the global tendency when ratings for the 56 most arousing sounds [high arousal: mean Spain = 7.08, mean U.S.A. = 6.79; $t(110) = -2.07, p = .045$] were compared.

In conclusion, American people rate IADS sounds as being higher in the valence dimension than do Spanish

Table 1
Means, Standard Deviations, and Range Values
of the Spanish and American Population Ratings
in the Three Affective Dimensions

Dimension	Spain			U.S.A.		
	<i>M</i>	Range	<i>SD</i>	<i>SD</i>	<i>M</i>	Range
Valence	4.17	1.69	7.55	4.97	1.70	6.54
Arousal	6.15	1.75	5.74	5.75	1.94	6.06
Dominance	4.51	1.92	5.23	4.76	1.94	5.10

people, independent of the pleasantness or unpleasantness of those sounds. However, although globally Americans rate IADS sounds as being lower than do Spaniards in the arousal dimension, this difference comes across in the arousing rather than in the nonarousing sounds.⁴ Cultural factors may be responsible for these differences. For instance, the “bomb” sound is rated by Spanish people as being much more unpleasant and arousing, perhaps due to the fact that that sound evokes terrorist events from the recent past, during which bombs were frequently used in Spain. On the other hand, “football” is rated as being much more pleasant by the Americans, perhaps because it is clearly identified with American football, which is rarely played in Spain. Therefore, in future research, it would be interesting to analyze the role of cultural differences in valence and arousal assessments, while also controlling for the possible interaction of gender. As Bradley et al. (2001) have suggested,

Cross-cultural studies, especially those investigating men and women raised in nontraditional Western societies, as well as additional developmental research would assist in determining the impact of biological–genetic or sociocultural variables in affecting men’s and women’s reactions to affective cues. (p. 317)

In sum, with regard to comparisons between the present data and those obtained previously with the IAPS and ANEW, for the valence dimension, it seems that the type of stimuli (sounds and words vs. images) determines the differences between the ratings of Spanish and American participants. For instance, for the arousal dimension, Spanish participants always show a higher emotional reactivity, independent of the kind of stimuli employed. Finally, although the Spanish participants possess a lower perception of control relative to words or images, this difference disappears in Americans when sounds are employed as stimuli.

Therefore, although we must keep in mind that American and Spanish sample populations evaluated IADS sounds in a highly similar way, it is also true that some slight differences have been found that should not be overlooked. In fact, the same happened with the IAPS and ANEW. We now know that Spanish people show a stronger emotional reactivity (arousal) across stimuli; they tend to assess words and sounds, but not images, as being slightly more unpleasant (valence) than do Americans; and, finally, the Americans show a higher feeling of control (dominance) over emotional images and words, but not over sounds. From an anthropological perspective, one

wonders whether those differences might be explained in terms of specific contextual factors or broad cross-cultural characterizations (Vrana & Rollock, 2002). These reflections put our data in touch with the old issue of whether emotions are universal—or, more pointedly, to what extent, and at what level of analysis, cultural variation exists (Elfenbein, Mandal, Ambady, Harizuka, & Kumar, 2002). Until researchers have a clear answer to these questions, they will have to be cautious in drawing conclusions on the basis of cross-cultural research on emotion (Diener, Oishi, & Lucas, 2003). In this sense, it seems advisable to base conclusions on data obtained from a variety of procedures and measures, using a set of normalized stimuli databases.

In this sense, as has been commented in previous work (Redondo et al., 2007), the IADS, IAPS, and ANEW constitute powerful instruments for investigation. It is worth noting that the identification of the stimuli through a number or label in each of these databases enhances the replication of results and makes scientific communication easier. Thus, one could easily select some stimuli from their ratings in each affective dimension. Moreover, comparative studies between sensorial modalities could be carried out by selecting images, words, and sounds with similar values in valence and arousal, in order to determine the extent to which different emotional stimuli give rise to different cognitive, physiological, and behavioral reactions in a variety of populations. As Bradley and Lang (2000a) have suggested elsewhere, as long as we can find consistent overlapping among all these measures, “the thesis that these responses reflect activation of a common emotional system is supported” (p. 204).

With the present work, we complete a line of research initiated some years ago by Moltó et al. (1999) and Redondo et al. (2007). These normative studies paved the way for future systematic research on affective reactions to emotional stimuli. Such research will now be possible, in an exhaustive and controlled way, among Spanish populations.

AUTHOR NOTE

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NOTES

1. The CD-ROM with both the sounds of the IADS and the normative ratings of the United States population can be obtained on request from the CSEA (cseamedia@php.ufl.edu).
2. These sounds (which obviously do not correspond to any of the experimental sounds of the IADS) were obtained from the Banco de Sonidos (Sound Bank) of the Spanish Ministry of Education and Science (recursos.cnice.mec.es/bancoimagenes/sonidos/index/php). A pleasant

sound (children laughing), an unpleasant sound (woman screaming), and a neutral one (water running) were selected. The duration of these sounds was adjusted to the 6-sec experimental presentations of the sounds of the IADS.

3. Although Bradley & Lang's (1999b) study does not provide for the values shown in Table 1, they have been calculated from the data that the authors have so kindly provided us.

4. In order to identify the sounds with the greater size differences, we calculated the absolute difference between Spanish and American ratings in valence and arousal dimensions. Thus, in low-valence sounds, the highest difference was obtained with "football" (#362) and "bomb" (#699) sounds (2.9 and 2.6, respectively). In high-valence sounds, the maximum difference occurred with "rollercoaster" (#360) and "baseball" (#353) sounds (2.2 and 1.8, respectively). Finally, in high-arousal sounds, the biggest difference was again obtained with "bomb" (#699) and "fight" (#290) sounds (2.3 and 1.6, respectively). In all of these cases, the direction of the differences followed the global tendency (i.e., the Americans rated sounds with higher values in valence and lower values in arousal than did the Spaniards).

APPENDIX

Below, the *description* is the original label that describes the content of each sound taken from the IADS. The *sound number* is a number that identifies each of the 111 sounds and corresponds to the original number in the IADS. The means (*M*s) and standard deviations (*SD*s) for valence, arousal, and dominance are included. Intensity, measured in db(A), of each sound is included. This value corresponds to the maximum peak of intensity registered along the 6-sec presentation of each sound.

Table A1
Means, Standard Deviations, and Decibels of Each Sound in the International Affective Digitized Sounds (IADS), in the Three Affective Dimensions

Description	Sound No.	Valence		Arousal		Dominance		dB
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
TomCat	100	4.21	2.24	5.38	1.75	5.53	2.17	70.0
PuppyCry	105	3.55	2.44	6.15	1.86	4.45	2.01	68.6
DogGrowl	106	1.89	1.49	7.89	1.35	2.38	2.00	74.9
Carousel	109	6.02	2.31	6.13	1.54	5.38	1.78	71.5
BabyLaugh	110	8.58	0.93	6.60	1.78	6.55	1.89	71.8
MusicBox	111	7.43	2.07	6.02	2.15	5.91	2.09	75.2
KidsInPark	112	6.45	2.15	5.91	1.48	5.62	1.87	71.5
Cows	113	4.96	2.08	5.15	1.91	4.83	2.06	72.4
Bees	115	1.66	1.27	6.75	2.09	2.55	1.76	67.8
Wasp	116	1.53	0.91	7.15	1.63	3.62	2.18	74.2
Rooster	120	5.11	2.34	6.72	1.78	5.04	1.99	78.4
Pig	130	2.28	1.57	5.91	1.78	3.58	2.29	78.0
Chickens	132	5.04	2.12	5.11	1.84	5.26	2.13	78.2
Bear	133	3.19	1.91	6.38	1.36	3.47	1.89	65.2
Cardinal	151	6.15	2.26	5.11	1.90	5.51	1.85	75.1
Tropical	152	6.19	2.29	5.11	2.12	5.85	1.97	77.5
CountryNight	171	5.26	2.26	4.43	1.97	4.98	2.04	68.1
EroticCouple	200	6.87	2.15	7.08	1.91	5.91	1.99	70.1
EroticFem1	201	6.38	2.51	7.17	1.76	5.75	2.31	69.6
EroticFem2	202	6.42	2.50	6.87	2.04	5.66	1.91	75.6
EroticFem3	205	6.32	2.22	5.06	2.48	5.42	1.97	68.9
Shower	206	7.36	1.57	3.91	1.93	6.92	1.88	69.0
EroticMale1	210	6.21	2.39	6.83	2.02	5.98	2.16	70.6
EroticCouple2	215	6.21	2.36	7.51	1.48	5.21	2.11	74.5
EroticCouple3	216	7.00	1.93	7.34	1.83	5.89	1.95	68.8
BoylLaugh	220	7.11	1.98	6.21	1.77	5.85	1.78	68.9
MaleLaugh	221	6.72	2.06	5.49	1.94	5.72	1.81	67.1
ClapGame	225	5.60	1.63	4.49	1.69	5.58	1.78	71.4
Laughing	226	6.77	2.23	6.19	1.71	5.77	1.81	71.7
Giggling	230	6.91	1.63	5.75	1.47	5.79	1.83	69.7
NoseBlow	251	2.47	1.50	4.30	2.05	4.66	2.10	71.7
MaleSnore	252	2.47	1.94	5.64	2.41	3.51	2.03	67.9
VideoGame	254	3.87	2.01	5.55	1.91	5.85	1.77	67.2
BabyCry	261	2.04	1.14	7.26	1.47	3.74	2.17	78.1
Yawn	262	5.45	1.87	2.60	1.60	4.96	2.08	68.2
Whistling	270	5.70	2.00	4.92	1.75	5.83	1.95	68.0
FemScream2	276	1.51	1.61	8.11	0.99	2.17	1.68	72.6

APPENDIX (Continued)

Table A1 (Continued)								
Description	Sound No.	Valence		Arousal		Dominance		dB
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
FemScream3	277	1.32	0.94	8.00	1.58	2.25	1.88	70.7
ChildAbuse	278	1.13	0.62	8.04	1.27	3.36	2.38	79.9
Attack1	279	1.04	0.19	8.34	0.83	1.81	1.37	77.9
Funeral	280	3.00	2.07	5.83	1.77	3.91	2.17	75.3
Attack2	285	1.08	0.33	8.25	0.92	2.43	2.07	70.3
Victim	286	1.15	0.84	8.06	1.31	1.70	1.20	70.9
CardiacArrest	287	1.91	1.40	6.72	1.95	2.68	1.83	70.4
Fight	290	1.23	0.70	7.85	1.29	2.25	1.37	76.9
Prowler	291	1.81	1.04	6.77	2.01	2.58	1.81	75.5
MaleScream	292	1.43	1.17	6.92	1.80	2.51	1.64	70.6
Crowd1	310	3.13	1.93	6.62	1.39	3.64	1.77	70.8
Crowd2	311	4.00	1.79	5.15	2.04	4.83	2.25	69.3
Office2	319	2.70	1.41	6.57	1.62	4.55	1.72	71.4
Office1	320	3.38	1.51	5.77	1.58	5.25	1.67	72.5
TypeWriter	322	4.02	1.77	4.72	1.82	5.32	1.78	70.5
Traffic	325	3.45	1.65	5.77	1.88	4.30	1.84	68.8
Applause	351	7.23	1.40	6.11	1.87	6.28	1.75	65.1
SportsCrowd	352	5.79	1.94	6.72	1.26	5.28	1.43	72.1
Baseball	353	5.91	1.88	6.45	1.58	5.28	1.79	73.2
Writing	358	3.36	1.51	5.04	1.85	5.26	2.04	70.9
RollerCoaster	360	4.70	2.64	7.28	1.88	3.83	2.07	76.7
Restaurant	361	4.55	2.18	5.89	1.63	5.45	1.74	71.6
Football	362	2.89	1.49	5.42	1.84	4.06	1.70	72.7
CourtSport	370	5.92	1.77	4.89	2.00	5.87	2.30	62.7
JackHammer	380	1.45	0.87	7.04	1.57	3.11	2.02	73.4
Jet	400	4.09	2.01	6.00	2.11	3.74	2.01	71.3
Applause	401	7.08	1.60	6.15	1.68	6.02	1.79	74.4
Helicopter1	403	3.38	1.93	6.13	1.63	4.25	2.03	73.4
Helicopter2	410	3.75	1.77	5.83	2.07	3.72	1.63	74.3
Countdown	415	4.70	1.76	6.00	1.63	4.51	2.12	69.0
CarHorns	420	2.25	1.34	6.55	1.77	4.06	2.09	74.2
TireSkids	422	2.08	1.72	7.42	1.43	3.19	2.07	75.0
Injury	423	2.49	1.61	6.11	1.68	3.66	1.59	75.2
CarWreck	424	1.09	0.35	8.13	1.33	2.04	1.75	79.3
Train	425	5.06	2.17	5.85	1.80	4.60	1.95	69.9
Wind	500	3.36	2.25	5.55	1.82	4.02	2.33	73.1
PlaneCrash	501	1.96	1.37	6.68	2.20	2.40	1.59	66.0
EngineFailure	502	2.40	1.49	5.75	2.16	2.77	1.55	67.5
BikeWreck	600	1.15	0.60	8.06	1.38	2.09	1.67	80.6
ColonialMusic	601	5.57	2.24	6.15	1.68	5.51	2.04	76.2
Thunderstorm	602	4.19	2.39	5.45	1.81	3.64	1.99	70.0
CboyIndians	610	4.77	2.06	6.34	1.98	4.83	2.08	69.7
MayDay	625	2.51	1.61	6.64	1.33	3.28	2.11	72.4
Bombs	626	2.15	1.67	7.47	1.44	2.79	2.14	76.8
HowlingRain	627	1.38	0.95	7.79	1.21	2.28	1.87	79.9
Raging Fire	698	1.51	0.87	7.89	1.53	2.30	1.69	79.4
Bomb	699	1.91	1.38	7.32	1.58	2.98	2.01	74.1
ToiletFlush	700	3.53	1.92	4.02	1.82	5.38	2.28	72.8
Fan	701	4.08	2.06	4.79	2.03	4.68	1.74	68.5
Belch	702	2.36	1.95	5.47	1.88	3.83	2.00	73.1
TouchTone	704	4.15	1.74	4.77	2.04	5.85	2.34	67.1
RotaryDial	705	4.42	1.45	5.98	1.98	4.85	2.19	71.4
War	706	1.91	1.62	6.98	1.62	2.85	2.00	71.3
ClockTick	708	3.42	1.56	5.17	2.07	4.36	2.20	69.9
AlarmClock	709	1.72	1.28	7.89	1.55	3.81	2.18	80.8
Cuckoo	710	3.74	2.24	6.72	1.69	4.49	2.23	74.9
Sirens	711	1.85	1.71	7.72	1.23	2.30	1.58	77.8
Buzzer	712	1.70	1.29	8.02	1.13	2.45	1.50	80.9
BrushTeeth	720	4.09	1.84	4.68	1.96	6.13	2.09	71.6
Beer	721	7.09	1.47	4.89	1.82	6.72	1.84	72.9
Walking	722	2.68	1.40	6.09	1.68	4.47	2.19	69.7
Radio	723	4.06	2.22	5.25	1.83	5.47	2.34	75.8
Chewing	724	4.25	2.37	5.13	1.94	5.34	2.17	68.1
SodaFizz	725	4.08	2.02	4.53	1.89	5.00	1.93	72.3
Cork	726	4.89	1.75	4.02	1.73	5.28	1.92	63.0
GlassBreak	730	2.38	1.24	6.19	1.75	4.25	1.84	77.5
Natives	802	7.28	1.77	5.79	2.08	6.21	1.63	69.2

APPENDIX (Continued)

Table A1 (Continued)

Description	Sound No.	Valence		Arousal		Dominance		dB
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Beethoven	810	8.21	1.08	5.28	2.54	6.81	1.75	71.0
Bach	811	7.49	1.60	5.49	2.01	5.83	1.95	69.8
Choir	812	6.47	2.25	3.70	2.14	5.43	2.10	68.8
RockNRoll	815	8.17	0.99	7.45	1.70	6.75	1.56	74.0
Guitar	816	8.08	1.11	4.87	2.31	6.66	1.40	67.5
FunkMusic	820	8.00	1.39	6.70	2.00	6.60	1.76	75.0
BagPipes	826	7.17	1.76	5.68	2.08	5.60	1.90	76.1

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