International Affective Picture System (IAPS):
   Technical Manual and Affective Ratings

Lang, P.J., Bradley, M.M., & Cuthbert, B.N.
NIMH Center for the Study of Emotion and Attention 1997

with the assistance over the years of.- *Mark Greenwald, Arne dhman, Dieter Vaid, Alfons Hamm, Ed Cook, Andy Bertron, Margaret Petry, Rob Bruner, Mark McManis, Deana Zabaldo, Shelley Martinet Scott Cuthbert, Debbie Ray, Kathy Koller, Misty Kolchakian, and Sarah Hayden*

Introduction

The International Affective Picture System (IAPS) is being developed to provide a set of normative emotional stimuli for experimental investigations of emotion and attention. The goal is to develop a large set of standardized, emotionally-evocative, internationally accessible, color photographs that includes contents across a wide range of semantic categories. The IAPS (pronounced EYE-APS), along with the International Affective Digitized Sound system (IADS), the Affective Lexicon of English Words (ANEW), as well as other collections of affective stimuli, are being developed and distributed by the NIMH Center for Emotion and Attention (CSEA) at the University of Florida in order to provide standardized materials that are available to researchers in the study of emotion and attention. The existence of these collections of normatively rated affective stimuli should: 1) allow better experimental control in the selection of emotional stimuli, 2) facilitate the comparison of results across different studies conducted in the same or different laboratory, and 3) encourage and allow exact replications within and across research labs who are assessing basic and applied problems in psychological science.

In an undertaking of this nature, choices have to be made regarding the emotional judgments selected for standardization. We began by relying on a relatively simple dimensional view, which assumes emotion can be defined by a coincidence of values on a number of different strategic dimensions. This view is founded in Osgood's (Osgood, Suci, & Tanenbaum, 1957) seminal work with the semantic differential, in which factor analyses conducted on a wide variety of verbal judgments indicated that the variance in emotional assessments were accounted for by three major dimensions: The two primary dimensions were one of affective valence (ranging from pleasant to unpleasant) and one of arousal (ranging from calm to excited). A third, less strongly-related dimension was variously called 'dominance' or 'control'. Dimensional views of emotion have been advocated by a large number of theorists through the years, including Wundt (1898), Mehrabian and Russell (1974) and Tellegen (1985)

To assess the three dimensions of pleasure, arousal, and dominance, the Self-Assessment Manikin (SAM), an affective rating system devised by Lang (1980) was used. In this system, a graphic figure depicting values along each of the 3 dimensions on a continuously varying scale is used to indicate emotional reactions. Figure 1 illustrates the paper-and-pencil version of SAM (used in rating Picture Sets 1-6 and for the children's ratings); Figure 2 illustrates a newer, scannable version of SAM (used in rating Picture sets 7-10). As can be seen, SAM ranges from a smiling, happy figure to a frowning, unhappy figure when representing the valence dimension. For the arousal dimension, SAM ranges from an excited, wide-eyed figure to a relaxed, sleepy figure. For the dominance dimension, SAM ranges from a large figure (in control) to a small figure (dominated). The subject can select any of the 5 figures comprising each scale, or between any two figures, which results in a 9-point rating scale for each dimension. Ratings are scored such that 9 represents a high rating on each dimension (i.e., high pleasure, high arousal, high dominance), and 1 represents a low rating on each dimension (i.e., low pleasure, low arousal, low dominance).

When the ScanSam version of **the SAM instrument** was initially designed, the SAM figures for pleasure, arousal, and dominance were the same as had been used in previous SAM versions (see Figure 2a). In addition, we developed a second dominance scale (see Figure 2b) to determine whether this third dimension, which accounts for relatively little unique variance in picture perception, could be better distinguished from pleasure and arousal. In this version of dominance SAM (see Fig 2b, third column), the most dominant SAM figure was not only larger than the least dominant SAM figure, but had an assertive, aggressive look to his eyebrows and arms.

In addition to the paper-and-pencil version, SAM exists as a dynamic computer display on a variety of different systems, including IBM-compatible computers, in a program written and distributed by Ed Cook at the

University of Alabama-Birmingham[i] (Cook, Atkinson, & Lang, 1987). The computer SAM scale uses a 21-point scale, rendering more discrimination in each dimension than the paper-and-pencil version.

Using SAM, subjects have rated the pictures currently in the IAPS on the dimensions of valence, arousal, and dominance. Figure 3 illustrates the typical shape of the affective space that results when each picture is plotted in terms of its mean valence and arousal rating. There are several characteristic features of the resulting space. First, these stimulus materials evoke reactions across the entire range of each dimension: mean pleasure ratings for these pictures range from very unpleasant to very pleasant , and are distributed fairly evenly across the space. Similarly, a wide range of arousal levels is elicited by these materials. Secondly, it is clear that pleasant pictures range continuously along the arousal dimension: The upper half of emotional space has exemplars at many positions along this dimension. These data suggest that the degree of arousal is uncorrelated with the pleasantness of the picture. Pictures depicting unpleasant events, however, show a tendency to cluster in the quadrant of emotional space indicating high arousal: There are relatively fewer unpleasant items located in the calm quadrant of emotional space. Finally, for items rated as neutral in valence (i.e., those occurring at and near the midline of the valence dimension), arousal ratings do not attain the high levels associated with either pleasant or unpleasant materials.

We have made efforts to find materials that will fill all portions of affective space, including the relatively impoverished quadrant of unpleasant pictures that are low in arousal. The categories that currently reside in this corner of space include pictures depicting pollution, starving children, and cemeteries. The relative lack of material in this quadrant may indicate, as Tellegen (1985) suggests, that high positive affect and high negative affect both involve high levels of arousal: without the arousal component, affective events are less 'intense' (see Lang, Bradley, & Cuthbert, 1992)

The SAM instrument is a relatively easy method for quickly assessing pleasure, arousal, and dominance. To determine whether these ratings are, in fact, comparable to those collected when administering the relatively longer semantic differential scale devised by Russell and Mehrabian (1974), we compared ratings obtained using this scale to the SAM instrument (Bradley and Lang, 1994). In this study, each subject made 18 judgments for each picture using the bipolar adjective scales of the semantic differential. Results indicated extremely high correlations for the factor scores of pleasure and arousal derived from the semantic differential ratings and those resulting from the use of SAM, suggesting that SAM quickly assesses these fundamental dimensions of emotion.

SAM data gathered to date also indicate that these ratings are stable when assessing either within- or between subject reliability. For example, the mean ratings of valence and arousal for these materials are highly internally consistent. The split-half coefficients for the valence and arousal dimensions were highly reliable (p< .001), both for pencil-and-paper (rs= .94 and .94, respectively for 60 pictures) and computer administration formats of SAM (rs= .94 and .93, respectively for 21 pictures). These affective judgments remained stable even when subjects in different experiments rated the same pictures. Using the pencil-and paper version of SAM, a small subset of pictures rated in Picture Set 1 were re-presented when Picture Set 2 was rated, in the context of a completely different set of to-berated pictures. Independent sample t-tests of these replicate pictures (which were distributed widely in the affective space) revealed no significant difference in either the mean valence or the mean arousal ratings. Using the interactive computer SAM instrument, it was also found that the ratings for a subset of pictures (n=11) were highly similar to the same pictures presented in an earlier experiment for both mean valence ratings (r = .99) and mean arousal ratings(r = .97). Again, t-tests revealed no significant differences in picture valence or arousal means across studies.

Normative rating procedure for IAPS

This overview of the rating procedure is an example of how these normative studies were conducted. In general, each picture set that was rated consisted of 60 different IAPS pictures that varied in pleasure and arousal. SAM ratings of pleasure, arousal, and dominance were made immediately after each picture was presented. This version of the technical report includes ratings for 700 pictures, which were rated in 12 Picture sets of 60 pictures each, over the course of the past 10 years. Tables 1, 2, & 3 list the mean ratings for these pictures for all subject (Table 1), for male subjects (Table 2) and for female subjects (Table 3). Means and sds listed under the column Dominance 1 used the dominance scale illustrated in the paper-and-pencil SAM version (Figure 1) and ScanSam (Figure 2a), whereas means/SDs listed under Dominance 2 used the dominance scale illustrated in ScanSam (Figure

2b). The data were very similar regardless of which dominance scale was used.

In addition, a subset of pictures from the IAPS were selected and rated by groups of children, ages 7-9 years, 10-12, and 13-14, as well as in an intact set by college students. These ratings are included in Table 4 of this technical report. The procedure for obtaining ratings for the children was almost identical to that described for adults, except for 1) the children were run in classrooms of 15-30, 2) instructions were slightly changed to

explain the affective dimensions in language easier for children to understand, and 3) children were given 20 s, instead of 15 s, to make their ratings before the next picture was shown.

Subjects. College students were members of both genders taking an Introductory Psychology class and who participated as part of a course requirement.

Design. Subjects were run in groups ranging in size from 8 to 25, with the male:female ratio no more than 1:2 (or 2:1) for any single group session. Three to four different picture orders were used, which balanced the position of a particular exemplar within the entire series of pictures. The three SAM dimensions served as dependent measures.

Materials and Equipment. Criteria for pictures included in the IAPS include: 1) Selection of a broad sample of contents across the entire affective space. 2) All pictures are in color, 3) Pictures are selected that are easy to resolve, have clear figure - ground relationships, and communicate affective quality relatively quickly.

Typically, members of our laboratory pre-screen potential new materials for ease of resolution and affective impact. Materials that meet these criteria are then included in the IAPS.

In addition to the 60 IAPS exemplars rated in each Picture Set, 3 practice pictures are viewed prior to the experimental ratings. These pictures provide subjects with a rough range of the types of contents that will be presented, as well as serving to anchor the emotional rating scales. Common anchor points used to date are: 420 (woman at beach), 701 (basket), and 310 (a burn victim).

In addition to the IAPS stimuli, additional pictures are used to instruct the subject regarding specific elements of the rating procedure. Each trial included presentation of the following preparation and rating slides immediately before and after the presentation of each IAPS picture:

(preparation slide:) **Rate the next slide on page x**

(rating slide:) **Please rate the slide on all 3 dimensions**

To conduct each rating study, 60 preparation slides were constructed, each with number indicating which stimulus was being rated (1-60). Sixty slides holding the rating instruction were also used. In addition to these materials, 9 slides that demonstrated the SAM ratings were used for instructional purposes. These 9 slides included 3 SAM figures for each dimension (pleasure, arousal, dominance) with the 3 examples illustrating: An extreme rating at one end of the scale (e.g., Marked on the smiling SAM face), an extreme rating at the other end of the scale (e.g., Marked on the frowning SAM face) and an example of an intermediate rating (e.g., Marked on the 3rd SAM figure).

The projector was controlled by either a timing tape that synchronized stimulus events (Picture Sets 1-8), or by a computer that controlled the projector through the serial port (Picture Sets 9-10). In each case, each rating trial lasted 26 s, with

The 26 s loops were the same for each picture stimulus. Three carousel trays are used to hold the slide stimuli used in these experiments. Each tray holds 20 picture trials (60 slides). The synchronization tape pauses

at these points for the changing of trays and rewinding of the synchronization cassette tape. Practice trials are presented using manual timing.

Procedure . The paper-and-pencil version of the Self-Assessment Manikin (Lang, 1980) in booklet format was used to acquire affective ratings for Picture Sets 1-6 (see Figure 1); Picture sets 7-10 used the new, compute-rscorable ScanSAM sheet (see Figure 2). In both formats, the (unlabeled) dimensions of valence, arousal and control/dominance are graphically rendered . Each of the 3 dimensions is ordinally scaled with 5 figures. The subject can select any figure (by placing an 'X' for the booklet version or bubbling in the circle for the appropriate figure in the ScanSam version). In the booklet version, the subject could also place an 'X' between any of the figures, resulting in a 9-point rating scale for both formats.

Experimental sessions were conducted in 20 ft x 35 ft room under the similar lighting conditions. Subjects were seared in rows of 90 degree arcs facing the screen on which the slides were projected. The maximum size of the image projected on the screen was standardized at approximately 4 ft x 5 ft.

Each trial began with a preparation slide ("Get ready to rate the next slide') that was presented for 5 seconds. Then, the picture to be rated was presented for 6 s, and immediately AFTER the picture left the screen, the subject made their ratings of pleasure, arousal, and dominance using SAM. A standard 15 s rating period was used, which allowed ample time for subjects to make the three SAM ratings.

<u>**Instructions: Adult Participants**</u>

We thank you for coming today and appreciate your participation in this experiment. In this study, we are interested in how people respond to pictures that represent a lot of different events that occur in life. For about the next 40 minutes, you will be looking at different pictures projected on the screen in front of you, and you will be rating each picture in terms of how it made you feel while viewing it. There are no right or wrong answers, so simply respond as honestly as you can. Before we start, I'd like you to read and sign the informed consent that accompanies your rating booklet. When you are finished reading the consent form, please sign your name on the appropriate line on the third page if you wish to partic1pate in this study. (pause)

Now let me explain your involvement in more detail. First, complete the information on the cover of the ratings booklet. (pause)

If you'll look at the sheet labeled page three, you will see 3 sets of 5 figures, each arranged along a continuum. We call this set of figures SAM, and you will be using these figures to rate how you felt while viewing each picture. You will use one page-- make all 3 ratings -- for *each* picture that you observe. SAM shows three different kinds of feelings: Happy vs. Unhappy, Excited vs. Calm, and Controlled vs. In-control.

** At this point, **turn out the lights, and turn on the first SAM demonstration slide** (see below).

"You can see that each SAM figure varies along each scale. In this illustration, the first SAM scale is the happy-unhappy scale, which ranges from a smile to a frown. At one extreme of the happy vs. unhappy scale, you felt <u>happy,</u> pleased, satisfied, <u>contented,</u> hopeful. If you felt completely *happy* **while viewing the** picture, you can indicate this by placing an "X" over the figure at the left, like this (demonstrate with **SAM1).** The other end of the scale is when you felt completely, unhappy, annoyed, unsatisfied, melancholic, despaired, bored. You can indicate feeling completely *unhappy* by placing an "X" on the figure at the right, like this (demonstrate with **SAM2).** The figures also allow you to describe intermediate feelings of pleasure, by placing an "X" over any of the other pictures. If you felt completely neutral, neither happy nor sad, place an "X" over the figure in the middle. If, in your judgment, your feeling of pleasure or displeasure falls *between* two of the pictures, then place an "X" between the figures, like this (demonstrate with **SAM3).** This permits you to make more finely graded ratings of how you feel in reaction to the pictures.

"The excited vs. calm dimension is the second type of feeling displayed here. At one extreme of the scale you felt stimulated, <u>excited,</u> frenzied, jittery, wide-awake, aroused. If you felt completely *aroused* while viewing the picture, place an "X" over the figure at the left of the row, like this (demonstrate with **SAM4).** On the other hand, at the other end of the scale, you felt completely <u>relaxed,</u> calm, sluggish, dull, sleepy, unaroused. You can indicate you felt completely *calm* by placing an "X" over the figure at the right of the row, like this (demonstrate with **SAM5).** As with the happy-unhappy scale, you can represent intermediate levels by placing an "X" over any of the other figures. If you are not at all excited nor at all calm, place an "X" over the figure in the middle of the row. Again, if you wish to make a more finely tuned rating of how excited or calm you feel, place an "X" *between* the pictures, like this. (demonstrate with **SAM6).**

The last scale of feeling that you will rate is the dimension of controlled vs. in-control. At one end of the scale you have feelings characterized as completely controlled, influenced, cared-for, awed, submissive, guided. Please indicate feeling *controlled* by placing an "X" over the figure at the left, like this (demonstrate with **SAM7).** At the other extreme of this scale, you felt completely controlling, influential, in control, important, dominant, autonomous. You can indicate that you felt *dominant* by placing an "X" over the figure at the right of the row, like this (demonstrate with **SAM8).** Note that when the figure is large, you feel important and influential, and that it will be very small when you feel controlled and guided. If you feel neither in control nor controlled you should make an "X" over the middle picture. Remember you can also represent your feelings between these endpoints. Either place an "X" over any of the intermediate figures, or *between* them--like this (demonstrate with **SAM9).**

Some of the pictures may prompt emotional experiences; others may seem relatively neutral. Your rating of each picture should reflect your immediate personal experience, and no more. Please rate each one AS *YOU ACTUALLY FELT WHILE YOU WATCHED THE PICTURE.*

The procedure will be as follows: *Before* each of the pictures which you will rate, there will be a *warning slide* that indicates the number of page you should use to rate the upcoming picture. At these times, you should always be certain that the *picture number* corresponds to the *ratings page number.* For example, when you see "Rate the next slide on page 10" (demonstrate with slide), you should turn to page number 10 of your ratings booklet.

"The warning slide should *also* prompt you to quickly complete the previous rating and pay close attention to the screen. It is important that your eyes be directed towards the screen when the pictures to be rated are

shown. You'll have only a few seconds to watch each picture. Please view the picture for the *entire* time it is on and make your ratings immediately *after* the picture is removed. If, for some reason, you should *miss* viewing any picture, please leave that ratings page *blank.* Remember: Your ratings page number must *always* have the same number as the picture.

"*After* each picture, you'll see projected 'Please rate the slide on all three dimensions' **(demonstrate with slide).** Take this time to record your emotional experience of the picture in the booklet, as I've already said. It is very important *not* to dwell on your ratings of the pictures, since

there will not be much time. Also remember that you will need to check the correct page number given on the warning slide for the next trial.

"*Please note* that the 3 dimensions are not presented in the same order on each page of the ratings booklet. Look at pages 3, 4, and 5 now to see that the dimensions are presented in *different* orders. (pause) We are interested in your own *personal* ratings of the pictures. Therefore, please don't make any comments which might influence the ratings that other people make. You can understand how this might bias our results." **(Remove tray 3, insert tray 1)**

"Before we begin, here are examples of the kinds of pictures you will be viewing and rating. Right now, I'd like you to take your sample rating sheet and practice rating the following pictures, all on the same sheet. This is just to help you get a feel for how the ratings are done." **(Present the practice slides;** these should be inserted at the beginning of Tray 1 and should have the same structure as an experimental trial).

Are there any questions before we begin? (pause) Just a reminder before we begin; when the warning slide comes on, make sure the slide number and the ratings page number match. Then view the picture slide for the entire time it is on. After the picture is off, make your ratings on all 3 dimensions as quickly as possible and get ready for the next picture. It is important that we have information from each of you on all of these pictures. There are no right or wrong answers; so *rate every picture on all three dimensions."*

At the end of the experiment: Please review your booklets carefully to be certain you have completed all ratings on all pictures, completed the information on the front of the booklet and printed your name on the first ratings page. We want to thank you very much for your participation today. It is important that you not discuss this experiment with anyone until after the end of the semester, since this might affect our results. Please leave the booklets in the box as you leave the room, and thank you very much."

Note: Slight changes in these instructions were made when the newer, ScanSam version was used (e.g., 'row' was used instead of page; 'bubble in' was used instead of 'make an X', but the substantive nature of the instructions remained identical.

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[i] Dr. Edwin Cook, University of Alabama-Birmingham,
Psychology Department, 201 Campbell Hall, 1300 University Blvd., Birmingham, AL 35294-1170.