Fearfulness and Affective Evaluations of Pictures

Margaret M. Bradley and Peter J. Lang

Subjects high and low in temperamental fearfulness made a speeded decision regarding whether each of a series of affective pictures was "unpleasant" or "pleasant." Fearful subjects made faster decisions on unpleasant pictures than did low fear subjects, whereas no difference was found between low and high fear participants when processing pleasant materials. Reaction time differences as a function of fearfulness were amplified when unpleasant pictures were also high in arousal, suggesting that stimulus intensity is a relevant methodological factor when assessing effects of temperament in cognitive processing. Taken together, these data are consistent with the hypothesis that an anxious or fearful temperament is associated with rapid reactions to unpleasant events.

Current views of temperament and personality are converging on the notion that differences in a factor related to trait anxiety may affect how people respond to emotional events (e.g., Derryberry & Rothbart, 1988; Eysenck, 1992; Watson & Clark, 1984). For instance, Byrne and Eysenck (1995) suggest that individuals high in trait anxiety engage in preferential processing of threatening objects and have a tendency to interpret ambiguous stimuli as threatening. Mathews and Milroy (1994) conclude that evidence generally supports the notion that threatening stimuli capture attention in anxious individuals. Most research investigating effects of trait anxiety on cognitive performance has used word stimuli that are either unpleasant or neutral. In the present study, we investigated the extent to which fearfulness affects cognitive processing by exploring how subjects high or low in temperamental fearfulness perceive emotional—both unpleasant and pleasant—pictures that also varied in level of arousal.

1This work was supported in part by National Institute of Mental Health (NIMH) Grants MH 52384, MH37757, MH43975. We thank Alex Lam and Heather Howes for their assistance in data collection and scoring.

2Correspondence concerning this article can be sent to Margaret Bradley, Ph.D., Box 100165 H.S.C., University of Florida, Gainesville, Florida 32610.
There are a number of reasons for using emotional pictures as cues to affective experience. First, we have been systematically collecting and acquiring affective norms for a large variety of pictures that vary in pleasure and arousal, which are gathered together in the International Affective Picture System (IAPS) (Center for the Study of Emotion and Attention, 1999). This standardized collection of color photographs (over 600 to date) allows one to easily select and control stimuli based on standard ratings of pleasure and arousal. Use of these stimuli allows us to (1) assess reactions to both unpleasant and pleasant stimuli as a function of temperamental fearfulness and (2) determine whether the level of arousal associated with the stimulus affects differential reactivity.

Secondly, recent studies have demonstrated that these emotional pictures reliably elicit measurable responses in several affect-relevant physiological and behavioral systems, including heart rate, skin conductance, facial muscle responses, and event-related potentials (see Bradley, Greenwald, & Hamm, 1993; Greenwald, Cook, & Lang, 1989; Lang, Greenwald, Bradley, & Hamm, 1993; Bradley & Lang, in press), as well as modulation of both startle and spinal reflexes (e.g., Bonnet, Bradley, Lang, & Requin, 1995; Lang, Bradley, & Cuthbert, 1990). Pictures of affective events and objects are also ecologically valid stimuli in the sense that they involve processing the kinds of visual material that people encounter daily in magazines, newspapers, books, and on television. Moreover, non-lexical visual information is often the first cue to signal a threat in the natural environment (e.g., the sight of a snake in the woods).

To measure trait anxiety or fearfulness, an instrument is needed that distinguishes between people disposed to fearful, anxious states and those who are not. Several existing questionnaires appear to tap this pervasive dimension of personality (see Strelau, 1991, for a representative list). In the current study, we used the EASI temperament questionnaire designed by Buss and Plomin (1975, 1984), as this instrument was designed to measure temperamental traits that are, in large part, inherited. Using data from monozygotic and dizygotic twins to select items, Buss and Plomin (1975) constructed this easy to administer questionnaire, which, in addition to assessing other personality traits, provides a measure of temperamental fearfulness, used here to index trait anxiety.

Each subject was asked to make a speeded decision regarding whether each of a series of 96 pictures denoted something pleasant or unpleasant, and reaction time was measured. Picture stimuli were selected to vary in pleasantness (pleasant,