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Valence Focus and Arousal Focus: Individual Differences in the Structure of Affective Experience

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The structure of affect is well represented as a circumplex. The results of a within-subject longitudinal study of self-reported mood indicate individual differences in the circumplex structure of affective experience. These differences can be captured by two constructs: valence focus and arousal focus. Valence focus is the degree to which individuals attend the hedonic component of their affective experience; arousal focus is the degree to which individuals attend the arousal component of their affective experience. In this study, differences in individuals' attention to the hedonic and arousal components of affective experience were related to observed correlations between specific affective elements, such as (a) ratings of anxious and depressed mood and (b) "Negative Affect" and "Positive Affect."

Research on mood has produced a reasonable consensus on the most general structure for affective experience: a circumplex, or circular ordering of stimuli around two dimensions (Larsen & Diener, 1992; Russell, 1980; Schlosberg, 1941; Watson & Tellegen, 1985). This abstract structure specifies the relationships among ratings of affective stimuli (i.e., ratings of facial expressions, semantic ratings of affect-related words, self-report ratings of mood; for a review see Russell, 1980). Its dimensions represent attributes that capture the shared variance among the stimuli. In descriptive terms, then, circumplex dimensions describe affective states. Any affective state may be defined by its placement relative to circumplex dimensions.

Although differences remain in the rotation and labeling of the affective dimensions (e.g., Diener, Larsen, Levine, & Emmons, 1985; Larsen & Diener, 1992; Thayer, 1989; Watson & Tellegen, 1985), all dimensions may be defined as combinations of the original valence–arousal dimensions (Reisenzein, 1994; Russell, 1980; Schlosberg, 1954). The valence dimension refers to the hedonic quality or pleasantness of an affective experience. The arousal dimension refers to the *perception* of arousal associated with such an experience (Russell, 1989). A representation of the valence–arousal model based on a multidimensional scaling of people's judgments of the semantic similarity among affect terms (taken from Feldman, in press) is presented in Figure 1a.

Within the domain of self-reported mood, the circumplex is a structural model derived from the observed relationships among a sample of mood ratings. Typically, the variance accounted for by the arousal dimension is half of that accounted for by the valence dimension in factor analyses of self-reported mood (e.g., Mayer & Gaschke, 1988; Meyer & Shack, 1989; Watson & Tellegen, 1985). As a result, the self-report structure is more elliptical than circular (Feldman, in press). Self-report ratings of mood reflect whether someone is feeling good or bad and, to a lesser extent, the level of arousal associated with the emotional state.

Circumplex models provide an explicit conceptual definition of psychological processes that produce a data structure (Wiggins, 1974, 1979). Patterns of affective expression support the existence of such processes. Analyses of the observed correlations between mood ratings produce dimensions that not only capture the shared variance among these ratings but also represent the processes that determine affective experience. For example, researchers have treated the similarity between the circumplex structures obtained from semantic data and from self-report ratings of mood as evidence that people use the semantic concepts as an informal, implicit theory of emotion when selecting affect words to label and report their subjective experiences (Russell, 1980, 1989). Within this view, valence and arousal are two of the semantic components used by individuals to interpret and communicate their affective experience.

The purpose of this study was to investigate individual differences in the valence–arousal circumplex structure of affect. When using the semantic structure to label and report their mood experiences, people may differentially weigh valence and arousal components to arrive at a judgment. I hypothesized that systematic individual differences exist in the extent to which people attend to the valence and arousal components of affective experience. I called these individual difference variables *degree of valence focus* and *degree of arousal focus*. Degree of valence focus is defined as individual differences in the tendency to attend to and report the pleasant or unpleasant aspects of emotional experience. Although hedonic quality is a universal aspect of affective experience (Russell, 1991), individuals may vary in the extent to which they emphasize it as a component of their affective experience. Degree of arousal focus is de-

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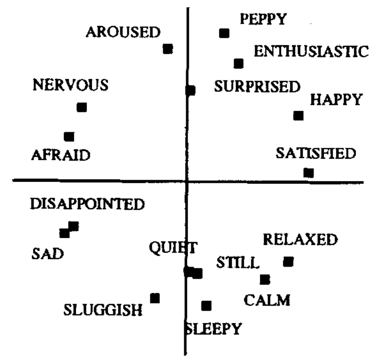

Figure 1a. Original Semantic Circumplex

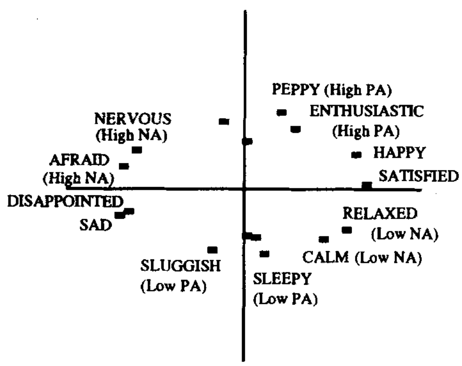

Figure 1b. Semantic Circumplex with Arousal Dimension Reduced by 50%

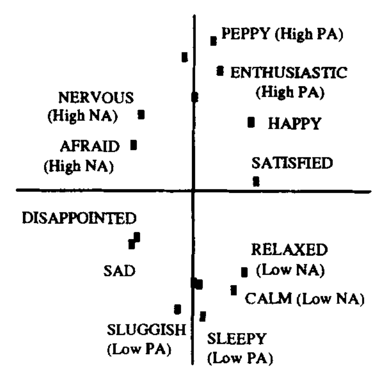

Figure 1c. Semantic Circumplex with Valence Dimension Reduced by 50%

Figure 1. Variations in the circumplex structure of affect.

fined as individual differences in the tendency to attend to and report the physiological arousal associated with affective states. Individuals may range from those who largely ignore their own arousal to those who emphasize it as part of their emotional experience. Degree of arousal focus is consistent with other research that has highlighted the relationship between individual differences in somesthetic perception and the labeling of emotional experiences (Blascovich, 1990, 1992; Blascovich et al., 1992; Katkin, 1985).

The importance of valence focus and arousal focus to the shape of the affective structure is shown in Figure 1. The semantically derived circumplex is presented in Figure 1a. This circumplex was obtained from similarity ratings of affect-related terms (Feldman, in press). In this circumplex, the valence dimension and the arousal dimension are equal in size. The remainder of Figure 1 presents hypothetical structures for individuals whose focus on arousal (Figure 1B) and valence (Figure 1C) are diminished relative to the semantic structure of affective experience. Variations in the valence and arousal components of the circumplex should predict the observed correlations between measures of any aspects of the affective space. My principal concern here was to determine how variations in the structure are related to specific changes in the correlation between ratings of anxious and depressed mood and between self-reported "Negative Affect" (NA) and "Positive Affect" (PA).[1]

Relationships Between Specific Affective Constructs

The Anxious Mood–Depressed Mood Correlation

Variations in valence focus and arousal focus predict that individual differences will occur in the correlation between self-

[1] I have placed the terms "Negative Affect" and "Positive Affect" in quotes to distinguish these psychological constructs from positive and negative emotions per se (also see Watson & Tellegen, 1985, p. 233). "Positive Affect" does not refer to all positive emotional states, and "Negative Affect" does not refer to all negative emotional states (see Watson & Tellegen, 1985, p. 233; Watson, 1988a).

reported anxiety and depression. In an ideal circumplex, the correlation between any two terms is equal to the cosine of the angle between them (Russell, 1989). Consider the placement of the terms *nervous* and *sad*, which serve as markers for anxious and depressed moods, respectively. In the semantic circumplex presented in Figure 1a, the terms *nervous* (a negative, high-arousal word) and *sad* (a negative, lower arousal word) are at a 60° angle, which corresponds to a moderate correlation between the two mood states (r = .50). An individual low in arousal focus (Figure 1b) should have a higher correlation between *nervous* and *sad*. In Figure 1b, the angle between *nervous* and *sad* has reduced to 31° (r = .86). Now consider an individual lower in valence focus (Figure 1c). The angle between *nervous* and *sad* has increased to 96° (r = −.10).

In cross-sectional studies, ratings of anxious and depressed mood are often so highly correlated that they are rarely meaningfully distinguished from one another. Clear and consistent differentiation between reports of anxious and depressed moods is rarely seen in nonclinical, subclinical, and clinical samples (for a detailed discussion of this observation, see Clark & Watson, 1991; Feldman, 1993a; Gotlib, 1984). Individual differences in valence and arousal focus, however, predict variation in the observed correlation between anxious and depressed moods. Some individuals should distinguish between these moods, whereas others should not.

NA and PA

Valence focus and arousal focus may predict individual differences in the correlation between NA and PA (Watson & Tellegen, 1985). "Negative Affect" and PA describe dimensions that fall at a 45° angle to the valence and arousal dimensions of the circumplex. "Negative Affect" is anchored by negatively valenced, high-arousal emotions at one end and by positively valenced, low-arousal emotions at the other. "Positive Affect" is anchored by positively valenced, high-arousal emotions at one end and by negatively valenced, low-arousal emotions at the other. "Negative Affect" and PA are considered to be largely orthogonal dimensions (Tellegen, 1985; Watson, 1988a, 1988b; Watson, Clark, & Tellegen, 1984; Watson & Tellegen, 1985). Within cross-sectional studies, however, there is evidence that this observed independence between NA and PA stems from both random and systematic sources of measurement error (Green, Goldman, & Salovey, 1993). "Negative Affect" and PA may in fact be negatively correlated once measurement error is accounted for.

Variations in valence focus and arousal focus suggest that individual differences in the correlation between NA and PA will occur when affective states are studied within subjects. In Figure 1a, the terms *nervous* (a negative, high-arousal word) and *enthusiastic* (a positive, high-arousal word) are at a 77° angle, which corresponds to a small correlation between the two mood states (r = .23). For the hypothetical individual low in arousal focus shown in Figure 1b, the angle between *nervous* and *enthusiastic* has increased to 108° (r = −.31). For the hypothetical individual low in valence focus shown in Figure 1c, the angle between *nervous* and *enthusiastic* has decreased to 47° (r = .68).

Thus, the correlation between NA and PA may vary across individual cases. There is some evidence that is consistent with this prediction. The correlations between NA and PA scale scores are often higher than 0 and demonstrate a wide range across different samples. These findings may be due to random error, but they also suggest that NA and PA may not be largely orthogonal.

Variations in Valence Focus and Arousal Focus

The main purpose of this study was to introduce two new individual-difference variables: valence focus and arousal focus. I will demonstrate variations in the structure of mood ratings across individuals by constructing an affective structure for each individual participant. Variations in the circular structure of affect depend on an individual's focus on hedonic and arousal information. In this study, I predicted that individual differences would emerge in the size of both the valence and arousal components in participants' self-reported mood ratings.

A second hypothesis was that variations in valence focus and arousal focus would account for a meaningful amount of the observed correlations between affect descriptors. The anxious–depressed mood and NA–PA correlations are just two examples. For someone low in arousal focus (Figure 1b), the correlation among affect descriptors will be based primarily on valence. In the extreme case, an individual might ignore arousal altogether. The affective circumplex would then collapse to a one-dimensional structure with anxious and depressed moods perfectly positively correlated and PA perfectly negatively correlated with NA. As degree of arousal focus increases, the angle between the anxiety and depression terms will increase, and their correlation should approach a moderate size. The correlation between the NA and PA terms will decrease, and their correlation should approach 0, as exemplified in the schematic diagrams of the circumplex (see Larsen & Diener, 1992; Watson & Tellegen, 1985). For someone low in valence focus (Figure 1c), the correlations among affect descriptors will primarily reflect arousal. In the extreme case, an individual might ignore valence altogether (undoubtedly hypothetical), causing the circumplex to collapse to a one-dimensional structure equivalent to arousal. For this individual, depression and anxiety are polar opposites, and NA and PA are equivalent.

Although these examples are hypothetical, they do illustrate how the structure of affect may vary with the simple weighting of the valence and arousal dimensions. Such weighting cannot be detected in the usual cross-sectional design and requires a within-subject approach. Previous within-subject studies of affective structure have tended to emphasize the similarity of the affective structure across individuals (e.g., Watson 1988a; Watson et al., 1984; Zevon & Tellegen, 1982). By combining circumplex and within-subject methods, an individual's pattern of mood ratings should suggest the psychological processes associated with affective experience and expression.

Method

Participants

Two male and 22 female students in the Department of Psychology at Pennsylvania State University participated in a longitudinal study on the relationship between personality and the structure of affective experience.

Procedure

These data are part of a larger data set collected to study the relationship between personality and emotional experience. At the beginning of the study, participants completed a questionnaire assessing the semantic similarity among mood adjectives. Next, they completed a battery of personality questionnaires. The procedure for collection of the daily mood ratings followed the one used by Zevon and Tellegen (1982). Participants completed the mood questionnaire every day for 62–91 consecutive days to ensure a sample of data that could be factor analyzed for each participant (Gorsuch, 1983). For 8 participants, the observation period was between September and December of 1992 (observation period of 70 days). For 16 of the participants, the observation period was between January and April of 1993 (observation period of 90 days). Some participants completed mood ratings on more days than were required, and I included these observations in the study. During the observation period, participants completed the questionnaire either during the morning (7 am–12 pm), afternoon (12 pm–5 pm), or evening (5 pm–12 am) of each day. The assigned time varied randomly each day across the study. The importance of filling out one questionnaire during the assigned time period each day was stressed, and participants were encouraged to generate strategies to help them comply with this guideline. Completed forms were returned Monday, Wednesday, and Friday of each week. Participants who failed to return their daily questionnaire were contacted within 48 hr. Data from 2 participants were excluded when they reported completing several of their daily measurements retrospectively. None of the 24 remaining participants missed more than 13% of the observation days. The average number of missed days was 4.29. Participants also took part in in three interviews during the study, to ensure their continued compliance with research procedures. Participants were debriefed during the last interview; none reported awareness of the hypotheses under investigation and, as volunteers, they did not receive any remuneration for their participation.

Daily Measure of Mood

The self-report questionnaire used in this study included affect terms that defined the valence, arousal, NA, and PA dimensions of the affective circumplex. Additional items were taken from several sets of commonly used anxious mood and depressed mood scales.[2] A total of 75 items were selected. Participants indicated on a 7-point scale the extent to which each of these 75 mood adjectives described their mood (0 = *not at all*, 3 = *a moderate amount*, 6 = *a great deal*). Participants were asked to rate their feelings at that moment in time. Several sets of measures were constructed from this larger questionnaire.

Octant items. Sixteen affect-related terms represented the circumplex space to ensure that all of its octants were equally represented (see Figure 2).

Scales for specific affect elements. Scores on several commonly used mood scales were computed from the larger questionnaire. Brief measures of PA and NA (Watson, Clark, & Tellegen, 1988) were constructed from 10 items each. Fear and Sadness subscales from the Positive Affect and Negative Affect Schedule—Expanded Form (PANAS-X; Watson & Clark, 1991) were constructed. The Fear subscale consisted of 6 items (*afraid, scared, nervous, jittery, frightened*, and *shaky*). The Sadness subscale consisted of 5 items (*sad, blue, downhearted, alone*, and *lonely*). Anxious mood and depressed mood subscales from the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971) were constructed. The anxious mood subscale consisted of 9 items (*tense, shaky, on edge, panicky, relaxed, uneasy, restless, nervous*, and *anxious*). The depressed mood subscale consisted of 11 items (*unhappy, sorry, blue,*

Figure 2. The 16 mood terms chosen from the current study (taken from Feldman, 1993a).

sad, hopeless, discouraged, lonely, gloomy, helpless, worthless, and *guilty*). To minimize item overlap between subscales, the items *miserable, desperate*, and *terrified* were not included in the POMS depressed mood subscale constructed in this study (Gotlib & Cane, 1989). The item *unworthy* was not included in the POMS depressed mood subscale because of overlap with the item *worthless*.

Semantic Similarity Measure

Participants rated the similarity of all 120 possible pairs of the 16 circumplex markers. Similarity was rated on a 7-point scale (1 = *extremely dissimilar*, 4 = *unrelated*, 7 = *extremely similar*). Each mood term appeared as the first member in one half of the pairs in which it occurred and as the second member in the other half (see Davison, 1983). The adjective pairs were presented in a single random order.

Results

The results are presented in three sections. First, individual differences in the circumplex structure of affect are presented. Subsequently, the relationship between degree of valence focus, degree of arousal focus, and the correlation between self-reports of anxious and depressed moods is examined. Finally, the relationship between degree of valence focus, degree of arousal focus, and the correlation between NA and PA is evaluated.

[2] Typically, self-report measures are labeled according to the face validity of the items. Scales containing items related to sadness or depressed mood have been referred to as measures of "depression," and those containing items related to fear or anxious mood have been referred to as measures of "anxiety." Continuing to label self-report measures of anxious and depressed mood on the basis of the face validity of the items seems problematic given the strong correlations between ratings on those measures in cross-sectional samples. I hypothesized, however, that individuals will vary in their correlations when studied with a within-subject method. For lack of a simple alternative, I have adopted the convention of referring to the scales as anxious mood and depressed mood scales.

Individual Differences in the Circumplex Structure of Affect

To investigate the possible variation in affective structure across individuals, one P-correlation matrix was computed for each participant. Each matrix consisted of correlations between the 16 circumplex markers for the observation period. Items with zero variance were removed from three matrices (Zevon & Tellegen, 1982). Participant 3 responded with zero variance to the item *afraid*. Another indicator of the negative valence, high arousal octant—the item *tense*—was substituted for the factor analysis of this participant's data. Participant 4 responded with zero variance to the item *surprised*. Another indicator of the neutral valence, high arousal octant—the item *astonished*—was substituted for the factor analysis of this participant's data. Participant 20 responded with zero variance to the item *still*. Another indicator of the neutral valence, low arousal octant— the item *inactive*— was substituted for the factor analysis of this participant's data. Item substitutions were made for the factor analyses only.

Individual differences in the P-correlation matrices were examined in two ways. The matrices were submitted to P-factor analyses, as well as compared to the semantic distances of the circumplex items. Both sets of analyses demonstrated that there was variation in the structure of affect across individuals.

Factor analyses. Each P-correlation matrix was subjected to a principal-axis factor analysis. These analyses were designed to yield a measure of valence focus and arousal focus for each participant. The scree test was used as a criterion for selecting the factor solution (Gorsuch, 1983). The number of extracted factors ranged from one to four, with 1 participant obtaining a one-factor solution, 9 participants obtaining a two-factor solution, 12 participants obtaining a three-factor solution, and 2 participants obtaining a four-factor solution. For the participant with the one-factor model, two factors were extracted to preserve comparability across participants.

The valence and arousal factors are typically identified in the unrotated factor solutions of mood ratings. To verify the presence of valence and arousal factors quantitatively in each P-correlation matrix, all extracted factors were compared with nomothetically derived valence and arousal factors using coefficients of congruence. The nomothetic factors were the first two unrotated factors in the factor analysis of cross-sectional mood ratings from 177 male and 135 female participants (see Feldman, in press, Sample 3). Consistent with previous research, the first unrotated factor in the nomothetic analysis was a valence factor; the second unrotated factor was an arousal factor. For each participant in the present study, a P-factor was identified as a valence dimension if it had the highest coefficient of congruence with the nomothetic valence factor. Similarly, a P-factor was identified as an arousal dimension if it had the highest coefficient of congruence with the nomothetic arousal factor.

For 23 of the 24 participants, the first unrotated P-factor was identified as the valence factor. For Participant 18, the second unrotated factor had a larger coefficient of congruence with nomothetic valence factor (.84, as opposed to .56 for the first unrotated factor); therefore, the second unrotated factor was identified as the valence factor for this participant. The coefficients of congruence between the nomothetic valence factor and the unrotated idiographic valence factors ranged between .77 and .97, with a mean of .91. The coefficient of congruence for the valence factor was below .90 for 6 participants (Harmon, 1976). The second unrotated P-factor was identified as the arousal factor for 19 of the 24 participants. For Participant 18, the first unrotated P-factor had the largest congruence with the nomothetic arousal factor. For 3 participants, the third unrotated P-factor had the largest coefficient of congruence with the nomothetic arousal factor. Finally, for the participant with the one-factor model (Participant 6), the coefficient of congruence between the nomothetic arousal factor and the second P-factor was low enough (.36) to reject it as an arousal factor. Recall that a second factor was extracted for this participant to preserve comparability across participants. The largest coefficients of congruence between the nomothetic arousal factor and the idiographic arousal factors ranged from .53 to .90, with a mean of .73. Although these coefficients are lower than expected, visual inspection of the factor loadings suggested that these factors were indeed interpretable as arousal factors for all participants.

In cases where more than two factors were extracted, the coefficients of congruence between all the additional factors were computed. All coefficients were low enough to reject the possibility that a third identifiable factor was being extracted reliably.

Thus, the first two unrotated P-factors yielded valence and arousal dimensions for all but 4 participants. For 3 of the participants who were exceptions, the first factor was the valence factor, and the third factor was the arousal factor. For the final exceptional participant, a one-factor valence model was indicated; the amount of variance captured by an arousal dimension was 0 for this participant. The valence and arousal factors together accounted for between 34% and 65% of the variance in the mood ratings, with a mean of 49%.

The present findings probably cannot be reduced to difficulty factors (Gorsuch, 1983). The mean, standard deviation, and skew of each item distribution were correlated with the loading of each word on each P-factor within the sample of data from each participant. This resulted in 192 correlations (64 P-factors × 3 item statistics). The magnitudes of the correlations were generally low enough to allay concerns that the factors extracted were difficulty factors. Of the 192 correlations calculated, only 4 were approximately .80, and only 1 was above .85. The mean and skew of ratings for each mood term were correlated $r = .80$ with the arousal factor loadings for Participant 12. The mean rating of each mood term was correlated $r = .80$ with the arousal factor loadings for Participant 13. The mean rating of each mood term was correlated $r = .89$ with the valence factor loadings for Participant 16, and $r = .81$ with the valence factor loadings for Participant 17. Furthermore, the means and variances for arousal and valence indicators were approximately equal within each participant's P-correlation matrix.

The percentage of total variance accounted for by an individual's valence factor was adopted as an index of valence focus. Similarly, the percentage of total variance accounted for by an individual's arousal factor was similarly adopted as an index of arousal focus. These percentages are listed as Index 1 in Table 1. For valence, the percentage ranged from 19% to 51%, with a mean of 33% and a standard deviation of 8%. For arousal, the percentage ranged from 0% to 32%, with a mean of 15% and a

Table 1
Degree of Valence and Arousal Focus in the Idiographic Mood Ratings

		Valence focus		Arousal focus	
Participant	N	Index 1	Index 2	Index 1	Index 2
1	62	30.2	.54	18.4	.37
2	70	28.1	.48	18.9	.33
3	76	36.5	.62	12.9	.17
4	75	28.1	.64	11.4	.17
5	66	39.0	.70	16.9	.25
6	73	51.2	.66	0.0	.01
7	65	20.7	.52	17.9	.41
8	73	32.9	.64	7.8	.14
9	84	32.9	.67	14.9	.23
10	85	31.6	.57	21.9	.38
11	86	25.3	.43	17.0	.22
12	80	38.1	.47	16.2	.22
13	89	22.8	.53	11.3	.44
14	84	43.1	.64	17.4	.23
15	83	41.9	.72	19.0	.30
16	88	26.7	.56	8.2	.14
17	88	35.1	.64	9.3	.06
18	81	19.3	.46	31.5	.65
19	88	21.7	.57	14.6	.34
20	80	36.9	.69	10.3	.10
21	91	29.2	.54	13.8	.23
22	78	26.5	.53	20.7	.43
23	86	43.6	.75	7.3	.02
24	84	43.1	.60	22.2	.33
M		32.69	.60	14.99	.26
SD		8.35	.14	6.39	.17

Note. N = number of days of observations for the participant. Index 1 = percentage of variance accounted for by the P-factor. Index 2 = size of the correlation between each P-self-report matrix and attribute-based matrix.

standard deviation of 6%.[3] Consistent with cross-sectional data, the valence factor was larger than the arousal factor for most, but not all, participants. Significant variation occurred in the size of both the valence and arousal factors, however.

Semantic similarity. To obtain a second index of valence focus and arousal focus, the P-correlation matrices were correlated to valence- and arousal-based semantic similarity matrices. Similarity matrices were obtained from a multidimensional scaling (MDS) of semantic similarity ratings of the circumplex terms. This second procedure provided a more direct assessment of the valence and arousal components in each participant's mood ratings. A more direct measure of the focus variables was important given the range of congruence coefficients for the arousal factors in the P-factor analyses.

Computing the second set of focus indices required four steps. First, participants' similarity ratings of the mood terms were subjected to a weighted individual-differences MDS analysis to provide a representation of the semantic structure of mood. Multidimensional scaling indicates the similarity between stimuli (in this case, mood adjectives) by their distance in a geometric space. The dimensions of the space are interpreted as the fundamental attributes that characterize the class of stimuli. The fit of a solution is determined by a stress value that indicates the extent of the model's departure from the observed data. A stress × dimension plot is used to decide the appropriate number of dimensions for a solution; dimensions are added to the solution until the stress is no longer significantly improved by the addition of more dimensions. A plot of the stress values by the number of dimensions for the MDS solution revealed a clear elbow at the two-dimensional solution, suggesting its suitability (stress = .16).[4] The mood terms fell, as predicted, in a circular order around two dimensions. The squared correlation (RSQ) for a solution represents the proportion of variance the scaling solution accounts for in the distances between terms, as estimated by their similarity ratings. The two-dimensional solution had an RSQ of .83. An inspection of the arrangement of terms along each dimension suggested that the axes represented the valence and arousal denoted by the mood terms.

Several researchers have criticized scalings of similarity ratings for requiring largely intuitive interpretation of the resulting dimensions (Ortony, Clore, & Collins, 1988; Smith & Ellsworth, 1985). In this study, subjective impressions of the MDS configuration were evaluated by correlating the dimension coordinates from the MDS analysis with external ratings of the mood words. Seventy-two participants from the University of Waterloo rated the valence and degree of arousal denoted by each circumplex item on a 7-point Likert scale (Feldman, 1990). Large, statistically significant correlations supported the hypothesis that valence and arousal were the two dimensions represented in the scaling solution. The mean valence rating for each emotion word was strongly correlated with the coordinates from the dimension hypothesized to represent valence (r = .96). Similarly, the mean arousal rating for each mood word was strongly correlated with the coordinates from the dimension hypothesized to represent arousal (r = .93).

The second step in computing participants' second set of focus scores involved creating valence- and arousal-based similarity matrices. The absolute difference between the MDS coordinates for all pairs of mood words was calculated along both the valence and arousal dimensions. The result was 120 valence-based distances that constituted the valence-based similarity matrix and 120 arousal-based distances that constituted the arousal-based similarity matrix. The smaller the absolute value between two coordinates, and the smaller the distance between two terms on a dimension, the more similar those terms were on the attribute represented by the dimension. Third, Fisher r-

[3] In this sample of data I calculated Spearman correlation coefficients between the number of factors needed to account for 50% of the variance in the factor analysis of the P-correlation matrices (Larsen & Cutler, 1992; Wessman & Ricks, 1966) and the percentage total variance accounted for by the valence and arousal factors. The percentage of total variance accounted for by the valence factor was negatively correlated with the number of factors extracted to criterion ($r = -.70, p < .001, N = 24$). The larger the valence factor, the fewer the factors needed to explain 50% of the variance in the emotion ratings. The percentage of total variance accounted for by the arousal factor was not related to the number of factors extracted ($r = -.12, p < .30$).

[4] Although Kruskal and Wish (1978) cautioned against accepting solutions with a stress value above .10, the elbow in the plot clearly appeared in the two-dimensional solution. I chose the two-dimensional solution on the basis of the plot and the relative interpretability of the various solutions (Davison, 1983).

to-z transformations were performed on the P-correlations within each participant's self-report matrix so that the correlations could be compared with the dimension distances. Finally, to produce a second index of valence and arousal focus, the valence- and arousal-based similarity matrices and the transformed P-correlation matrix were correlated across the 120 pairs of mood terms for each participant. These correlations, presented as Index 2 in Table 1, represent the degree to which words similar in valence or arousal are rated similarly. The absolute values of the correlation coefficients are presented.

Similar to the factor analyses presented earlier, evidence for both structural similarity and difference was found in the second set of focus indices. All participants evidenced some degree of valence focus, and most, but not all, evidenced some degree of arousal focus. Consistent with nomothetically derived self-report structures, the amount of valence-based similarity in the mood ratings was larger than arousal-based similarity for most, but not all, participants. The size of both indices varied significantly, however. The correlations between valence-based similarity and participants' self-report P-correlation matrices ranged from $r = .43$ to $r = .75$, with a mean of $r = .60$ and a standard deviation of .14. The correlations between arousal-based similarity and participants' self-report P-correlation matrices ranged from $r = .01$ to $r = .65$, with a mean of $r = .26$ and a standard deviation of .17.

The semantic circumplex derived from participants' similarity ratings of the mood words is a central component of the second set of focus indices. The valence- and arousal-based distances used to compute the second set of focus indices were derived from one single semantic circumplex. This procedure assumes that the semantic structure is identical for all participants. Strictly speaking, however, this was not so. The RSQ statistics for each participant ranged from .66 to .94, indicating some variation in the semantic structure of the mood terms across participants. This variation was not significantly related to either index of valence or arousal focus, however. Dimension weights quantifying the importance of the valence dimension to each participant's semantic ratings were not related to the size of the valence component in self-report (participant weights were correlated $r = -.08$ with degree of valence-based similarity and $r = .06$ with the amount of variance accounted for by the valence factor). Dimension weights were negatively related to the size of the arousal component in self-report; this indicated that if anything, the less important the semantic dimension was, the more important it was in self-report (participant weights were correlated $r = -.37$ with degree of arousal-based similarity and $r = -.25$ with the amount of variance accounted for by the arousal factor).

Relationship between valence and arousal focus. The correlations between indices of valence and arousal focus are presented in Table 2. The correlation between the two indices of arousal focus was large. This convergent finding is particularly important given the smaller coefficients of congruence found for the arousal factors in the P-factor analyses. Valence focus and arousal focus were negatively related to one another. This finding was not surprising in the first set of indices. Once the first factor is extracted according to the factor analytic procedure used, the amount of reliable variance available for subsequent factors is restricted (Gorsuch, 1983). Valence focus and arousal focus were related in the second set of indices ($r = -.58$, $p < .01$). Again, this finding was not surprising, given that the same P-correlation matrices were used in the construction of both focus variables. The valence- and arousal-based semantic distances were not related to each other ($r = -.12$). As is evident in Table 2, however, the cross-method estimates of valence focus and arousal focus were also strongly negatively correlated. Valence focus and arousal focus will be treated as separate constructs for the moment, although the correlations between the two suggests the possibility of a meaningful relationship.

Table 2
Relationships Between Indices of Valence Focus and Arousal Focus

Index	1	2	3	4
1. Valence Focus Index 1	—			
2. Valence Focus Index 2	.68****	—		
3. Arousal Focus Index 1	−.40	−.46**	—	
4. Arousal Focus Index 2	−.63****	−.58****	.85****	—

Note. $N = 24$. Index 1 = percentage of variance accounted for by the P-factor. Index 2 = size of the correlation between each P-self-report matrix and attribute-based matrix. Degrees of freedom = 22.
**$p < .05$, two-tailed. ****$p < .01$, two-tailed.

Figure 3 is a scatter plot of the degree of valence focus by the degree of arousal focus operationalized by the similarity-based correlations (Index 2) presented in the fourth and sixth columns of Table 1. The diagonal represents equal weighting of arousal and valence focus. Individuals who fall along the diagonal would evidence the prototype circumplex. Valence focus and arousal focus should fully account for the covariation in the mood ratings of individuals who fall in the upper right of the graph. Individuals who fall in the lower left must include other factors when describing their emotional state. Individuals who fall below the diagonal have a higher valence focus than arousal focus. These individuals should evidence a circumplex struc-

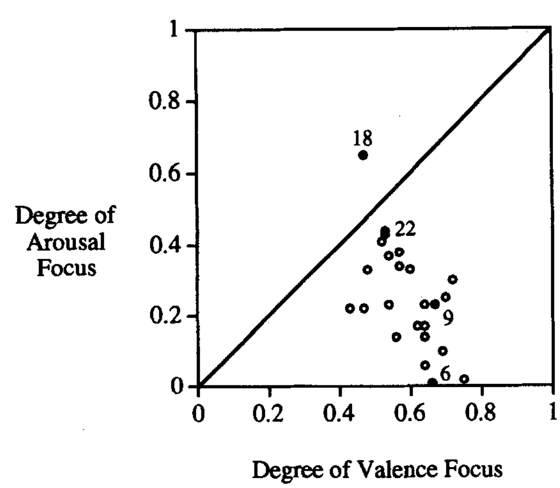

Figure 3. Degree of valence focus by degree of arousal focus.

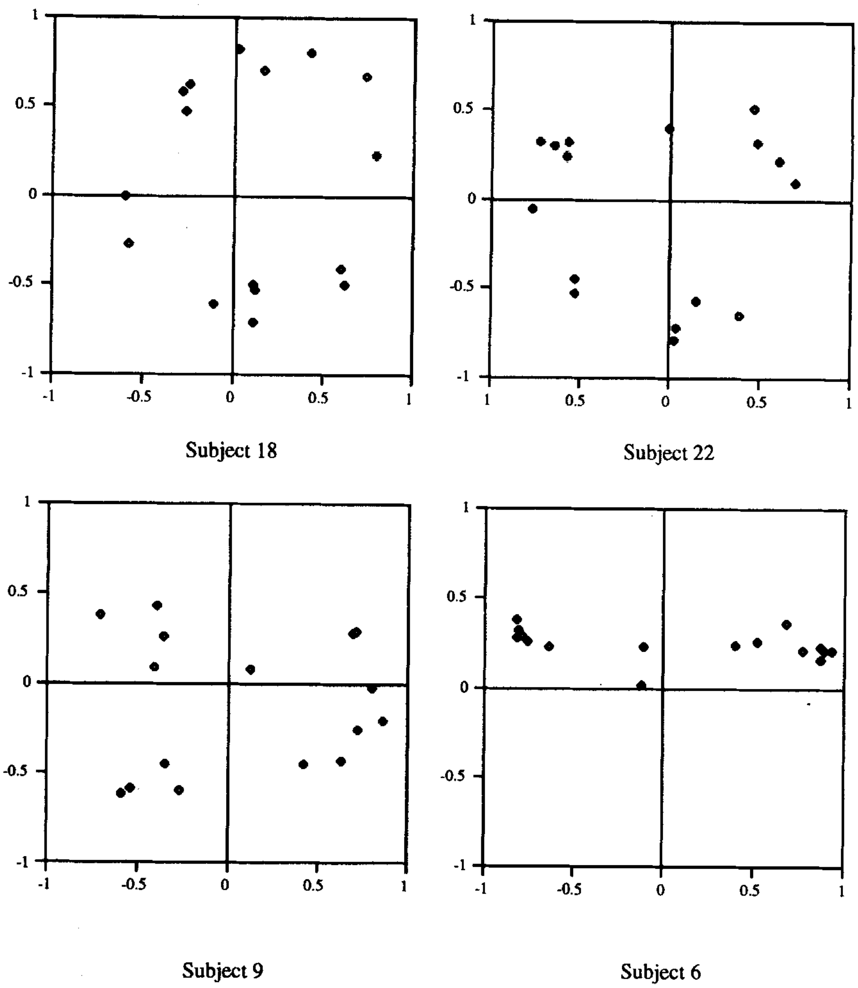

Figure 4. Variations in circumplex shape across subjects.

ture like that presented in Figure 1b. The farther away from the diagonal, the more elliptical their affective structure will be. Individuals who fall above the diagonal have a higher arousal focus than valence focus and should evidence a structure like that presented in Figure 1c. Again, the farther away from the diagonal, the more elliptical their structure will be. As the graph shows, most participants fell below the diagonal to the lower right of the graph, demonstrating a larger degree of valence focus than arousal focus. The opposite was true for only 1 participant in this study (Participant 18). Some participants fell closer to the diagonal (e.g., Participant 22) than others (e.g., Participant 9). Several participants fell in the very bottom of the lower right of the graph (e.g., Participant 6). No participants fell in the lower left, indicating that some degree of valence focus was present for all participants. A scatter plot of the percentage of variance accounted for by valence and arousal factors (Index 1 presented in the third and fifth columns of Table 1) produced the same results.

Plots of the factor loadings for the 4 participants noted above are presented in Figure 4. The factor loading plots in this figure highlight the predicted importance of degree of valence focus and arousal focus for the shape of the affective structure. Participant 18 has the largest degree of arousal focus in this study. Indeed, her arousal focus was slightly larger than her valence focus. The circumplex from Participant 18 is close to the semantic structure with a slight tendency to resemble the hypothetical figure presented in Figure 1c. Participant 22 is the closest to the diagonal, indicating that this individual has approximately equal amounts of valence and arousal focus. This participant's structure is also similar to the semantic circumplex, but in this case valence focus was slightly larger than arousal focus. Participant 9 has a larger degree of valence focus than arousal focus, and her structure resembles that presented in Figure 1b. Participant 6 had a large degree of valence focus and an almost nonexistent arousal focus, making her structure dramatically flatter than even the hypothetical structure presented in Figure 1b.

Thus far, these analyses describe individual differences in the structure of affective experience. Variations occurred in the valence and arousal components of participants' affective structures. These variations should predict the observed correlations between measures of any aspects of the affective space. The next set of analyses demonstrates how variations in affective structure are related to the correlation between ratings of anxious and depressed mood and between NA and PA.

Relationships Between Specific Affective Constructs

Depressed mood–anxious mood correlation. Table 3 presents the correlations between anxious mood and depressed mood subscales for each participant. Correlations between the Fear and Sadness subscales (PANAS-X) ranged from $r = -.08$ to $r = .79$, with a mean of .45 and a standard deviation of .36. Correlations between anxious mood and depressed mood subscales (POMS) ranged from $r = .16$ to $r = .90$, with a mean of .65 and a standard deviation of .36. These results demonstrate large individual differences in the correlation between ratings of anxious and depressed moods.

The correlations between valence focus, arousal focus, and the anxiety–depression relationships across participants are presented in Table 4.[5] As predicted, degree of arousal focus was associated with the degree of correlation in ratings of anxious and depressed moods. As degree of arousal focus increased, the correlation between ratings of anxious and depressed moods became less positive. For example, Participant 18 evidenced one of the largest degrees of arousal focus as well as one of the smallest anxious–depressed mood correlations (PANAS subscales, $r = .04$; POMS subscales, $r = .32$). Although the correlations between both indices of arousal focus and both sets of subscales were moderate, only one reached statistical significance. This result may have been due to the small number of participants included in the analysis. In fact, statistical comparisons of the correlations in the lower left quadrant of Table 4 were not significant. Neither index of arousal focus was more strongly related to the anxious–depressed mood correlations (for correlations involving the PANAS-X subscales, $z = .83, p < .41$, two-tailed, [Meng, Rosenthal, & Rubin, 1992]; for correlations involving the POMS subscales, $z = .90, p < .37$, two-tailed).

The results were less clear for the relationship between valence focus and the anxious–depressed mood correlations. In general, as degree of valence focus increased, the correlation between ratings of *anxious* and *depressed* became more positive. This finding was much stronger when using the first index of valence focus than when using the second index. This difference was significant when comparing correlations involving the POMS subscales ($z = 2.84, p < .005$, two-tailed) but only marginally so for the correlations involving the PANAS-X subscales ($z = 1.82, p < .07$, two-tailed).

It could be argued that the relationships between the focus indices and the anxious–depressed mood correlations are a statistical artifact. There was little item overlap between the focus indices and the scales, however. Two circumplex markers appeared in the PANAS-X Fear subscale (6-item scale). One

Table 4
Associations Between Arousal Focus, Valence Focus, and Correlations Among Circumplex Elements

	Anxiety–depression		NA–PA	
	Fear–Sad	Anx–Dep	Scales	Factors
Valence focus				
Index 1	.47†††	.50†††	−.78†††††	−.38†
Index 2	.23	.13	−.66†††††	−.45†††
Arousal focus				
Index 1	−.31†	−.23	.57†††††	.16
Index 2	−.41†††	−.35†	.76†††††	.12

Note. $N = 24$. Index 1 = percentage of variance accounted for by the P-factor. Index 2 = size of the correlation between each P-self-report matrix and attribute-based matrix. Fear–Sad = correlation between Sadness and Fear subscales of the Positive Affect and Negative Affect Schedule (Expanded Form; Watson & Clark, 1991). Anx–Dep = correlation between Anxiety and Depression subscales of the Profile of Mood States (McNair, Lorr, & Dropplemen, 1971). Scales = correlations between brief negative affect (NA) and positive affect (PA) scales. Factors = correlations between obliquely rotated NA and PA factors. Degrees of freedom = 22.
†$p < .08$, one-tailed. †††$p < .025$, one-tailed. †††††$p < .005$, one-tailed.

Table 3
Variations in Anxiety–Depression and Negative Affect–Positive Affect (NA–PA) Correlations

		Anxiety–depression		NA–PA	
Participant	N	Fear–Sad	Anx–Dep	Scales	Factors
1	62	.20	.26	−.46	−.19
2	70	.47	.64	−.33	.09
3	76	.25	.61	−.55	−.01
4	75	.17	.34	−.37	−.09
5	66	.44	.66	−.56	−.20
6	73	.72	.87	−.60	−.46
7	65	.32	.51	−.06	.05
8	73	−.08	.16	−.37	.11
9	84	.34	.68	−.29	−.22
10	85	−.06	.41	−.32	−.13
11	86	.31	.60	−.32	.01
12	80	.67	.86	−.52	.24
13	89	.24	.44	−.24	−.09
14	84	.71	.83	−.44	.00
15	83	.38	.67	−.50	−.21
16	88	.79	.90	−.08	.06
17	88	.55	.53	−.51	−.26
18	81	.04	.32	−.21	−.18
19	88	.18	.65	−.35	.05
20	80	.75	.56	−.57	.28
21	91	.25	.60	−.38	−.06
22	78	.79	.80	.00	−.15
23	86	.72	.80	−.72	−.54
24	84	.62	.84	−.37	−.14
M		.45	.65	−.38	−.09
SD		.36	.36	.25	.20

Note. N = number of days of observations for the participant. Fear–Sad = correlation between Sadness and Fear subscales of the Positive Affect and Negative Affect Schedule (Expanded Form; Watson & Clark, 1991). Anx–Dep = correlation between Anxiety and Depression subscales of the Profile of Mood States (McNair, Lorr, & Droppleman, 1971). Scales = correlations between brief NA and PA scales. Factors = correlations betwen obliquely rotaed NA and PA factors.

[5] All correlation coefficients were subjected to a Fisher's r-to-z transformation before being used in additional analyses.

marker appeared in the PANAS-X sadness subscale (5-item scale). Two circumplex markers appeared in the POMS anxious mood subscale (9-item scale). One marker appeared in the POMS depressed mood scale (11-item scale). Furthermore, the analyses presented in columns 2 and 3 of Table 4 were recalculated after removing all item overlap from the scales. All the correlations remained essentially the same as those presented.

NA–PA correlations. The correlations between the brief NA and PA scales for each participant are listed in Table 3. As predicted, the correlation between the two differed across individuals, ranging from $r = -.72$ to $r = .21$, with a mean of −.38 and a standard deviation of .25. Table 4 presents correlations to demonstrate that both valence and arousal focus are related to the association between NA and PA scores in the predicted direction. As the degree of valence focus increased, the correlations became more negative. For example, Participant 23 evidenced one of the largest degrees of valence focus as well as the most negative NA–PA correlation ($r = -.72$). Conversely, as degree of arousal focus increased, the correlations between NA and PA became more positive. For example, Participant 18 evidenced the largest degree of arousal focus and the most positive NA–PA correlation ($r = .21$). After removing the item overlap (2 of the 10 items on the NA scale were circumplex markers; 1 of the 10 items of the PA scale was a circumplex marker), the association between indices of valence focus, arousal focus, and the NA–PA scale correlations remained essentially the same as those presented in column 4 of Table 4.

The unrotated P-factor solutions were orthogonally rotated for each participant to yield NA and PA factors (Watson, 1988a). To verify the presence of these factors quantitatively, all extracted factors were compared with NA and PA factors derived from an orthogonal rotation of the nomothetic valence and arousal dimensions (Feldman, in press, Sample 3). Factor loadings could not be compared with previous within-subject solutions (e.g., Zevon & Tellegen, 1982) because of item-pool differences. Similarly, a P-factor was identified as an NA dimension if it had the highest coefficient of congruence with the NA factor from the nomothetic analysis. A factor was identified as a PA dimension if it had the highest coefficient of congruence with the PA factor from the nomothetic analysis.[6] The coefficients of congruence between the nomothetic NA factor and the idiographic NA factors ranged from .00 to .95, with a mean of .70. The coefficients of congruence between the nomothetic PA factor and the idiographic PA factors ranged from .10 to .94, with a mean of .77. The NA and PA factors were then obliquely rotated to determine their correlation. The correlations listed in Table 3 demonstrate that NA and PA are not largely orthogonal dimensions (correlations ranged from $r = -.54$ to $r = .28$, with a mean $r = -.09$ and a standard deviation of .20).

Table 4 presents correlations between valence and arousal focus and NA–PA factor correlations. Valence focus was related to the factor correlations in the predicted direction. As the degree of valence focus increased, their correlations became more negative. For example, Participant 23 evidenced one of the largest degrees of valence focus as well as the most negative NA–PA correlation ($r = -.54$). Degree of arousal focus, however, was unrelated to the NA–PA factor correlations.

Finally, neither set of NA–PA correlations was related to the anxious–depressed mood correlations. The correlations ranged from −.08 to −.24, with a mean of −.16 and a standard deviation of .07. These findings suggest that variations in the relationship between NA and PA are not related to the correlation between ratings of anxious and depressed moods.

Discussion

This study demonstrated the presence of individual differences in the structure of affect. Individuals varied in the degree to which valence and arousal were components in their mood ratings. At the level of description, this study has demonstrated the existence of differences in the observed patterns of correlations among mood ratings for different individuals. These differences translate into variously shaped affective structures for different individuals. Individuals with perfect circular structures tend to distinguish between affective states denoting different levels of arousal, even when these states are similar in valence. Those with larger valence components and elliptical structures may ignore the differences between similarly valenced states and tend to distinguish between moods of different hedonic tone more so than individuals with smaller valence components.

Furthermore, this research suggests that the structure of affective experience changes depending on an individual's focus of attention. Individual differences in the structure of affect were interpreted as variations in valence focus and arousal focus, or as variations in the degree to which individuals attend to and report the hedonic and arousal components of their affective experience. As evidence of this interpretation, the variations in valence and arousal focus were predictably related to correlations between other affective constructs. Anxious and depressed mood words are similar in their valence but denote different levels of arousal. "Negative Affect" and PA are opposite in valence but similar in their level of arousal. Both the correlation between anxious and depressed mood and the correlation between NA and PA were related to the degree of valence focus and arousal focus. The observed variation in the anxious–depressed mood correlations and the NA–PA correlations may be more than just a statistical consequence of the circumplex. The variations in these correlations are theoretically consistent with the valence focus and arousal focus constructs.

Several observations challenge the interpretation of these findings, however. First, the reliability of the indices must be demonstrated. In this study, participants made only one set of

[6] In several cases, the coefficient of congruence was high for the NA factor but low for the PA factor. In these cases, the second factor was labeled as PA. Similarly, in some cases the coefficient of congruence was high for the PA factor but low for the NA factor. In these cases, the second factor was labeled as NA. This convention was adopted to be consistent with previous within-subject studies of mood ratings. For example, Zevon and Tellegen (1982) conducted a longitudinal, factor analytic study of NA–PA structure. Eleven of the 23 participants in that study had at least one coefficient of congruence between an idiographic factor and a nomothetic factor fall below .85 (Tucker, 1951), suggesting that at least one idiographic factor failed to precisely match the nomothetic factor 48% of the time. Five of the participants (22%) obtained coefficients of congruence below .85 for both factors.

mood ratings each day. This measurement strategy could be problematic, because the temporal stability of the constructs cannot be estimated. It was not possible to divide each participant's data (Epstein, 1983) to compute the temporal stability of the P-correlation matrices. Doing so would have resulted in a sample size that would be too small to compute stability coefficients. Second, both sets of valence and arousal focus indices were derived from one sample of data per participant, thus increasing the likelihood of capitalizing on chance. Increasing the number of measurement periods would allow an investigation of the stability of the measures. This type of design would also avoid the reliance on one set of data for both indices of valence and arousal focus.

It is unlikely, however, that the individual differences demonstrated in this study were due to random error. Both sets of focus indices related to the correlations between anxious and depressed moods, and between NA and PA, even after removing item overlap. Furthermore, this study has been replicated on 56 additional participants to date (Feldman, 1994). Preliminary data analyses suggest that the focus indices are stable over time. Participants were asked to rate their mood in the morning, afternoon, and evening of each day for 90 days. The temporal stability of the valence focus indices ranged from $r = .76$ to $r = .91$ across even and odd days of the study. The temporal stability of the arousal focus indices ranged from $r = .80$ to .86.

A third possible problem with this study stems from the extraction of unrotated factors to serve as the first index of valence focus and arousal focus. Extraction of valence and arousal factors through unrotated principal-axis factor analysis has occurred in previous studies (e.g., Almagor & Ben-Porath, 1989; Feldman, in press; Russell, 1980; Watson, 1988a). Unrotated factors tend to be unstable. Perhaps the individual differences demonstrated in this study are due to the instability of these factors. This is unlikely, however. The unrotated valence and arousal dimensions extracted in cross-sectional studies of mood have demonstrated some consistency across item–pool variations, both in number and in type of item. Furthermore, the coefficients of congruence between the within-subject and the cross-sectional factors were high for the valence dimension. The coefficients of congruence were more moderate for the arousal dimensions. Note, though, that the second set of focus indices provided a more direct measure of the valence and arousal components in the P-correlation matrices, and the two indices of arousal focus were consistent with each other.

The fourth problematic aspect of this study is that the interpretation of the findings is inferential at this point. The data demonstrate individual variation in the size of the valence and arousal components in affective structure. In this study, these variations have been treated as evidence of differences in individuals' focus of attention. The allocation of attention is a hypothetical, causal process inferred from patterns of past affective experiences. A causal interpretation of the valence and arousal dimensions is an inferential leap that involves shifting from attributes of the experience to attributes of the individuals. In descriptive terms, the circumplex dimensions address the question "What are the important components of affective experience?" In causal terms, the dimensions address the question "What causes a person to feel as he or she does?" Some researchers might criticize the interpretation of the circumplex dimensions as processes because it blurs the distinction between the dimensions as descriptions of affective states and the dimensions as causal processes (for a discussion, see Wiggins, 1974). The latter interpretation is consistent with the logic of circular models, however. The patterns of correlations associated with a circular structure give evidence of the processes that produced the structure and can be used to predict future affective experiences (cf. Wiggins, 1974). Clearly, the focus variables require construct validation involving measures external to mood ratings.

In the absence of external correlates, one can turn to evidence of theoretical congruity. A conceptual link may be drawn between the focus constructs and a biopsychosocial model of affect labeling and regulation. Within this model (Blascovich, 1990, 1992), the labeling of emotional states is related to perceptions of arousal rather than to physiological reactivity or actual physiological arousal. Some individuals are dispositionally hypersensitive to their arousal states, whereas others are hyposensitive (e.g., Blascovich et al., 1992; Katkin, 1985). Hypersensitive individuals attend to internal (somesthetic) cues when labeling their affective states, whereas hyposensitive individuals look to external (environmental) cues to label emotions. Thus, individuals may vary in their integration of information about their internal state with information about their immediate environment. Some individuals label their emotions both as a function of the perception of physiological cues and perceptions of the external environment; others label their emotions primarily on the basis of external, environmental cues. Valence focus and arousal focus may be related to allocating attention to environmental and somesthetic stimuli, respectively.

Valence focus may be associated with the tendency to attend to environmental, particularly social cues when labeling affective experience. Cues from the social environment shape our inner emotional experience. Knowledge of social norms for emotional states may help regulate emotional expression as well as the labeling of our inner feelings (Barrett & Campos, 1987; Goffman, 1974; Hochschild, 1979; Izard & Malatesta, 1987). The valence of an emotion is empirically related to its social meaning (Feldman, 1993b). Small degrees of valence focus, as in Figure 1C, may be associated with a distinctive style of experiencing and communicating emotions that is dysregulated from the social context. In this study, individuals did vary in their degree of valence focus, although none evidenced low valence focus. Individuals in a nonclinical sample of participants would not be expected to show small degrees of valence focus.

Individuals high in valence focus may be highly influenced by their social surroundings when labeling their affective state. The valence of an affective state has been linked with the tendency to view a situation as personally relevant (Frijda, 1986; Reisenzein, 1994). High-valence-focus individuals should be more likely to judge social situations as personally relevant and thus be more emotionally reactive to their environment. Individuals high in valence focus may also score highly on personality traits associated with responsivity to the external social environment. For example, neuroticism is related to emotional reactivity to social stimuli (Bolger & Schilling, 1991). The personality trait "affect intensity" (Larsen & Diener, 1987) is associated with the tendency to be emotionally responsive to the environment (Larsen, 1987). A recent study (Blascovich et al., 1992) dem-

(Larsen, 1987). A recent study (Blascovich et al., 1992) demonstrated that affect intensity is negatively related to attention to internal states and therefore is likely to be related to increased attention to external cues.

In contrast, arousal focus should be related to the tendency to attend to internal physiological cues when labeling affective experience. Good somesthetic perceivers might display a large degree of arousal focus, whereas poor perceivers might display a small degree. Psychophysiological measurement strategies (e.g., Blascovich et al., 1992; Katkin, 1985) could be used to investigate the construct validity of arousal focus. Arousal focus should be related to personality characteristics associated with an awareness of internal experiences. For example, components of self-consciousness (Fenigstein, Scheier, & Buss, 1975) and body consciousness (Miller, Murphy, & Buss, 1981) are thought to be related to the degree of attention given to internal bodily states and sensations (Scheier, Carver, & Matthews, 1983).

As defined, arousal focus entails attention to arousal cues, in addition to a tendency to attribute that arousal to emotional experience. The causal direction between sensitivity to physiological cues and attention to those cues is theoretically ambiguous, however (Blascovich, 1992). In the original model, Blascovich (1990) suggested that arousal must be perceived in order to have attention directed to it. Blascovich (1992) further suggested that somesthetic sensitivity may be dispositional. Others, however, invoke attention as the process that causes sensitivity (for a discussion see Scheier, Carver, & Matthews, 1983). Whatever the specific role of attention, the allocation of attentional capacity is likely to vary as a function of the relative strength of internal and external cues. Thus, all individuals will become better somesthetic perceivers given intense levels of arousal (Blascovich et al., 1992). Under such circumstances, arousal will become more relevant to the labeling of emotions. Under nonevocative conditions, such as those sampled in this study, more dispositional individual differences arise in somesthetic perception. The variation in arousal focus demonstrated in this study suggests that perceptions of arousal may be more central to the emotional experience of some individuals than to others. Thus, the classical arousal–appraisal model of emotional experience (Schachter & Singer, 1962) may be more true of some individuals than of others.

According to Blascovich's model (Blascovich, 1990, 1992), an individual's attentional capacity is split between internal (somesthetic) and external (environmental) stimuli. To the extent that attention is allocated to one set of cues, attention to the other set should decrease. This suggests that attention to physiological cues should be negatively correlated with attention to environmental cues. In this study, valence and arousal focus were negatively correlated, again suggesting a conceptual relationship between the focus constructs and attention allocation to cues.

Because the focus concepts are inferential at this point, and their relationship to external criteria has not been established, the variations in affective structure documented in this study are open to alternative interpretations. One explanation for these results is that individuals vary in the extent to which they distinguish valence from arousal information. Perhaps the shape of the circumplex structure can be described in terms of the correlation between the valence and arousal dimensions. For example, individuals such as Participant 18, who have a more circular structure, may have a small correlation between valence and arousal dimensions and thus may distinguish between valence- and arousal-based information. In contrast, individuals who have a more elliptical structure, such as Participant 6, may have a larger correlation between valence and arousal dimensions and may tend not to distinguish between valence and arousal information. The correlation between valence and arousal dimensions could not be calculated for each participant with the factor analytic procedures used in this study because of the extraction of unrotated factors. A more direct test of this hypothesis would involve performing Procrustes factor analyses on each P-correlation matrix, to determine the correlation between valence and arousal factors.

Study results also demonstrated that there are individual differences in the correlation between NA and PA. This finding may be used to elaborate the NA–PA model of affective experience. Some individuals have large negative correlations between NA and PA. For these individuals, their predisposition to experience some negative emotions (high NA) interferes with their ability to energetically engage the world effectively (PA). For individuals with no correlation between NA and PA, the experience of negative mood states did not interfere with the ability to be energetic and experience effective engagement. The picture is less clear for individuals with a positive correlation between NA and PA. Such a correlation implies that the predisposition to experience negative emotions is positively associated with energetic and effective engagement. Large positive correlations between NA and PA did not occur in this sample of participants and may be rare.

A fifth possible criticism of this study is that only two dimensions of affective experience were investigated. The valence and arousal components accounted for much, but not all, of the variance in the mood ratings of individual participants. Although some participants did evidence more than two factors in the P-factor analyses of their mood ratings, no additional factor was identified consistently. Cognitive appraisal investigators have offered evidence for several substantive dimensions beyond valence and arousal (e.g., Smith & Ellsworth, 1985). Most cognitive dimensions are typically obtained from recall-based mood ratings or ratings of hypothetical situations, however, and are rarely extracted from on-line ratings of affect.

Finally, the findings of this study may be culture bound. Through processes such as socialization and enculturation, a culture defines the domain of affective experience and gives shape to the psychological processes associated with affective experience (Shweder, 1993). For example, a culture defines what constitutes an emotional experience versus a pure bodily experience (Shweder, 1993). Cultures may differ in the extent to which various emotional states are associated with a somatic component. As a result, the degree of arousal focus may differ for individuals in different cultures. It may be that individuals from different cultures differ in the extent to which external, social situations are self-relevant. The experience of an emotion depends on the construal of the social situation in relation to the self (Markus & Kitayama, 1991). For example, some cultures emphasize the importance of interpersonal states for the self and deemphasize the importance of intrapersonal states. Investigations of such cultures may not demonstrate an arousal dimension at all but rather may produce a dominance–submissiveness dimension (Russell, 1991) or an engagement–disengagement dimension (Markus & Kitayama, 1991). In contrast, western cultures emphasize the importance of noninterpersonal states and almost always demonstrate an arousal dimension.

Conclusions

Amidst the conjectures and inference, the findings from this study highlight several important observations. First, there are meaningful individual differences in the structure of affective experience when measured by means of self-report. These individual differences are related to the observed correlations between specific affective elements. Second, there are potentially important differences between cross-sectional and within-subject measurements of mood. Ratings of anxious and depressed mood are highly correlated in cross-sectional analyses, whereas the longitudinal analyses presented here indicate that some individuals do rate the two moods differentially in self-report. Furthermore, what appear to be stable orthogonal relationships between PA and NA show more variation when studied within subjects. Finally, this study provides the foundation for an investigation of two processes—valence focus and arousal focus—that may be associated with the labeling and reporting of affective experience.

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