
Sex Differences in Emotional Awareness

Lisa Feldman Barrett

Boston College

Richard D. Lane

Lee Sechrest

Gary E. Schwartz

University of Arizona

The present study examined sex differences in the complexity and differentiation of people's representations of emotional experience. Female participants from seven different samples, ranging in age, scholastic performance, socioeconomic status, and culture, scored higher on a performance test of emotional awareness than did male participants. Women consistently displayed more complexity and differentiation in their articulations of emotional experiences than did men, even when the effect of verbal intelligence was controlled. Together, the findings suggest that a sex difference in display of emotional awareness is a stable, highly generalizable effect. Implications of these findings are presented.

There is a prevailing belief embedded in our society that women are more emotional than are men. According to commonly held beliefs, women are more emotionally responsive, experiencing and expressing most emotions more intensely than do men; men, if they are emotional at all, are believed to experience and express more anger (Fabes & Martin, 1991). Even preschool children believe that women experience and express more emotion (e.g., Birnbaum & Croll, 1984; Birnbaum, Nosanchuk, & Croll, 1980), and these beliefs continue into adulthood (e.g., Grossman & Wood, 1993; Hochschild, 1983; Lutz, 1990; Shields, 1987).

In contrast to these widely held beliefs, the empirical status of sex differences in emotion remains unresolved. When emotionality is defined as a global disposition that is stable over time and largely independent of social context, the stereotype seems to hold: Women consistently describe themselves as more emotionally intense than do men (e.g., Diener, Sandvik, & Larsen, 1985; Fujita, Diener, & Sandvik, 1991; Grossman & Wood, 1993). When emotionality is defined as the experience of a specific emotion, however, the findings are inconsistent.

Just as many studies report sex differences in fear or anxiety, anger, depression or sadness, guilt, and happiness as those that do not; when differences appear, however, they are typically in the stereotypic direction (Feldman Barrett & Morganstein, 1995). Given the lack of consistent findings across studies, it is not surprising that review articles draw surprisingly different conclusions regarding the status of sex differences in emotion. Some suggest that there are sex differences in emotional experience, primarily rooted in differential socialization experiences (e.g., Brody & Hall, 1993; Fischer, 1993; Manstead, 1993), whereas others suggest that differences are not as prevalent as we believe them to be (e.g., LaFrance & Banaji, 1992; Shields, 1991) and exist mainly for emotional expressions.

Recent investigations have demonstrated that sex differences in reports of emotional experience are bounded by both the scope of the questions asked and the degree to which respondents must rely on memory when describing their experiences. Recent evidence suggests that stable sex differences exist in magnitude of autobiographical memories of emotional experience, with women remembering more frequent emotional events than do men (Davis, 1999; Fujita et al., 1991; Seidlitz & Diener, 1998). Furthermore, when partici-

Authors' Note: We thank Bebe Axelrod, Victoria Welden, and Robert Riedel for their assistance with data collection and scoring. We thank Claudia Wrana and Walter Thomas for sharing data collected in Germany. We also thank David L. Buckner for his contributions to an earlier draft of this article. Preparation of this article was facilitated by Grant No. SBR-9727896 from the National Science Foundation to Lisa Feldman Barrett. Correspondence should be addressed to Lisa Feldman Barrett, Department of Psychology, Boston College, Chestnut Hill, MA 02167; e-mail: barretli@bc.edu, or to Richard D. Lane, Department of Psychiatry, University of Arizona, P.O. Box 245002, Tucson, AZ 85724-5002; e-mail: lane@u.arizona.edu.

PSPB, Vol. 26 No. 9, September 2000 1027-1035

© 2000 by the Society for Personality and Social Psychology, Inc.

pants describe their own experience of emotion using global, retrospective ratings, female participants describe themselves as more affectively intense, open and sensitive to their feelings, anxious, sad, and happy than do men when responding to global, memory-based measures (Feldman Barrett, Robin, Pietromonaco, & Eysell, 1998). Yet this pattern is not observed when these same participants documented their emotional reactions on a moment-to-moment basis, either across a 2-week period (Feldman Barrett et al., 1998) or across a 2- to 3-month time span (Feldman Barrett & Morganstein, 1995).

Why would sex differences appear in global, retrospective self-descriptions of emotional characteristics but not in momentary ratings of emotional experience? People must retrieve, summarize, and integrate information into a consistent set of global responses to the questionnaire items. When people remember their previous experiences or describe themselves in terms of those experiences, they must construct those previous experiences (for reviews of memory as a reconstructive process, see Ross, 1989; Schacter, 1996). Knowledge, goals, or motivations that are momentarily activated or accessible will influence the nature of those reconstructions. Thus, it is likely that people rely on accessible emotion knowledge to construct their previous emotional experiences. Differences in the complexity or differentiation of accessible emotion knowledge likely influence the complexity with which a person performs this reconstruction. If women have more accessible differentiated emotion knowledge than do men, then we would expect to see enhanced retrospections in women when compared to men. That is, if women possess more detailed and interconnected mental representations of emotion, then they should be able to use specific emotion concepts in a differentiated, but integrated, fashion to represent their own feelings as well as the feelings of others; this would be so especially if the emotion knowledge were highly accessible. As a result, women would demonstrate more richness and complexity in their remembered emotional experiences.

No study to date has directly demonstrated that women show this advantage over men. There is indirect evidence for the idea that women display more complex emotion knowledge. Women are superior to men at identifying emotion from nonverbal cues (Brody & Hall, 1993), although there is some evidence that women are not superior at decoding expressions of anger (e.g., Wagner, MacDonald, & Manstead, 1986). Women also are superior in matching emotion stimuli to emotion responses. In a recent study comparing the performance of 196 women and 184 men on the Perception of Affect Task (PAT), women scored higher than men ($p < .01$) across the entire measure (Lane et al., 1996). The PAT is

an emotion-based performance task that requires participants to match both verbal or nonverbal emotion stimuli to verbal or nonverbal emotion responses. The tasks include matching sentences and words (verbal-verbal), faces and words (nonverbal-verbal), sentences and faces (verbal-nonverbal), and faces and photographs of scenes (nonverbal-nonverbal). Women scored significantly higher on the first three tasks, all of which involved the use of emotion language in some way ($p < .02$ to $p < .002$), and they scored marginally high when matching nonverbal stimuli ($p < .15$) (Lane et al., 1998).

OVERVIEW OF STUDY

The purpose of the present investigation was to explicitly test the hypothesis that women display more complex emotion knowledge than do men when articulating their own and others' emotional experience. Male and female participants from seven different samples completed the Levels of Emotional Awareness Scale (LEAS) (Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990). The LEAS is an emotion-based performance task in which respondents generate verbal descriptions of their own anticipated feelings and those of another person for each of 20 scenarios. Each response is scored for the degree of complexity (i.e., the degree to which discrete emotion terms are applied and integrated to describe the emotional reactions attributed to the self and to the other person in the scenario). Higher scores reflect greater differentiation in emotion knowledge and greater awareness of emotional complexity in self and other. We predicted women would score higher on the LEAS than would men. Participants from three samples also completed measures of verbal intelligence so that we were able to rule out the possibility that a sex difference on LEAS scores was mediated by verbal intelligence.

METHOD

Participants

Sample 1. Participants were 94 1st- and 2nd-year undergraduate students (50 men) from Yale University. They ranged in age from 17 to 27 years old ($M = 19.29$, $SD = 1.36$). Participants were recruited through newspaper ads and posted announcements and were paid \$10 for their participation. Data from the first 40 participants were reported in Lane et al. (1990); sex differences on the LEAS were not discussed in that report.

Sample 2. Participants were 377 adults (183 men) from Tucson, Arizona, and Marshall, Minnesota. Participants from the community were asked to participate in a study that measured their levels of emotional awareness. Participants were selected from public libraries; shelters for

the homeless (in the Tucson area); retirement sites and service groups (e.g., Kiwanis of Marshall); and students, faculty, and staff from the University of Arizona and Southwest State University in Minnesota. A random, stratified sample procedure was used such that equal numbers of participants were obtained for 30 cells defined by men and women, three socioeconomic classes (based on occupation), and five age groups (18 to 25, 26 to 35, 36 to 48, 49 to 64, and 65 to 80 years). Each participant was paid \$10 after completing the battery. All participants were native English speakers who reported that they had no history of serious psychiatric disorder, substance abuse, or cognitive impairment. Sex differences on the LEAS for this sample were reported previously in Lane et al. (1996).

Sample 3. Participants were 211 undergraduate students (96 men) in the Department of Psychology at the University of Arizona. Participants ranged in age from 17 to 28 years old ($M = 19.11$, $SD = 1.78$). Of the participants, 178 (80 men) spoke English as their first language. Participants received course credit for their introductory psychology course in return for their time.

Sample 4. Participants were 51 1st- and 2nd-year medical students (30 men) from Chicago Medical School (a private, Midwestern medical school). Participants ranged in age from 21 to 34 years old ($M = 24.18$, $SD = 2.84$). Of the participants, 45 (24 men) spoke English as their first language. Participants were paid \$10 for their time. Sex differences on the LEAS for this sample were reported previously in Lane, Kivley, DuBois, Shamasundara, and Schwartz (1995); sex differences were not examined controlling for verbal intelligence in that report, however.

Sample 5. Participants were 61 undergraduate students (14 men) in the Department of Psychology at Penn State University. Participants ranged in age from 16 to 25 years old ($M = 18.80$, $SD = 1.39$). Participants received course credit for their participation in the study.

Sample 6. Participants were 92 undergraduate students (38 men) in the Department of Psychology at Penn State University. Participants ranged in age from 19 to 38 years old ($M = 21.49$, $SD = 2.35$). Participants completed the LEAS as part of a large, experience-sampling study on emotion and personality. The experience-sampling data from 56 of these participants were reported in Feldman Barrett (1997, 1998), but analyses using the LEAS data have not been reported previously; furthermore, the hypotheses and analyses reported in those articles do not overlap with those presented here. Participants received course credit for their participation in the study.

Sample 7. Participants were 331 medical students (160 men) from Cologne University in Germany. The LEAS, along with the scoring manual, was translated into German for use with this sample. Participants were volunteers and did not receive formal remuneration for their participation.

Procedure

Participants in Sample 1 completed a questionnaire packet including the LEAS in one large group; the LEAS was the first instrument in the packet. Participants in Samples 2 and 3 completed a questionnaire packet including the LEAS in small groups of 6 to 10. Participants in Sample 4 completed a questionnaire packet including the LEAS in two large groups (1st- and 2nd-year medical students were tested separately); the LEAS was the first instrument in the packet. Participants in Samples 5 and 6 were tested individually and were presented with the LEAS as part of a larger battery of questionnaires. Participants in Sample 7 were tested in one large group. All participants completed the LEAS independently without any input from others.

Materials

LEAS. The LEAS (Lane et al., 1990) is a performance measure of the articulation of emotional experience. Participants were asked to describe their own anticipated feelings, and those of another person, in each of 20 scenarios (except Sample 7, who responded to only 10 scenarios of the original 20). Scenarios were presented in two to four sentences each (e.g., "You and your best friend are in the same line of work. There is a prize given annually to the best performance of the year. The two of you work hard to win the prize. One night the winner is announced—your friend. How would you feel? How would your friend feel?"). One scenario was presented per page, followed by two questions, "How would you feel?" and "How would the other person feel?" at the top of each page. Participants wrote their responses on the remainder of each page. They were instructed to use as much or as little of the page as needed to answer the two questions.

Highly structured scoring criteria were used to evaluate the degree of differentiation and integration in the language used to describe the emotional responses to each scenario. Each scenario received a score of 0 to 5 corresponding to the cognitive-developmental theory of emotional awareness that underlies the LEAS (Lane & Schwartz, 1987). The rating procedure is based entirely on the denotative structure of the language used to describe emotional responses, with no inference regarding the appropriateness of the response described. A glossary of words at each level was created to guide scoring. A score of 0 was assigned when nonaffective words

were used or when the word *feel* was used to describe a thought rather than a feeling. A score of 1 was assigned when words indicating physiological cues were used in the description of feelings (e.g., "I'd feel tired"). A score of 2 was assigned when words were used that convey relatively undifferentiated emotion (e.g., "I'd feel bad") or when the word *feel* was used to convey an action tendency (e.g., "I'd feel like punching the wall"). A score of 3 was assigned when one word conveying a typical, differentiated emotion was used (e.g., happy, sad, angry, etc.). A score of 4 was assigned when two or more Level 3 words were used in a way that conveyed greater emotional differentiation than would either word alone. Each participant received a separate score for the "self" response and for the "other" response ranging from 0 to 4; thus, LEAS scores for self and other could range from 0 to 80. In addition, a total LEAS score was given to each scenario equal to the higher of the self and other scores. A score of 5 was assigned to the total when self and other received a score of 4 and were differentiated from one another; thus, a maximum total LEAS score of 100 was possible.

The reliability for the LEAS has been consistently high across studies: intraclass $r = .84$, $\alpha = .81$, Sample 1 (Lane et al., 1990); r ranging from .91 to .98, α ranging from .83 to .88, Sample 2 (Lane et al., 1996); $r = .97$, Sample 4 (Lane et al., 1995); interrater reliability = .81, Sample 7 (Wrana et al., 1998). Reliability estimates for the LEAS are not available for Samples 3, 5, and 6 because expert scorers were used whose interrater reliability was established in Sample 2.

Wechsler Adult Intelligence Scale-Revised (WAIS-R) vocabulary subtest (Wechsler, 1981). Participants in Samples 1 and 6 completed the WAIS-R vocabulary subtest, which is a widely validated measure of vocabulary and highly related to verbal intelligence. For Sample 1, the vocabulary subtest was administered to participants as one of several questionnaires in a packet with no time limit set for completion; participants were asked to explain in writing the meanings of 35 words taken from the WAIS-R subtest. For Sample 6, the vocabulary subtest was administered to participants according to the standardized procedure detailed for the WAIS-R. Participants were asked to explain the meanings of 35 words that become increasingly difficult, and their responses were coded on a 3-point scale (0 = an incorrect response, 1 = a partially correct response, 2 = complete response). Scores were summed to reflect a participant's verbal intelligence.

Shipley Institute of Living Scale Vocabulary subtest (Shipley, 1940). Participants in Sample 4 completed the Shipley Vocabulary subtest to assess their verbal ability. The Shipley Vocabulary subtest is a 40-item multiple choice

test of word meaning that has a 10-minute time limit. Test scores consisted of the number of correct answers.

RESULTS

Table 1 presents the descriptive statistics for LEAS scores from all samples. To test for sex differences in emotional awareness, we performed separate sets of regression analyses for each sample of participants. Three regressions were first performed for each sample—one regression analysis for each LEAS score. Participants' sex was effect coded for all of the regression analyses.¹ The findings, presented in Table 2, indicate clearly that women consistently perform better on the LEAS than do men. This effect continued to hold when SES was controlled for Sample 3 and when only native speakers of English were tested in Samples 3 and 4. On average, the magnitude of the difference between men and women was .69 of a standard deviation for LEAS self scores, .54 for LEAS other scores, and .61 for LEAS total scores, constituting medium effect sizes (Cohen, 1988).

We next evaluated whether differences in verbal intelligence accounted for the observed sex differences in emotional awareness. For this next set of analyses, we used data from samples that included a measure of verbal intelligence (i.e., Samples 1, 4, and 6). First, we assessed whether male and female participants differed in their verbal intelligence. There was no consistent relationship between participants' gender and their verbal intelligence. There were no sex differences in verbal intelligence scores for Sample 1; men ($M = 56.15$) and women ($M = 57.69$) had very similar vocabulary scores ($t = 1.04$, *ns*). There were significant sex differences in verbal intelligence in Samples 4 and 6. In Sample 4, women performed better on the Shipley Vocabulary subtest than did men ($M = 34.7$ and $M = 31.87$), $t = 3.37$, $p < .001$. In Sample 6, however, men performed better on the vocabulary subtest of the WAIS-R when compared with women ($M = 58.50$ and $M = 54.10$, $t = 2.17$, $p < .05$).

Second, we conducted hierarchical regression analyses to test the hypothesis that sex differences in emotional awareness were not attributable to verbal intelligence. One set of regression analyses was computed for each sample and included a separate analysis for each LEAS score. In each analysis, centered verbal intelligence scores were entered as the predictors in Step 1 of the regression, followed by the effect code for sex in Step 2. The results from Step 2 represent an estimate of the unique contribution of participants' sex in predicting their LEAS scores after controlling for verbal intelligence. Step 1 of the regression analyses for Samples 1 and 6 indicated that participants with higher verbal intelligence performed better on the LEAS than did those who were lower in verbal intelligence. In both samples,

TABLE 1: Descriptive Statistics for Levels of Emotional Awareness Scale (LEAS) Scores

	N	Verbal Intelligence		LEAS Self		LEAS Other		LEAS Total	
		M	SD	M	SD	M	SD	M	SD
Sample 1	94	56.87	7.06	63.77	8.11	57.37	8.74	72.07	8.27
Sample 2	377	—	—	54.11	11.19	49.06	11.23	61.79	10.83
Sample 3	211	—	—	57.89	7.37	52.34	7.46	65.03	6.97
Sample 4	51	33.04	3.26	59.18	7.23	54.08	7.50	66.24	7.92
Sample 5	61	—	—	55.46	6.54	49.21	8.51	60.87	6.08
Sample 6	92	55.62	7.65	58.51	8.42	52.25	9.04	64.97	9.00
Sample 7	331	—	—	—	—	—	—	—	—

TABLE 2: Sex Differences in Levels of Emotional Awareness

	LEAS Self				LEAS Other				LEAS Total			
	M	F	t	p	M	F	t	p	M	F	t	p
Sample 1	61.18 (8.25)	66.70 (6.95)	3.49	.001	55.40 (9.02)	59.61 (7.92)	2.39	.02	69.60 (7.98)	74.89 (7.76)	3.25	.002
Sample 2	51.11 (11.53)	56.95 (10.10)	5.24	.0001	46.78 (11.72)	51.21 (10.33)	3.89	.0001	58.92 (10.87)	64.50 (10.09)	5.17	.0001
Sample 3	55.43 (7.50)	59.95 (6.62)	4.65	.0001	50.44 (8.00)	53.93 (6.61)	3.47	.001	62.77 (6.90)	66.92 (6.48)	4.50	.0001
Sample 4	57.20 (6.59)	62.00 (7.32)	2.45	.02	52.30 (5.59)	56.62 (9.15)	2.09	.05	63.97 (6.11)	69.48 (9.16)	2.58	.02
Sample 5	51.14 (6.55)	56.74 (6.02)	3.00	.004	44.43 (12.07)	50.64 (6.66)	2.50	.02	57.43 (6.17)	61.89 (5.73)	2.52	.02
Sample 6	54.66 (8.24)	61.22 (7.51)	3.97	.0001	49.26 (8.82)	54.35 (8.66)	2.75	.007	60.66 (8.83)	68.00 (7.87)	4.19	.0001
Sample 7	—	—	—	—	—	—	—	—	29.51 (5.99)	31.81 (5.73)	3.57	.001

NOTE: LEAS = Levels of Emotional Awareness Scale, M = male participants, F = female participants. Standard deviations are presented in parentheses. Means for Sample 7 are lower than for the other six samples because 10, rather than 20, scenarios were administered to participants.

vocabulary scores were moderately related to LEAS self scores ($B = .37, SE_B = .10, p < .0004$ and $B = .36, SE_B = .12, p < .006$) and to LEAS total scores ($B = .38, SE_B = .10, p < .0002$ and $B = .28, SE_B = .13, p < .04$); vocabulary scores were only related to the LEAS other score in Sample 1 ($B = .36, SE_B = .10, p < .0005$) but not in Sample 6 ($B = .12, SE_B = .13, p < .35$). Verbal intelligence, when measured by the Shipley Vocabulary subtest in Sample 4, was not related to LEAS scores (B ranged from .07 to .17, $SE_B = .14$ for all three standardized regression coefficients). Step 2 of the regression analyses for all samples indicated that women continued to perform better on the LEAS than did men, even after differences in verbal intelligence were controlled. These results are presented in Table 3.

DISCUSSION

The results of this study demonstrate clearly that women displayed more emotional awareness than did men. On average, women participants scored higher than did men on the LEAS, indicating that the women used emotion language to represent their own and others' emotional experience with more differentiation and complexity. This difference was observed in several

different undergraduate samples from schools that varied in their scholastic admission requirements (Samples 1, 3, 5, and 6), in samples of medical students (Samples 4 and 7), in adults spanning the entire age spectrum (Sample 2), and across two different cultures (Samples 1 through 6 vs. Sample 7). These findings are consistent with the observation that women performed better on the LEAS than did men in a sample of patients with borderline personality disorder and controls (Levine, Marziali, & Hood, 1997). Thus, this sex difference appears to be a stable, highly generalizable effect.

The sex difference was observed when controlling for verbal intelligence, indicating that women's better performance on the LEAS was not simply a function of differences in verbal ability. This demonstration was important because some researchers have argued that sex differences in emotion knowledge may be partly attributable to differences in development of verbal language. Although girls do develop verbal language (and specifically their emotion vocabulary) earlier than boys and maintain language superiority throughout development (Brody, 1993), the magnitude of sex differences in verbal ability in adults tends to be quite small. In addition, there was no evidence in our data that the sex difference in

TABLE 3: Sex Differences in Levels of Emotional Awareness Controlling for Verbal Intelligence

	Step 1			Step 2				
	R ²	F	p	B	SE _B	Incremental R ²	F	p
Sample 1								
LEAS self	.13	13.71	.0004	.30	.09	.09	10.33	.002
LEAS other	.13	12.87	.0005	.21	.10	.04	4.35	.04
LEAS total	.15	14.94	.0002	.28	.10	.08	8.81	.004
Sample 4								
LEAS self	.01	.25	.62	.37	.15	.11	5.98	.02
LEAS other	.02	.85	.36	.28	.15	.06	3.40	.08
LEAS total	.03	1.43	.24	.34	.15	.09	5.00	.03
Sample 6								
LEAS self	.13	8.36	.006	.52	.11	.25	22.88	.0001
LEAS other	.02	.90	.35	.34	.13	.11	6.75	.02
LEAS total	.08	4.76	.04	.52	.11	.25	20.69	.0001

NOTE: Step 1 regression coefficients represent the effect of verbal intelligence on Levels of Emotional Awareness Scale (LEAS) performance. Step 2 regression coefficients are presented only for the effect of sex of participant intelligence on LEAS performance, after controlling for verbal intelligence. Incremental R^2 represents an estimate of the unique relationship between participants' sex and their LEAS scores after controlling for verbal intelligence. SE_B = standard error of the standardized regression coefficient.

LEAS performance was especially pronounced among those participants who were higher in verbal ability. Thus, sex differences on the LEAS did not stem from differences in verbal intelligence.

The actual source of women's superior performance on the LEAS is not known as yet. One way to think about the LEAS is as a measure of how people apply language to their emotional experiences, which in turn may be related to the complexity with which people process emotional information as well as to the richness in their representations of their own emotion experience. Sex differences in performance on the LEAS may exist because women have more elaborated emotion knowledge structures than do men (i.e., more available emotion knowledge) (Tulving & Pearlstone, 1966). Availability differences might be inherited, due to differing socialization processes for boys and girls or some combination of the two. Alternatively, women may more easily use what they know than do men, even if both men and women have equally complex knowledge. They might have greater access to their emotion knowledge (i.e., more accessible emotion knowledge) (Tulving & Pearlstone, 1966) because they use what they know about emotion more frequently than do men or they may be more willing to use what they know (i.e., have more motivation to perform the task) because they are more interested in the task. Of course, these various explanations are not necessarily independent of one another. What begins as accessibility differences may actually lead to availability differences. For example, greater use of language to articulate emotional experience may lead to increased differentiation and complexity of emotion knowledge structures (i.e., more available knowledge). Of course, these ideas are speculative and this research remains to be done. At this point, all we can

confidently say is that women consistently perform better on tasks in which the products of emotion knowledge structures are displayed.

The observed sex differences on the LEAS also may indicate that women can use their emotion knowledge to better predict how they or others might feel in a given situation than do men. The LEAS consists of a series of hypothetical scenarios and participants are asked to estimate how they would feel in a given situation, even though they may not experience the identified emotion in that particular situation. Thus, performance on the LEAS may require the use of abstract, propositional knowledge about emotion experience to predict how the self or others would respond in a variety of emotion-provoking situations; the knowledge may be episodic (based on personal experience) or semantic (based on general conceptual information). Participants may use what they know about the range of abstract situations or relational contexts that can cause emotional experience to predict how they themselves or others would feel in a given scenario. Women's superior performance on the LEAS may be an indication that they can more easily bring abstract propositional knowledge to bear when anticipating how they might feel in a given situation. If this were the case, then we might expect there to be sex differences in certain types of antecedent emotion regulation strategies, such as situation selection, which would require such knowledge (for a classification of emotion regulation, see Gross, in press). In fact, preliminary evidence suggests that women do report greater use of such regulation strategies (Gross & John, 1999).

If we think of the LEAS as an emotion-performance task, then the findings from the present study are consistent with a large body of research on sex differences in

emotionally expressive behavior. A substantial body of research has demonstrated with few exceptions that women are more emotionally expressive than are men. In general, women express their emotions both nonverbally (e.g., facial and postural changes) and verbally more than do men (e.g., Barr & Kleck, 1995; Kring & Gordon, 1998, for nonverbal behaviors; Gross & John, 1995; Kring, Smith, & Neale, 1994, for self-reports of expressivity; Lang, Greenwald, Bradley, & Hamm, 1993, for electromyography measures of facial expressivity; for a review, see Brody & Hall, 1993; LaFrance & Banaji, 1992; Shields, 1987). Because emotional expressivity serves many functions in the social context, it also can be seen as an emotion-related performance task. Because they are influenced both by learned display rules and by the demands of the situation, emotional expressions can be executed with differential accuracy and efficiency (Buck, Miller, & Caul, 1974; Buck, Savin, Miller, & Caul, 1972). Coordinating emotional expressions to the complex and changing demands of the social context implies a considerable degree of differentiation and complexity in expressive behavior. We would argue that the ability to know what one is feeling, monitor and modulate how that might be expressed outwardly, and anticipate how a given display will be experienced by others all may influence the nature of emotional expression and vary as a function of one's level of emotional awareness. Unfortunately, there have been no studies to date that have examined whether women execute emotional expressions in a more differentiated, context-appropriate way than do men. This research remains to be done.

Implications of the Present Study

Retrospective versus on-line ratings of emotion. The current findings shed some light on the apparent paradox that consistent sex differences in retrospective accounts of emotional experiences are not observed in studies involving on-line, momentary ratings. Similar to the hypothetical situations posed in the LEAS, retrospective self-report inventories require people to make use of their emotion knowledge structures. Retrospective ratings are not based on previous emotional experiences that are stored, intact, in memory. Similar to other memory-based ratings, retrospective ratings of emotional experience are likely constructed, in part, on the basis of existing knowledge (Feldman Barrett, 1997). The degree of differentiation and intensity in the construction, and thus in the retrospective ratings, should be related to the degree of differentiation of the emotion-knowledge structures that are used in the construction process (Lane & Schwartz, 1987). To the extent that women attend more to their emotions when they occur, think more about them, label them or share their

emotions more with other people, women may have a more elaborated view of their emotion life than typically occurs for men (cf. Feldman Barrett et al., 1998). Thus, it may be that sex differences exist in retrospective ratings of emotion for the same reason that they appear on the LEAS: Women display evidence of more differentiated emotion-knowledge structures.

Recent evidence suggests women indeed have a more elaborated view of their emotional lives, and of their day-to-day life experiences in general, when they are asked to remember their previous life experiences. Female participants have a better memory for momentary emotional events, and for daily events in general, because they encode their autobiographical memories with more detail than do male participants (Seidlitz & Diener, 1998). Sex differences in encoding for emotional events, in particular, may occur in part because women may have more associations between accessible representations of their own and others' emotional experience. Female participants are faster at recalling emotional memories than are men and organize their autobiographical memories of emotion into a wider range of subjective categories (although men and women remembered an equally complex range of emotional experiences during the events recalled) (Davis, 1999). For incoming information to be processed in an elaborated fashion, material to be remembered has to be embellished or enhanced by linking it to previous stored information (Craik & Tulving, 1975). The greater degree of elaborative processing of real-life emotional experiences may be facilitated in women, then, because they have more available or more accessible emotion-knowledge structures. One could even speculate that women have better memory for their day-to-day life experiences because of the emotional significance that they attach to daily life events. Perhaps women typically attend to emotion cues and encode emotion information in naturally occurring events to a greater extent than do men. If instructed to do so, men may be able to attend to emotion cues in a similar manner, but their default tendency may be to not attend to emotion cues to as great an extent.

Momentary ratings also are a constructive process in that language is used to formulate the conscious representation of experiences as they occur in real time. It might be expected, then, that sex differences should appear in on-line, momentary ratings of emotional experience as well. It may be that sex differences in momentary experience do exist but are not detected because the ratings are constrained by the measurement devices (i.e., by the terms or the rating format provided). Alternatively, it may be that on-line constructions of these representations are less completely a function of emotion knowledge because on-line stimuli are proximally avail-

able. In this scenario, retrospective ratings of emotion might be a more straightforward test of emotion knowledge when compared to momentary ratings. From this perspective, retrospective ratings of emotion might be seen primarily as an emotion-related performance task rather than solely as a measure of emotional experience per se.

Emotional adaptation. Although in general it seems likely that greater emotional complexity is associated with greater adaptation to the environment (cf. Feldman Barrett, 1998), lower scores on the LEAS may not necessarily imply lower levels of emotional adaptation. Lower scores on the LEAS reflect a lesser propensity to represent emotional experience with complex emotion language and a greater propensity to represent it with words that describe sensory motor experiences (e.g., actions or action tendencies) (i.e., Level 2). Our findings indicate that men, with their lower scores on the LEAS, are more likely to represent their emotional experiences in action-oriented terms. This finding dovetails with previous suggestions that men are more behaviorally oriented in their emotional expressions than are women, who tend to use facial and verbal expressions that reflect a greater conscious awareness of experience (cf. Brody & Hall, 1993). Together, the findings suggest that men may be more likely to manage their emotions in an automatic, behavioral fashion. Women, who represent their experience with complex language, may be more likely to use conscious, self-reflective coping strategies that are more language based. Not all of these strategies are necessarily effective. For example, there is a growing body of research to indicate that women tend to cope with their emotions by ruminating, and the tendency to ruminate increases the risk for depressive disorders (Just & Alloy, 1997; Nolen-Hoeksema, 1991; Nolen-Hoeksema & Morrow, 1993). We can speculate that, at times, women may be at risk for prolonging their negative emotional experiences by their tendency to use reflective, language-based, emotion-regulation strategies.

CONCLUSION

In conclusion, we have demonstrated that compared to men, women display more extensive knowledge of emotional experience. They provide more complex and differentiated descriptions of the emotions that people would experience in hypothetical situations. These results may reflect a sex difference in the availability of emotion knowledge, in the accessibility of emotion knowledge, in the motivation to use emotion knowledge, or in all three. Although our study was more descriptive than explanatory in nature, the findings are consistent with the conclusion that women reliably per-

form better on emotion-related tasks than do men. Women may indeed be the more emotional sex, at least in terms of the ease with which they display what they know about emotions and how they represent their own experiences in conscious thought. The next question to address is why.

NOTE

1. All predictors were centered for all of the regression analyses, unless otherwise stated (Aiken & West, 1991).

REFERENCES

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Barr, C., & Kleck, R. E. (1995). Self-other perception of the intensity of facial expressions of emotion. Do we know what we show? *Journal of Personality and Social Psychology*, *68*, 608-618.
- Birnbaum, D. W., & Croll, W. L. (1984). The etiology of children's stereotypes about sex differences in emotionality. *Sex Roles*, *10*, 677-691.
- Birnbaum, D. W., Nosanchuk, T. A., & Croll, W. L. (1980). Children's stereotypes about sex differences in emotionality. *Sex Roles*, *6*, 435-443.
- Brody, L. R. (1993). On understanding gender differences in the expression of emotion: Gender roles, socialization, and language. In S. L. Ablon, D. Brown, E. J. Khantzian, & J. E. Mack (Eds.), *Human feelings: Explorations in affect development and meaning* (pp. 87-121). Hillsdale, NJ: Analytic Press.
- Brody, L. R., & Hall, J. A. (1993). Gender and emotion. In M. Lewis & J. Haviland (Eds.), *Handbook of emotions* (pp. 447-460). New York: Guilford.
- Buck, R., Miller, R. E., & Caul, W. F. (1974). Sex, personality, and physiological variables in the communication of affect via facial expression. *Journal of Personality and Social Psychology*, *30*, 587-596.
- Buck, R., Savin, V. J., Miller, R. E., & Caul, W. F. (1972). Communication of affect through facial expressions in humans. *Journal of Personality and Social Psychology*, *23*, 362-371.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Craik, F.I.M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General*, *11*, 268-294.
- Davis, P. J. (1999). Gender differences in autobiographical memory for childhood emotional experiences. *Journal of Personality and Social Psychology*, *76*, 498-510.
- Diener, E., Sandvik, E., & Larsen, R. J. (1985). Age and sex effects for emotional intensity. *Developmental Psychology*, *21*, 542-546.
- Fabes, R. A., & Martin, C. J. (1991). Gender and age stereotypes in emotionality. *Personality and Social Psychology Bulletin*, *17*, 532-540.
- Feldman Barrett, L. (1997). The relationships among momentary emotion experiences, personality descriptions, and retrospective ratings of emotion. *Personality and Social Psychology Bulletin*, *23*, 1100-1110.
- Feldman Barrett, L. (1998). Discrete emotions or dimensions? The role of valence focus and arousal focus. *Cognition and Emotion*, *12*, 579-599.
- Feldman Barrett, L., & Morganstein, M. (1995, August). *Sex differences in the experience of emotion: Retrospective versus momentary ratings*. Paper presented at the annual conference of the American Psychological Association, New York.
- Feldman Barrett, L., Robin, L., Pietromonaco, P. R., & Eysell, K. M. (1998). Are women the "more emotional sex?" Evidence from emotional experiences in social context. *Cognition and Emotion*, *12*, 555-578.
- Fischer, A. (1993). Sex difference in emotionality: Fact or stereotype? *Feminism and Psychology*, *3*, 303-318.

- Fujita, F., Diener, E., & Sandvik, E. (1991). Gender differences in negative affect and well-being: The case for emotional intensity. *Journal of Personality and Social Psychology, 61*, 427-434.
- Gross, J. J. (in press). Emotion regulation. *Review of General Psychology*.
- Gross, J. J., & John, O. P. (1995). Facets of emotional expressivity: Three self-report factors and their correlates. *Personality and Individual Differences, 19*, 555-568.
- Gross, J. J., & John, O. P. (1999). [Measuring emotion regulation: The emotion regulation questionnaire]. Unpublished raw data, Stanford University.
- Grossman, M., & Wood, W. (1993). Sex differences in intensity of emotional experience: A social role interpretation. *Journal of Personality and Social Psychology, 65*, 1010-1022.
- Hochschild, A. R. (1983). *The managed heart: Commercialization of human feeling*. Berkeley: University of California Press.
- Just, N., & Alloy, L. B. (1997). The response styles theory of depression: Tests and an extension of the theory. *Journal of Abnormal Psychology, 106*, 221-229.
- Kring, A. M., & Gordon, A. H. (1998). Sex differences in emotion: Expression, experience, and physiology. *Journal of Personality and Social Psychology, 74*, 686-703.
- Kring, A. M., Smith, D. A., & Neale, J. M. (1994). Individual differences in dispositional expressiveness: Development and validation of the Expressiveness Scale. *Journal of Personality and Social Psychology, 66*, 934-949.
- LaFrance, M., & Banaji, M. (1992). Towards a reconsideration of the gender-emotion relationship. In M. S. Clark (Ed.), *Emotion and social behavior: Review of personality and social psychology* (Vol. 14, pp. 178-201). Newbury Park, CA: Sage.
- Lane, R., Kivley, L. S., DuBois, M. A., Shamasundara, P., & Schwartz, G. (1995). Levels of emotional awareness and the degree of right hemispheric dominance in the perception of facial emotion. *Neuropsychologia, 33*, 525-538.
- Lane, R., Quinlan, D., Schwartz, G., Walker, P., & Zeitlin, S. (1990). The levels of emotional awareness scale: A cognitive-developmental measure of emotion. *Journal of Personality Assessment, 55*, 124-134.
- Lane, R., & Schwartz, G. E. (1987). Levels of emotional awareness: A cognitive-developmental theory and its application to psychopathology. *American Journal of Psychiatry, 144*, 133-143.
- Lane, R., Sechrest, B., Reidel, R., Weldon, V., Kaszniak, A., & Schwartz, G. (1996). Impaired verbal and nonverbal emotion recognition in alexithymia. *Psychosomatic Medicine, 58*, 203-210.
- Lane, R. D., Sechrest, L., Riedel, R., Weldon, V., Kaszniak, A., & Schwartz, G. E. (1998). Unpublished data. University of Arizona.
- Lang, P. J., Greenwald, M. K., Bradley, M. M., & Hamm, A. O. (1993). Looking at pictures: Affective, facial, visceral, and behavioral reactions. *Psychophysiology, 30*, 261-273.
- Levine, D., Marziali, E., & Hood, J. (1997). Emotion processing in borderline personality disorders. *Journal of Nervous and Mental Disease, 185*, 240-246.
- Lutz, C. A. (1990). Engendered emotion: Gender, power, and the rhetoric of emotional control in American discourse. In C. Lutz & L. Abu-Lughod (Eds.), *Language and the politics of emotion* (pp. 69-91). Cambridge, UK: Cambridge University Press.
- Manstead, A.S.R. (1993). Gender differences in emotion. In A. Gayle & M. W. Eysenck (Eds.), *Handbook of individual differences: Biological perspectives* (pp. 355-387). New York: John Wiley.
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*, 569-582.
- Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion, 7*, 561-570.
- Ross, M. (1989). Relation of implicit theories to the construction of personal histories. *Psychological Review, 96*, 341-357.
- Schacter, D. L. (1996). *Searching for memory*. New York: Basic Books.
- Seidnitz, L., & Diener, E. (1998). Sex differences in the recall of affective experiences. *Journal of Personality and Social Psychology, 74*, 262-271.
- Shields, S. A. (1987). Women, men, and the dilemma of emotions. In P. Shaver & C. Hendrick (Eds.), *Sex and gender: Review of personality and social psychology* (pp. 229-240). Newbury Park, CA: Sage.
- Shields, S. A. (1991). Gender in the psychology of emotion: A selective research review. In K. I. Strongman (Ed.), *International review of studies on emotion* (Vol. 1, pp. 227-245). New York: John Wiley.
- Shipley, W. (1940). A self-administering scale for measuring intellectual impairment and deterioration. *Journal of Psychology, 9*, 371-377.
- Tulving, E., & Pearlstone, Z. (1966). Availability versus accessibility of information in memory for words. *Journal of Verbal Learning and Verbal Behavior, 5*, 381-391.
- Wagner, H. L., MacDonald, C. J., & Manstead, A.S.R. (1986). Communication of individual emotions by spontaneous facial expressions. *Journal of Personality and Social Psychology, 50*, 737-743.
- Wechsler, D. (1981). *Manual for the Wechsler Adult Intelligence Scale-Revised (WAIS-R)*. San Antonio, TX: The Psychological Corporation.
- Wrana, C., Thomas, W., Heindichs, G., Huber, M., Obliers, R., Koerfer, A., & Köhle, K. (1998, March). *Levels of Emotional Awareness Scale (LEAS): ein beitrag zur empirischen überprüfung von validität und reliabilität einer Deutschen fassung [Levels of Emotional Awareness Scale (LEAS): A contribution to an empirical examination of validity and reliability of a German version]*. Poster presentation at the 47th working conference of the German College of Psychosomatic Medicine.

Received December 2, 1998

Revision accepted May 19, 1999