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Sex Differences in Intensity of Emotional Experience: A Social Role Interpretation

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According to gender role theory, women's greater emotional intensity than men's stems from normative expectations for sex differences that arise as a result of men's and women's social roles. In the 1st experiment, endorsement of normative expectations for sex differences was associated with sex differences in Ss' own emotions: To the extent that they endorsed stereotypical differences between men and women, female Ss reported personally experiencing emotions of greater intensity and male Ss reported experiencing emotions of lesser intensity. The 2nd study manipulated expectations for responsiveness while Ss viewed a series of emotion-inducing slides. When instructions rendered normative expectations comparable for men and women, no sex differences were obtained in emotion self-reports. Furthermore, women evidenced more extreme electromyograph physiological responding than men, suggesting general sex differences in emotion that are not limited to self-report.

In literature and in popular culture, women are consistently identified as the more emotional sex. Psychological research on self-reports of emotions has corroborated this idea. Women report more intense experience of emotions than men, more intense expression, and greater comfort with and tendency to seek out emotional experiences (Allen & Haccoun, 1976; Allen & Hamsher, 1974; Balswick & Avertt, 1977; Larsen & Diener, 1987). The sex difference in intensity of emotional experience has been found across the life span, in adolescents as well as middle-aged adults (Diener, Sandvik, & Larsen, 1985).

Women's greater emotional responsiveness than men has also emerged in self-reports of specific emotions. For example, in the domain of positive emotions, women report greater overall warmth, emotional expressiveness, and concern for others than do men (Spence & Helmreich, 1978) as well as higher levels of happiness and life satisfaction (Wood, Rhodes, & Whelan, 1989). With respect to negative emotions, women report higher levels of negative affect and depression than do men (Gove, 1972, 1978; Gove & Tudor, 1973; Nolen-Hoeksema, 1987) as well as greater fear and sadness (Scherer, Walbotlin, & Summerfield, 1986). Reports of anger, however, have not yielded consistent sex differences. Some studies find men report more frequent anger than women (Biaggio, 1980; Doyle & Biaggio, 1981), whereas others have failed to find significant sex differences (Averill, 1982; Wintre, Polivy, & Murray, 1990).

The seemingly paradoxical finding that women report more intense positive as well as negative emotions than men can be understood if positive and negative affect are conceptualized as separate, unipolar dimensions (although see Green, Goldman, & Salovey, 1993). People appear to possess a characteristic level of emotional intensity across both dimensions, represented by, for example, intense, passionate emotions or relatively placid, subdued emotions (Diener, 1984; Diener, Larsen, Levine, & Emmons, 1985; Larsen & Diener, 1987).[1] Thus, women's more intense style of emotional responding than men's would be expected to emerge in both positive and negative domains.

We argue in this article that sex differences in the intensity of emotional experience stem from the roles men and women fill in our society (Eagly, 1987; Eagly & Wood, 1991; Wood & Rhodes, 1992). Women are less likely than men to hold jobs in paid employment settings, and furthermore, women are more likely than men to fill caretaker roles in the home (e.g., wife and mother) and when employed for pay (e.g., teacher and nurse). These role differences generate sex differences in social behavior because sex-differentiated roles form the basis for general beliefs or social stereotypes about the likely and expected behavior of men and women, termed *gender roles*. The content of social stereotypes is informative about gender role expectations concerning emotions. Typical women are described as emotionally expressive, concerned with their own and others' feeling states, and emotionally labile (Broverman, Vogel, Broverman, Clarkson, & Rosenkrantz, 1972; Ruble, 1983). Typical men, in contrast, are believed to be emotionally stable, stoic, and not excitable. Thus, women are attributed both greater emotional expressiveness and greater sensitivity to emotional events.

Men's and women's personal history of enacting social roles

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[1] In contrast, frequency of emotional experience in the two hedonic domains can be conceived of along a single bipolar dimension. At any given time, the experience of either positive or negative emotion apparently suppresses the experience of the other.

is also an indirect cause of sex differences in behavior because of the influence these experiences have on skills and attitudes. Enactment of caretaker roles by women is likely to involve sensitivity to the needs of others and emotional expression, whereas men's roles are less likely to emphasize emotional responsiveness. Prior role enactment and socialization for particular roles thus plausibly instill beliefs and skills that lead women to be more responsive to their own and others' emotions than men. In general, then, sex-differentiated prior experiences cause men and women to have somewhat different emotional skills and attitudes, which, in conjunction with gender role expectations concerning emotions, generate sex differences.

The social role explanation is congruent with a recent response style account of sex differences in depression (Nolen-Hoeksema, 1987). In this view, men's lower levels of reported depression than women's is due to men's active coping style in dealing with depressive events. Women's tendency to be less active and to ruminate about depressive episodes amplifies and prolongs depressive episodes. Nolen-Hoeksema (1987) attributed these response style differences to conformity to sex role stereotypes, specifically to the normative beliefs that specify that men, compared with women, are not emotional and are relatively insensitive to their own mood states.

A number of findings from different literatures are consistent with a social role account of sex differences. First, direct observations of men's and women's daily activities across various cultures suggest that women, more frequently than men, engage in activities requiring emotional sensitivity and responsiveness. For example, Crano and Aronoff's (1978) analysis of a representative cross-cultural sample of 186 societies revealed considerably more socioemotional support provided to sons by mothers than fathers during infancy as well as early childhood (1–5 years of age).[2] Analyses of caretaking of the elderly (in Western societies) have generated a similar pattern, revealing greater caretaking activities by women than men (Dwyer & Seecomb, 1991; Stone, Cafferata, & Sangl, 1987). Furthermore, the nature of this caretaking activity varies with sex, with women more likely to provide personal care and support and men more likely to provide routine household maintenance, repair, and transportation (Dwyer & Seecomb, 1991; Stephens & Christianson, 1986). As a consequence of these sex-differentiated role experiences, women have greater opportunity than men to practice emotion-related skills and to develop beliefs and values concerning emotional sensitivity and expressiveness.

In addition, experimental research on stereotypic beliefs about women and men suggests that sex-differentiated roles contribute to gender role beliefs and expectations (Eagly & Steffen, 1984; Eagly & Wood, 1982). That is, perceivers' judgments of a typical man's or woman's communal orientation (i.e., warmth, expressiveness, and concern for others) appear to derive from presumptions about men's and women's likely social roles. Typical women are judged more likely than typical men to fill homemaker and caretaker roles, requiring emotional sensitivity and expressiveness, with the result that typical women are judged higher in communal traits. However, when perceivers are told that male and female stimulus persons fill identical roles, perceivers report no difference between men's and women's likely communal orientation (Eagly & Steffen, 1984). Thus, consistent with a gender role analysis, sex-stereotypic beliefs about emotions appear to derive from the presumed social roles of men and women.

Perhaps the most convincing evidence in support of a social role analysis is the finding from large-scale social surveys that men's and women's own emotional experiences vary with enactment of life roles. The greater tendency for women than men to report high levels of happiness (Wood, Rhodes, & Whelan, 1989) and high levels of depression (Gove, 1972; Gove & Tudor, 1973) has been found primarily in comparisons between married men and women and not with unmarried persons. This sex difference among married persons plausibly stems from the role of wife, in comparison with husband, being associated with heightened responsiveness to positive emotional events in marriage, represented in increased well-being, along with heightened responsiveness to negative emotional events, represented in increased depression. Although these survey investigations did not evaluate the gender role beliefs, skills, and attitudes that we believe mediate the relation between role occupancy and men's and women's emotional experience, they provide important evidence of the overall link between sex-differentiated role occupancy and sex differences in emotional intensity.

In summary, then, the social role analysis of sex differences in emotions is consistent with observations of men's and women's daily activities in various cultures, suggesting that women's activities are more likely than men's to convey skills and attitudes associated with emotional expertise. Furthermore, experimental research on sex stereotypes suggests that the gender role expectation of greater communal orientation in women than men derives from presumptions about sex-differentiated social roles. Finally, survey assessments of men's and women's well-being have found that women report more extreme emotions than men primarily when the sexes fill different life roles (i.e., wife vs. husband). Despite this suggestive evidence, however, we are not aware of any research designed specifically to test a social role account of emotion sex differences, and the present research was undertaken to accomplish such a test.

Present Research

The first study in this report directly examined whether gender role norms underlie men's and women's differential reports of their own emotional experience. We focused on five types of emotions in this work, including fear, joy, sadness, anger, and love. These represent the five basic types of emotions that appear to feature in people's implicit theories (Shaver, Schwartz, Kirson, & O'Connor, 1987).

Male and female participants rated the intensity and frequency of their typical emotional experiences with regard to the five basic emotions. They also reported their stereotypic beliefs concerning these emotions by judging the intensity of experience for a typical man and a typical woman. Although as we have noted, on the average, stereotypes specify greater emotion-

[2] Although women demonstrated greater socioemotional activity than did men, men's contributions to the expressive functions of the family were not negligible (Crano & Aronoff, 1978). Thus, these data do not support the argument in traditional research on small groups (e.g., Bales & Slater, 1955) that women in family groups contribute exclusively to expressive roles and men contribute exclusively to task roles.

ality in women than men, variability is found in personal endorsement of these normative beliefs. That is, some people endorse these beliefs more extremely than others. Indeed, current research on social stereotypes differentiates personal beliefs from socially prescribed stereotypes (e.g., Ashmore & Del Boca, 1981; Devine, 1989).

If people conform to their own personal interpretation of normative pressures and if sex differences in emotion stem from conformity to such normative beliefs, then subjects' beliefs about norms for men and women should correspond to their own experiences as a man or a woman. Specifically, women who endorse strong normative differences between men and women should also report more extreme, heightened personal emotions than women who endorse minimal stereotypic sex differences. Conversely, men who endorse large stereotypic sex differences should report more placid, moderate personal emotions than men who endorse minimal sex differences.

Table 1
Self-Reports of Emotional Experience

Dimension	Female raters	Male raters
Mean of ratings for love, fear, joy, and sadness		
Intensity of feeling	10.38	9.57
Frequency of feelings	8.96	8.02
Intensity of expression	8.93	7.87
Frequency of expression	9.34	7.93
Anger		
Intensity of feeling	9.54	10.29
Frequency of feelings	7.60	8.08
Intensity of expression	8.23	9.27
Frequency of expression	7.73	8.56

Note. Ratings were obtained on 15-point scales on which higher numbers indicate greater intensity or frequency.

Experiment 1

Method

Subjects

Forty-eight male and 37 female undergraduate students at Texas A&M University participated as part of a requirement in their introductory psychology courses.

Procedure

Subjects participated in groups of approximately 15. They individually completed questionnaires assessing their own emotional experiences (see below) and then assessed their stereotypic beliefs concerning men's and women's emotions (see below). Subjects were then debriefed and excused.

Measures

Reports of own experiences. On each page of the questionnaire, an emotion was listed at the top and the response scales were listed below. Five versions of each page were represented in the questionnaire packet, with each page corresponding to a specific emotion from the set of love, joy, sadness, anger, and fear. The first two rating scales on each page referred to subjects' personal experience of the emotion. On 15-point scales, subjects were asked to indicate how frequently they felt the emotion (with scale endpoints labeled *almost never* and *almost always*) and how intensely they felt the emotion (with endpoints labeled *very mild* and *very strong*).

The next two scales on each page referred to subjects' expression of the emotion to others, given that they were feeling the emotion inside. Subjects rated the frequency with which they expressed the emotion (with scale endpoints labeled *almost never* and *almost always*) and the intensity with which they expressed the emotion (with endpoints labeled *very mildly* and *extremely strongly*).[3]

Given that four of the emotions we assessed (i.e., love, joy, sadness, and fear) have typically revealed more extreme ratings by women than men in prior research and that our interest is in emotionality in general and not specific classes of emotion, indexes were formed to represent mean emotion ratings across this set of emotions. The reliability coefficient for each index was as follows: frequency of feeling, $\alpha = .74$; intensity of feeling, $\alpha = .66$; frequency of expression, $\alpha = .60$; intensity of expression, $\alpha = .56$. Because anger has yielded inconsistent sex differences in earlier research, ratings of this emotion were analyzed separately.

Stereotypic beliefs. Subjects first indicated how intensely the typical man expresses each of the five emotions, love, joy, anger, sadness, and fear. These ratings were obtained on five scales with endpoints ranging from 1 (*extremely mild*) to 15 (*extremely intense*). These same scales were reproduced on a second page, referring to the typical woman's expression of the five emotions. On a third page, subjects rated how intensely the typical man feels each of the five emotions inside. These ratings were obtained on 15-point scales ranging from *extremely mild* to *extremely intense*. Finally, subjects completed these ratings with respect to the typical woman's feeling of emotions.

These ratings were again aggregated across the four emotions that typically reveal more extreme ratings by women than men (i.e., love, joy, sadness, and fear) to yield mean judgments of emotion. The reliability coefficient for each index was as follows: typical man's intensity of expression, $\alpha = .85$; typical woman's intensity of expression, $\alpha = .79$; typical man's intensity of feeling, $\alpha = .92$; typical woman's intensity of feeling, $\alpha = .90$. Again, anger ratings were treated separately.

Results

Reports of Own Emotional Experiences

Male subjects' ratings of emotional experiences were compared with female subjects' ratings in a one-way analysis of variance design.

Ratings of own feeling. Mean ratings of emotion are presented in Table 1. On the aggregate index across ratings of love, joy, fear, and sadness, women reported more frequent feelings of emotion than did men, $F(1, 83) = 11.20$, $p < .01$, and more intense feelings than did men, $F(1, 83) = 4.04$, $p < .05$. No significant differences were obtained in analyses on frequency or intensity of feeling anger.

[3] In addition, several questions assessed the accuracy with which subjects thought they could detect their own feeling of emotion and express this to others as well as the importance of detecting their own emotional feeling and expressing it to others. The only significant effects on these scales were (a) men reported greater accuracy at identifying and at expressing their feelings of anger than women did ($ps < .05$), and (b) women reported that it was more important than did men to express the emotions of love, joy, fear, and sadness ($p < .001$).

Ratings of expression to others. As can be seen in Table 1, on the aggregate index across ratings of love, joy, fear, and sadness, women reported expressing emotions more frequently than did men, $F(1, 83) = 12.39$, $p < .001$, and reported expressing them more intensely than did men, $F(1, 83) = 7.10$, $p < .01$. No significant differences were obtained in analyses of frequency or intensity of expression of anger.

Stereotypic Beliefs About Intensity of Emotions

Stereotype ratings were analyzed in a 2 (male vs. female raters) × 2 (male vs. female stimulus persons) analysis of variance design with repeated measures across sex of stimulus person. The mean ratings for typical men and for typical women are presented in Table 2.

On the aggregate index across ratings of love, joy, sadness, and fear, the typical woman was believed to feel the emotions more intensely than the typical man, $F(1, 83) = 137.20$, $p < .001$. No other effects were significant in this analysis. Also, on ratings of the experience of anger, the typical man was judged to feel anger more intensely than the typical woman, $F(1, 83) = 8.22$, $p < .01$. The interaction between sex of rater and person rated was marginally significant ($p < .10$), indicating that the stereotype judgment of typical men feeling the most anger was more pronounced among female than male raters.

On the aggregate index across ratings of love, joy, sadness, and fear, the typical woman was believed to express the emotions more intensely than the typical man, $F(1, 83) = 536.29$, $p < .001$. In addition, male raters judged both sexes higher in expression than female raters ($p < .05$). On ratings of expression of anger, the typical man was believed to express this more intensely than the typical woman, $F(1, 83) = 23.18$, $p < .001$. In addition, male raters judged both sexes higher in expression than female raters ($p < .01$) and the significant interaction between sex of rater and sex of target indicated that the stereotype judgment of typical men expressing the most anger was more pronounced among female than male raters ($p < .001$).

Association Between Own Ratings of Emotional Intensity and Sex Stereotypes

Subjects' beliefs in sex differences in emotional experience were estimated by calculating a stereotype difference score, subtracting each subject's rating of the typical woman from the subject's rating of the typical man. These scores were then correlated with subjects' ratings of the intensity of their own emotional experiences to assess the correspondence between own judgments and endorsement of stereotypes.

Table 2
Stereotype Ratings for Intensity of Emotional Experience

Dimension	Typical woman	Typical man	Typical woman − typical man
Mean of ratings for love, fear, joy, and sadness			
Intensity of feeling	11.90	9.48	2.42*
Intensity of expression	11.71	7.00	4.71*
Anger			
Intensity of feeling	11.28	12.12	−.83*
Intensity of expression	10.54	11.81	−1.27*

Note. Ratings are collapsed across sex of rater. Ratings were obtained on 15-point scales on which higher numbers indicate greater intensity.
* $p < .05$.

Table 3
Correlations Between Self-Reports of Emotional Experiences and Beliefs that Typical Women Have More Extreme Emotions Than Typical Men

Dimension	Correlation
Women ($n = 37$)	
Intensity of anger	
Feeling	.29
Expression	.33*
Intensity of fear, love, joy, and sadness	
Feeling	15
Expression	.34*
Men ($n = 48$)	
Intensity of anger	
Feeling	−.17
Expression	−.29*
Intensity of fear, love, joy, and sadness	
Feeling	−.43*
Expression	−.16

* $p < .05$.

We anticipated that women would report more intense emotional experiences to the extent that they judged typical women to experience emotions more intensely than typical men. As can be seen in Table 3, the correlations between own experience and stereotypical judgments were uniformly positive for female raters, although only the relations between expression of emotions and stereotypic beliefs about expression achieved significance. We also anticipated that men would report less intense emotional experiences to the extent that they judged typical women to experience emotions more intensely than typical men. Indeed, the correlations between self-ratings and stereotypical judgments were all in the negative direction for male raters, although the only significant relations were obtained for intensity of anger expression and intensity of feeling for love, joy, sadness, and fear. Statistical comparisons between the findings for the sexes revealed that the correlations differed significantly between the sexes across all of the emotion categories ($ps < .05$).

Discussion

Subjects' reports of their own emotional experiences proved to be highly consistent with findings from earlier research (e.g., Balswick & Avertt, 1977; Fujita, Diener, & Sandvik, 1991). Women reported more intense and more frequent emotions than men did, with the exception of anger. Sex differences in intensity and in frequency of self-reported emotions were obtained whether subjects were rating their own personal feeling or their expression of emotions to others. Subjects' stereotypic judgments of emotions were also consistent with earlier re-

search (e.g., Fabes & Martin, 1991), in that the typical woman was believed to experience emotions more intensely than the typical man, again with the exception of anger.

Support for the social role theory of sex differences in emotions was obtained when we examined the correspondence between subjects' endorsement of social stereotypes and their reports of their own experiences. We had anticipated that subjects' own emotional experiences would conform to their normative beliefs about men's and women's emotions. Indeed, to the extent that our female raters believed the typical woman feels emotions more intensely than the typical man, they reported more intense personal feelings of emotion themselves. To the extent that female raters believed the typical woman expresses emotions more intensely than the typical man, they reported greater intensity of own expression. Parallel effects were obtained for male raters. To the extent that men endorsed stereotypes of greater intensity of feeling and of expression in women than men, they reported less intensity in their own personal feelings and in their personal expressions. The relations held across the five types of emotions we assessed, including the aggregated index across love, fear, sadness, and joy, as well as the separate ratings of anger.

These relations between normative beliefs and personal experience are correlational and are open to alternate interpretation. For example, it might be argued that, instead of normative beliefs underlying emotional experiences, emotions underlie perceived norms. In this view, female subjects who experienced emotions intensely assumed that other women have comparably intense experiences and male subjects who experienced subdued emotions presumed that other men are similarly nonintense. If this kind of assumed consensus underlies our findings, subjects' own emotions should correlate primarily with normative beliefs for their own sex and not for the opposite sex. To examine this possibility, we recomputed the correlations between ratings of own experience and normative beliefs concerning women and then own experience and normative beliefs concerning men (instead of representing norms through the difference between ratings of women and men). The pattern of correlations did not support an assumed consensus explanation: No tendency was obtained for especially strong correlations to emerge between own experience and beliefs about own sex norms in comparison with the correlations between own experience and opposite sex norms.

Anger functioned somewhat differently from the other emotions we assessed. A slight, though nonsignificant, tendency was obtained for men to report more intense anger than women, and subjects also reported that typical men experience and express anger more intensely than typical women. Consistent with the social role analysis, subjects' reports of their own experience corresponded to their normative beliefs: Women who endorsed stereotypic sex differences in anger also reported experiencing relatively subdued anger themselves and men who endorsed stereotypic sex differences also reported experiencing heightened anger. Also not inconsistent with a social role analysis is the different pattern of sex differences in normative beliefs we obtained for anger versus fear, joy, love, and happiness. The belief that women have more intense emotions than men would plausibly be limited to those emotions that arise in women's caretaking roles (i.e., love, happiness, fear, and sadness). Possibly, typical men are judged to feel and express more intense anger than typical women because the roles filled by men, especially higher status paid employment roles, allow some expression of this emotion. In a related argument, Tavris (1984) attributed the stereotype of women's lesser anger than men's to women's subordinate social status, which makes them especially vulnerable to retaliation. Alternately, anger sex differences may be linked to aggression in stereotypic beliefs. Men are stereotypically identified as the more aggressive sex (Broverman et al., 1972), and beliefs concerning sex differences in anger may coincide with this judgment.

The results of this first study, then, provide initial support for the social role interpretation of sex differences in emotions. The data are, of course, limited to self-reports of emotional states, which constrains their impact as a general test of social role theory. Emotions are commonly thought to reflect a broad syndrome or pattern of responses involving a variety of systems in addition to self-reports (Averill, 1983; Brody, 1985; Izard, 1977; Roseman, 1984). For example, Roseman (1984) identified five components of emotional response, including phenomenological, subjective feelings; physiological patterns of bodily responses; gestural, expressive reactions to others; behavioral actions; and emotivational goals to which particular emotions give rise.

At best, our self-report data provide a partial but not complete picture of men's and women's emotions, reflecting only one of the many aspects of emotional experience. At worst, self-reports may be an especially poor indicator of the full range of emotional response because self-reports are particularly susceptible to intentional distortion (through biased reporting) or unintentional distortion (through selective recall or subjective interpretation of ambiguous events). The emotion ratings in the first study may be highly susceptible to these kinds of distortion, given that our subjects reported on global, aggregate emotional experiences rather than any single, concrete event. Further complicating the interpretation of self-report measures is the possibility that men and women are not using the response scales in a comparable fashion. Sex differences in scale ratings may reflect differences in the labels, or criteria, applied to emotional experience instead of differences in the experience of emotion itself (Shields, 1987).

To evaluate men's and women's emotional reactions to specific events under controlled conditions and to examine multiple components of emotions, we conducted a second, laboratory study that examined physiological as well as self-reported aspects of emotions. We measured subjects' facial muscle reactions associated with emotional events in addition to their self-reported responses. To the extent that sex differences in emotional reactions prove to be limited to self-report measures, the emotion sex difference is best located at the level of men's and women's verbalization of emotion. To the extent that men and women differ in facial muscle response to emotional events in addition to self-reported reactions, emotion sex differences reflect a pattern of responding that involves multiple components of experience (cf. Cacioppo et al., 1992).

Experiment 2

Electromyograph (EMG) assessments of facial muscle movements reveal both gross muscle responses, as would be gener-

ated with public, overt expression of emotional response, as well as muscular activity too small or fleeting to evoke detectable movements (Cacioppo, Tassinary, & Fridlund, 1990). In past research, EMG recordings have yielded unique patterns for positive and for negative affect. The corrugator muscle region (i.e., above the eyebrow) appears especially sensitive to negative emotional events and unpleasant stimuli, whereas the zygomatic muscle region (i.e., the lower cheek) appears sensitive to positive events and pleasant stimuli (Cacioppo, Petty, Losch, & Kim, 1986; Cacioppo, Petty, & Tassinary, 1989; Ekman, Levenson, & Friesen, 1983; Schwartz et al., 1979; Schwartz, Brown, Ahern, 1980).

Prior research provides only suggestive evidence of sex differences in EMG responses to emotional events. Although Schwartz et al. (1979) obtained no significant sex differences in EMG responding while men and women answered questions that may have contained emotional content (e.g., gave synonyms for words like terror), sex differences were obtained in subsequent research (Schwartz, Brown, & Ahern, 1980) in which subjects imagined they were experiencing various emotion-eliciting events (e.g., for fear, imagine that "the brakes of your car stop working while you are driving"). During these self-constructed emotional states, women showed greater EMG response than men (i.e., change from baseline resting score) for the corrugator muscle region, particularly with respect to the negative emotional episodes of fear, sadness, and anger. However, interpretation of this effect is clouded by the possibility that men and women differed not only in their physiological responses but also in their abilities to self-generate the emotions. In more recent work, Lang, Greenwald, Bradley, and Hamm (1993) reported greater mean EMG response in women than in men in the corrugator, but not zygomatic, muscle regions during exposure to a wide range of emotion-inducing slides. However, the sex difference emerged with positive, negative, and neutral stimuli, and consequently may reflect a general process not tied to specific emotions, such as an orienting response to the slide presentations. Finally, Dimberg and Lundquist (1990) found that women demonstrated greater zygomatic activity than men in response to depictions of happy faces. However, the sexes did not differ significantly in corrugator activity in response to depictions of angry faces. It is unclear in this study whether the EMG activity was part of an emotional reaction or represented an imitative response to the facial depictions. In general, then, when sex differences have been obtained in past research, they have been in the direction of greater responsiveness of women. However, the specific findings of individual studies are difficult to interpret conclusively.

In addition to assessing men's and women's overall levels of emotional response on self-report and physiological measures, we also evaluated the correspondence between these two indicators. If sex differences in emotional intensity reflect a general response style, then correspondence should be found across the multiple assessments of emotional response for both sexes. That is, women should generate more intense emotions than men on both self-report measures and EMG assessments of muscle response. Furthermore, on a correlational basis, members of both sexes reporting intense emotions should display intense physiological reactions, whereas those reporting mild emotional reactions should display moderate physiological responses.

Furthermore, we evaluated whether the level of correspondence between components of emotions varied for men versus women. In prior research, when sex differences have emerged, women have tended to demonstrate greater correspondence between self-reports and EMG responses than men. That is, women's self-reports of unhappiness and anger during self-generation of emotional episodes revealed greater correspondence with EMG reactions in the corrugator muscle region than did men's self-reports (Schwartz et al., 1980). A similar, though nonsignificant sex difference was obtained by Lang et al. (1993) between self-reports of pleasantness and assessments of corrugator and assessments of zygomatic muscle response during presentation of slides varying in emotional content.

Overview

Male and female subjects individually viewed a series of slides selected from the International Affective Picture System (Lang, Bradley, & Cuthbert, 1990; Lang, Oehman, & Vaitl, 1988). These slides depict a range of emotion-inducing events, including positive, negative, and neutral stimuli. Self-report ratings of emotion were obtained for each slide as well as heart rate response and EMG activity from the corrugator supercilli region, a muscle region especially sensitive to negative emotions. Because we were not interested in tapping public displays of emotion to others, EMG responses were assessed while subjects were seated in virtual isolation in a darkened room.

To examine whether sex differences in emotion are a function of social norms, the experiment varied social expectations concerning subjects' emotional response. Instead of measuring idiosyncratic beliefs concerning normative pressures, as in Study 1, we manipulated normative pressures through instructions to enhance or to attenuate emotional responses. When social expectations were rendered comparable for men and women through instructions to enhance or to attenuate emotional reactions, we expected no sex differences in self-reported emotions. In a control condition, we provided no explicit information concerning appropriate response; in this circumstance, expectations for appropriate response should have been driven by broader social norms that include sex-stereotypic pressures, and women were expected to demonstrate more intense emotions than men. In sum, the experimental design varied subjects' sex, normative instructions to enhance emotional response or attenuate response, or no instructions, and valence of the stimulus slides. To minimize subject fatigue and to complete the slide presentation within a reasonable period of time, valence was manipulated on a between-subjects basis. Subjects were exposed either to negative and neutral slides or to positive and neutral slides.

We had no clear expectation that physiological measures would differ from self-reports, except that EMG assessment of muscle reactions in the corrugator region should be sensitive to negative and not to positive emotions (Cacioppo et al., 1986). Thus, we anticipated greater EMG reaction to negative than to positive or neutral slides, especially when the instructions directed subjects to enhance rather than to attenuate responses. If the sex difference in emotional responsiveness is apparent with physiological reactions, we anticipated that these would emerge in EMG responsiveness to the negative stimuli and not to the

positive stimuli. Furthermore, these sex differences should be most pronounced in the no-instruction conditions, because it was only in this context that gender role expectations were not muted by the explicit instructions to enhance or attenuate response.

Method

Subjects

Fifty-seven female and 61 male introductory psychology students from Texas A&M University individually participated in this experiment as partial fulfillment of a course requirement. On the basis of subjects' responses to a postexperimental questionnaire, 7 subjects were removed from the final analysis because possible drug-induced confounds may have biased the physiological measures (i.e., subjects reported recent high levels of coffee drinking or drug use). The final sample thus consisted of 111 subjects.

Apparatus and Stimuli

The stimuli consisted of forty-five 35-mm color slides. These slides were selected from the International Affective Picture System (Lang et al., 1990; Lang et al., 1988). The perceived valence of each slide has been validated with a national sample (Lang & Greenwald, 1988), and these ratings were used to select the slides in the present investigation. Our stimuli consisted of 20 slides that received moderate to extreme positive ratings (e.g., puppies and happy couples), 20 slides with moderate to extreme negative ratings (e.g., mutilated bodies and dead animals), and 20 slides that received neutral ratings (e.g., basket and fork).

Physiological measures were obtained with a Cyborg Biolab 21 machine, equipped to assess physiological reactions through two channels, which we assigned to heart rate and corrugator EMG (electromyograph) assessment. The heart rate measure, obtained with a pulse wave-velocity sensor attached to the index finger of the nondominant hand, yielded no systematic results, and we will not report the heart rate findings. Heart rate and EMG were selected to provide some diversity in our physiological measures.

A bipolar method was used to detect surface EMG activity over the left corrugator supercilia, or brow region. Two .25-cm silver-silver chloride (Ag-AgCl) surface electrodes were positioned above the left eyebrow, parallel to the course of the corrugator muscle curve and spaced approximately 1 cm apart for each subject. An additional electrode of the same type and size was placed in the midforehead region, serving as a ground. For more detailed information concerning placement of electrodes and EMG measurement, see Cacioppo, Tassinary, and Fridlund (1990).

EMG signals were relayed through shielded cable to an EMG M-130 Biolab module amplifier, set in an isolation transformer. The signals were smoothed through AC line filters and a surge suppressor. A 12-bit converter with resolution of 1 part in 4096 was used for analog-to-digital conversion. The EMG module was calibrated and set to an effective range of 3.4 to 102.4 μV. EMG signals were transmitted on-line to an Apple IIe microcomputer at the rate of 10 samples per second. The mean amplitude of 32 EMG signals produced two data points per slide. These were combined in our analyses to yield a single mean-level response to each slide for each subject.

Self-report responses to the emotional stimuli were recorded on the microcomputer. Participants indicated how positive or negative each slide made them feel by pressing the appropriately labeled key on a 7-point scale, ranging from 1 (*extremely unpleasant*) to 7 (*extremely pleasant*), with the scale midpoint of 4 labeled as *neutral*.

Procedure

Sessions were conducted with individual participants. Subjects were told that they would view a series of slides. They were then given instructions to establish normative pressures to enhance subjects' emotional reactions or to attenuate reactions; otherwise, they received no instructions (cf. Koriat, Melkman, Averill, & Lazarus, 1974). The instructions described the supposed relation between intensity of expression and valued outcomes such as psychological adjustment. In the condition designed to enhance emotional response, participants were told that previous research has shown there is a positive correlation between emotional responsiveness and psychological adjustment, and in the condition designed to attenuate response and encourage emotional detachment, subjects were told that previous research has shown a negative relation. For the two instruction conditions, this information was delivered at two points during the experimental session, just before beginning the slide presentation and again in the middle of presentation when the experimenter changed trays on the slide projector.

The slide presentation procedure closely followed that typically used with the International Affective Picture System (Lang et al., 1990). Subjects were told that they would be shown a series of slides ranging in emotional content. They were to respond to each slide by indicating how positive or negative the slide made them feel. Ratings were supposed to reflect immediate personal experience.

The physiological recording equipment was described to each subject as a method of detecting involuntary physiological reactions. Following this explanation, the sensors were attached to the subject and the subject was made as comfortable as possible. Each participant was given a few practice trials in order to become acquainted with the procedure. The slides were projected directly in front of each subject in a darkened room with approximately a 3 ft $\times$ 4 ft (0.91 m $\times$ 1.22 m) image. Each participant first viewed and rated the five practice slides. These were presented in the same order across conditions. The practice stimuli provided the participants with a range of the types of emotional stimuli they might be seeing throughout the experiment and included two positive, two negative, and one neutral slide. Subjects sat in the front section of the darkened presentation room, and the experimenter unobtrusively remained at the back of the room, behind the subject, to ensure that the presentation remained standard across subjects and to monitor extraneous movements by the subject (e.g., coughing and sneezing) that might invalidate the physiological measures.

The presentation of the slides was controlled by a timing device on the computer. Each stimulus slide was preceded by a preparation slide stating, "Be prepared to view the next slide." This appeared for 6.4 s, after which a stimulus slide was presented for 6.4 s. After the slide presentation, subjects were presented with a slide containing the rating scale and the instructions, "Please rate how unpleasant or pleasant the slide made you feel." The rating slide was presented for 6.4 s and was followed by a blank screen displayed for 6.4 s. In all, then, each slide presentation took 25.6 s, yielding an interval of 19.2 s between slides. This intertrial interval was designed to allow sufficient recovery time (back to baseline) for the slides containing affective content (i.e., Lang & Greenwald, 1988, specified an interval of 20 s). The order of slide presentation followed one of four different randomized sequences. Facial EMG activity was recorded over all intervals, including the pre- and postpresentation periods.

A postexperimental inquiry by the experimenter was conducted in all conditions to ensure that participants were not suspicious about the purpose of the experiment and to assess their belief in the cover story. No subjects needed to be removed for suspicion; all appeared to accept the experimenter's description of the study.

Results

Self-Reports of Emotion

Individual slide ratings were aggregated to yield a mean rating for the neutral slides and for the emotion-inducing slides, re-

flecting either positive or negative stimuli.[4] The mean ratings were analyzed by a Sex (male vs. female subjects) × Instructions (enhance emotional reactions vs. attenuate reactions vs. no instructions) × Slide Valence (positive vs. negative slide condition) × Slide Emotionality (emotion-inducing slides vs. neutral slides) mixed analysis of variance design, with repeated measures on the last factor.

The analysis revealed that subjects correctly perceived the experimental variations of slide valence and slide emotionality (see Table 4). A significant main effect for slide valence, $F(1, 106) = 740.10$, $p < .001$, indicated that slides in the positive condition were rated more favorably than slides in the negative condition. This main effect was modified by a Slide Valence × Slide Emotionality interaction, $F(1, 106) = 365.80$, $p < .001$. Simple effects tests indicated that the difference between the positive and negative slide conditions was strongly marked for the emotion-inducing slides, $F(1, 106) = 1279.00$, $p < .001$, and less pronounced for the neutral slides, $F(1, 106) = 9.86$, $p < .01$. The effect on neutral slides represents a form of "carry-over," with the neutral slides, which were actually identical for both positive and negative slide conditions, judged to be similar to the emotion-inducing slides with which they were paired.

In addition, subjects correctly responded to the instructional manipulations, as reflected in the Instructions × Slide Valence interaction, $F(2, 106) = 2.96$, $p < .06$. The difference between positive and negative slides was greater when subjects were instructed to enhance their emotional reactions than when instructed to attenuate emotions, $F(1, 106) = 11.90$, $p < .001$, and was greater in the enhance than in the no-instruction condition, $F(1, 106) = 4.28$, $p < .05$. The difference between positive and negative emotion-inducing slides was also slightly, but not significantly, greater in the no-instruction condition than when subjects were told to attenuate their reactions, $F(1, 106) = 1.90$, *ns*.

Most importantly, the analysis also yielded a four-way interaction that reflected the predicted pattern of effects, $F(2, 106) = 5.15$, $p < .05$. This interaction was interpreted by conducting Sex × Slide Valence × Slide Emotionality analyses at each level of instructional set. The three-way interaction proved significant in the no-instruction condition, $F(1, 106) = 11.39$, $p < .001$. Simple effects tests indicated that women gave more extreme responses than men to negative slides, $F(1, 106) = 7.56$, $p < .01$, and to positive slides, $F(1, 106) = 6.32$, $p < .01$. However, no consistent sex difference was obtained with neutral slides.[5] The sex differences in ratings of emotion-inducing slides in the no-instruction condition replicate previous research on men's and women's self-reports and suggest that when no explicit instructions are given concerning appropriate emotional responses, gender role expectations govern behavior and men's and women's responses conform to social stereotypes.

The simple three-way analyses conducted in other instruction conditions did not yield any significant effects. When instructions stressed heightened emotional responsiveness, no differences were obtained between men and women on positive slides ($F < 1$) or on negative slides, $F(1, 106) = 1.90$, *ns*. Similarly, in the condition discouraging emotional expressiveness, no significant differences between the sexes were found on either positive or negative slides ($Fs < 1$).

Table 4
Mean Self-Reports on Emotional Reaction to Slides: Study 2

Instructions	Positive slides		Negative slides	
	Emotion inducing	Neutral	Emotion inducing	Neutral
		Men		
Enhance reaction	5.90	4.10	2.12	3.77
Attenuate reaction	5.41	4.13	2.63	4.00
No specific instructions	5.30	4.40	2.70	3.87
		Women		
Enhance reaction	5.80	3.97	2.16	3.63
Attenuate reaction	5.36	4.14	2.42	3.18
No specific instructions	5.90	3.81	2.10	3.92

Note. Emotion ratings were given on a 7-point bipolar scale with 1 = *extreme negative response*, 4 = *neutral response*, and 7 = *extreme positive response*. Cell *n*s ranged from 8 to 11.

EMG Responses

EMG responses were collected during an initial prepresentation period, during the stimulus slide presentation, and during the postpresentation period. To estimate baseline differences across subjects in levels of EMG response, the pre- and postpresentation scores were aggregated to form a mean baseline score. To examine differences across conditions in levels of EMG response, 2 (male vs. female) × 3 (enhance reactions vs. attenuate reactions vs. no instructions) × 2 (positive vs. negative slide condition) × 2 (emotion-inducing slides vs. neutral slides) analyses of variance were conducted, with repeated measures across the last factor.

Raw EMG responses. In the analyses on baseline scores, a main effect for sex was obtained such that women ($M = 72.09$) demonstrated greater response than did men ($M = 57.89$), $F(1, 101) = 18.39$, $p < .001$. A sex difference was also obtained in the

[4] Reliability analyses were conducted on the scale ratings, with analyses calculated separately for the 20 positive emotion-inducing slides, the 20 negative emotion-inducing slides, and the 20 neutral slides. The positive slide grouping yielded an alpha of .84, and the neutral slides yielded an alpha of .79. The slides representing negative emotional events proved more heterogeneous, and two of these slides yielded especially low item–total correlations (i.e., *r*s = −.02 and .19). These were removed from the calculations, and the resulting alpha level for the negative slides was .86. The analyses reported in the text were based on the 18 remaining negative-emotion-inducing slides.

[5] In the analysis on ratings of the neutral slides in the no-instruction condition, men and women did not differ in the evaluations of neutral slides paired with negative ones ($F < 1$), but when neutral slides were paired with positive ones, men rated the neutral slides more positively than women did, $F(1, 106) = 7.10$, $p < .01$.

analyses on raw EMG responses during the slide presentation period, $F(1, 101) = 21.94$, $p < .001$ (Ms = 98.07 and 73.34, for women vs. men, respectively). These sex effects indicate that women showed greater facial muscle movement than men, both in the presence of the slides and during the baseline, nonpresentation periods (Table 5).

Several additional effects were obtained in the analyses on raw EMG scores, essentially indicating that the experimental manipulations had the anticipated effects. Analyses on both baseline scores and scores during the stimulus presentation yielded main effects for the instruction conditions (Fs = 3.16 and 3.83 for baseline and stimulus presentation, respectively, ps $< .05$), indicating that subjects in the enhance conditions generated greater facial response than subjects in either the attenuate or the no-instruction conditions (ps $< .05$). The experimental instructions thus enhanced or attenuated muscle activity in general and not specifically in response to the emotion-inducing slides. That is, the enhance instructions yielded heightened muscle activity during the baseline periods as well as the presentation of negative slides, and the attenuate instructions reduced activity during both periods for negative slides. During the baseline periods, subjects were apparently still remembering and reacting to the negative emotional events depicted in the slides and still conforming to the instructions concerning appropriate style of reaction.

Also, analyses on both baseline responses and those during the slide presentation yielded significant Slide Valence × Slide Emotionality interactions (Fs = 11.74 and 14.48, for baseline and stimulus presentation, respectively, ps $< .01$). As anticipated, given that EMG responses were assessed for muscles in the corrugator region, greater response was apparent to negative than to positive stimuli with the emotion-inducing slides (ps $< .05$). However, no differences in response were obtained with the neutral slides paired with negative slides versus the neutral slides paired with positive ones.

EMG responsivity to emotional stimuli. Given that sex differences were obtained on the baseline measure of EMG responsiveness as well as during the slide presentation, it is possible that the physiological measure taps a general tendency toward facial responsiveness on the part of women. To examine intensity of response specifically to emotional stimuli, EMG difference scores were computed by subtracting subjects' mean baseline responses (6.4 s preceding picture onset and 12.8 s following onset) for each slide from their reactions during the slide presentation period. These difference scores were then aggregated across slides to form mean response levels for each subject for the emotion-inducing slides and for the neutral slides. Analyses were calculated on these mean difference scores.[6]

As anticipated, muscle movement in the corrugator region was especially sensitive to negative emotional events, and the analysis yielded a significant main effect of slide valence, $F(1, 101) = 4.49$, $p < .05$. EMG responses were higher for slides presented in the negative than the positive slide condition. This main effect was modified by a marginally significant interaction between slide valence and slide emotionality, $F(1, 101) = 3.12$, $p < .08$. As anticipated, the difference between the positive and negative slide conditions was significant for the emotion-inducing slides, $F(1, 101) = 5.91$, $p < .01$, but not for the neutral slides ($F < 1$).

In addition, a significant main effect of sex was obtained, $F(1, 101) = 7.20$, $p < .01$, with women demonstrating higher overall EMG responsiveness to slides than men. Most important, even though the interaction among sex, slide valence, and slide emotionality was not significant ($F < 1$), planned comparisons for the emotion-inducing slides revealed no sex differences for positive slides ($F < 1$); whereas for negative slides, women (M = 2.41) demonstrated greater EMG responsiveness than men (M = .83), $F(1, 101) = 4.35$, $p < .05$. Unexpectedly, the magnitude of the sex difference in muscle reactivity to negative slides was relatively constant across all instruction conditions (ps $< .05$). However, additional analyses revealed that the exact pattern of the sex difference varied across instructional set. In general, women were especially successful at heightening muscle activity when instructed to enhance emotional response, and men were particularly successful at inhibiting muscle activity when instructed to attenuate response. That is, when the instructions specified enhanced responsiveness, women responded appropriately ($M = 2.77$), but not men ($M = 1.39$), when each sexes' scores were compared with the no-instruction conditions (M = 2.18, $p < .05$, for women and M = 1.53, *ns*, for men). Furthermore, when the normative pressures specified attenuated responsiveness, in comparison with the no-instruction conditions, men responded appropriately ($M = -0.62$, $p < .05$) but not women ($M = 2.29$, ns). Thus, the uniform sex difference obtained across instruction conditions was primarily a function of the differential success of the instructions across the sexes: Women (but not men) responded appropriately to the enhance instructions and men (but not women) responded appropriately to the attenuate instructions.

Analyses on the neutral slides yielded no effects, although a weak, nonsignificant carryover from the emotion-inducing slides was apparent. That is, the neutral slides paired with positive slides yielded no sex difference ($F < 1$), whereas the neutral slides paired with negative slides yielded slightly greater corrugator activity for women than men, $F(1, 101) = 2.46$, $p < .15$.

Correlations Between Self-Report and EMG Measures

To examine the correspondence between subjects' self-reports of emotional experience and their physiological reactions, correlations were computed between slide ratings and EMG responses to the emotion-inducing slides, with the EMG measure calculated as the difference from baseline responding. Across all subjects, an inverse relation was obtained ($r = -.25$, $p < .05$) indicating that the more affectively negative slide ratings were associated with greater muscle movement in the corrugator region. When these correlations were calculated separately for

[6] Although we report both the raw EMG responses and the difference between baseline and slide presentation periods, the difference scores are most relevant for testing our hypotheses. We were primarily interested in men's and women's responsivity to emotional slides, and not responsivity in general. In addition to the difference score analysis reported in the text, EMG responses were also analyzed in a repeated measures design, with the repeated factor representing EMG responses during baseline versus slide presentation periods. This analysis yielded results that were highly comparable with the difference score analyses reported in the text.

Table 5
Mean Electromyograph Responses in the Corrugator Muscle Region Represented in Microvolts: Study 2

Instructions	Positive slides		Negative slides	
	Emotion inducing	Neutral	Emotion inducing	Neutral
		Men		
Enhance reaction	0.10	0.56	1.39	0.86
Attenuate reaction	−0.06	0.13	−0.62	−1.01
No specific instructions	−0.31	−0.84	1.53	0.28
		Women		
Enhance reaction	0.53	0.83	2.77	1.83
Attenuate reaction	0.78	−0.66	2.29	0.94
No specific instructions	0.58	1.90	2.18	0.91

Note. Scores are mean differences between electromyograph responses during slide presentation and responses during nonpresentation periods, such that higher numbers represent greater muscle reaction.

male and female subjects, women demonstrated significant correspondence between the two measures of emotional intensity ($r = -.33$, $p < .05$), and men displayed a similar, though weaker tendency ($r = -.15$, ns). We also calculated these relations for each sex separately within the instruction conditions. For women, the inverse relation held across all conditions, although the relatively low power associated with the small sample sizes within conditions rendered the effects nonsignificant: For the no-instruction condition, $r = -.21$; for the enhance instructions, $r = -.44$; and for the attenuate instructions, $r = -.34$. For men, these relations did not prove quite as stable, and again the relations did not achieve significance, with $r = -.50$ in the no-instruction condition, $r = -.11$ for the enhance instructions, and $r = .25$ for the attenuate instructions. The correlation for the men in the no-instruction condition differed from that in the attenuate instructions condition ($p < .05$).

Discussion

This experiment replicated the finding from Study 1 that women self-report more intense emotional reactions than men. In the experimental condition in which no instructions were given concerning appropriate response, women generated more extreme emotion ratings than men to both positive and negative stimuli. In this condition, the expectations placed on subjects were not directly manipulated in the experiment but instead likely reflected sex-stereotypic norms from the broader society.

To demonstrate the importance of normative pressures on sex differences in emotional responding, we included instructional manipulations directing subjects to enhance or to attenuate their emotional responses. In these conditions, normative pressures were comparable for men and women, resulting in the sexes reporting similar emotional reactions. Men and women encouraged to be especially responsive indicated more extreme emotions, in comparison with the no-instruction condition, to both positive and negative emotional stimuli, and men and women encouraged to be unresponsive reported slightly, though nonsignificantly, less extreme emotions in comparison with the no-instruction condition. This pattern of findings is consistent with the idea that sex differences in emotion derive from normative pressures; when sex-differentiated normative expectations were muted by the specific experimental instructions, men and women did not differ in their self-reports.

We also obtained measures of the physiological, facial expressive component of emotion, represented by EMG reactions in the facial corrugator muscle region. This measurement site has proved especially sensitive to the experience of negative emotional events (Cacioppo et al., 1986; Schwartz et al., 1980). We calculated physiological reaction to the slides in relation to baseline responding to control for overall differences between the sexes in EMG activity. For the negative emotion-inducing slides, women demonstrated greater intensity of emotional reaction than men on the physiological assessments as well as on the self-report measures. Providing discriminant validity for the physiological measure, no sex difference in EMG reaction was obtained for the positive slides. Thus, the self-report and physiological measures taken together indicate that women demonstrated heightened emotional reactions, in comparison with men, across the multiple components of emotion assessed in this research, at least with respect to negative experiences.

The significant correlations obtained between participants' self-reports and EMG responses suggest a coherent style of responding to emotional events. When the total sample of subjects was evaluated, those who indicated intense negative emotional reactions on the self-report measures also tended to respond extremely in the physiological assessment. The relation between EMG reactions and self-reports was also obtained when the correlations were calculated only for women, and further, the relation for women proved stable across the various instruction conditions. However, men's emotional reactions did not demonstrate this level of coherence. The relation between the two components of emotional response was not significant in the analysis including only men, and the magnitude of the relation for men varied across the instruction conditions: A larger, negative relation was apparent in the no-instruction condition than in the attenuate response condition.

In general, these correlational findings, in conjunction with the mean-level sex differences obtained on the self-report measures and on the physiological indicators suggest that women have a more intense emotional style than men that is reflected in a more coherent pattern of response across multiple indicators of emotion. In the present research, then, sex differences in emotional intensity were not limited to self-reports but represented a general pattern, or syndrome that included multiple components of emotion.

The correlations between self-reports and EMG muscle response we obtained might be considered small to moderate in magnitude, suggesting that these are connected but separable components of emotional experience. Indeed, the correlations among aspects of emotion in past research have been character-

ized as typically positive but weak (see Frijda, Ortony, Sonnemans, & Clore, 1992). In our study, self-reports and facial muscle responses were affected in similar ways by the experimental variations, with both measures revealing greater negativity to the slides depicting negative (vs. neutral or positive) emotional events and greater negativity to these slides on the part of women than men. The exception to this pattern of comparable outcomes across ratings and physiological reactions occurred with the instructional manipulation. Although self-reports yielded, as expected, a sex difference only in the no-instruction condition, the physiological measure yielded sex differences across all instruction conditions. Inspection of the mean corrugator activity suggested that this pattern was due to men's failure to enhance muscle activity to negative slides when instructions encouraged heightened emotional responsivity, in conjunction with women's failure to attenuate muscle activity to the negative slides when instructions encouraged emotional detachment and minimal responsiveness. The instruction results for facial muscle responding are not due to any failure for subjects to attend to or understand the manipulation, given that instructions did have the anticipated effects on self-reports.

It is interesting to consider why the social role predictions were supported with the EMG measures for women only when instructions specified enhancement and for men only when instructions specified attenuation. It may be that this differential success of the instructions is due to the attitudes and skills component of our social role analysis. That is, women's prior role-related experiences may have conveyed attitudes and skills that enabled easy facilitation (but not attenuation) of emotional response, and men's prior experiences may have conveyed attitudes and skills that enabled easy attenuation (but not facilitation) of emotions. In this view, the instructional manipulation was successful for both men and women with the rating scale responses because enhancement and attenuation of rating scale reports is not limited by subjects' skill or habitual style of response. Thus, the insensitivity of men's physiological reactions to enhancement conditions and of women's physiological reactions to detachment conditions may have resulted from the difficulty subjects experienced when carrying out these specific instructions. A more complete test of the social role analysis would consider not only sex-differentiated expectations, as in the present research, but also sex differences in the skills and attitudes that derive from men's and women's past role-related experiences.

Finally, although the present research demonstrated correspondence between women's more extreme self-reports than men's and women's greater EMG responsiveness than men's, this particular pattern of findings is likely limited to specific emotions and to particular physiological measures. Despite the consistent finding in past research of sex differences in self-reported intensity of emotional experience, the sexes have not always been found to differ in physiological reaction during emotional events (LaFrance & Banaji, 1992). In part, these failures to obtain sex differences on physiological measures may reflect the emotion-specific nature of physiological activity (cf. James, 1884). That is, if the physiological response under investigation is not related to the target emotion, then any sex differences in that emotion will not be manifested on the physiological measure. For example, in the present study, facial muscle activity in the corrugator region was primarily affected by slide depictions of negative, and not positive, emotional events. An additional complexity in linking self-reports with psychophysiological indicators is that some physiological measures do not have a simple, positive relation to verbal reports. For example, an inverse relation sometimes emerges between overt expression of emotion and electrodermal activity. Men's typically greater response on electrodermal indicators than women's may be associated with their tendency to suppress emotional expression (Manstead, 1992). Thus, sex differences in the physiological components of emotion will not always coincide with sex differences in self-reports. Instead, we can expect complex patterns that may include separate configurations of female responsiveness and male suppression, each of which varies according to specific emotions.

Summary and General Conclusions

The present research provides strong support for the idea that sex differences in emotional intensity derive from sex-differentiated normative pressures that specify that women are more emotionally responsive than men (Eagly, 1987; Wood, Rhodes, & Whelan, 1989). In support of this idea, the first experiment demonstrated that self-reports of emotional response correspond to participants' stereotypic beliefs. That is, women who endorsed the stereotypic belief that women are more intensely sad, fearful, joyous, and in-love than men reported experiencing heightened emotions themselves. Similarly, men who endorsed the stereotypic sex difference in these domains reported relatively subdued, attenuated emotional response.

The second study directly manipulated expectations for emotional response and assessed both physiological and self-report indicators of emotion. Self-reports varied with expectations, such that no sex differences were obtained when expectations were experimentally constructed to be comparable for men and women. When no clear instructions were given concerning appropriate response, subjects apparently relied on their knowledge of gender role norms, and women reported more intense emotions than men. Furthermore, the emotion sex difference proved to reflect a general pattern, or syndrome of responding, implicating physiological events as well as self-reports. Women not only reported more intense emotional experience than men, but they also generated more extreme physiological reactions.

Our social role analysis of sex differences in emotions is not inconsistent with other views of sex differences that locate the cause of men's and women's characteristic styles of emotional reaction in inherent, biological differences between the sexes or in sex-differentiated socialization pressures (e.g., Brody, 1985; Haviland & Malatesta, 1981; Pennebaker & Roberts, 1992). The social role approach, by emphasizing gender role expectations and role-related beliefs and abilities, focuses on the immediate contingencies and beliefs surrounding emotional experience, rather than the more distal predictors of biological predispositions or developmentally based socialization processes. Our preference for a social role approach stems from its compatibility with a social psychological emphasis on immediate, contextual predictors of behavior. Furthermore, it provides a particularly effective account of the variability across situations

in men's and women's emotional experiences: A social role analysis can explain the more pronounced sex differences that emerge when men and women differ in life circumstances and roles (e.g., in the marital roles of husband and wife) than when men and women fill the same roles (Wood et al., 1989). This approach also accounts for the variability in emotion sex differences that we obtained in the present research as a function of subjects' naturally occurring endorsement of normative expectations (Study 1) and our experimental manipulation of expectations and pressures (Study 2).

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