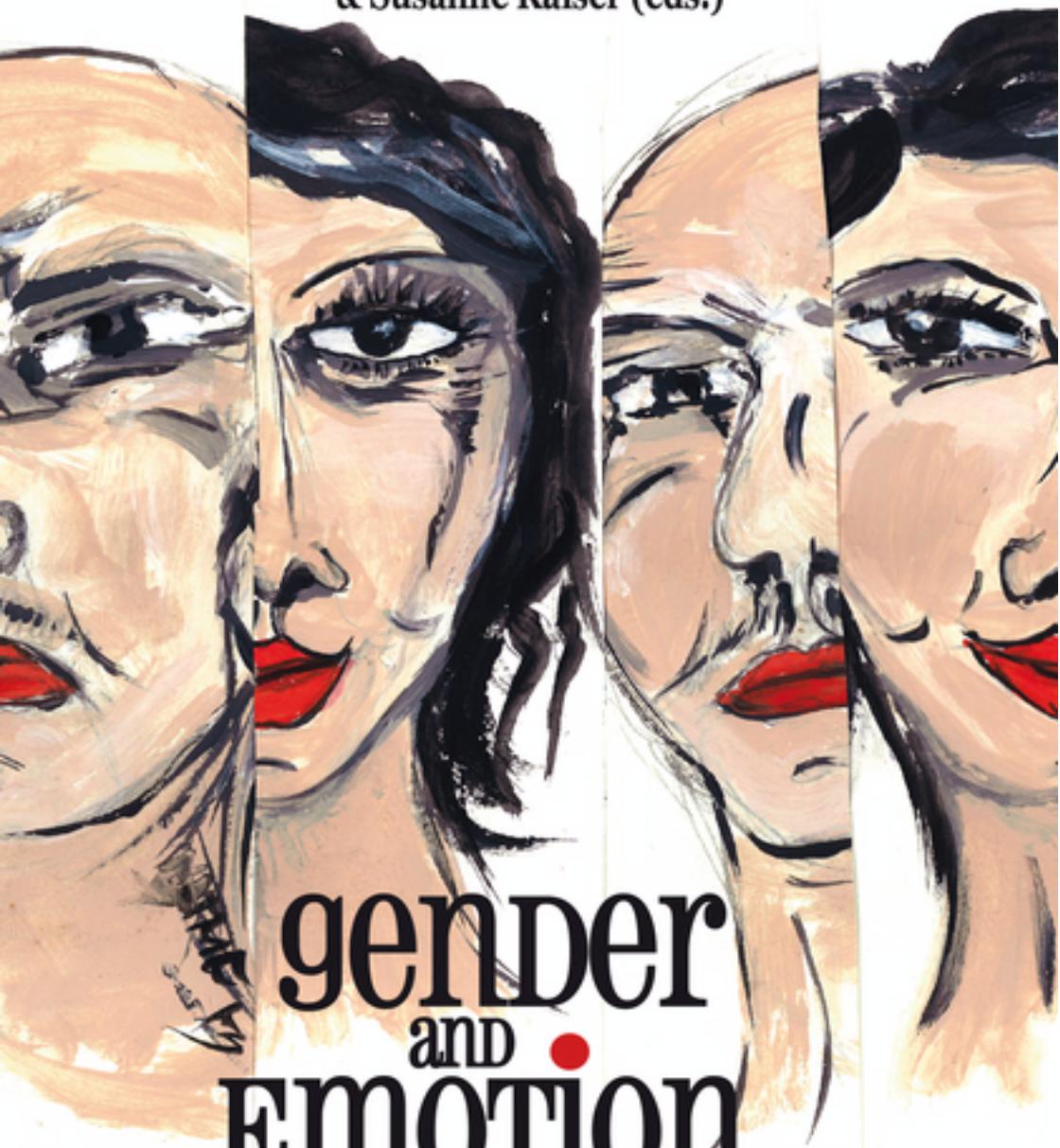


Ioana Latu, Marianne Schmid Mast
& Susanne Kaiser (eds.)



gender
and •
EMOTION

An Interdisciplinary Perspective

Peter Lang

1. Gender and Emotion Expression, Experience, Physiology and Well-Being: A Psychological Perspective

CHIARA FIORENTINI

Men and women are thought to be fundamentally different in their emotionality. We review the evidence about gender differences in three emotion components (facial expression, subjective experience, and physiological reactions), and in emotional well-being. Several studies suggest that women are more emotionally expressive than men, although this can be disconfirmed in particular contexts. Women's enhanced expressivity does not reflect more intense experience or greater physiological responses with respect to men. Gender differences in emotion experience and physiology are less consistent and depend on the nature of the emotional stimulus, the context, and the response format. This complex pattern of findings is best accounted by a bio-social approach, which acknowledges both social and biological determinants as a source of gender differences.

It is a common and pervasive belief in Western culture that women are “more emotional than men”, in the sense of being more “in touch” with their emotions, more responsive, sensitive, and empathic (e.g., Germans Gard & Kring, 2007; Grossman & Wood, 1993; LaFrance & Banaji, 1992). Considerable research in the past decades has focused on sex differences in emotionality, but findings have been inconsistent.

The issue is a difficult one for at least three reasons. Firstly, “emotion” is a debated term, generally construed as a multidimensional concept including several components, such as emotional experience, expression, and physiology (LaFrance & Banaji, 1992). According to some authors, the general statement of gender differences in “emotionality” is therefore too vague, and should be speci-

fied by individuating actual differences between men and women in one or more components of emotion, for instance in experience or in expression (Germans Gard & Kring, 2007). As gender differences in one component (e.g., expression) may, or may not, correlate with differences in another component (e.g., experience) – due to biological, cultural, and situational factors (Ekman, Friesen, & Ellsworth, 1982; Kring & Gordon, 1998), it may be difficult to generalize the observations made on only one component to others (e.g., inferring how intensely we feel emotion by how strongly we express it).

Secondly, even when looking at just one component (e.g., experience), differences between men and women can be assessed along different – and not necessarily correlated – dimensions, such as the intensity, valence, frequency, or duration of the emotion experienced. Therefore, when asking if women experience more emotion than men, one should be clear whether he means that women experience emotion more intensely (intensity), more frequently (frequency), or for a longer period after the eliciting condition (duration). In addition, other methodological aspects, like the degree of intrusiveness of the measure that is taken, can affect the results (LaFrance & Banaji, 1992).

Finally, the positive evidence of gender differences in some aspects of emotionality does not easily lend itself to an account of how these differences arise. In fact, gender-specific emotion patterns are often explained equally well both as a product of socialization and in terms of biologically, hard-wired differences between men and women.

In this chapter we review the current evidence about gender differences in three main emotion components (i.e., expression, experience, and physiology) as well as in aspects linked to emotional well-being. We concentrate on research published mostly after the 1980s (although a few earlier studies are included) and conducted on adult population. We start with gender differences in emotion expression, focusing on facial expressivity as the primary data; next, we consider research on gender and the phenomenal experience of emotion, and then, we turn to studies that compared how men and women react physiologically to emotional situations. In the section on emotion and well-being, we consider how men and women dif-

fer in emotion regulation, coping strategies, and stress reactivity, pointing to the implications of gender differences for situations outside the laboratory setting. Finally, we conclude by presenting some theoretical explanations of gender differences in emotion.

Gender and Emotion Expression

According to most authors, “emotional expressivity” reflects the extent to which individuals outwardly display their emotions (Kring, Smith, & Neale, 1994), and includes the behavioural changes (e.g., facial, postural, verbal) that typically accompany emotion (Gross & John, 1997). Research on gender differences has predominantly focused on the expressive component and, with few exceptions, results indicate that women are more emotionally expressive than men (Fischer, Rodriguez Mosquera, van Vianen, & Manstead, 2004; for reviews, see Ashmore, 1990; Brody & Hall, 1983; Hall, 1984). Most studies evaluated facial expressivity, with different methods including facial electromyography (fEMG), observational coding by trained raters, judgments by naïve raters, and self-report (Kring & Gordon, 1998).

Gender differences were found primarily in self-reports of facial expressivity (LaFrance & Banaji, 1992), but they were confirmed by evidence obtained with fEMG studies, ratings of communication accuracy, and self-reports of various nonverbal behaviours such as smiling and gesturing (e.g., Barr & Kleck, 1995, LaFrance, Hecht, & Levy Paluck, 2003; see Kring & Gordon, 1998, for a review).

Whereas self reports of expression may be influenced by what individuals think about themselves and by self-presentational concerns, fEMG recordings are more subtle and objective measures of expression. Facial muscle activity is measured by detecting and amplifying the tiny electrical impulses that are generated by muscle fibers when they contract. Electrodes are placed on the face in correspondence of major muscle groups, usually the corrugator supercilii, which lowers the brows and produce frowns, and the zygomatic-

cus major, which controls smiling. Activity of these muscles measured through fEMG is related to emotional reaction: the activation of the zygomaticus major is positively associated to positive emotional stimuli and positive mood state, whereas the activation of the corrugator is positively associated to negative emotional stimuli and mood state (Dimberg, 1990).

Women show stronger facial EMG reactions than men in tasks of mental imagery of emotional situations (Schwartz, Brown, & Ahern, 1980), and in response to auditory and visual stimuli of different valence (Dimberg, 1990). Dimberg and Lundquist (1990) measured the facial muscle reactivity of a sample of male and female participants while they were shown happy and angry facial expressions. As expected, angry faces evoked increased corrugator activity whereas happy faces evoked increased zygomatic activity. These effects were more pronounced for females, especially for the response to happy faces. Moreover, differences in facial reactivity were not accompanied by differences between men and women in the ability of perceiving the emotional stimuli (as inferred from subject's ratings of the facial expressions) and were not influenced by the gender of the stimulus face.

Overall, a lot of research conducted with different methods suggests that women are more expressive than men, with only few studies failing to find sex differences in expressivity (e.g., Fridlund, 1990; Vrana, 1993; Wagner, 1990, among the most recent). In general, women appear to be more expressive than men with respect to most emotions. When specific emotions were examined, women resulted more expressive in sadness, anger, disgust, fear, surprise, anger, and happiness-smiling as compared to men (see Kring & Gordon, 1998, for a review of individual studies).

Two main explanations of this finding have been proposed: 1) women express more emotion because they actually experience more emotion than men. 2) Alternatively, men and women differ in emotional expression but these differences do not depend on differences on experienced emotion. The issue is difficult to judge because not many authors directly compared measures of experience and measures of expression in men and women and, those who did, reported mixed findings: some found that women were more ex-

pressive and also reported to experience more emotion than men (e.g., Greenwald, Cook & Lang, 1989; Gross & Levenson, 1993), whereas others found no sex differences in either expression or experience (Cupchik & Poulos, 1984; Lanzetta, Cartwright-Smith, & Kleck, 1976). However, some studies (Kring & Gordon, 1998; Wagner, Buck, & Winterbotham, 1993; Zuckerman, Klorman, Larrance, & Spiegel, 1981) found sex differences in expression (i.e., women were more expressive than men) that were not accompanied by differences in experience.

We consider the study by Kring and Gordon (1998) in detail, as it is one of the few that examined sex differences in emotion expression, experience, and physiology at the same time. To elicit emotion, participants were shown emotional films with either positive or negative content. While they were watching the films, participants' facial expressions were videotaped and subsequently coded by experts by using The Facial Expression Coding System (FACES; Kring & Sloan, 1991) to determine the frequency, intensity and duration of positive and negative expressions. During film exposure, the authors also measured skin conductance, which is a reliable indicator of autonomic nervous system activity, is easy to measure unobtrusively, and is sensitive to changes in psychological and emotion states (e.g., Levenson, Ekman, & Friesen, 1990; see paragraph on Physiological Reactions). Emotion experience was assessed through self-reports, by asking participants to rate the extent to which they experienced four emotions (sadness, fear, disgust, and happiness) on a 4-point scale.

Compared with men, women were more expressive of both positive and negative emotions (i.e., positive expressions in response to happy films and negative expressions in response to sad films), while there were no differences in reports of experienced emotion. Men and women also showed different skin conductance responses, which were not in the direction of a higher reactivity of women as compared to men, but varied according to the type of emotion film: men had greater reactivity to fear and anger films, and women had greater reactivity to sad and disgust films. These results suggest that sex differences in expressivity cannot be accounted for by differences in self-reported emotional experience or differences in skin conduct-

ance reactivity. According to the authors, their findings are consistent with the view that men and women are socialized differently with respect to emotion expression, in the sense that men learn to mask their emotions more than women.

To test their hypothesis, Kring and Gordon (1998) performed a second study, in which they examined whether variables like gender role (a personality feature indicating how much an individual endorse characteristics associated with either “masculinity” or “femininity”) and family expressiveness (the extent to which participants rated their family as being emotionally expressive) can moderate the relationship between sex and expressivity. Surprisingly, being “feminine” was not associated with enhanced expressivity. Instead, the individuals of both sexes classified as “androgynous” (i.e. who displayed a high number of both feminine and masculine characteristics) were more facially expressive and reported greater dispositional expressivity than participants classified as either “masculine” or “feminine”. Women’s increased expressivity was actually accounted by a higher prevalence of individuals rated as “androgynous” in the female compared to the male group. According to Kring and Gordon (1998), “androgynous” individuals, being less conditioned to conform to a sex-typed role, would be more extrovert and behaviourally flexible, and hence more emotionally expressive, than “masculine” or “feminine” persons. The second variable, family expressiveness did not yield significant sex differences. However, for both men and women, reports of greater family expressiveness correlated with reports of greater dispositional expressivity, which suggests a role for familial socialization in the development of expressive abilities.

The finding that adherence to a “feminine” stereotype is not linked to increased expressiveness in women is consistent with evidence of situations in which women are actually less expressive than men. For instance, Friedman and Miller-Herringer (1991) studied the concealing of spontaneous expressions of happiness after winning in a competitive situation against peers, both in social and solitary condition. In general, being in a social context versus being alone strongly influenced expressive behaviours, leading subjects to conceal their positive emotion in front of the loser (social inhibition effect).

However, as compared to women, men tended to show more expressive changes (i.e. to inhibit less) than women. Furthermore, especially among men, and especially in the alone condition, there was a positive relationship between exhibition (a personality variable) and expressions of anger (a rated variable). This additional finding suggests that the sex difference in the social inhibition effect might have been determined by the competitive nature of the situation, to which men would respond more than women. Indeed, the expressions accompanying victory displayed some aggressiveness, which resembles anger. Therefore, this explanation is also consistent with the notion that men tend to be less expressive than women, with the exception of expressing anger (Friedman & Miller-Herringer, 1991).

To sum up, the finding that women are more expressive than men is fairly robust, but it can be disconfirmed in particular contexts. Women's greater expressivity does not seem to reflect enhanced emotional experience in women than in men and is not positively correlated with greater physiological responses. Sex differences in emotional expressivity appear to be modulated by multiple factors, including the situation, the type of emotion expressed, the personality style of the individual, and the adhesion to a masculine/feminine stereotype learnt through social reinforcement since very early in life (e.g., Brody & Hall, 1993, 2000).

Gender and Emotion Experience

The subjective experience of emotion is typically assessed through verbal self-reports, which can vary in many important ways. For example, they can be direct, asking subjects how much emotion they feel, or indirect (e.g., the experimenter extracts an emotion score from a memory test for emotional information, or from the use of emotion terms in verbal descriptions). Self-reports can either probe specific emotions, such as anger or happiness, or instead focus on a global disposition of "emotionality" (e.g., asking people how emotional they are). Finally, the eliciting context can be included or not

in the measure, and the self report can ask about private or public situations. All these factors may affect the results substantially (Feldman Barrett, Lane, Sechrest, & Schwartz, 2000; see LaFrance & Banaji, 1992 for a complete review), which as a consequence are quite mixed.

Gender differences mostly emerge from direct self-reports focusing on emotional experience as a global disposition, with women describing themselves as more emotionally intense than men (e.g., Diener, Sandvik, & Larsen, 1985; Fujita, Diener, & Sandvik, 1991; Grossman & Wood, 1993). Instead, evidence is less consistent when indirect measures are used, or when a specific emotion is probed, the number of studies reporting sex differences in fear/anxiety, anger, depression/sadness, guilt, and happiness being almost the same as the number of studies that do not. Yet, when differences emerge, they usually confirm the expectation of women experiencing these emotions more than men (Feldman Barrett & Morganstein, 1995). When participants have to describe their emotional experience using global, memory-based measures, females describe themselves as more affectively intense, sensitive to their feelings, anxious, sad, and happy than do men. Instead, when situational, momentary-based ratings are used, either across a two-week period (Feldman Barrett, Robin, Pietromonaco, & Eyssell, 1998) or across a 2 to 3-month time span (Feldman Barrett & Morganstein, 1995), no gender differences are found. A possible explanation for this discrepancy is that cultural stereotypes have a differential impact on general and situational reports: whereas the former relies on commonsense understanding of “what it means to be emotional” and is easily influenced by gender-role stereotypes, the latter would remain tied to the specific circumstances about which the report is asked (Feldman Barrett et al., 1998; LaFrance & Banaji, 1992). In other words, general self-reports allow men and women to provide descriptions which are conform to the “emotional style” usually attributed to their respective sex (i.e., women are emotional, men are not) rather than based on their actual experiences.

However, recent studies have demonstrated that women and men actually differ in their autobiographical memory for emotional experience, with women remembering more frequent emotional events

than do men (Davis, 1999; Fujita et al., 1991; Seidlitz & Diener, 1998). This raises the possibility that sex differences in global, retrospective ratings of emotional experience reflect stable differences between men and women in the complexity or accessibility of emotion knowledge that is used to make reconstructions, rather than the influence of cultural stereotypes. Feldman Barrett et al. (2000) directly tested the hypothesis that women display more complex emotion knowledge than men when articulating about their own and others' emotional experience. Female and male participants from 7 different samples completed the Levels of Emotional Awareness Scale (LEAS, Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990), a task in which respondents generate verbal description of their own anticipated feelings and those of another person for 20 different scenarios. Responses are scored for the degree of complexity (i.e., the degree to which emotion terms are employed and integrated to describe the emotions attributed to the self and to the other person in the scenario). As predicted, women scored higher than men, indicating a more complex and differentiated use of language in the articulation of emotional experiences, which was independent of verbal intelligence. Two interpretations are suggested: 1) due to inherited predisposition and/or socialization process, women have more elaborated emotion knowledge than men; 2) both men and women have equally complex knowledge, but women may use it more easily, because they do it more frequently or because they have more motivation. Whatever the specific causal factor is, the above findings suggests that sex differences exist in retrospective ratings of emotion because women, by attending more to emotions when they occur, thinking of them, and sharing them with other people, may acquire a more elaborated view of their emotional lives than do men (Feldman Barrett et al., 2000).

How can we then explain the inconsistencies in the reported experience of specific discrete emotions? Some authors suggest that certain emotions (e.g. anger) are more typical of males, whereas others (e.g., sadness, fear) are more typical of females. As early as preschool age, children seem to "know" that anger is a male characteristic, whereas fear and sadness are typical of females (Birnbaum & Croll, 1984). Exactly as broad dispositional concepts, also self-reports of experience of specific emotions can be influenced by cul-

tural stereotypes, and by the learning of rules about emotion expression and regulation that reinforce different behaviours in boys and girls (Brody, 1985).

Another possibility is that women experience and report more negative emotions because they have stronger reactions than men in response to unpleasant events, especially those that are threatening or traumatic (Kring & Gordon, 1998). Epidemiological data indicating that women are at higher risk for affective disorders, such as anxiety and depression (Nolen-Hoeksema, 1987) are consistent with this hypothesis. However, this view is challenged by evidence that women also report experiencing more happiness and joy than men (e.g., Brody, 1996) and by the fact that differences occur more in physiological reactions than in verbal report of the subjectively experienced emotion (Bradley, Codispoti, Sabatinelli, & Lang, 2001).

To sum up, there is little to substantiate the general claim that women experience more frequent or more intense emotions than men. However, men and women seem to differ in at least two aspects of emotional experience: 1) the way they judge and describe their “emotionality”, and 2) the structure of the autobiographical memory for emotional episodes. Without excluding the influence of biological determinants, the social reinforcement of different reactions and feelings in men and women since very early in development is suggested to be an important modulator of emotional experience.

Gender and Physiological indicators of emotion

Evidence of gender differences in the physiological concomitants of emotion is complex and incomplete, and the complexity comes from various sources. First, there are few systematic studies that directly addressed this issue (Manstead, 1992). Second, physiological reactivity is not unidimensional, and, what is more, there is no agreed upon measure or set of measures that are unambiguously linked to emotionality. Finally, when gender is taken into account, the pattern of results is mixed, with some studies reporting that men are more

reactive than women, some studies showing the opposite and some other studies reporting either mixed findings or no gender differences at all on physiological measures (LaFrance & Banaji, 1992).

Traditionally, the method of investigation is similar to that used to study emotion expression: in a laboratory setting, affectively loaded stimuli (usually pictures or video-clips) are presented to a sample of participants and one or more physiological indicators (e. g. skin conductance reactivity, heart rate, blood pressure, etc.) are measured during participants' exposure to the emotional material. In some studies, positive/negative-valenced stimuli are replaced by actual "stressors" (i. e., stimuli chosen to cause stress to the organism, such as elevated sound levels, over-illumination, etc.) and the physiological measures that are taken reflect more specifically a stress-response (see following paragraph).

Overall, findings seem to depend on the physiological indicator that is measured. Early studies of skin conductance reactivity in response to emotional stimuli reported greater reactions in women than in men (Aronfreed, Messick & Diggory, 1953; Berry & Martin, 1957). A later study found men to be more reactive, by showing larger blood pressure under stress than women (Stoney, Davis, & Matthews, 1987). However, Stone, Dembrosky, Costa, and McDougall (1990) reported that women responded with higher diastolic blood pressure to two types of stressors, whereas men were higher on systolic blood pressure only on one of the stressors. LaFrance and Banaji (1992) observe that, when studies use multiple physiological measures, the results are often not consistent across measures and do not yield a simple main effect of gender. For instance, Cornelius and Averill (1983) found that, in response to a live tarantula, females showed a higher heart rate than men, but did not differ from them on skin conductance. Other studies found no differences at all between men and women in response to emotion on the physiological parameters that were measured. Kleck and Strenta (1985) reported no significant gender differences in a sample of participants who were shown images of themselves being disfigured.

The overall picture becomes even more complex when physiological response is assessed together with emotion experience and/or expressivity. Overall, gender differences in physiological reac-

tivity do not seem to correlate with underlying differences in the reported emotional experience. Vrana and Rollock (2002) found no gender differences in heart rate or skin conductance levels between men and women during an imagery task, although women reported experiencing more intense emotion and showed more intense facial behaviour than men. Nater and colleagues (Nater, Abuzzese, Krebs, & Ehlert, 2006) examined sex differences in the psychological and physiological reactions to pleasant and relaxing versus unpleasant and arousing musical stimuli. Psychophysiological measures included heart rate, electrodermal activity, skin temperature, salivary cortisol, and salivary alpha-amylase (respectively, a steroid hormone and an enzyme, both regarded as biomarkers for stress). Whereas men and women did not differ in psychological responses, they showed very different reactivity to musical stimuli. Women displayed elevated responses to the arousing and unpleasant stimulus, whereas men did not. Only the endocrine measures of saliva gave no gender differences. These findings suggest that 1) gender differences might be linked to the valence of the emotion elicited, and 2) they are not entirely consistent across physiological indicators. Furthermore, they confirm that the various emotion components do not necessarily correlate with each other, as women, who reacted more to unpleasant stimuli, did not seem to experience “more” than men.

As for the relationship between facial expression and physiological reactivity, an interesting finding was reported by Buck and colleagues (Buck, Miller, & Caul, 1974; Buck, Savin, Miller, & Caul, 1972) in the early '70s. They found that, in response to emotional stimuli, women were more facially expressive but showed less autonomic arousal, whereas men were less expressive but conveyed more physiologically. The intuitive explanation of this result is that suppression of overt display of emotion would “cause” enhanced internal reactivity. Whereas women tend to express their emotions overtly (they are externalizers), men are more inclined to conceal them (they are internalizers). Subsequent research has provided some support to the externalizers/internalizers explanation of gender differences, but the evidence was never straightforward. For instance, in the study by Kring and Gordon (1998) introduced above, more women than men were externalizers and more men than women are internalizers. How-

ever, as men were not, overall, more physiologically reactive than women, the externalizer/internalizer distinction did not appear a crucial explanatory variable. Rather, the main finding was that men and women responded differently to different types of emotional stimuli (i.e., men were more reactive than women to the fear and anger films; women more reactive to the sad and disgust films). This is consistent with findings by other studies. For example, heart rate of male students was found to increase in response to erotic stimuli, whereas heart rate of female students increased in response to crying baby video segments (Furedy, Fleming, Ruby, Scher, et al., 1989).

Similar results were obtained by Bradley et al. (2001), who measured physiological parameters (skin conductance, heart rate, and reflex modulation), facial expression, and subjective judgment (i.e. rating of pleasantness, arousal, and dominance) in men and women exposed to neutral and emotional stimuli. As expected, highly arousing pictures of threat, mutilation, and erotica produced the largest reactions in both sexes. Reactions differed according to stimulus content: pictures of threat and mutilation produced an increase in skin conductance, in the startle reflex, and in cardiac deceleration, all regarded as indicators of defensive activation. Erotica enhanced skin conductance while inhibiting the startle reflex, two reactions which reflect appetitive activation. Interestingly, whereas women exhibited greater defensive reactivity to aversive pictures, regardless of their specific content, men showed increased appetitive activation only viewing erotica.

Recently, Chentsova-Dutton and Tsai (2007) examined gender differences in electrodermal reactivity, self-reports of emotion and emotional facial behaviour in European Americans and Hmong Americans while they relived past emotional events. Women showed greater changes in electrodermal reactivity than men overall. However, differences in self reports of emotion and in facial behaviour depended on the emotion, with women reporting more intense emotion while reliving anger and love, and smiling more while reliving happiness and love.

In sum, evidence of sex differences in the physiological component of emotion is quite elusive. In contrast with emotional expression, there is not a general tendency for women to be more reactive

than men. Evidence for the opposite (i.e. men more reactive than women) has been viewed as a way to compensate for the reduced overt expression of emotional reactions in men. However, gender differences in physiological reactions seem strongly linked to contextual factors, such as the valence of the emotional stimulus, and the emotion-eliciting task.

Emotion and well-being: regulation, coping strategies, and stress reactivity

In Western society cultural norms somehow prescribe that men inhibit their emotions more than women (Gross & John, 2003). Parents report teaching their sons greater emotional control than their daughters, and boys say that they are expected to inhibit their emotional expressions more than girls (Underwood, Coie, & Hersbam, 1992). As a consequence, different emotion regulation strategies may be preferentially adopted by each sex in order to conform to different social expectations. Gross and John (2003) investigated individual differences in the use of two “strategies”, reappraisal versus suppression, to regulate emotional reactions. By focusing on the elaboration of the emotional meaning of events for the individual, reappraisal is thought to have a positive effect on the individual’s well-being and social adjustment. Instead, suppression, which controls only the ultimate behavioural reactions to such events, represents a less adaptive strategy, and is more correlated to depressive symptoms, rumination, poor self-esteem and life satisfaction. As expected by the authors, men were found to suppress more than women. On the other hand, the mechanism of suppression seemed to work in the same way for both sexes: no gender differences were observed in the ease with which individuals suppress “on command”, or in any of the behavioural, subjective, or autonomic consequences of suppression in a negative emotion context.

Another line of research has focused on stress reactivity. As already mentioned, women appear more vulnerable than men to de-

velop depression or anxiety during life (Kessler, Sonnega, Bromet, Hughes, 1995; Nolen-Hoeksema, 1987, 2001). These data suggest a higher incidence of negative affect in women than in men, possibly mediated by heightened reactions to aversive stimulation (Watson, Clark, & Mineka, 1994). Indeed, considerable evidence shows that women are both more psychologically and physiologically reactive to stressors than men (Matud, 2004). They show increased heart rate (e.g., Kudielka, Buske-Kirschbaum, Hellhammer, & Kirschbaum, 2004; Labouvie-Vief, Lumley, Jain, & Heinze, 2003), greater emotional responses – e.g., as inferred by their use of emotion words – (Sells & Martin, 2001), and report more stress, intrusive thoughts, and avoidance (Lepore, Ragan, & Jones, 2000). However, the relationship between gender and stress reactivity is complicated by the fact that women and men seem to be sensitive to different type of stressors (Stroud, Salovey, & Epel, 2002) and show somewhat different physiological responses (Stoney, 1987; Wolf & Kimerling, 1997).

Most studies examined acute response to stress. Schmaus and colleagues (Schmaus, Laubmeier, Boquiren, Herzer, & Zakowski, 2008) looked at gender differences in response to initial and repeated exposure to a laboratory stressor: although gender differences were not found after initial exposure, women showed significantly greater heart rate and negative affect reactivity than men after the second exposure, suggesting a process of sensitization that make them more vulnerable to repeated stress exposure as compared to men. Women also reported more intrusive thoughts and avoidance of the stressor, although these did not seem to account for the gender differences in reactivity.

Wallbott and Scherer (1991) looked at the interaction between gender and type of stress. They found that women reacted more strongly in the condition of high cognitive stress than in the condition of low cognitive stress, and showed only small differences in reacting to high as compared to low emotional stress. The reverse pattern was found for men, even if differences were much smaller than those for women. Overall, gender of the participants was strongly involved in mediating arousal responses in different response modalities (i.e., subjective reports of arousal, total amount

of facial activity, and, to a lesser extent, physiological reactions) and with respect to different types and levels of stress.

Greater emotional complexity is thought to be associated with greater emotional adaptation (Feldman Barrett et al., 2000). However, lower performances in emotion-related tasks for men with respect to women do not necessarily reflect lower levels of emotional adaptation, and might instead indicate differentially tuned emotion processes. For example, men's lower scores in emotion knowledge (Feldman Barrett et al., 2000) may reflect a greater propensity to represent emotional experience with action oriented terms than with descriptive ones. This is coherent with the idea that men are more behaviourally oriented in their emotional expressions and more likely to manage their emotions in automatic fashion than women (Brody & Hall, 1993). In contrast, women may use conscious, self-reflective coping strategies that are more language based. One might even speculate that women's increased risk for depression is linked to the risk of prolonging their negative emotional experiences by using self-reflective emotion regulation strategies (Feldman Barrett et al., 2000), which makes even clearer how the adaptive value of specific characteristics/responses strongly depends on the situational context.

How do we explain gender differences?

The bio-social approach

Gender differences have been frequently attributed to the social and cultural context, especially as represented by gender-stereotypes (Brody & Hall, 1993; Jansz, 2000; Shields, 2002). According to the socio-cultural perspective, emotions can be seen as a part of the process of socialization into the roles that men and women generally occupy. As such, they are linked to (perceived) differences in power and status of each sex: in order to perform the social roles successfully, different emotions and emotion expressions are required (Fischer et al., 2004). In contrast with the above approach, the biological perspective holds that gender differences in emotionality are fundamentally

based on biological differences between men and women (e.g., hormonal influences could explain the more frequent crying in women).

As a compromise between the above perspectives, the majority of the current theories about sex differences in emotionality share the idea that both biological and socio-cultural factors contribute to differential emotional experience and expression (Bradley et al., 2001). In line with a biological view, women tend to report more fear in threatening situations, reflecting a feeling of inability to physically protect themselves if attacked (Gordon & Riger, 1991), whereas men report more emotional arousal than do women in presence of erotic stimuli (Murnen & Stockton, 1997). Biological explanations are therefore consistent with the existing evidence that different cues tend to arouse emotion in men and women. Likewise, the fact that gender differences are most evident in facial expressivity and global subjective reports – more vulnerable to social learning and voluntary control than physiological responses or momentary emotion experience – can be at least partly explained in terms of cultural reinforcement (Bradley et al., 2001). Such a perspective, which emphasizes social roles but acknowledges the impact of sex-specific biological characteristics in shaping social behaviour (Wood & Eagly, 2002), is called biosocial approach.

In line with this approach, Fischer et al. (2004) examined the cross-cultural variability of gender differences in reported emotion, in countries in which the roles occupied by men and women are different. The authors wanted to test whether the gender-specific pattern found in studies with Western participants, namely that men report more powerful emotions (e.g., anger and hostile emotions) and women report more powerless emotions (e.g., fear, sadness) is a universal feature or rather varies according to the gender roles present in the various countries. Traditionally, in Western countries, men are more likely than women to provide material resources and to assume a role in the paid economy. Instead, women are more likely to have domestic and nurturing roles, focused on the emotional care of others and giving less power and status than male roles. A high-status male role would reinforce powerful emotions that show one's power and assertiveness, while discouraging powerless emotions. Instead, a nurturing female role would discourage

powerful emotions but encourage powerless emotions, which, by expressing internal blame and vulnerability, help maintaining harmony in social relations with little overt hostility. Therefore, across countries, the strength of this gender-specific pattern should vary according to the social role (and status) held by men and women in their respective countries.

Fischer et al. (2004) analyzed data from respondents from 37 countries all over the world, which had completed a questionnaire about the intensity, expression, and control, of powerful (anger and disgust) and powerless (fear, sadness, shame, and guilt) emotions. As a measure of the “gender role” played by men and women in a society, the authors used an index, the Gender Empowerment Measure (GEM; United Nations Development Programme Human Development Report 2002), which reflects the extent to which women actively participate in the political and economic life of a country. The higher the GEM, the more status and power women have in a specific society. Low GEM scores are characteristic of most African, Asian, and South American countries, which maintain a traditional division of labor between the sexes, whereas most Western European and English-speaking countries, in which women actively participate in public life, have high GEM scores.

Overall, the results showed a rather universal gender specific pattern (i.e., women report to experience and express more powerless emotions than men), but a few interactions with GEM were found. There were no gender differences for powerful emotions. However, in the case of the powerless emotions, men’s scores, but not those of women, significantly interacted with the GEM. Men from high-GEM countries rated their powerless emotions as less intense than did men from low-GEM countries, suggesting that powerless and vulnerability correspond less with the male role in Western countries than with the male role in non Western countries. With respect to the two emotion expressions, crying revealed a uniform pattern across countries, suggesting that this emotion expression is more determined by biological factors than social roles. Expressions of anger appeared more affected by social roles, with women in high-GEM countries reporting more anger expressions than women in low-GEM countries.

Overall, Fischer et al. (2004) concluded that the biosocial theory of gender differences (Wood and Eagly, 2002) is a useful framework to account for their findings, which seem to be best explained by an interplay between social factors, showing some extent of cultural variation, and biological determinants, showing little cultural variation. Further research is needed, for instance in order to understand the impact of social roles onto the immediate contexts in which emotions are elicited.

Summary and Conclusions

The present review focused on gender differences in emotion expression, experience, physiology, and well-being. The majority of the studies reported here examined a single emotion component, and only few (e.g., Bradley et al., 2001; Kring & Gordon, 1998) measured expression, experience and physiology at the same time. As a consequence, a direct comparison of sex differences in these three aspects is almost never possible. In addition, methodological factors, which also vary greatly across studies, were shown to affect results substantially (LaFrance and Banaji, 1992).

The resulting picture is therefore quite complex. The expressive component has been the most studied, especially with respect to facial behaviour. Experimental measures include verbal descriptions, both as external and self-reports, FACS coding, and fEMG measures. Overall, results indicate that women are more emotionally expressive than men. However, women's more pronounced expressivity does not systematically correspond to greater underlying emotional experience in women than in men, or to enhanced physiological responses. In fact, stable gender differences in emotional experience emerge mostly from studies using self-reports and examining the "global" disposition of the individual to experience emotions (frequency, intensity of emotional episodes): in this kind of study, women generally report greater emotionality than men. Instead, differences are less consistent when specific emotions

are examined, and when situational, momentary-based ratings are used.

There are various possible explanations for the existence of individual differences in emotional expression that are not paralleled by differences in experienced emotion. The most common interpretation is that differences in expressive behaviour are due to sex role stereotypes and to cultural learning. As suggested by various studies, men and women may learn, since very early age, different rules for emotional expression: whereas boys learn to conceal their feelings, girls learn to express them more freely (Brody, 1985). This statement is however disconfirmed in some particular contexts in which women are actually less expressive than men (e.g., Friedman & Miller-Herringer, 1991).

With respect to physiological activity, a traditional hypothesis is that women tend to be externalizers, whereas men tend to be internalizers. Even though this distinction is in keeping with the general finding of women as more expressive than men, the pattern of sex differences in the physiological component of emotion is much less stable, with little evidence that men are more physiologically reactive than women. One limitation is that most studies measured only one parameter (usually, skin conductance), and those that measured more than one gave mixed results (LaFrance & Banaji, 1992). Across studies, the most consistent finding is that men and women show different physiological reactivity to stimuli of different emotional content, with women being generally more reactive than men to aversive stimuli eliciting negative affect (Bradley et al., 2001).

In sum, the nature of the emotional stimulus and, consequently, the type of emotion elicited, appear as crucial determinants of gender differences in emotional responses in all components. Other factors, like the situational context and the influence of socio-cultural learning may explain why differences in one component appear more strikingly than in others. Research on gender differences in emotional well-being is in line with the above suggestion. For instance, gender differences in stress reactivity were found to depend strongly on the type of stressors to which individuals are exposed (Wallbott & Scherer, 1991): women react more strongly in situations of high

cognitive stress than of low cognitive stress, and show only small differences in reacting to high as compared to low emotional stress, whereas men tend to exhibit the reverse pattern.

Women and men seem also to differ in the processing strategies applied to emotional stimuli. An example is the memory for emotional events. Feldman-Barrett et al. (2000) showed that women have more elaborated and/or accessible emotion knowledge than men, which can explain – more than or in addition to cultural stereotypes – why women describe themselves as “more emotional” than men. This finding suggests that men and women are differentially equipped to respond to emotional stimuli, with men managing their emotions in a more automatic, action-oriented way, and women applying more descriptive, self-reflective strategies. Furthermore, it shows that gender differences can have multiple determinants, both biological (i.e. innate predisposition) and cultural (i.e. social learning and reinforcement), as maintained by the biosocial approach (Wood & Eagly, 2002). A complex interplay between biological predisposition and cultural shaping is confirmed by imaging studies of gender differences in emotion processes, showing both innate and developmental sex differences in brain regions associated to emotion perception, memory, and experience (see Chapter 4 for a review of these aspects). A difficult but intriguing issue is determining which differences are hard-wired in the brain rather than acquired later in development, and, for those that develop later, what is due to biological predisposition and what results from social shaping. In order to answer those questions successfully, future research on gender differences in emotion should acknowledge all the possible sources of variability in a developmental perspective and focus on the actual mechanisms that can mediate emotional responses in particular contexts.

References

- Aronfreed, J. M., Messick, S. A., & Diggory, J. C. (1953). Re-examining emotionality and perceptual defense. *Journal of Personality, 21*, 517–528.
- Ashmore, R. D. (1990). Sex, gender, and the individual. In L. A. Pervin (Ed.), *Handbook of personality: Theory and research* (486–526). New York: Guilford Press.
- Barr, C. L., & 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.
- Berry, J. L., & Martin, B. (1957). GSR reactivity as a function of anxiety, instructions, and sex. *Journal of Abnormal and Social Psychology, 54*, 9–12.
- Birnbaum, D. W., & Croll, W. L. (1984). The etiology of children's stereotypes about sex differences in emotionality. *Sex Roles, 10*, 677–691.
- Bradley, M. M., Codispoti, M., Sabatinelli, D., & Lang, P. J. (2001). Emotion and Motivation II: Sex Differences in Picture Processing. *Emotion, 1*, 300–319.
- Brody, L. R. (1985). Gender differences in emotional development: A review of theories and research. *Journal of Personality, 53*, 102–149.
- Brody, L. R. (1996). Gender, emotional expression, and parent-child boundaries. In R. D. Kavanaugh, B. Zimmerberg, & S. Fein (Eds.), *Emotion: Interdisciplinary perspectives* (139–170). Mahwah, NJ: Erlbaum.
- Brody, L. R., & Hall, J. A. (1993). Gender and emotion. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (447–460). New York: Guilford Press.
- Brody, L. R., & Hall, J. A. (2000). Gender, emotion, and expression. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (2nd ed., pp. 338–349). New York: Guilford Press.
- 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.
- Cornelius. R. R., & Averill, J. R. (1983). Sex differences in fur of spiders. *Journal of Personality and Social Psychology, 45*, 377–383.
- Cupchik, G. C., & Poulos, C. X. (1984). Judgments of emotional intensity in self and others: The effects of stimulus, context, sex, and expressivity. *Journal of Personality and Social Psychology, 46*, 431–439.
- 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.
- Dimberg, U. (1990). Facial reactions to auditory stimuli: Sex differences. *Scandinavian Journal of Psychology, 31*.

- Dimberg, U. & Lundquist, L. (1990). Gender Differences in Facial Reactions to Facial Expressions. *Biological Psychology*, *30*, 151–159.
- Feldman Barrett, L., Lane, R.L., Sechrest, L., & Schwartz, G.E. (2000). Sex Differences in Emotional Awareness. *Personality and Social Psychology Bulletin*, *26*, 1027–1035.
- 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., & Eyssell, K. (1998). Are Women the “More Emotional” Sex? Evidence from Emotional Experiences in Social Context. *Cognition and Emotion*, *12*, 555–578.
- Fischer, A.H., Rodriguez Mosquera, P.M., van Vianen, A.E.M., & Manstead, A.S.R. (2004). Gender and Culture Differences in Emotion. *Emotion*, *87*–94.
- Fridlund, A.J. (1990). Sociality of solitary smiling: Potentiation by an implicit audience. *Journal of Personality and Social Psychology*, *60*, 229–240.
- Friedman, H. S. & Miller-Herringer, T. (1991). Nonverbal Display of Emotion in Public and Private: Self-Monitoring, Personality, and Expressive Cues. *Journal of Personality and Social Psychology*, *61*, 766–775.
- 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.
- Furedy, I.J., Fleming, A.S., Ruble, D.N., Scher, H., et al. (1989). Sex differences in small magnitude heart rate responses to sexual and infant-related stimuli: A psychophysiological approach. *Physiology and Behavior*, *46*, 903–905.
- Germans Gard, M., & Kring, A.M. (2007). Sex Differences in the Time Course of Emotion. *Emotion*, *7*, 429–437.
- Gordon, M.T., & Riger, S. (1991). *The female fear: The social costs of rape*. Chicago: University of Illinois Press.
- Greenwald, M.K., Cook, E.W., & Lang, P.J. (1989). Affective judgment and psychological response: Dimensional covariation in the evaluation of pictorial stimuli. *Journal of Psychophysiology*, *3*, 51–64.
- Gross, J.J. & John, O.P. (1997). Revealing feelings: Facets of emotional expressivity in self-reports, peer ratings, and behavior. *Journal of Personality and Social Psychology*, *72*, 435–448.
- Gross, J.J., & John, O.P. (2003). Individual Differences in Two Emotion Regulation Processes: Implications for Affect, Relationship, and Well-Being. *Journal of Personality and Social Psychology*, *85*, 348–362.
- Gross, J.J., & Levenson, R.W. (1993). Emotional suppression: Physiology, self-report, and expressive behavior. *Journal of Personality and Social Psychology*, *64*, 970–986.
- 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.

- Halberstadt, A. G., Cassidy, J., Stifter, C. A., Parke, R. D., & Fox, N. A. (1995). Self-expressiveness within the family context: Psychometric support for a new measure. *Psychological Assessment, 7*, 93–103.
- Hall, J. A. (1984). Nonverbal sex differences: Communication accuracy and expressive style. Baltimore: Johns Hopkins University Press.
- Hall, J. A., & Matsumoto, D. (2004). Gender Differences in Judgments of Multiple Emotions from Facial Expressions. *Emotion, 4*, 201–206.
- Jansz, J. (2000). Masculine identity and restrictive emotionality. In A. H. Fischer (Ed.), *Gender and emotion: Social psychological perspectives* (pp. 166–188). Cambridge, England: Cambridge University Press.
- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., Nelson, C. B. (1995). Post-traumatic stress disorder in the national comorbidity survey. *Arch. Gen. Psychiatry, 52*, 1048–1060.
- Kleck, R. E., & Strenta, A. C. (1985). Gender and responses to disfigurement in self and others. *Journal of Social and Clinical Psychology, 3*, 257–267.
- 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., & Sloan, D. (1991). The Facial Expression Coding System (FACES): A users guide. Unpublished manuscript.
- Kring, A. M., Smith, D. A., & Neale, J. M. (1994). Individual differences in dispositional expressiveness: The development and validation of the Emotional Expressivity Scale. *Journal of Personality and Social Psychology, 66*, 934–949.
- Kudielka, B. M., Buske-Kirschbaum, A., Hellhammer, D. H., Kirschbaum, C. (2004). Differential heart rate reactivity and recovery after psychosocial stress (TSST) in healthy children, younger adults, and elderly adults: the impact of age and gender. *Int. J. Behav. Med. 11*, 116–121.
- Labouvie-Vief, G., Lumley, M. A., Jain, E., & Heinze, H. (2003). Age and gender differences in cardiac reactivity and subjective emotion responses to emotional autobiographical memories. *Emotion 3*, 115–126.
- LaFrance, M., & Banaji, M. (1992). Toward a Reconsideration of the Gender-Emotion Relationship. In M. S. Clark (Ed.), *Review of personality and social psychology: Emotions and social behavior* (Vol. 14, pp. 178–202). Newbury Park, CA: Sage.
- LaFrance, M., Hecht, M. A., & Levy Paluck, E. (2003). The Contingent Smile: A Meta-Analysis of Sex Differences in Smiling. *Psychological Bulletin, 129*, 305–334.
- 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.
- Lanzetta, J. T., Cartwright-Smith, J., & Kleck, R. E. (1976). Effects of nonverbal dissimulation on emotional experience and autonomic arousal. *Journal of Personality and Social Psychology, 33r*, 354–370.

- Lepore, S.J., Ragan, J.D., Jones, S. (2000). Talking facilitates cognitive-emotional processes of adaptation to an acute stressor. *J. Pers. Soc. Psychol.* 78, 499–508.
- Levenson, R. W., Ekman, P., & Friesen, W. V. (1990). Voluntary facial action generates emotion-specific autonomic nervous system activity. *Psychophysiology*, 27, 363–384.
- Manstead, A. S. R. (1992). Gender differences in emotion. In M. A. Gale & M. W. Eysenck (Eds.), *Handbook of individual differences: Biological perspectives* (pp. 355–387). Chichester, England: Wiley.
- Matud, M.P. (2004). Gender differences in stress and coping styles. *Pers. Individ. Differ.*, 37, 1401–1415.
- Murnen, S. K., & Stockton, M. (1997). Gender and self-reported sexual arousal in response to sexual stimulation: A meta-analytic review. *Sex Roles*, 37, 135–153.
- Nater, U. M., Abruzzese, E., Krebs, M., & Ehlert, U. (2006). Sex differences in emotional and psychophysiological responses to musical stimuli. *International Journal of Psychophysiology*, 62, 300–308.
- Nolen-Hoeksema, S. (1987). Sex differences in bipolar depression: Evidence and theory. *Psychological Bulletin*, 101, 259–282.
- Nolen-Hoeksema, S. (2001). Gender differences in depression. *Curr. Dir. in Psychol. Sci.*, 10, 173–176.
- Schmaus, B. J., Laubmeier, K. K., Boquiren, V. M., Herzer, M., & Zakowski, S. G. (2008). Gender and stress: Differential psychophysiological reactivity to stress reexposure in the laboratory. *International Journal of Psychophysiology*, 69, 101–106.
- Schwartz, G. E., Brown, S. L., & Ahern, L. (1980). Facial muscle patterning and subjective experience during affective imagery: sex differences. *Psychophysiology*, 17, 75–82.
- Seidlitz, L., & Diener, E. (1998). Sex differences in the recall of affective experiences. *Journal of Personality and Social Psychology*, 74, 262–271.
- Sells, D. J., Martin, R. B. (2001). Gender and modality differences in experiencing and emotional expression. *Can. J. Couns.*, 35, 176–188.
- Shields, S. A. (2000). Thinking about gender, thinking about theory: Gender and emotional experience. In A. H. Fischer (Ed.), *Gender and emotion: Social psychological perspectives* (pp. 3–24). Cambridge, England: Cambridge University Press.
- Stone, S. V., Dembroski, T. M., Costa, P. T., & Machugall, J. M. (1990). Gender differences in cardiovascular activity. *Journal of Behavioral Medicine*, 13, 137–156.
- Stoney, C. M., Davis, M. C., & Matthews, K. A. (1987). Sex differences in physiological response to stress and in coronary heart disease: A causal link? *Psychophysiology*, 24, 127–131.
- Stroud, L. R., Salovey, P., Epel, E. S. (2002). Sex differences in stress responses: social rejection versus achievement stress. *Biol. Psychiatry* 52, 318–327.
- Underwood, M. K., Coie, J. D., & Hersbam, C. R. (1992). Display rules for anger and aggression in school-age children. *Child Development*, 63, 380.

- United Nations Development Programme Human Development Report 2002. (2002). Gender Empowerment Measure. Retrieved December 12, 2003, from <<http://hdr.undp.org/reports/global/2002/en>>.
- Vrana, S. R. (1993). The Psychophysiology of disgust: Differentiating negative emotional contexts with facial EMG. *Psychophysiology*, *30*, 279–286.
- Vrana, S. R., & Rollock, D. (2002). The role of ethnicity, gender, emotional content, and contextual differences in physiological, expressive, and self-reported emotional responses to imagery. *Cognition and Emotion*, *16*, 165–192.
- Wagner, H. L. (1990). The spontaneous facial expression of differential positive and negative emotions. *Motivation and Emotion*, *14*, 27–43.
- Wagner, H. L., Buck, R., & Winterbotham, M. (1993). Communication of specific emotions: Gender differences in sending accuracy and communication measures. *Journal of Nonverbal Behavior*, *17*, 29–52.
- Wallbott, H. G., & Scherer, K. R. (1991). Stress Specificities: Differential Effects of Coping Style, Gender and Type of Stressor on Autonomic Arousal, Facial Expression, and Subjective Feeling. *Journal of Personality and Social Psychology*, *61*, 147–156.
- Watson, D., Clark, L. A., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology*, *103*, 103–116.
- Wolf, J., Kimerling, R. (1997). Gender issues in the assessment of posttraumatic stress disorder. In: Wilson, J. P., Keane, T. M. (Eds.), *Assessing Psychological Trauma and PTSD*. The Guilford Press, 192–238.
- Wood, W., & Eagly, A. H. (2002). A cross-cultural analysis of the behavior of women and men: Implications for the origin of sex differences. *Psychological Bulletin*, *128*, 699–727.
- Zuckerman, M., Klorman, R., Larrance, D. T., & Spiegel, N. H. (1981). Facial, autonomic, and subjective components of emotion: The facial feedback hypothesis versus the externalizer-internalizer distinction. *Journal of Personality and Social Psychology*, *41*, 929–944.