

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



gender
and
EMOTION

An Interdisciplinary Perspective

Peter Lang

Women express more emotion than men, but do they also experience more emotion than men? Are emotions represented differently in men and women's brains? What are the origins of gender differences in emotions – are we born different or is it socialization that renders us different? What are the implications of gender differences in emotion for general well-being, insomnia, depression, antisocial behavior, and alexithymia? What are the most appropriate methodologies for the empirical study of gender differences in emotional experiences?

In the current book, coordinated by The Swiss Center for Affective Sciences, these questions are answered by reviewing research on general emotional expression and experience, but also on specific emotions and affective experiences such as shame, empathy, and impulsivity. We propose an interdisciplinary contribution to the field of gender and emotions, with works authored by specialists in the fields of psychology, neuroscience, psychiatry, economics, philosophy, and anthropology.

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Table of Contents

Introduction 7

Acknowledgements 11

Well Being and Psychopathology

1. Gender and Emotion Expression, Experience, Physiology
and Well-Being: A Psychological Perspective 15
CHIARA FIORENTINI
Q&A Box: Chiara Fiorentini 41

2. Gender and Impulsivity: A Psychopathological Perspective .. 43
RALPH ERICH SCHMIDT and MARTIAL VAN DER LINDEN
Q&A Box: Ralph Erich Schmidt and Martial Van der Linden 60

Q&A Box: Marco Piccinelli 63

The Brain

3. Gender and Social Emotions: A Review of the
Neuroscientific Literature on Empathy and its Link
to Psychopathy, Antisocial Behavior and Alexithymia 69
CHRISTIAN M. BRODBECK and GIORGIA SILANI
Q&A Box: Christian M. Brodbeck and Giorgia Silani 90

4. Gender and the Affective Brain: Neuroscientific Perspectives	93
TATJANA AUE and PATRIK VUILLEUMIER	
Q&A Box: Tatjana Aue and Patrick Vuilleumier	110
Q&A Box: Joseph Andreano and Lisa Feldman Barrett	113
Q&A Box: Erin B. Tone	115

Social Interactions: Present and Past

5. Gender and Nonverbal Expression of Emotions	119
GAËTAN COUSIN and MARIANNE SCHMID MAST	
Q&A Box: Gaëtan Cousin and Marianne Schmid Mast	130
6. Gender Differences in Risk Aversions – The Role of Emotions	133
EVA RANEHILL and ANNE BOSCHINI	
Q&A Box: Eva Ranehill and Anne Boschini	154
7. Gender and Shame: A Philosophical Perspective	155
RAFFAELE RODOGNO	
Q&A Box: Raffaele Rodogno	169
8. Gender and Emotion: An Anthropological and Historico-Religious Approach (Mesopotamia, Egypt, Ancient Judaism, Greece, and Rome)	171
DELPHINE EGCEL	
Q&A Box: Delphine Egcel	180
Q&A Box: Agneta Fisher	183

Introduction

Women express more emotion than men, but do they also experience more emotion than men? Are emotions represented differently in men and women's brains? What are the origins of gender differences in emotions – are we born different or is it socialization that renders us different? What are the implications of gender differences in emotion for general well-being, insomnia, depression, antisocial behavior, and alexithymia? What are the most appropriate methodologies for the empirical study of gender differences in emotional experiences?

In the current book, we answer these questions by reviewing research on general emotional expression and experience, but also on specific emotions and affective experiences such as shame, empathy, and impulsivity. We propose a truly interdisciplinary contribution to the field of gender and emotions, with works authored by specialists in the fields of psychology, neuroscience, economics, philosophy, and anthropology. This interdisciplinary nature closely mirrors the origins of this book. Authors are members of The Swiss Center for Affective Sciences, a National Center of Competence in Research (NCCR) established by the Swiss federal government through funding from the Swiss National Science Foundation (SNSF). Despite their diverse background, the members of the NCCR Affective Sciences all have a common, central interest: emotion and its origins, expression, experience, neural bases, and implications for daily life. From here, the interest in gender came naturally, as questions about the differences in the affective make-up of men and women have always fascinated researchers in the field of emotion. Together, we pooled the existing resources and compiled a much needed image of gender and emotion from an interdisciplinary, mostly empirical perspective.

Besides contributions coming from The Swiss Center for Affective Sciences, we are also honored to include interventions from several international experts in the field of emotions, who embody

the interdisciplinary nature of this book: Agneta Fisher (social psychology), Joseph Andreano and Lisa Feldman Barrett (neuroscience), Erin Tone McLure (developmental psychology), and Marco Piccinelli (psychiatry). The experts and the main contributors shared with us their answers to several questions, which we grouped in Q&A Boxes throughout the book. The questions are of interest to gender and emotion researchers in all domains and include:

- Based on your research, where do gender differences in emotion come from – socialization and culture or biological differences between women and men?
- From a methodological standpoint, what would you recommend researchers who study emotion in terms of taking into account gender differences?
- Where do you see the field of gender and emotions going in the next 20 years?
- What is the finding on gender differences (or lack thereof) that surprised you the most in your own research?
- What should everybody know about gender differences in emotion? What are, in your view, the most important findings in this literature so far?

We organized this book in three parts, based on the domains in which gender and emotions are discussed. In the first part, Well Being and Psychopathology, we include two chapters. In Chapter 1, Chiara Fiorentini discusses the empirical support for the claim that women are more emotional than men and the implication of these gender differences for general well-being, including emotional regulation and stress reactivity. In Chapter 2, Ralph Erich Schmidt and Martial Van der Linden discuss the implications of gender differences in impulsivity (with a focus on urgency, lack of perseverance, and sensation seeking) on men and women's psychopathology. To complete this perspective, Marco Piccinelli discusses gender differences in depression from a psychiatric viewpoint in a Q&A Box.

The second part of the book, titled The Brain, completes the psychopathology perspective from a neuroscientific angle. In Chapter 3, Christian M. Brodbeck and Giorgia Silani discusses gender differences in the underlying brain activation for empathy and their

implications for antisocial personality (the lack of empathy and concern for other's emotions) and alexythimia (the inability to identify one's own emotions). In Chapter 4, Tatjana Aue and Patrik Vuilleumier provide an overview of the empirical evidence on gender differences in neural activations for memory and perception of affective stimuli. Joseph Andreano with Lisa Feldman Barrett add to this perspective, further discussing the neuroscience of gender differences in emotion, including the role of gonadal hormone levels and maleness as an induced state of the brain. Finally, Erin Tone McLure shares her expertise on the development of gender differences in emotion and the utility of using neuroimaging methods such as fMRI.

In the last part we include diverse contributions that discuss gender and emotion in the context of social interactions. Gaëtan Cousin and Marianne Schmid Mast focus on the nature and origin of gender differences in the nonverbal expression of emotions in Chapter 5. Eva Ranehill and Anne Boschini continue in Chapter 6 from an economics perspective, discussing gender differences in risk aversion, social preferences, and responses to competition. In Chapter 7, Raffaele Rodogno considers the philosophical perspective on shame as a result of oppression and domination of women by men. In Chapter 8, Delphine Eggel focuses on women's suffering and the expression of suffering in the Ancient world, from an anthropological viewpoint. The Social Interactions part is completed by a Q&A Box from Agneta Fisher on the social psychology of gender and emotion.

This book is addressed to scientists who are interested in gender and emotion, as it incorporates the state of the art in this field, including both existing empirical knowledge and methodological advances and recommendations. It is especially useful to those researchers who want to take a well-informed interdisciplinary approach to study these issues further. However, due to its accessible language, the book is also addressed to the general public who may be interested in learning about what makes men and women different in the affective realm.

This work was supported by the National Centre of Competence in Research (NCCR) Affective Sciences, financed by the Swiss National Science Foundation (SNSF, no. 51NF40-104897), and hosted by the University of Geneva.

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Well Being and Psychopathology

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, Abruzeese, 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.

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Q&A Box: Chiara Fiorentini

From the methodological standpoint, what would you recommend researchers who study emotion in terms of taking into account gender differences?

The complex picture emerging from studies on gender differences in emotion suggests several factors that need consideration. I will mention four of them. First, researchers should be aware of the basic finding that gender differences in one component (e. g. expression) do not necessarily correlate with gender differences in another component (e. g. experience). Therefore, although examining emotion expression, experience, and physiology at the same time is obviously difficult, it can be more informative than focusing on only one of these components. Second, as each of these components can be evaluated along multiple dimensions (e. g., intensity, frequency, duration of the emotion expressed/experienced), one should always be clear about which dimension would be probed by the experiment. Third, in choosing a specific measure for a given component, one should prefer the measure that minimizes response biases and confounds, and is less intrusive. For instance, if the aim is to evaluate emotional facial expression, video-recording participants' facial behaviour while they watch emotional films, and subsequently coding the material for the occurrence, valence, and duration of expressions is probably a more useful strategy than asking participants themselves to rate their facial expressivity. Finally, researchers should carefully consider the role of the context in mediating gender differences. Because contextual factors can never be completely eliminated, and they often play an important role in eliciting an emotional response successfully, one should always ask himself whether a difference between men and women is due to the context (i. e., the emotion-eliciting stimulus) or would remain stable across different situations.

Based on your research, where do gender differences in emotion come from – socialization and culture or biological determinants?

Based on current evidence, gender differences in emotion come from the interplay between biological and cultural determinants, starting early in development. Some differences are more easily accounted for by social than by biological factors, and vice-versa. For instance, women's tendency to be more emotionally expressive than men can be due to cultural learning, which tends to reinforce emotion expression in women more than in men. There are exceptions to this rule, namely specific emotions/contexts for which cultural norms cause women to be less expressive than men (see, for example, page 20). Furthermore, for some expressive behaviours, like the more frequent crying in women than in men, biological factors seem to be most important.

As opposed to expression, actual emotion experience and physiological correlates appear less affected by cultural learning, partly because they are less under volitional control. Not surprisingly, the evidence of gender differences in these domains is mixed.

An aspect we do not know much about is the interaction between cultural and biological factors. For instance, the influence of socialization can be subtler than was commonly thought. It was generally believed that women report more intense emotion than men because of conformity to social stereotypes. Feldman Barrett et al. (2001) instead showed that men and women actually differ in the structure/accessibility of their emotional memory (Feldman Barret et al., 2001), which can be due to innate predisposition, but also to the fact that they learn to think, recall, and express their emotions in different ways early in life.

Where do you see the field of gender and emotion going in the next 20 years?

Up to now, the study of gender and emotion has explored a number of aspects from different perspectives. The available evidence, although mixed and incomplete, suggests that gender differences in emotionality are more than a cultural stereotype. I expect future research in the domain to make significant progress, by capitalizing on what we have already learnt. For instance, we have learnt that gender is less often responsible in a main effect (e.g., women more emotional than men, men more reactive than women, etc.) than the ingredient of an interaction, for instance with a specific type of emotional stimulus or situation. As a consequence, we can now ask more specific questions, by considering more carefully at which variables elicit a differential response in men and women. Furthermore, as shown by recent imaging studies (see Chapter 4, the studies by Canli et al., and Cahill et al.), gender differences are most likely to reflect different processes activated by men and women in response to an emotional situation, rather than differences in the magnitude of a response. In the next years, this idea is likely to become much more acknowledged, shifting researchers' focus from observable behavior to the underlying processes. Finally, I believe future research will be able to offer a more integrated perspective on gender and emotion, by showing the implications of gender differences in emotional memory, perception, etc., for aspects like wellbeing and psychopathology, and by suggesting how to promote behaviors that are emotionally adaptive in different contexts.

2. Gender and Impulsivity: A Psychopathological Perspective

RALPH ERICH SCHMIDT and MARTIAL VAN DER LINDEN

Given that impulsivity is a multi-dimensional construct, the question of gender differences has to be investigated for each dimension separately. Within the comprehensive UPPS (urgency, lack of premeditation, lack of perseverance, sensation-seeking) approach to impulsivity as developed by Whiteside and Lynam (2001), women score higher on urgency, whereas men tend to obtain higher scores on lack of premeditation and sensation seeking. Urgency denotes a propensity to act rashly, particularly under conditions of negative affect, and is the facet of impulsivity most strongly associated with psychopathology. Recent research suggests that urgency may contribute to gender-specific pathways to psychopathology, and that dysfunctional emotion regulation is an important mediating mechanism that differentiates impulsivity-related pathways to psychological and behavioral problems in men and women.

Impulsivity constitutes a central psychological construct that not only appears in every major theory of personality (e.g., Evenden, 1999) but has also been associated with a wide range of problematic behaviors and psychopathological states (e.g., Moeller et al., 2001). Impulsivity manifests itself in “actions that appear poorly conceived, prematurely expressed, unduly risky, or inappropriate to the situation and often result in undesirable consequences” (Daruna & Barnes, 1993, p. 23). As may be gathered from this description, impulsivity plays a pivotal role in affective experiences: Impulsive behavior may be facilitated by certain affective states, such as anger (e.g., Abramowitz & Berenbaum, 2007), and may in turn fuel other affective states, such as regret, shame, and guilt (e.g., Schmidt & Van der Linden, 2009). For instance, an impulsive individual may, in a fit of anger, utter hurtful words to a friend and later regret the harm that was caused.

Conflicting conceptions of impulsivity and contradictory findings on gender differences

Regarding gender differences in impulsivity, the available evidence presents a seemingly paradoxical picture. On the one hand, gender differences in impulsivity have, for example, been implicated in the comparatively higher prevalence of alcoholism (e. g., Nolen-Hoeksema, 2004) or antisocial behavior and delinquency in men (e. g., Gottfredson & Hirschi, 1990; Moffitt, Caspi, Rutter, & Silva, 2001). On the other hand, in a comprehensive meta-analysis on gender differences in personality, Feingold (1994) concluded “there were essentially no overall gender differences on scales of impulsiveness” (p. 449).

How can these seemingly contradictory lines of evidence be reconciled? A closer look at the results of Feingold’s (1994) meta-analysis reveals that although men and women did not significantly differ in their overall levels of impulsivity, gender differences were sometimes found on specific operationalizations of this personality trait. In normative samples from the U.S., for instance, men scored higher than women on the self-control subscale of the California Psychological Inventory (CPI/CPI-R) and lower than women on the impulsiveness subscales of the NEO Personality Inventory (NEO-PI/NEO-PI-R) and the Personality Research Form (PRF). Essentially no gender differences were found on the cautiousness subscale of the Gordon Personality Inventory (GPI) and on the restraint subscale of the Guilford-Zimmerman Temperament Survey (GZTS).

In line with Feingold’s (1994) findings, more recent studies have indicated that men and women may differ on specific dimensions of impulsivity without necessarily doing so on all of them, and that the direction of the gender effect may vary. Numerous studies have, for example, employed the latest version of the Barratt Impulsivity Scale (BIS-11), which captures three distinct dimensions of impulsivity: attentional impulsiveness, motor impulsiveness, and nonplanning impulsiveness (Patton, Stanford, & Barratt, 1995). A number of investigations using this instrument has found that men obtained higher

total scores and higher subscale scores than women did (e.g., Compton & Kaslow, 2005; Stoltenberg, Batién, & Birgenheir, 2008). However, in at least one study, men's comparatively higher total scores resulted essentially from higher scores on a single subscale, namely, motor impulsiveness (Eisenberg et al., 2007). Moreover, several studies have not found any significant gender difference in impulsivity as measured by the BIS-11 (e.g., Kamarajan et al., 2008; Rogers, Jordan, & Harrisson, 2007; Smith, Waterman, & Ward, 2006), and one study has found comparatively higher total scores for women, which resulted from higher scores on attentional impulsiveness and motor impulsiveness (Lejuez, Bornovalova, Reynolds, Daughters, & Curtin 2007).

In a recent attempt to uncover basic mechanisms of impulsivity on which the genders might differ, Cross, Copping and Campbell (2011) conducted a meta-analysis of 277 studies that was organized around the tripartite theoretical distinction between reward hypersensitivity (strong approach motivation), punishment hyposensitivity (weak avoidance motivation), and inadequate effortful control. Effortful control describes the "ability to choose a course of action under conditions of conflict, to plan for the future, and to detect errors" (Rothbart, 2007, p. 207). Behaviorally, it is defined as the ability to inhibit a dominant response and perform a subdominant response. According to Cross and colleagues (2011), these three mentioned basic mechanisms of impulsivity may be illustrated by an automotive analogy: An impulsive individual may be thought of as a driver who has a problem with a stuck accelerator (strong approach motivation), a problem of faulty brakes (weak avoidance motivation), or a problem of poor judgment and control in complex situations. In their meta-analysis, Cross and colleagues (2011) found that men showed higher sensation seeking, which may be regarded as one dimension of reward sensitivity. In contrast, women were consistently more punishment sensitive. Regarding effortful control, men reported slightly more deficits on questionnaire measures, but there were no significant gender differences in delay discounting tasks (where impulsivity is manifested in favoring a smaller but immediate reward over a bigger but delayed reward) or executive function tasks (where impulsivity is manifested in an inability to

inhibit motor responses, maintain attention, develop and execute a plan, or switch attention to a new set of properties of the environment).

A new approach to impulsivity: The UPPS Impulsive Behavior Scale

As Cross and colleagues (2011) point out in the conclusions of their meta-analysis, the fact that no coherent overall pattern of gender differences in impulsivity has as yet emerged from research may partly be explained by the proliferation of incomplete and sometimes incompatible conceptualizations and measurements of this personality construct (for a review of conceptualizations, see Evenden, 1999). In an attempt to overcome the inflation of approaches to impulsivity, Whiteside and Lynam (2001) administered 17 widely used impulsivity scales and the Revised NEO Personality Inventory (NEO-PI-R; Costa and McCrae, 1992) to a sample of 437 undergraduate students. An exploratory factor analysis conducted on these impulsivity scales and on four impulsivity-related facets of the NEO-PI-R (impulsiveness, excitement seeking, self-discipline, and deliberation) resulted in a four-factor solution. Following content analysis, these factors were labeled urgency, lack of premeditation, lack of perseverance, and sensation seeking. Finally, the items with the highest loadings on each factor were selected to create four new scales, which together form the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001).

The first facet of UPPS impulsivity, urgency, can be defined as the tendency to act rashly, especially under conditions of negative affect. This facet has been shown to reflect a relative inability to deliberately suppress automatic, dominant, or prepotent responses (Gay, Rochat, Billieux, d'Acremont, & Van der Linden, 2008). The second facet of impulsivity, lack of premeditation, may be characterized as the tendency not to consider the consequences of an act before engaging in that act. This facet seems to relate to deficient

anticipation of future outcomes in decision-making processes (Bechara & Van der Linden, 2005). The third facet of impulsivity, lack of perseverance, refers to an individual's inability to remain focused on a task, especially if the latter is boring or difficult. This facet is linked to a relative inability to inhibit recurrent and irrelevant thoughts or memories (Gay et al., 2008). The fourth and final facet of impulsivity, sensation seeking, has been described as a "tendency to enjoy and pursue activities that are exciting and openness to trying new experiences" (Whiteside & Lynam, 2001, p. 686). In contrast to the first three dimensions, which imply executive and effortful control capacities, sensation seeking seems to involve motivational aspects of impulsivity, which rely on a system that exaggerates the impact of reward and undermines the impact of punishment (Bechara et al., 2002).

Investigations using the UPPS Impulsive Behavior Scale have repeatedly revealed gender differences on three of its dimensions: Women generally score higher on urgency (e.g., Gay et al., 2008; Whiteside & Lynam, 2003), whereas men tend to obtain higher scores on lack of perseverance (e.g., Schmidt, Gay, d'Acremont, & Van der Linden, 2008; Van der Linden et al., 2006) and sensation seeking (e.g., Billieux, Rochat, Rebetz, & Van der Linden, 2008; d'Acremont & Van der Linden, 2005; see also Cross et al., 2011). Urgency has proven to be the form of impulsivity most strongly associated with psychopathology (Whiteside, Lynam, Miller, & Reynolds, 2005): Urgency has, for example, been associated with cigarette craving (e.g., Billieux, Van der Linden, & Ceschi, 2007), concern for dieting (e.g., Mobbs, Ghisletta, & Van der Linden, 2008), problematic gambling (e.g., Whiteside et al., 2005), obsessive-compulsive symptoms (e.g., Zermatten & Van der Linden, 2008), depression (e.g., d'Acremont & Van der Linden, 2007), insomnia (e.g., Schmidt, Gay, & Van der Linden, 2008), borderline personality disorder features (e.g., Whiteside et al., 2005), and antisocial personality traits (e.g., Whiteside & Lynam, 2003). In view of the associations between urgency and a wide range of behavioral and psychological problems, the gender difference on this facet of impulsivity is of particular clinical importance.

Can gender differences in UPPS-defined impulsivity help explain gender differences in psychopathology?

In view of these associations, the question arises as to whether gender differences in the prevalence of certain types of psychopathology can at least partly be traced back to diverging levels of urgency in men and women. It is, for instance, well-established that women suffer significantly more often from insomnia than men do (e.g., National Sleep Foundation, 2008). A recent investigation from our laboratory has revealed that urgency-related rash behavior tends to entail counterfactual thinking and corresponding emotions (regret, shame, guilt) at sleep onset, thereby contributing to insomnia (Schmidt & Van der Linden, 2009). The term “counterfactual thinking” refers to comparing the facts of reality with counterfactual imaginations of what might have been (e.g., “If I had [not] done X, I would be in a better situation now”; e.g., Epstude & Roese, 2008; Zeelenberg & Pieters, 2007). Regret, shame, and guilt are generally conceptualized as “counterfactual emotions” because they flow from counterfactual thoughts about what might have been (e.g., Kahneman & Miller, 1986). Given that women generally score higher on urgency than men do (e.g., Gay et al., 2008; Whiteside & Lynam, 2003), women may be more prone to experience counterfactual thoughts and emotions at bedtime, which may partly explain the higher prevalence of insomnia in women – an intriguing hypothesis that calls for investigation.

Moreover, a follow-up study to our initial investigation (Schmidt & Van der Linden, 2009) revealed that the effect of urgency on counterfactual processing and insomnia is partially mediated by the use of a dysfunctional strategy of shame regulation, namely, self-attacking (Schmidt, Gay, Gomez, Van der Linden, in preparation). Self-attacking, also called self-blame, refers to self-directed anger or contempt that typically manifests itself in inner speech (e.g., “How stupid I am!”). The findings of our follow-up study (Schmidt et al., in preparation) are in line with the results of an earlier investigation into the relations between urgency and depression in adolescents (d’Acre-

mont & Van der Linden, 2007), which revealed that the effect of urgency on depression was mediated by the use of inappropriate emotion regulation strategies such as self-blame and rumination.

Given that women turn to self-attacking more often than men do (Elison, Lennon, & Pulos, 2006), the data of the two mentioned studies (d'Acremont & Van der Linden, 2007; Schmidt et al., in preparation) suggest that maladaptive shame regulation may amplify the effect of impulsive urgency on insomnia and depression in women, thereby potentially contributing to the higher prevalence of insomnia (e.g., National Sleep Foundation, 2008) and depression (e.g., Angst et al., 2002) in women. For instance, after insulting a friend in a fit of anger, women may be comparatively more inclined to engage in self-attacking when reviewing their daytime behavior in bed (e.g., by saying to themselves: "What an idiot I am! How could I be so inconsiderate!"), with the use of self-attacking being likely to increase sleep-interfering feelings of shame and related counterfactual thoughts (e.g., "If only I had shut up!").

To summarize, the presented evidence suggests that impulsive urgency not only contributes to symptoms of the externalizing spectrum (e.g., antisocial behavior) but also to those of the internalizing spectrum (e.g., depression), and that the experience of shame and related counterfactual emotions may play a pivotal role in determining diverging pathways from urgency to psychopathology in men and women. In fact, shame has been shown to potentially trigger both externalizing and internalizing symptoms, essentially depending on the way this emotion is regulated (e.g., Tangney, Stuewig, & Mashek, 2007): Inward-directed coping styles, such as self-attacking and withdrawal, favor internalizing symptoms, whereas outward-directed styles, such as blaming and attacking others, promote externalizing symptoms. Given that women are comparatively more inclined to adopt internalizing shame coping styles (Elison et al., 2006), impulsive urgency may more easily translate into internalizing symptoms in women as compared with men. Gender-typical strategies of coping with impulsivity-driven shame may thus contribute to the comparatively higher prevalence of externalizing symptoms in men and of internalizing symptoms in women (for the prevalence of externalizing/internalizing syndromes, see Kramer, Krueger, & Hicks, 2007).

Apart from urgency, lack of perseverance and sensation seeking also merit attention in a gender perspective because, as already mentioned, men tend to score higher on these facets of impulsivity than women do. Moreover, the two facets are also associated with psychopathological conditions. For example, lack of perseverance has been found to be associated with depression and insomnia, albeit to a lesser degree than urgency is (e.g., d'Acromont & Van der Linden, 2007; Schmidt et al., 2008), and sensation seeking has been shown to be related to antisocial and borderline personality features (Whiteside et al., 2005). However, even if these facets sometimes contribute to the same disorders as urgency does, the underlying mechanisms are clearly different. To illustrate, while both urgency and lack of perseverance relate to insomnia (e.g., Schmidt, Gay, Ghisletta, & Van der Linden, 2010), only the former facet is connected to sleep-interfering counterfactual emotions such as shame (Schmidt & Van der Linden, 2009). Moreover, and contrary to urgency, lack of perseverance cannot account for the comparatively higher prevalence of insomnia in women because men generally score higher on this facet of impulsivity.

Thus, the pathways from gender differences in impulsivity to specific forms of psychopathology have to be tracked separately for each facet of this personality construct. For example, sensation seeking seems to be specifically related to sensitivity to reward (Torrubia, Ávila, Moltó, & Caseras, 2001). Interestingly, a recent study has found that reward drive was associated with problem gambling in men, but not in women (Loxton, Nguyen, Casey, & Dawe, 2008). Future investigations will have to determine the degree to which the sensitivity-to-reward mechanism may account for self-reported differences in sensation seeking.

Conclusions and Challenges for Future Research

In conclusion, three important points emerge from a review of the literature on gender differences in impulsivity and psychopathology. First, given that impulsivity is a multi-dimensional construct, the question of gender differences has to be addressed for each of these dimensions separately. For example, when adopting the multi-faceted view of impulsivity termed UPPS (Whiteside & Lynam, 2001), it appears that men score higher on some dimensions (e.g., sensation seeking), whereas women score higher on others (e.g., urgency). Second, gender differences on specific dimensions of impulsivity may contribute to gender-specific pathways to psychopathology and gender-disparate levels of prevalence. For example, women generally score higher on impulsive urgency and, as a consequence, are more prone to experience counterfactual emotions, which have been shown to interfere with sleep (Schmidt & Van der Linden, 2009; Schmidt & Van der Linden, 2011). Impulsive urgency may in this way contribute to the higher prevalence of insomnia in women (for the gender difference in prevalence, see, e.g., Mai & Buysse, 2008). And third, gender differences in emotion regulation are an important part of gender-specific pathways from impulsivity to psychopathology. For example, women are comparatively more likely to adopt internalizing shame regulation strategies, such as self-attacking and withdrawal (Elison et al., 2006), and the use of these strategies has been shown to partly mediate the effect of impulsive urgency on insomnia (Schmidt et al., 2011).

In view of these connections between impulsivity and psychopathology, a more thorough elucidation of gender differences could significantly advance our understanding of gender-typical pathways to psychological problems. Research in this field of investigation currently faces a number of challenges. On the methodological front, self-report measures of impulsivity are in need of further extension and refinement. For instance, even though the innovative approach to impulsivity as developed by Whiteside and Lynam (2001) may be regarded as the most comprehensive to date, recent evidence suggests that it has to be complemented. There is, for example, evi-

dence that not only negative but also positive affective states can precipitate “urgent”, that is: rash and ill-advised behavior (for a review, see Cyders & Smith, 2008), and, accordingly, an expanded version of the original UPPS scale has been proposed that also includes a subscale of positive urgency (Cyders et al., 2007). Of note in the present context, positive and negative urgency seem to be differentially related to psychological problems that show gender differences in terms of prevalence. For example, bulimic behavior, which is more prevalent in women (e.g., Hudson, Hiripi, Pope, & Kessler, 2007), is better predicted by negative than positive urgency (Fischer, Smith, & Cyders, 2008; Smyth et al., 2007). Conversely, illegal drug use, which is more prevalent in men (e.g., Sutherland & Willner, 1998), is better predicted by positive than negative urgency (Zapolski, Cyders, & Smith, 2009). In order to obtain a complete picture of gender-specific pathways from impulsivity to psychopathology, measures of positive urgency should therefore be included in future research.

As for behavioral measures of impulsivity, the challenge for future research is to develop paradigms and tasks that map onto the dimensions of impulsivity that have emerged from self-report studies (e.g., Gay et al., 2008). A look at the existing literature reveals that this challenge is arduous: Tasks that purportedly assess impulsivity are often not correlated with self-report measures of this personality construct (e.g., Reynolds, Ortengren, Richards, & de Wit, 2006) or differ from self-report measures in the prediction of pathology (e.g., Stoltenberg et al., 2008). However, recent research demonstrates that self-report and behavioral measures of impulsivity can successfully be matched (e.g., Billieux, Gay, Rochat, & Van der Linden, 2010; Cyders & Coskunpinar, *in press*). The development of behavioral measures that map onto self-reported dimensions of impulsivity is all the more important as gender differences have been found on some of the existing measures. For example, a difference on the Balloon Analogue Risk Task was found suggesting that men are willing to continue the pursuit of a reward in the face of increasing risk for a longer time than women (for a review, see Cross et al., 2011). To obtain a complete picture of gender-specific associations between facets of impulsivity and psychological problems, meth-

odological approaches that integrate self-report and behavioral measures thus seem most indispensable.

Finally, regarding physiological measures of impulsivity, an analogous challenge calls for research efforts. A number of physiological correlates or markers of impulsivity have been proposed, for example diminished functioning of the serotonergic system (e.g., Carver & Miller, 2006) or the noradrenergic system (e.g., Chamberlain & Sahakian, 2007), decreased P300 amplitude of event-related potentials (e.g., Justus, Finn, & Steinmetz, 2001), and reduced response in event-related oscillations (e.g., Kamarajan et al., 2008). Of particular interest in the present context, some of these physiological concomitants of impulsivity have been shown to be differentially related to gender. For example, Justus and colleagues (2001) found that a reduction in the P300 amplitude of event-related potentials – purportedly a physiological marker of disinhibited behavior – is associated with impulsivity, social deviance, and alcohol problems in men, but not in women. According to the authors of the study, a possible explanation for this finding is that the mechanisms underlying vulnerability for social deviance and alcoholism differ between the two genders. Clearly, the precise relations between physiological, behavioral, and self-report measures of the different dimensions of impulsivity call for further investigation.

Aside from the methodological front, researchers are also faced with considerable challenges at the etiological front. A number of different biological and psychosocial factors have been proposed to account for gender differences in impulsivity and impulsivity-related disorders, but the interplay between these factors is far from being completely understood. Among the biological factors, genetics have been implicated in impulsivity (e.g., Congdon & Canli, 2008). Twin studies using various questionnaire measures of impulsivity have, for example, revealed that approximately 45% of the variance in self-reported impulsivity is accounted for by genetic factors (Hur & Bouchard, 1997; Pedersen, Plomin, McClearn, & Friberg, 1988; Seroczynski, Bergeman, & Coccaro, 1999). Genetics have also been implicated in gender differences in impulsivity-related pathologies. Regarding alcoholism, for instance, adoption and twin studies indicate that genetics play a role as a risk factor, with some

studies suggesting that this role is more important in men (for a review, see Nolen-Hoeksema, 2004).

With regard to the psychosocial origins of gender differences in impulsivity and impulsivity-related pathologies, there is evidence suggesting that factors such as parenting, gender roles, and social sanctions also play an important role (e. g., Nolen-Hoeksema & Hilt, 2006). To illustrate, Patock-Peckham and Morgan-Lopez (2006) found that a permissive parenting style can increase levels of impulsivity in the child, especially within the father-son and mother-daughter dyads, thereby indirectly influencing later alcohol use and abuse in the offspring. Providing another illustration, Chapple and Johnson (2007) analyzed data from the National Longitudinal Survey of Youth (NLSY) in the U.S. (Center for Human Resource Research, 2004) and found that impulsivity in boys was significantly predicted by living in poverty, poor early motor skills, poor reading abilities, less maternal monitoring of whom the boys were with while outside the home, a lower attachment to their mothers, and their mothers' use of nonpositive, inefficient discipline. For girls, impulsivity was significantly predicted by living in poverty and, marginally, by reading ability. These findings suggest that the social structuring of impulsivity is even more important for boys than for girls. Chapple and Johnson (2007) concluded that boys' disorganized familial environments detrimentally impact their impulsivity, perhaps through poorer early development of their motor skills and reading ability. The integration of this psychosocial perspective on gender differences in impulsivity with the earlier mentioned biological approach might be viewed as one of the major theoretical challenges in this field of investigation.

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Q&A Box: Ralph Erich Schmidt and Martial Van der Linden

Where do gender differences in impulsivity and impulsivity-related psychological problems come from – socialization and culture or biological differences?

The big picture that emerges from different strands of research suggests that gender differences in impulsivity and in impulsivity-related disorders result from a complex interplay between biological and cultural factors. Twin studies that used various questionnaire measures of impulsivity have, for example, found that approximately 45% of the variance in self-reported impulsivity may be accounted for by genetic factors (e.g., Congdon & Canli, 2008). Adoption and twin studies also indicate that genetics play a role in impulsivity-related pathologies: Regarding alcoholism, for instance, the available evidence suggests that genetics play a role as a risk factor, with some studies suggesting that this role is more important in men than it is in women (e.g., Nolen-Hoeksema, 2004). As the percentage of variance explained by genetic factors indicates, there is ample room for cultural factors in forging individual differences in impulsivity. Longitudinal data indicate, for instance, that factors such as living in poverty, poor early motor skills, poor reading abilities, low maternal attachment, and use of inefficient sanctions by the parents may all predict higher levels of impulsivity in children (Chapple and Johnson, 2007). Of note, the relations between, on the one hand, low maternal attachment and parental use of inefficient sanctions, and, on the other hand, impulsivity, were stronger for boys than for girls, suggesting that adverse family environments detrimentally impact impulsivity especially in boys. Future research will have to disentangle how exactly biological and cultural factors interact to forge gender differences in the different facets of impulsivity, taken separately.

From a methodological standpoint, what do you recommend to researchers who study emotion in terms of taking into account gender differences?

To investigate the complex interactions between biological and cultural factors in the development of gender differences in impulsivity and impulsivity-related psychopathology, an integration of different levels of analysis is required. To date, the impact of genetic factors has mainly been examined by means of adoption and twin studies, but molecular genetics have recently opened new methodological approaches. For example, whole-genome scans will allow us to discover novel gene polymorphisms associated with impulsivity in healthy and in patient populations of both genders (e.g., Congdon & Canli, 2008). Further biological factors or physiological markers of impulsivity may be investigated by

using measures of functional brain activity. For example, the P300 amplitude of event-related potentials, purportedly a marker of disinhibited behavior, has been found to be associated with impulsivity, social deviance, and alcohol problems in men, but not in women (Justus et al., 2001). For cultural factors, their impact can essentially be grasped with behavioral and questionnaire measures, and the main challenge for research here is to develop experimental tasks that map onto self-reported facets of impulsivity. For example, many existing behavioral tasks assess inhibitory deficits in emotionally “cool” conditions, but impulsive behavior is often observed in emotionally “hot” conditions – a distinction that is of particular importance with respect to gender differences because women may have an advantage in affective inhibition (Cross et al., 2011). In order to track interactions between biological and cultural factors over time, longitudinal studies using a combination of the previously mentioned levels of analysis seem particularly promising.

What is the finding on gender differences that surprised you the most in your own research?

There is suggestive evidence that women have an advantage over men in “hot” forms of inhibition, which refer to control over social and affective processes (e.g., Cross et al., 2011). Surprisingly, however, recent research also indicates that women consistently score higher than men on a specific facet of impulsivity termed “urgency”, which refers to a tendency to act rashly, especially under conditions of negative affect (Whiteside & Lynam, 2001). As a consequence of their rash behavior, women are comparatively more prone to experience feelings of regret, shame, and guilt, to engage in dysfunctional strategies of emotion regulation, such self-attacking (Elison et al., 2006; Schmidt et al., 2011), and to suffer from psychological problems such as insomnia and depression (d’Acremont & Van der Linden, 2007; Schmidt & Van der Linden, 2009). The reasons that women are more liable to experience impulsivity-driven feelings of regret, shame, and guilt are likely multiple. Consistent evidence indicates that women are comparatively more punishment sensitive (e.g., Cross et al., 2011). From an evolutionary viewpoint, women’s reproductive success may depend to a greater extent than men’s upon avoiding harm to their social relationships (e.g., Taylor et al., 2000), and higher punishment sensitivity may be a mechanism that contributes to the maintenance of social relationships. The reverse side of this prosocial motivation may be that women are more prone to experience “emotional sanctions” when they act on impulse and thereby violate social rules or norms.

Q&A Box: Marco Piccinelli

Based on your research, where do gender differences in depression come from – socialization and culture or biological differences between females and males?

Environmental, social and cultural factors play a greater role in gender differences in depression compared to genetic and biological factors.

Adverse experiences in childhood may be partly responsible for a female preponderance in depression rates, due to females being more sensitive to their depressogenic effects and at greater risk of certain events (e.g., sexual abuse).

The assumption that females suffer from higher rates of adverse life events leading to depression has received inconsistent support. Actually, females tend to rate higher the actual impact of adverse events and experience feelings of defeat, humiliation and entrapment, in response to them possibly because of their distinctive social circumstances.

Females are more likely to sustain role limitations within different domains of private and social life. The resulting lack of choice or limited opportunities, disadvantaged socioeconomic position, role overload and competing social roles contribute to females' increased risk of depression.

Although genetic factors retain a strong influence on liability to depression, they do not seem to contribute to the increased risk to females by a direct mechanism. On the other hand, genetic factors might indirectly increase vulnerability to depression in one gender through temperamental features associated with low self-esteem and cognitive vulnerability, exposure to negative life events and reduced social support or social integration.

Gonadal hormones influence neurotransmitter functioning and circadian rhythms through both genomic and non-genomic effects and contribute to personality features and coping responses to stress, although their contribution to gender differences seems smaller compared to environmental variables.

Gender differences have been reported in two neurotransmitter systems traditionally implicated in the pathophysiology of depression (namely noradrenalin and serotonin), but their role is still unclear. In any case, there seem to be no gender differences in response to antidepressants.

What should everybody know about gender differences in depression?

Although several artefactual determinants (e.g., study design and measurement procedures, thresholds for caseness, effect of recall, developmental pathways towards depression, depression course, help-seeking and illness behaviour) may

enhance a female preponderance in depressive disorders, evidence has been provided that gender differences in depression are genuine.

Alongside more universal biological and psychological factors which are responsible for females' increased risk of depression across countries, socioeconomic factors, family-related characteristics, social roles and cultural norms moderate the relationship between gender and depression and may account for between-country differences in depression levels and the associated gender gap.

Whereas depression rates in males and females are comparable in childhood, a dramatic rise in depression levels occurs during adolescence, especially among females, leading to females being twice as likely to suffer from depression compared to males from then on.

Efforts aimed at the integration of determinants of gender differences in depression into aetio-pathogenetic models have led to the construction of developmentally sensitive cognitive vulnerability-transactional stress models of depression, explaining the emergence of the gender difference in depression in adolescence. In these models stress related to negative life events contribute to initial elevations of general negative affect. Cognitive vulnerability factors are then responsible for the initial negative affect progressing to depression. In turn, depression can lead to more self-generated negative life events, thus starting the causal chain again.

However, this is not the only direction linking negative life events, cognitive vulnerability and depression. Gender differences in depressive symptoms may also emerge prior to gender differences in cognitive vulnerability and negative life events and significantly mediate the emergent gender difference in cognitive style and exposure to negative life events (especially, interpersonal stress). Moreover, gender by itself may moderate the predictive relationships between stress related to negative life events, vulnerability and/or the vulnerability-stress interaction and depression, with females showing stronger association between the cognitive vulnerability-stress interaction and depression over time.

Where do you see the field of gender and depression going in the next 20 years?

It goes without saying that new acquisitions in the fields of neurosciences and psychology and the ongoing changes in social norms and cultural values may provide new insights into gender differences in depression.

We have high expectations based on the findings stemming from genetic mapping, functional neuroimaging, neuroendocrinology, the neural and genetic basis of cognition, emotion and behaviour, the refinement of resilience and vulnerability factors, only to quote a few topics.

In general, social sciences have devoted greater attention to the effect on females' mental health by changes at different levels (e.g., legal context, wel-

fare system, family arrangements, labor market, etc.), which might provide females with greater economic independence and increasing sharing of childcare responsibilities with males and lessen their risk of economic discrimination and job inequality as well as role overload and role conflict. The associated challenges to the traditional definition of masculinity and the higher risk of males to develop depression have been far less investigated, pointing to the need to fill this gap.

So far, research in gender differences in depression has conceived gender in binary terms (males versus females) and not as a continuum along which the so-called gender identity disorders also find a place. There is an ongoing debate regarding the removal of gender identity disorders from classifications of mental disorders. Indeed, in May 2009 France was the first country in the world to no longer consider “transsexualism” a mental disorder. If this is the case, new challenges are posed to the study of gender differences in depression by a different way of looking at the development and maintenance of gender identity through a complex process involving genetic, biological, environmental and socio-cultural factors.

The Brain

3. Gender and Social Emotions: A Review of the Neuroscientific Literature on Empathy and its Link to Psychopathy, Antisocial Behavior and Alexithymia

CHRISTIAN M. BRODBECK and GIORGIA SILANI

In the current chapter, we review gender differences reported in the literature on three related topics: (1) empathy, the ability or disposition to understand and share the feelings of others; (2) antisocial personality disorder (APD), characterized prominently by a lack of empathy and concern for other people's feelings; and (3) alexithymia, a disorder characterized by an inability to identify one's own emotions, with consequent reduction of the understanding and sharing of other's emotions. Consistent gender differences have been found on a behavioral level in all three areas: Women tend to be more empathic than men, less vulnerable to APD, and less alexithymic (i. e., better at identifying and reporting their emotions). While research on the neurological differences underlying these gender differences is often less conclusive, we try to provide a summary of different approaches and results.

Empathy

Empathy is a crucial component of successful social interaction. The term originally comes from the Old Greek "empathia" (passion), which is composed of "en" (in) and "pathos" (feeling) and denotes an affective response to the directly perceived, imagined or inferred emotional state of another being (see Batson, 2008 for a review). According to Rogers (1959), the term empathy is defined as the ability "to perceive the internal frame of reference of another with accuracy and with the emotional components and meanings which

pertain thereto as if one were the person, but without ever losing the ‘as if’ condition” (Rogers, 1959, p. 210). At a phenomenological level, the concept of “empathy” expresses a sense of sameness, a sharing between one’s own feelings and those expressed by another person (Thompson, 2001), and at the same time implies a cognitive mechanism that keeps track of the source of the emotional state, and thus differentiates the self from the other. In our own understanding, empathy requires the engagement of two key components. The first component is sharing the other person’s affect. More precisely, an empathic response requires that an individual’s (referred to as the *observer*) perception or imagination of someone else’s (the *target*) affective state triggers a feeling in the observer that is partially isomorphic to what the target is feeling. Second, and equally important, the observer has to be aware at any point in time that the source of his or her feelings is the target. This stresses the central importance of the capacity for self/other distinction, which is the ability to distinguish between mental and bodily representations related to the self or to the other (de Vignemont and Singer, 2006, Decety and Lamm, 2006, Singer and Lamm, 2009). Is this fundamental ability expressed and wired differently in men and women? Recently, social psychologists and neuroscientists have started to uncover answers to this question.

Behaviorally, higher levels of empathy in girls compared to boys are found starting at 21 months (Hastings et al., 2000; Owen-Anderson et al., 2008). When Knickmeyer et al. (2006) asked 4-year-olds to describe cartoons with 2 moving triangles, females used more mental and affective state terms, whereas males used more neutral words. Women generally achieve higher scores on the Empathy Quotient (EQ; “empathizing” being the drive to identify another person’s emotions and thoughts and respond to them appropriately), men on the Systemizing Quotient (SQ; “systemizing” being a drive to analyze systems or construct systems) (Nettle, 2007; Wakabayashi et al., 2007, 2006). However, these differences are cancelled when taking into account the familiarity with the partner: males and females (aged 14–21) performed equally well when rating the emotional state of their significant other in a videotaped discussion (Haugen et al., 2008).

Event related potentials (ERP, electrical potentials on the scalp influenced by brain activity) have been used to track gender differences

in the empathic response. Emotional as compared to neutral pictures have been consistently observed to evoke a late positive potential (LPP) over centro-posterior sites, starting around 300–400 ms (Bradley et al., 2009). In the study of Han and colleagues ERPs were measured during observation of pictures of hands in painful versus neutral situations. (Chinese) women, as compared to men, showed a stronger correlation between amplitude of an early ERP component (140–180ms) and ratings of subjective unpleasantness and pain attributed to the model (Han et al., 2008). Similarly, Proverbio et al. (2008) measured responses to pictures involving (a) humans in positive and negative contexts and (b) positive and negative scenes with no humans visible. They found that the LPP was disproportionately increased in response to pictures of suffering humans in women but not in men, while no differences were observed in response to emotional scenes. The authors interpreted these results as indicators of a stronger empathic response in women as compared to men.

Fukushima and Hiraki (2006) recorded ERPs while subjects took part in an economic game task with another person, where the two participants took turns in betting money. Each win for the player entailed a loss of the same amount for the observer and vice versa. While both genders showed a medial-frontal negativity (MFN, between 200 and 300ms) for loss vs. gain when they were the players themselves, only women, and not men, also showed an MFN for the other participant's loss vs. gain (even though that entailed a win for themselves). In the whole sample, MFN amplitude to games played by the other participant (but not by themselves) correlated with both affect related to the other's outcome and the difference (empathizing score – systemizing score). Using functional magnetic resonance imaging during first person and vicarious experience of physical pain, Singer and colleagues found that while men's empathic brain responses (defined as the amount of 'shared network' between self and other) were reduced by the perceived unfairness of the partner, women's didn't show this effect (Singer et al. 2006).

Besides being more empathic, women are better at recognizing emotional cues in others. A meta-analysis by Hall (1978) indicated that women are consistently better than men at identifying emotions from face, body and voice tone. ERP studies have also observed a

gender difference in the processing of emotional prosody, which suggests that women attend to emotional prosody more than men. When participants are asked to classify words into emotionally positive and negative stimuli according to their meaning, a mismatch may occur between prosodic and semantic (e. g., *happy*, pronounced with sad prosody) components. This interference is visible in longer reaction times (e. g. Grimshaw, 1998; Ishii et al., 2003). ERP studies found that such mismatch trials evoked a broad negativity in women that was absent (Schirmer et al., 2003) or delayed (Ishii et al., 2010) in men. In a related study (Schirmer et al., 2002), participants had to classify written words as positive or negative after hearing a seemingly unrelated sentence with neutral content, but spoken with emotional prosody. When words were presented shortly after the sentence (200 ms), only women showed a mismatch-related negativity, in addition to slower RTs to words whose valence was opposite that of the preceding sentence's prosody. However, with a longer interval (750 ms), men but not women showed a mismatch-related negativity. Together, these studies suggest that women integrate emotional prosody earlier in linguistic processing than men.

In an fMRI study employing the same task (Schirmer et al., 2004) incongruence lead to increased BOLD signal in the IFG (BA 44 and 45), bilaterally in women, but only in the right hemisphere in men. The results have been interpreted in light of the connection between mirror neuron system and empathy (see following section)

Empathy and the Mirror System

The initial component that precedes empathy is based on the concept of somatic imitation, also known as “emotional contagion”, which is the tendency to simulate automatically the expressions, vocalizations, postures, and movements of another person and, consequently, to synchronize emotionally with others (Hatfield, Cacioppo, Rapson, 1993). It has been suggested that, initially, unconscious imitation has evolved as a mechanism to promote survival and conservation of the

species, allowing the development of communication skills. The pioneering work of Rizzolatti and coworkers (Rizzolatti & Craighero, 2004, for a review) has shown that neurophysiologically we are wired to resonate with other people's intentions and actions. Through electrophysiological recordings in monkeys, as well as neuroimaging experiments on humans, it has been shown that the mere observation of actions performed by others activates the observer's cortical areas involved in the planning and initialization of the same action. This has led to claims that humans and monkeys possess a so-called *mirror neuron system*, which mainly includes the inferior parietal lobe and the inferior frontal gyrus (pars opercularis) and enables us to automatically mirror the actions of others. Several observations suggest that this system is stronger in females than in males. For example, Cheng et al. (2007) measured the strength of the soleus reflex evoked by electrical stimulation on the left leg while participants observed videos of leg movements. In both men and women, the reflex was stronger when they watched the videos than when they watched a black screen, suggesting that their motor system mirrored the observed actions, but the modulation was significantly stronger in women compared to men.

Increased mirroring in women has also been observed in facial muscles. Women more readily facially express their emotions compared to men (see Sonnby-Borgstrom et al., 2008) and also more readily mirror emotions perceived in others' facial expressions (Dimberg & Lundquist, 1990). To learn more about the time course of this effect, Sonnby-Borgstrom et al. (2008) presented subjects with emotional faces, varying exposure times between subliminal (23 ms), borderliminal (70 ms) and supraliminal (2500 ms). They measured both imitative response through activation of facial muscles, and emotional contagion through self-report of positive or negative hedonic tone after stimulus exposure. Both men and women already reported emotional contagion after subliminal exposure, even though they could not consciously perceive the face. While ratings for men remained stable with longer presentation times, emotional contagion increased for women. Interestingly, imitative facial expressions were not found after subliminal presentation, and emerged after longer presentations more consistently for women. Sonnby-Borgstrom et

al. interpreted their result in terms of cultural display rules, according to which women tend to amplify their emotional response, whereas men tend to inhibit them.

Another way to measure activity in the motor system of the brain is to measure suppression of the mu rhythm (e.g., Hari, 2006). The mu rhythm is a characteristic oscillatory brain potential with dominant frequencies around 10 and 20 Hz, which can be measured on the scalp over the motor cortex when the subject is at rest. The mu rhythm is suppressed when the subject moves, and rebounds thereafter. Thus, mu suppression is used as an index of activation of the motor system. Importantly, the mu rhythm is also suppressed when people observe actions performed by others, probably reflecting activation of the motor system as part of the mirror neuron system.

Cheng et al. (2008) reported that when participants watched hand actions, women showed more mu suppression than males, but when participants watched a moving dot, no gender differences in mu suppression were found. Mu suppression during the observation of hand actions correlated positively with the personal distress subscale of the interpersonal reactivity index (IRI-personal distress) and negatively with the systemizing quotient. Similarly, when viewing body parts in painful as well as non-painful situations, women showed stronger mu suppression than males did, and mu suppression only correlated with IRI-personal distress in women (Yang et al., 2009).

Consistent with these observations, a study comparing brain anatomy between men and women suggests that women have a stronger mirror system (Cheng et al., 2009). Compared to men, women had greater gray matter volume in two brain areas thought to be part of the core of the human mirror neuron system, the pars opercularis of the right inferior frontal gyrus (rIFG), and the right anterior inferior parietal lobule. Supporting the link with empathy, gray matter volume in these two areas also correlated with self-reported empathic disposition across all male and female participants.

Using fMRI (functional Magnetic Resonance Imaging), Schulte-Ruther et al. (2008) compared brain activity evoked by pictures of emotional facial expressions while participants focused either on their own emotional response or on the emotion expressed by the face. As a baseline, participants judged the age and gender of the face. For

both types of emotional judgements, women activated a region in the pars triangularis of the rIFG (just anterior to the pars opercularis) more strongly than males. Across men and women, activity in this region (and its homologue in the left hemisphere) during emotional judgement correlated with self-rated empathic ability, and reported intensity of the emotional response during the task. The authors argued that this reflected stronger activation of the mirror neuron system.

Alexithymia

Empathy is a complex social emotion that goes beyond mere emotional contagion. Moreover, it requires higher order cognitive processes such as the ability to differentiate self-related from other-related representations, as well as being aware of your own emotional experience. Self-awareness is therefore a necessary condition to make inferences about emotional states of others (Gallup 1982). In two studies involving subjects with alexithymic traits (alexithymia is a sub-clinical phenomenon marked by difficulties in identifying and describing feelings (Nemiah, Freyberg, & Sifneos, 1976), we recently tested the mechanisms underlying the ability to understand one's own emotions and its relationship to the ability to empathize (Silani et al., 2008, Bird et al. 2010). Notably, we observed that deficits in the understanding of one's own feelings are associated with hypoactivation of AI (anterior insula) both when inferring one's own emotional state and when empathizing with another's emotional state. This suggests that a lack of emotional awareness could cause a reduction of empathic behavior (defined as "embodied simulation"). Alexithymia in healthy populations is usually assessed using self-report questionnaires, such as the Toronto Alexithymia Scale (TAS). In such populations, smaller studies (n~200) often report finding no gender differences in Alexithymia scores among adults (Bagby et al., 1988; Parker et al., 1989) as well as adolescents (Sakkinen et al., 2007) and the elderly (Joukamaa et al., 1996). Studies with large samples (ns>1000) have found marginally higher levels among male

adolescents (Joukamaa et al., 2007) and adults (Franz et al., 2008; Honkalampi et al., 2004; Mattila et al., 2006), although in Salminen et al.'s (1999) sample of 1285 subjects representing the general population of Finland, men were alexithymic almost twice as often as women were (17% vs. 10%). However, sex differences might be culturally mediated, and differ for the three factors of the TAS: difficulty in identifying feelings, difficulty describing feelings and externally oriented thinking (Dion, 1996; Moriguchi et al., 2007; Salminen et al., 1999).

Several studies have linked the brain region called the anterior cingulate cortex (ACC) to emotional awareness (see Lane, 2000) and, conversely, the volume of this area has been found to be reduced in healthy people that scored high in alexithymia questionnaires (Borsci et al., 2009; Paradiso et al., 2008; but see Gundel et al., 2004). These results are complemented by observations of gender differences in the ACC. McRae et al. (2008) observed a positive correlation between the Levels of Emotional Awareness Scale (LEAS) and ACC activity in the context of viewing highly arousing pictures, and this correlation was significantly stronger in women than in men. Good et al. (2001) found greater amounts of gray matter in the ACC of women than men, while Gundel et al. (2004) found increased gray matter for females in the right but not the left ACC. Examining gray matter volume in three medial frontal sulci, Paus et al. (1996) found that gray matter volume of the cingulate sulcus (which they associated with integration of emotions with cognition) was significantly higher in women than men.

A neuropsychological model of alexithymia proposes that because emotions are localized in the right hemisphere and verbal expression depends on the left hemisphere, alexithymia is related to a lack of connection between the two cerebral hemispheres (Dewaraja & Sasaki, 1990; Montreuil & Pardinielli, 1995). Two studies in non-clinical participants with high alexithymia scores reported reduced interhemispheric transfer in males and the absence of such an effect in females (Grabe et al., 2004; Lumley & Sielky, 2000). This might indicate that a breakdown of interhemispheric communication is associated with alexithymia in men, but not in women. However, two other studies using very similar procedures failed to replicate

this gender effect, reporting reduced interhemispheric transfer in males as well as females (Richter et al., 2006; Romei et al., 2008). In addition, alexithymia has been observed with agenesis of the corpus callosum (the main brain structure which connects the two hemispheres) in both sexes (cited in Tabibnia & Zaidel, 2005; Ernst et al., 1999; Paul et al., 2006). This seemingly inconsistent gender effect might thus simply be related to the tendency towards a more consistent lateralisation of functions in males as compared to females, which is sometimes (but not always) observed in studies of emotions (Wager et al. 2003) and language (Haut & Barch, 2006).

Psychopathy / Antisocial behavior

Psychopathy (as alexithymia) offers another good model for understanding gender differences in the empathic brain and behavior by understanding their failure. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM IV-TR), antisocial personality disorder (APD, also referred to as psychopathy), is characterized by an enduring, “pervasive pattern of disregard for, and violation of, the rights of others” (p. 701). Individuals with APD are frequently manipulative and deceitful, lack empathy, act impulsively, and often resort to aggression, with a disregard for the consequences for themselves and others.

Epidemiologic studies in different settings have typically found a higher prevalence for all varieties of antisocial behavior and disorders in males than in females by a factor of two or more (see review by Cale & Lilienfeld, 2002; Dolan & Vollm, 2009; Eme, 2007; Ullrich et al., 2003). The DSM IV-TR estimates the prevalence of APD in community samples to be about 3% in men and about 1% in women. Also in various problematic groups (e.g., delinquents, psychiatric patients, substance abusers), men were found to exhibit more antisocial tendencies, whereas women exhibited more mood and anxiety problems (Grella et al., 2009; Kim & Kim, 2005; Rogers et al., 2007; Trestman et al., 2007; Vesga-Lopez et al., 2008; Zlotnick et al., 2008).

On a biological level, Eme (2007) argued that males are predisposed to be more violent/antisocial (e.g., through factors as simple as possessing more physical strength). In addition, he reviewed evidence that certain male behavioral traits depend on prenatal androgen exposure. For example, an increased tendency to “rough and tumble” play can be observed in boys as early as age 2–3 years old, and such a tendency has clear parallels in chimpanzees. Crucially, this tendency is also observed in girls who were exposed to high levels of testosterone prenatally.

An additional biological factor is that men can be more vulnerable than women to polymorphisms in genes located on the X chromosome. Whereas males only have one X-chromosome, females have two, and can thus compensate for a deficient gene with a second copy (Eme, 2007; Good et al., 2003). A good candidate in this respect is the monoamine oxidase A (MAOA) gene (Buckholtz & Meyer-Lindenberg, 2008; Good et al., 2003). In men, a defective MAOA allele has been observed to cause borderline mental retardation, impulsive aggressive and antisocial behaviors, whereas (heterozygous) female carriers did not show behavioral abnormalities. In addition, MAOA expression in cultured skin cells was absent for male carriers, but in the low to moderate control range for heterozygous women (Brunner et al., 1993). While this outright defect in the MAOA gene is very rare, there is a common polymorphism between MAOA-H (higher MAOA expression) and MAOA-L (lower MAOA expression). Eme (2007) estimated that about one-third of human males are carriers of MAOA-L. Studies directly correlating MAOA activity and aggression have yielded mixed results. However, there is clear evidence that in males the MAOA-L genotype increases developmental vulnerability to adverse environmental influences with respect to the development of antisocial traits (Buckholtz & Meyer-Lindenberg, 2008; Taylor & Kim-Cohen, 2007).

Less is known on the specific nature of gender differences in APD. Indeed, a major criticism of research on APD is that it applies male criteria to women. The concept of psychopathy has been developed with an almost exclusive focus on the male gender, and concerns about its applicability to females have been raised repeatedly (e.g., Grann, 2000). For example, there are specific concerns

regarding the DSM IV-TR diagnostic criterion for APD that requires presence of childhood symptoms, which are more often absent in antisocial women than men (Rutherford et al., 1999). It has also been suggested that a single underlying etiology could lead to different expression in men and women, with APD being more common among males, and borderline personality disorder being more common among females (see Beauchaine et al., 2009).

A further caveat is that a lot of APD research has focused on incarcerated psychopaths, while many individuals with APD, so called “successful” psychopaths, manage to stay out of the criminal justice system (Gao & Raine, 2010). It is questionable to what extent results from the incarcerated male subgroup generalize to APD in general. For example, Gao and Raine suggest that successful psychopaths might be out of jail precisely because they do not share incarcerated psychopaths’ executive dysfunctions. These reservations should be kept in mind when interpreting studies on gender differences in APD.

In addition to quantitative differences in the incidence of APD, qualitative differences have been described between APD in males and females. In boys, antisocial tendencies seem to be associated more with direct aggression and violent behavior, whereas in girls they seem to be associated with relational and indirect aggression (Cale & Lilienfeld, 2002; Marcus, 1999; Marsee et al., 2005; Qouta et al., 2008; Viding et al., 2009). Studies comparing female and male psychopathic and violent offenders reported that females displayed significantly more lying, deceitfulness, lack of control and promiscuous sexual behavior, while males scored higher on antisocial behavior, especially adolescent antisocial behavior, and callousness/lack of empathy (Grann, 2000; Strand & Belfrage, 2005; see also Forouzan & Cooke, 2005). In addition, there is some indication that antisocial tendencies are more stable in males than in females over time (Helgeland et al., 2005; Rutherford et al., 1999; Schmidt et al., 2006; Windle, 1990).

Among participants in a longitudinal study, who were recruited from the general population and followed from an early age, increased negative emotionality and impulsivity in males compared to females explained 96% of the sex differences in antisocial behavior (cited by Strüber et al., 2008). Strüber et al. (2008) suggested that

differences in a neural emotion regulation network might be the neural basis of this gender difference: (a) While the amygdala (implicated in the learning of emotional associations) in men is of equal or greater volume than in women, women have been found to have larger orbito-frontal cortex volume (OFC, implicated in emotion regulation; Goldstein et al., 2001; Good et al., 2001; Gur et al., 2002). (b) During a task involving pictures with negative emotional facial expressions, women showed higher functional amygdala-OFC connectivity than men.

Finally, some psychophysiological variables could be more closely associated with antisocial tendencies in males than in females. A relation between low resting heart rate and antisocial behavior was found more consistently in males than in females (ages 16 to 18; Crozier et al., 2008). Male, but not female, college students who scored high on a self-report psychopathy scale lacked a stress-induced cortisol response to the Trier Social Stress Test (O'Leary et al., 2007). In 108 adolescents selected with high or low levels of callous-unemotional (CU) traits, male participants exhibiting elevated CU traits were uniquely characterized by low resting cortisol levels relative to male comparison groups, whereas testosterone levels did not differentiate groups and no hormone effects were found for female participants (Loney et al., 2006). Decreased ACC volume was a significantly better predictor of aggressive and defiant behavior in boys than girls (ages 7–17; Boes et al., 2008). Justus et al. (2001) reported that in a sample of mostly college students, social deviance, impulsivity, and alcohol problems were associated with reductions in the P300 ERP, but only in male subjects (the authors reported a significant social deviance x sex interaction in predicting the P300 amplitude.)

Conclusions

Finding gender difference requires more subjects than finding effects that are consistent across subjects. Consequently, psychological research often ignores potential gender-related differences. Accordingly, the absence of reports of gender differences in this literature

cannot be taken as evidence of the absence of gender differences. The results reviewed above suggest that there are consistent gender differences in these areas and mandate the inclusion of gender in future neuroscientific research.

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Q&A Box: Christian M. Brodbeck and Giorgia Silani

Based on your research, where do gender differences in emotion come from – socialization and culture or biological differences between women and men?

Reviewing the scientific literature about emotion and gender differences, it's quite surprising that in spite of many years of research on the topic, and evidence of differences between males and females in several aspects of emotional processing, from emotional awareness to empathy and psychopathy, it's still unclear where the origin of these differences comes from.

Finding a gender difference neither explains how the difference got there nor what maintains it. There are, of course, differences in the way men and women, as groups, approach and express emotion; and similarly there are biological differences between sexes, that drive and regulate development and behaviors. However, to focus only on the identification of differences is limiting, with the risk of reproducing folk notions and stereotypes. The challenge we have in the next years is to advance the understanding of the dynamic complexity of the relationship between gender and emotion, accounting for what is related to the biology, how the wiring of the systems is connected to the social realm, how it models it and how it is modeled.

From a methodological standpoint, what would you recommend researchers who study emotion in terms of taking into account gender differences?

In the field of neurobiology of emotion and gender, it must be noted that the trend so far has been to minimizing gender differences instead of understanding them. Finding gender differences requires more subjects than finding effects that are consistent across subjects. Consequently, neuropsychological and neurophysiological research often ignores potential gender related differences. Accordingly, the absence of reports of gender differences in this literature cannot be taken as evidence of the absence of gender differences. The results reviewed in this chapter suggest that there are consistent gender differences in these topics, and mandate the inclusion of gender in future research. Neuroimaging techniques are more and more suitable in basic and clinical research. This will possibly open to the systematic exploration of this issue. Secondly, societies model differently the expression and perception of emotion in men and women. The definition of experimental paradigms should take this into account, in order to provide an unbiased instrument for the detection of the neural underpinning of emotional processing across gender.

Where do you see the field of gender and emotions going in the next 20 years?

I believe that the field now is ready (from a theoretical and methodological point of view) to start a systematic investigation on the neurophysiological basis of gender and emotion. In the past few years, social neuroscientists have challenged the more classical cognitive approaches and brought creative ideas in order to investigate the neuronal bases of complex social interactions and emotions, opening up the possibility of understanding the mechanisms behind complex and dynamic phenomena. The combination of such experimental paradigms (taken from social psychology for example) with innovative neuroimaging techniques will help the characterization of gender differences on its behavioral, biological and sociological aspects, as well as the understanding of the distal and proximal causes of them. I believe that the future will give us some of the answers we have been waiting for.

4. Gender and the Affective Brain: Neuroscientific Perspectives

TATJANA AUE and PATRIK VUILLEUMIER

This chapter gives a general overview of gender differences in neural activations reported for memory and perception of affective stimuli. Given its prevalence in publications, we focus on visual stimulus material. Several gender differences have been repeatedly observed; however, their cause and consistency often remain unclear. We also broach the issues of whether observed gender differences in brain functioning might be subject to developmental factors, and how neuroscience on gender differences might advance our understanding of affective processing and associated affective disorders. Despite differences reported in the reviewed areas, one has to keep in mind that research on gender effects in the affective neurosciences has just started. Future studies that systematically investigate conditions under which gender differentially affects brain functioning are therefore strongly warranted and will need to take into account various factors potentially associated with gender.

Gender and the affective brain

Gender differences in emotion perception and emotional behavior have often been described in psychology and neuropsychology (see also Chapters 1 & 2 of the current volume), but their exact nature and origin still remain unclear and even controversial. In behavioral studies, women are frequently found to exhibit greater sensitivity for threatening (social) information and facial expressions than do men (e.g., Bradley, Cuthbert, & Lang, 1999; McClure, 2000; Thayer & Johnsen, 2000). Women are also generally more expressive than are men (Kring & Gordon, 1998). In addition, males and females

display differential risk for diverse affective and anxiety disorders (e. g., Davidson et al., 2002; Merikangas et al., 2002; Nolen-Hoeksema, 1990; see also Chapter 3 on empathy). Even non-affective disorders such as schizophrenia go along with a differential impairment in emotion processing in men and women (Scholten et al., 2005). These observations converge to indicate that women might process affective stimuli differently than do men – either quantitatively or qualitatively (or both), which then impacts perception, memory, physiological responding, and behavior.

What is at the basis of these gender differences – how can they be explained? Can the differential sensitivity of males and females to emotional or social cues be related to specific changes in brain functioning or to activation of different neural networks? And if so, what might be the origin of these differential changes? Are they directly “caused” by gender differences, or instead induced by other mediating factors and possibly changing with context and time? In this chapter, we review recent research in affective neuroscience concerning gender effects on emotional memory and perception, with a focus on pictorial stimuli and facial expressions, since these are among the most effective and most studied emotional stimuli with a special social significance.

Research on memory

One area in which gender differences have been repeatedly observed concerns emotional memory. The amygdala, an almond-shaped structure located in the medial temporal lobe, that is implicated in fear and relevance detection (Sander, Grafman, & Zalla, 2003), plays a key role in modulating the storage of emotional information in memory. Interestingly, it has been demonstrated that successful memory for arousing pictures and film clips was positively related to left amygdala activation during the encoding phase in females but to right amygdala activation in males (Cahill et al., 2001, 2004; Canli et al., 2002). Moreover, since the amygdalo-cortical connec-

tions are mostly ipsilateral, it has been hypothesized that such laterality effects (i. e., brain functions being located either in the left or in the right hemisphere) might also be reflected at the cortical level. Consistent with this idea, Gasbarri et al. (2007) reported greater frontal and parietal P300¹ amplitudes in the right hemisphere in men than in women when shown unpleasant scenes in the encoding phase of a memory task. Conversely, women displayed stronger P300 amplitudes in the left hemisphere than did men. A similar pattern was revealed by latencies of the P300 component. No such effect was found for pleasant or neutral pictures in this study. However, Dolcos and Cabeza (2002) observed larger left frontal than right frontal evoked potentials for pleasant pictures in females, therefore suggesting that arousal rather than valence might be at the source of these effects.

Thus, male and female brains may show differential hemispheric organization that is further modulated by task-related perceptual or memory processes. What is more, lateralization effects have been observed even outside the context of emotional tasks. Amygdala connectivity in the resting state has been shown to differ between men and women, as demonstrated by Kilpatrick et al. (2006). Whereas the right amygdala displayed greater functional connectivity² in males than in females, the reverse was true for the left amygdala. Areas which were more strongly functionally connected to the right amygdala in males than in females (pulvinar, sensorimotor cortices, striatal areas, cf. Cahill et al., 2001) were located exclusively in the right hemisphere. Conversely, areas which were more strongly functionally connected to the left amygdala in females than in males (subgenual cortex, hypothalamus) were located exclusively in the left hemisphere (cf. Cahill et al., 2004). Such differential and

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- 1 The P300 amplitude describes a positive deflection in voltage in the electroencephalogram that occurs between about 300 to 600 ms after stimulus onset. It is triggered by unexpected or infrequent, task-relevant and/or affectively-laden stimuli.
 - 2 Functional connectivity is determined by intercorrelated activity between two or more different brain areas, suggesting dynamic interactions or dependencies between these areas.

lateralized brain connectivity pattern was interpreted in relation to greater attention to the internal versus the external environment in females versus males, respectively. Kilpatrick et al.'s (2006) findings may accord with the idea that resting state activity relates to processes mediating introspective states and interoceptive awareness (Gusnard & Raichle, 2001), and tends to differ according to gender (Gur et al., 1995). However, other factors might influence such amygdala asymmetries, including primary differences in hemispheric specialization, habituation, or learning (Zald, 2003).

Similar findings on hemispheric asymmetries in a memory task have been reported by Canli and collaborators (2002). However, lateralization was not as strict as in the Kilpatrick et al. (2006) study. Importantly, females displayed a greater overlap of activations for emotional experience (correlating with subjective arousal) and activations for successful encoding (correlating with later memory accuracy) in response to target items, suggesting that the women's better performance in memory tasks may originate in this similarity of recruited brain regions. Thus, women may be characterized by better memory for emotional scenes because their encoding is based on *living* or *experiencing* a depicted affect, unlike men who may employ other processing strategies, that rely on the consideration of more abstract features of the situation such as the encoding of the context (e.g., where did the event happen) or on attempts at rationalization.

Whereas all of the above-mentioned studies concerned affective scenes with multiple objects or actors, Fischer and collaborators (2007) investigated more specifically whether men and women might differ in encoding emotional expressions in faces. The authors found that, overall, both genders employed highly similar neural networks during the encoding of fearful or neutral faces (right amygdala and hippocampus). Subtle gender differences were observed for neutral facial expressions only. This is in accordance with the finding that gender does not impact memory for facial expressions (Savaskan et al., 2007) and the observation of comparable prefrontal responses during the processing of happy, neutral, and fearful facial expressions in men and women (Sergerie, Lepage, & Armony, 2005). Likewise, in another study, females as well as males showed a right hemisphere

advantage for storing emotional compared to unemotional facial expressions in memory (McKeever & Dixon, 1981).

One possible explanation of the inconsistency between the results for affective scenes and those for affective facial expressions may be that most studies on facial expressions do not take into account the gender of the target face stimuli. Accordingly, it has been shown that not only the gender of the observer can influence brain activity but also the gender of the target face (Aleman & Swart, 2008; Fischer et al., 2004). In women, successfully remembered female faces with a fearful expression provoked stronger activity in the left amygdala than successfully remembered faces of fearful males (Armony & Sergerie, 2007). In men, successfully remembered faces of fearful males provoked stronger activity in the right amygdala than faces of fearful females. Similar interactions between gender of observer and gender of target face stimuli have been found to modulate the influence of perceived gaze contact on face memory (Vuilleumier et al., 2005).

In sum, research on memory for affective scenes has revealed a consistent picture at least for amygdala responses, but the exact sources of gender effects remain undetermined. One explanation of differential lateralization of amygdala activity during the encoding of arousing stimulus material such as unpleasant pictures proposed that females might be confronted with qualitatively different stressors than males (Berkley, 1997), and hence shows distinct hemispheric adaptations or specializations of their right and left amygdalae. From an evolutionary perspective, the internal milieu should be more relevant to women (e.g., pregnancy and childbirth). Conversely, male stressors might predominantly concern events in the external environment (implicating fight-flight responses). Given this differential stressor relevance, brain networks may have evolved in order to accommodate such differential needs. Cultural and personal factors might also play a role in shaping such emotional learning mechanisms (e.g., by increasing the salience of the internal or the external environment in an individual, and/or by modifying everyday experiences).

Alternative interpretations broach the issue of gender differences in hemispheric lateralization as being a result of different stimulus

processing strategies that either rely more strongly on the left or more strongly on the right hemisphere. For instance, men could process stimuli as a whole, whereas women pay more attention to details, implying differences in global (right hemisphere) versus detailed (left hemisphere) stimulus processing, respectively (Delis et al., 1986). Women might also employ more often verbal (left hemisphere) and males more often spatial (right hemisphere) processing strategies (Phelps et al., 2001). Still another perspective accounts for gender differences in hemispheric lateralization in relation to potential differences in conscious (left hemisphere) versus unconscious (right hemisphere) processing (Morris, Öhman & Dolan). It remains to be clarified whether such laterality effects will be reliably observed for brain regions other than the amygdala, and other tasks in other studies, and whether these differences extend to facial expressions.

Research on perception

Another issue investigated by gender research concerns the perception of affective stimuli. Amygdala responses have been shown to be more lateralized in men than in women during the viewing of affective faces (Killgore & Yurgelun-Todd, 2001), converging with other evidence of more asymmetric hemispheric functions in men than women across a range of cognitive domains (e.g. language). Moreover, the lateralization in men was moderated by the type of facial display: happy facial expressions provoked higher right than left amygdala activation, fearful facial expressions higher left than right amygdala activation. Women displayed no differential right and left amygdala activation for either happy or fearful faces. These results accord with the observation of greater lateralization of activity in inferior frontal and orbitofrontal cortices in men than in women during the recall of sad memories (Pardo, Pardo, & Raichle, 1993) and suggest that there may be fundamental differences in the processing and perception of facial affect in men and women.

Lee and collaborators (2005) reported that male but not female participants processed happy and sad emotional expressions by recalling factual events and objects of past emotional experiences. Women instead focused on emotional descriptors. These differences went along with stronger left thalamic and right insular activation in males, the latter structure being associated with self-induced or internally generated emotions (note, however, that such an interpretation slightly controverts the conclusions drawn by Canli et al., 2002, and others, who suggested that women instead of men rely more strongly on introspection for the processing of emotional events).

In an earlier study, Lee et al. (2002) also demonstrated differential brain activity between men and women during the processing of happy and sad facial displays with particularly strong differences for sad expressions. Happy displays were associated with mostly left-lateralized activation in both sexes (in particular bilateral frontal and left parietal activation), but evoked left thalamic as well as right occipital and temporal activations in women that were not seen in men. By contrast, sad displays were associated with greater left hemispheric activation in females and greater right hemispheric activation in males, with the left parietal, left lentiform, and right occipital activations being observed only in women but not in men, whereas bilateral frontal, right temporal, and right lentiform activations were observed in men but not in women. The authors concluded from these patterns of activation that the presentation of sad facial expressions in their study might have triggered affect-laden autobiographical materials in male participants, whereas females employed visuo-spatial processing strategies for both happy and sad facial displays. Overall, lateralization was again stronger in males than in females (see Hall et al., 2004, study 1). Although the direction of lateralization for negative faces in the latter studies is inconsistent with Killgore and Yurgelun-Todd (2001; see also Kesler-West et al., 2001), it is congruent with the lateralization effects observed in memory research (see preceding section).

Along these lines, a PET study by Hall et al. (2004, study 2) required participants to match prosodic voices and emotional faces. In this study, males were characterized by a left-lateralized frontal activation, whereas females were characterized by more bilateral

cortical responses and, most importantly, stronger limbic activation. From these results it was concluded that males might integrate cross-modal stimuli by using cognitive strategies whereas females rely more strongly on direct emotional associations.

Also consistent with these imaging studies, suggesting greater lateralization for males compared with females, are data from an ERP study conducted by Proverbio et al. (2006b). This study revealed a right-hemispheric dominance measured over occipito-temporal electrodes with a modulation of ERP responses involving early stages of visual processing during the viewing of affective expressions in men. These responses were only partly visible in women. Interestingly, a P450³ component in ERPs was found to be more enhanced in response to faces for females than males during a facial affective discrimination task (Orozco & Ehlers, 1998). Both gender and expression of the face targets modulated the P450 characteristics. Therefore, once more, it appears to take into account not only observer but also target gender. Finally, another ERP study by Proverbio et al. (2006a) revealed early (thus relatively automatic) visual processing differences between men and women in response to infant faces with happy and distressed expression displays. Such an effect accords with a higher level of accuracy for decoding infant expressions in women as compared with men (Proverbio et al., 2007).

In sum, studies on perception of affective facial expressions have yielded various, and partly discrepant, findings concerning gender differences. Lateralization effects for men and women in response to specific facial displays (e.g., happy and sad facial expressions) are inconsistent (e.g., Killgore & Yurgelun-Todd, 2001, versus Lee et al., 2002). Therefore, more research in this area is still needed. Furthermore, attempts to replicate a given study are generally rare, if not entirely absent, although the convergence between studies has already provided some robust findings. Thus, even though the degree and nature of lateralization in men (left versus right advantage) seem highly variable across studies and emotions, a stronger asym-

3 The P450 is a positive going component in the electroencephalogram with its peak between 300 and 600 ms after stimulus onset (sometimes also termed P300; for further information, see footnote 1).

metry in men than in women has been found quite consistently. This finding may indicate that men display stronger emotion- or situation specificity in the application of processing strategies during the viewing of facial displays than do women. However, as for the observations in relation to memory, much remains to be learned concerning the origin and generality of these differences.

Which brain regions most frequently indicate gender-related differences?

The brain region that, to date, has attracted most interest in the research on gender differences in affective neuroscience is the amygdala, in keeping with the central role of this region in emotion processing across several species. In contrast, the investigation of other regions and brain networks has just begun. Consistent with observed differences in amygdala activity between males and females in relation to affective memory, there are important neuroanatomical differences in amygdala volume and neuronal density between the sexes (Stefanova & Ovtsharoff, 2000), as well as differences in opioid receptor⁴ binding within the amygdala (Goldstein et al., 2001). It remains to be further investigated how these differences relate to other functional or behavioral findings such as the observation of stronger and more vivid memories for emotional events in women than in men (e.g., Canli et al., 2002). In addition, it is also highly desirable that the above-reported findings be replicated with different tasks and by different laboratories.

Another brain structure commonly associated with gender differences is the corpus callosum, which connects the two hemispheres and has often been found to be thicker in females than males (see Allen et al., 1991). This variation has repeatedly been attributed to

4 The opioid system refers to neuromodulation by endorphins and is implicated in responses to pain and stress, but also learning, memory, and affective disorders such as depression.

more lateralized hemispheric functions in males and more inter-hemispheric exchanges in females. However, differences in corpus callosum size remain debated and could be partly explained by differences in relative ratio to the total brain size. This controversy highlights how gender-related differences may potentially relate to other variables and their functional meaning be misattributed.

At what ages do gender differences appear?

Is there a developmental factor?

Killgore, Deborah, and Yurgelun-Todd (2001) showed that differences between male and female responses to affective faces are subject to development. With increasing age, women displayed greater prefrontal relative to amygdala activation, whereas there was a non-significant trend for men in the opposite direction. Such a finding could point toward greater cognitive control in adult women than in adult men. However, the result partly disagrees with the findings reported by Hall et al. (2004) who found greater frontal than limbic activity in adult men than women.

McClure et al. (2004) reported that adult women's orbitofrontal and amygdala activities (mainly in the right hemisphere) discriminated well between angry and fearful facial expressions in a threat-evaluation task, whereas this was not the case for men. In the same study, no gender differences were found for adolescents. These younger participants displayed activation patterns similar to the adult male participants. In sum, there is some first indication that observed gender differences are subject to developmental changes. Nevertheless, the exact nature and cause of these differences need to be further investigated. Specifically, future research is warranted to clarify the role of sexual hormones and the effects of hormonal changes during development as well as during the menstrual cycle in women.

How can neuroscience studies on gender differences advance our understanding of affective processes and their disorders?

Gender differences in brain activation might explain part of the variance in the risk of suffering from diverse psychiatric disorders (although, of course, the direction of the link is, to date, unclear). In particular, anxiety and depressive disorders are more common in women than men. Both of these disorders have been linked, among others, to amygdala hyperactivation, particularly on the left side (Drevets et al., 2002). In keeping with this pattern, females but not males have been reported to recruit the left amygdala to successfully encode emotionally-arousing pictorial material (e.g., Cahill et al., 2001, 2004; Canli et al., 2002). Thus, in females, amygdala activation could more easily surpass an internally set threshold and produce depressive symptoms. Conversely, since males do not seem to activate the amygdala as strongly during the encoding of emotionally-arousing material, they might be less prone to suffer from depression.

In addition, the subgenual prefrontal cortex has also been critically associated with depression and emotion regulation (Drevets et al., 1998), and was shown to be more functionally connected to women's left-lateralized amygdala network in the study of Kilpatrick et al. (2006). In contrast, in males, a reduced modulation of amygdala activity by the dorsolateral prefrontal cortex was suggested by a study of Killgore et al. (2001), which might point to lower cognitive control of emotional arousal. This might, in turn, also explain why men are characterized by greater proneness to anger and aggressive disorders than women. Reduced cognitive control might also relate to a lower density of gray matter in the dorsolateral prefrontal cortex in males compared with females (Schlaepfer et al., 1995). Future studies could usefully employ new MRI techniques such as diffusion tensor imaging to assess structural connectivity of amygdala and frontal regions with other brain areas as a function of individual and gender differences in emotional control.

The problem of unpublished non-significant results

Many studies do not explicitly investigate gender differences and simply pool data from male and female participants. Other investigators may have checked for gender differences, but decided not to report non-significant effects. In addition, there is a high risk that non-significant results may not pass a journal review for publication because a significant result is typically judged to be more interesting than a non-significant result. Hence, it is very likely that a publication bias exists and complicates research on gender differences. Although this issue fits in with a more general concern in scientific communication, the presence or absence of gender differences might be worth being more systematically described by published work in the field of affective sciences.

Conclusion

The above-reported observations point to the need to pay greater attention to participant gender in brain research. What is more, if the stimulus material comprises facial expressions, the interaction between target and participant gender might also turn out to be of key interest (Aleman & Swart, 2008; Armony & Sergerie, 2007; Fischer et al., 2004). A clearer picture of what particular factors might determine gender differences, and in which contexts these might arise, can only emerge when differences between studies are minimized or more systematically considered. Inconsistent research results can stem from numerous differences in factors such as (a) study population, (b) domain or task under investigation (e.g., perception, memory), (c) stimulus material, (d) stimulus duration, (e) specific brain region analyzed, or (f) statistical method adopted (e.g., specific type of connectivity analysis; subtraction versus conjunction analysis).

In addition, so far research on gender differences has mainly focused on negative affective states related to fear and anger. However, gender differences for pleasant stimulus material need further investigation. Also, to date, only a single study on facial expressions examined differences between contempt and disgust (Aleman & Swart, 2008). This research revealed stronger activation in the medial and inferior frontal gyri and in the superior temporal gyrus to contemptuous facial expressions in men than in women. Conversely, women exhibited more pronounced responses to disgust faces in several brain areas. Gender differences for complex or social emotions (e. g. shame, pride) might contribute to our understanding of the basic appraisal processes underlying distinct affective states and the emergence of distinct categories of emotions.

Future brain research needs to further clarify how personality characteristics or variations in voluntary attention interact with gender. A study by Dickie and Armony (2008), for example, suggested that trait anxiety is positively correlated with amygdala reactivity to unattended fearful expressions in women but not in men. Another behavioral experiment (Inzlicht, Kaiser, & Major, 2008) demonstrated an influence of prejudice expectations on females' evaluations of out-group faces, which was not observed in males.

Finally, an important goal should be to better establish which part of the observed gender differences is due to genetic or biological factors, and which part can be attributed to the psychosocial and experiential environment. Clearly, such an investigation should not be restricted to the amygdala and frontal cortical areas, and should begin to integrate laboratory experimental designs with more ecological approaches. In addition, while gender differences tend to be considered as inherently dichotomous, more refined approaches are needed that distinguish more systematically the role of other contextual, social, or experiential factors that may be associated with the gender of individuals and the development of their brain.

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Q&A Box: Tatjana Aue and Patrik Vuilleumier

From a methodological standpoint, what would you recommend researchers who study emotion in terms of taking into account gender differences?

Gender differences observed in one task for a specific population (e.g., undergraduate students) need to be replicated, and it is crucial to investigate whether the results extend to other study populations (e.g., younger, older, other education) in different cultural contexts. If gender differences cannot be generalized across different education levels or cannot be replicated for a population of the same age and the same education but in a different socio-economic background, the reported results will be difficult if not impossible to interpret. Understanding these differences will require careful consideration of many other variables that are associated with sex factors. In particular, the role of differential social and interpersonal experiences (or development) due to societal factors should be more systematically taken into account.

In a similar vein, researchers studying gender differences in emotion need to rule out that gender differences in their study are a mere artifact of the employed task. For instance, a specific task in emotion research may require specific mental capacities (e.g., arithmetics, language, spatial processing) that are themselves unrelated to emotion processing per se, and/or linked to other social or learning influences. Differential abilities with respect to these mental capacities may introduce a bias in neurophysiological activations that is falsely taken as an indicator of differential emotion processing. Therefore, a careful evaluation of gender effects on these mental capacities should be performed independently, in order to consider them as covariate in statistical analyses whenever appropriate.

Based on your research, where do gender differences in emotion come from – socialization and culture or biological differences between women and men?

We described that researchers in our domain observed gender differences in neural activations that can possibly be explained by the fact that women tend to more often use verbal processing strategies than do men. In addition, according to research on memory, women may rely more strongly than men on autobiographic encoding that comprises the reliving of earlier emotional experiences. Men as compared with women, on the contrary, may use autobiographic encoding strategies that implicate a focus on contextual factors (such as who was present at that time or where the event happened) rather than reflecting on their own feeling state.

At the current stage, it is difficult to say, whether the observed differences originate in a differential socialization or in differential biological characteris-

tics. On the one hand, upbringing of girls usually includes more elements that encourage verbal communication and feelings as well as expressions of emotions than upbringing of boys. The latter, in contrast, are generally expected to analyze situations more rationally and to more strongly control anxious feelings. On the other hand, hormonal factors can produce strong effects on limbic structures implicated in stress responses, both at developmental stages and during adult life. Recent research also found that even the composition of early maternal milk during breastfeeding differs with respect to whether the baby is a boy or a girl (Petherick, 2010); a finding that can hardly be explained by differential socialization or cultural influences on boys and girls. It may rather be a result of the child's genetic (or hormonal) influence on maternal milk production that, in turn, could very well shape early responding including cognitive processing of the child. Finally, there are alternative indications that cognitive abilities and processing are strongly influenced by genetics (e. g., Aarts et al., 2010). In any case, it seems that biological explanations are often favored, whereas effects of social context tend to be relatively neglected or underestimated, although these may also produce strong effects on the development of behavior and affective processes from an early age onwards.

Aarts, E., Roelofs, A., Franke, B., Rijpkema, M., Fernandez, G., et al. (2010). *Striatal dopamine mediates the interface between motivational and cognitive control in humans: Evidence from genetic imaging. Neuropsychopharmacology*, 35, 1943–1951.

Petherick, A. (2010). *Mother's milk: A rich opportunity. Nature*, 468, 5–7.

What should everybody know about gender differences in emotion? What are, in your view, the most important findings in this literature so far? – with the most important applied consequences, maybe.

Perhaps the most important finding in the literature on gender differences in emotion is the finding that sex hormones can have profound influences on stress responses and fundamental emotional learning processes, such as fear conditioning and extinction (Cahill 2006, Milad et al., 2006). This has crucial implications for understanding gender differences in anxiety and depression disorders.

Another important notion is that differences at one level of observation are not necessarily found at another level (see also Chapter 1). For instance, behavioral differences do not always go along with similar somatovisceral changes. On the other hand, behavioral differences are often reflected in corresponding differential neural activations. It remains to be clarified, why changes at some levels of observation do correspond better than do others. One could for instance imagine that factors such as slight differences in baselines or statistical analyses of mediating variables are responsible for this incongruence. It is also conceivable that a

limited selection of somatovisceral measures in a given study is not capable of capturing meaningful differences similarly reflected at the behavioral and neural levels.

Finally, it is also possible that some behavioral differences in emotion processing are only reflected at the neural and not necessarily or not always at the somatovisceral level. If the latter case applies, and at the same time emotions are considered as phenomena that comprises synchronized changes in different body parts or components (e.g., hormones, somatovisceral, neural, but also cognition, behavior, motivation), such findings will be important to study because they will require refining our current concepts about emotions and their components.

Cahill L. (2006). *Why sex matters for neuroscience*. *Nat Rev Neurosci* 7, 477–484.

Milad MR, Goldstein JM, Orr SP, Wedig MM, Klibanski A, Pitman RK, Rauch SL. (2006). *Fear conditioning and extinction: influence of sex and menstrual cycle in healthy humans*. *Behav Neurosci* 120, 1196–1203.

Q&A Box: Joseph Andreano and Lisa Feldman Barrett

Based on your research, where do gender differences in emotion come from – socialization and culture or biological differences between women and men?

In the final analysis, culture and socialization have their influences via biology so the question is difficult to answer the way it is phrased. There are definitely some biological differences. Structurally, brain regions involved in realizing emotion differ between the sexes: the cingulate cortex and orbitofrontal cortex are larger, relative to brain size, in women, and the amygdala is relatively larger in men. When viewing emotional material, activity in insula and cingulate is greater in women compared to men. In men, right amygdala activity predicts memory for emotional material; in women, it's the left amygdala. The stress hormone response to emotional experience also differs between men and women. But, of course, any or all of these biological differences could be the result of socialization or endowment. There are sex differences that change over the course of the female menstrual cycle, which strengthens the argument for some effect of endowment. That being said, there is also ample evidence of socialization effect in sex differences in emotion, but it depends on how the question is asked. Men and women do not differ in their subjective reports of moment-to-moment emotional experiences in response to specific events as they occur in everyday life using an experience-sampling procedure, although women describe themselves as more emotional when they characterize their experiences using memory-based self-report measures, most likely because such measures tap stereotypes and other beliefs that are strongly gendered. Furthermore, women use significantly more emotional language in their autobiographical narratives, an effect that is probably due partially to culture.

From a methodological standpoint, what would you recommend researchers who study emotion in terms of taking into account gender differences?

First, researchers should measure emotional experience on-line, rather than in retrospect or using general measures. Second, it is important to examine emotion in multiple contexts, because "objective" measures of emotion like measures of peripheral physiology or facial actions are very contextually sensitive. Some studies report that women show larger physiological changes in evocative situations, whereas others do not or report the opposite pattern of results. Sometimes women smile more than men and sometimes less. Third, all studies of sex differences should consider variation in gonadal hormone levels. For example, women's response to evocative material in the amygdala is greater during parts of the cycle where progesterone is elevated compare to other phases of the menstrual cycle. In a number of other

regions, including OFC and anterior cingulate cortex, activity reduced during high-estrogen phases of the cycle. Similarly while men show a greater hormone response to stress than women as a group, the difference is not significant when men are compared only to women in the luteal phase of their cycles. Thus many sex differences in emotion might be better understood as differences between men and a subset of women of a certain gonadal status. Changes in testosterone levels in men over the course of the day are probably also an important mediating factor in sex differences, although the emotional consequences of these changes are less well understood.

Where do you see the field of gender and emotions going in the next 20 years?

One thing that would improve the science of gender differences in emotion is to refine our concept of gender and sex. Because maleness is an induced state in the brain (all brains begin development in a ‘female’ state and ‘maleness’ is induced by aromatized estrogen from a testosterone surge), the degree of ‘maleness’ in a brain will vary according to a number of developmental factors (the uterine environment, the mother’s immune response, etc.). Thus there is a continuum of maleness (as defined in terms of difference from the female brain), just as there is a continuum of femaleness (again, defined in terms of difference from the male brain) over the course of the menstrual cycle. Studies that consider the position of their participants along these continua will give us a much more detailed picture of the influence of sex on emotion than we currently have.

Another important avenue will be to understand how context influences sex differences in emotion. While there are often real statistical differences in emotional responding at times between men and women, there is also huge variation within each group that is not well understood. Some of this variation is noise and might have to do with hormonal variation, but as we turn to more context-sensitive experiments, we will be better able to understand sex differences rather than look for simple group differences.

Finally, it is important to refine our understanding of what emotions are, and how they work, to really understand where sex differences in emotion live, and where they are just a figment of our own perceptions. For example, while there are sex differences in the structure of the brain, we don’t really know how these translate into experiences of emotion or emotional behaviors. As another example, we have found that human perceivers tend to make more “internal” attributions about the emotional behaviors that they observe in women, whereas they make more “external” attributions about the emotional behaviors that they observe in men; people understand smiles, scowls, and frowns to reveal something about a person’s internal state when the target person is female, but there is something particular about the situational demands when the target person is male. These data are consistent with the idea that emotion perception is a complex perceptual process that involves more than just simple inborn, universal mechanisms for detecting facial expressions.

Q&A Box: Erin B. Tone

Based on your research, where do gender differences in emotion come from – socialization and culture or biological differences between women and men?

This is a question that has long interested me; I have yet, however, to generate or come across data that provide a satisfying answer. Indeed, the longer I work in the field of emotion research, the more complicated and ambiguous I find data about sex differences (and similarities) in emotion to be. In particular, researchers vary dramatically in how they define and constrain the construct of emotion; depending on which facets (e.g., expression, recognition, etc.) they highlight, and how they measure “emotion”, sex differences vary in both occurrence and magnitude. My own work, for example, has focused both on the development of sex differences in the capacity to distinguish among and/or label emotional facial expressions and on neural responses to emotional faces. Findings from these two lines of work, despite their ostensible overlap, have been challenging to integrate. In a meta-analysis of behavioral studies (McClure, 2000), I found evidence that facial expression labeling skill emerges as a function of a complex interplay of biology and socialization, with biological factors (brain maturation, hormonal changes, etc.) playing a larger role very early in life and socialization/cultural factors becoming increasingly important as development progresses. My data do not, however, provide information about how other emotion skills and proclivities emerge; indeed my neuroimaging work with colleagues at the U.S. National Institute of Mental Health suggest increases in sex differences in neural responses to facial threat between adolescence and adulthood (McClure et al., 2007). Thus, the relative contributions of biology and culture, as well as the timelines along which their interactions unfold, may be markedly different, depending on the facets of emotion that are under study.

What should everybody know about gender differences in emotion? What are, in your view, the most important findings in this literature so far?

Recently there has been, in the popular literature, considerable attention focused on sex/gender differences in the experience, expression, and processing of emotion. Unfortunately, a substantial segment of this literature both magnifies and oversimplifies differences, making them seem larger, more straightforward and, in some cases, more meaningful than they probably are. Indeed, some of the most interesting and, in my view, important recent work on sex/gender differences in emotion suggests that men and women are broadly similar in their capacities and proclivities to process and respond to emotional cues. However,

they appear to achieve comparable ends by different means. For example, recent studies of the neural mechanisms underlying emotion regulation suggest that although both males and females can (and routinely do) effectively regulate negative emotions, they apply different strategies and engage their brains differently in the process of doing so (e. g., McRae et al., 2008; Domes et al., 2010). These and similar findings lend weight to the idea that it may be more fruitful to focus on differences in *process* between males and females than it is to search for differences in *outcome* (e. g., emotion labeling accuracy, etc.).

From a methodological standpoint, what would you recommend to researchers who study emotion in terms of taking into account gender differences?

Recent technological advances have given researchers exciting new ways to approach the study of gender or sex differences in emotion. The increasing accessibility of neuroimaging equipment and analysis tools, in particular, allows us to examine neural manifestations and correlates of emotional experience in ways that were inconceivable a few decades ago. These tools have already facilitated the generation of a wide range of new insights about mechanisms underlying behavioral and experiential sex/gender differences associated with emotion. It is worth bearing in mind, however, that these tools can be used recklessly or sloppily and that it is easy to present data in ways that overlook or obscure complexities and subtleties in actual patterns of functioning. In fMRI studies of emotion and sex differences, for instance, researchers often focus on key “regions of interest” (ROIs), such as the amygdala, which have already been implicated in emotional functioning. This strategy has many merits; however, an exclusive focus on a priori selected ROIs increases the possibility that we will overlook other brain regions that participate in unpredicted ways in emotion processing and that we oversimplify or misrepresent broad networks that are engaged during emotion processing in females versus males. The use of functional connectivity analyses and diffusion tensor imaging (DTI) techniques, which help elucidate networks and pathways of brain activity, may help offset the risk of such oversight or error. I would thus recommend to researchers who study sex/gender differences and emotion, both those who dive into neuroimaging and those who read and evaluate the literature, to think systemically and integratively when considering neural mechanisms of emotional function and to approach neuroimaging techniques cautiously and critically.

Social Interactions: Present and Past

5. Gender and Nonverbal Expression of Emotions

GAËTAN COUSIN and MARIANNE SCHMID MAST

Our nonverbal behavior, and in particular our facial expressions and voice quality, can convey emotional information. Research shows that men and women differ in their nonverbal expression of emotional states. Women are more emotionally expressive, in general, but there are differences with respect to which emotions are expressed. For instance, women express joy and sadness more than men do, but men express anger more than women do. Biological differences inherited from evolution may be at the origin of some of the observed differences, but the differential socialization of girls and boys, different display rules that prevail, and specific gender expectations can also explain those differences. Research suggests the existence of a constant social control on the expression of emotions in that men and women who do not conform to existing display rules must often expect negative social consequences.

Gender and Nonverbal Expression of Emotions

The aim of this chapter is to give an overview of existing findings and knowledge regarding gender differences with respect to the nonverbal expression of emotions. The main functions of nonverbal behavior in human interactions will be addressed, followed by a discussion about how men and women differ in their expression of nonverbal behavior in general, and in their nonverbal expression of emotions in particular. Differences between men and women in their ability to infer others' emotions on the basis of nonverbal behavior will also be discussed.

What Is Nonverbal Behavior?

Nonverbal behavior can be defined as communication without words (Knapp & Hall, 2002). Nonverbal behavior typically investigated includes facial expressions (e.g., smiling, frowning), eye gaze, body movements (e.g., gestures), posture, touching behavior, and vocal behavior (e.g., tone of voice, speech modulation, speech duration). A distinction can be made between speech-related nonverbal behavior (e.g. tone of voice, speaking time) and speech-unrelated nonverbal behavior (e.g. posture, gestures, facial expression) (Knapp & Hall, 2002).

Nonverbal behavior serves many functions and can reinforce, be substituted by, or even contradict the verbal components of conversations. In ambiguous situations, nonverbal behavior is often consulted as an additional source of information. Nonverbal behavior can signal attention, reflect physical states (e.g., pain), coordinate turn-taking in conversations, and reflect and reveal personality characteristics (Knapp & Hall, 2002). As such, others' nonverbal cues allow us to better understand them and better interact with them. Nonverbal behavior is at the basis of the first impressions we form about others (Ambady, Hallahan, & Rosenthal, 1995; Borkenau & Liebler, 1992; Costanzo & Archer, 1989; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979; Schmid Mast & Hall, 2004). For instance, we correctly recognize others' emotions and are able to infer their motives, intentions, and thoughts (Ickes, 2003; Rosenthal, et al., 1979), on the basis of so-called thin slices (i.e. brief observations) of nonverbal behavior. Also, when we observe two people interacting, nonverbal behavior conveys information about the nature of their social relationship (Schmid Mast & Hall, 2004; Sternberg & Smith, 1985). Last but not least, nonverbal behavior is used to express emotions (Ekman, 1993).

Emotions are expressed through nonverbal behavior in different channels (e.g., facial expression, voice, touch). For instance, anger can be expressed by frowning (face) and speaking loudly (voice). The communication of emotions through nonverbal behavior may be intentional or unintentional, and authentic or faint (Hall, Carter, & Horgan, 2000). What distinguishes emotional expressions (especially

facial expressions) from other nonverbal behaviors is that emotional expressions are usually very brief (between 1 and 10 seconds), use involuntary muscle actions (muscles that most people cannot activate or suppress when they want), and have parallels in nonhuman species (Oatley, Keltner, & Jenkins, 2006). Emotions can be communicated through all nonverbal behaviors, but some channels seem to be used more often than others, like facial and vocal cues. Facial cues include for instance smiles, grins, frowning, and gaze; vocal cues include voice pitch, tempo, and loudness (Scherer, 1986).

How Do Women and Men Differ in Nonverbal Behavior?

We have today a broad literature that documents the differences between men and women with respect to nonverbal behavior (Hall, 2006; Hall, et al., 2000; LaFrance, Hecht, & Paluck, 2003; Vrugt & Kerkstra, 1984). It has been documented that women smile more, show more nodding and forward leaning, interact at closer distances, do more gestures, show more self-touch, and have more expressive faces. Men show more restless body movements (e.g., fidgeting), greater bodily expansiveness, more visual dominance – defined as the ratio of percentage of looking while speaking to the percentage of looking while listening – (Dovidio, Ellyson, Keating, Heltman, & Brown, 1988), and they talk more than women. With respect to speech related nonverbal behavior, men make more speech errors, use more pause-fillers (e.g. “er”, “ah”, “ehm”) and are more likely to interrupt (Anderson & Leaper, 1998) their interlocutor than women.

We also find differences in women’s and men’s ability to read others’ nonverbal behaviors. Women are better at decoding nonverbal cues in general. Their advantage is the largest for decoding facial cues, next largest for decoding body cues, and smaller for decoding vocal cues (Hall, 1978). Women show more interpersonal sensitivity (accurate perception of another person’s traits or states) and especially so when inferring others’ emotions (Hall, 1984, 2006; Hall, et al., 2000). They are also better at remembering others’ nonverbal be-

havior (Hall, Murphy, & Schmid Mast, 2006) and appearance (Horgan, Schmid Mast, Hall, & Carter, 2004; Schmid Mast & Hall, 2006).

As a general observation, differences between men and women regarding nonverbal behavior are well documented and they are significant in magnitude compared to gender differences in other areas of psychology (Hall, 2006). It is also important to notice that these differences are largely in line with existing gender role stereotypes. Women are seen as more socially oriented and caring (communal) (Bakan, 1966; Eagly & Wood, 1999), showing more supportive interpersonal nonverbal behavior such as nodding or smiling, and more behaviors that manifest other-orientation, interest in and concern with the social interaction partner such as facial expressiveness, nodding, or closer interpersonal distance. Men's stereotypical gender role is more oriented toward power and self-promotion (agentic), and, in fact, they speak more, interrupt others more frequently, talk in a louder voice, and take more interpersonal space (i. e., body expansiveness).

How do Men and Women Differ in the Expression of Emotions?

Between men and women, differences can be observed in the verbal and nonverbal expression of emotions as well (Fisher, 2000; Hall, 1984). In general, women are more emotionally expressive (Fisher, 2000; Hall & Briton, 1993; Merten, 2001; Mesquita, 2002). This could explain, at least partially, why female emotional cues are more accurately judged than male emotional cues (Hall, 1984). Women seem better at encoding emotions, while men seem better at controlling emotional displays (Riggio, 1993). We also find differences in the modalities by which men and women express their emotions; women express them through facial expressions more than men do, and men tend to express them through actions more than women do (i. e., through aggressive, dangerous, or distracting behavior) (Brody, 1993).

Gender differences can also be found with respect to which emotions are expressed, verbally and nonverbally (Brody, 1997;

Fisher, 2000). Even if there are important variations from one context to another (Brody, 1997), women tend to express more emotions of fear, sadness, anxiety, shame, guilt, but also joy (Hall, 1984; Merten, 2001) – in particular, women smile more often than men (Brody & Hall, 2000; Hall, et al., 2000). Men tend to display more often emotions that are related to aggression and high self-esteem, such as anger, contempt, or pride (Fisher, 2000; Kitayama & Markus, 1995; Shields, 2000). Some of these differences can be already observed in childhood and adolescence: in a situation eliciting negative emotions (losing a game or playing with a kind who cheats), boys nonverbally express more anger than girls (through facial expressions, voice intonation, and other nonverbal behaviors), while girls express more sadness than boys (through facial expressions) (Hubbard, 1995). Adolescent boys report to inhibit the expression of sadness (i.e., “I hide my sadness”) more than adolescent girls (Perry-Parrish & Zeman, 2011).

Where Do these Gender Differences Come From?

There are many theories about the origins of differences between men and women’s expression of emotions or decoding abilities. With respect to a biological-evolutionary approach, Hall (1978) suggests that women may be better at decoding others’ nonverbal cues because the ability to detect distress in their offspring enhanced the chances of survival in the latter. Under a social-psychological perspective, gender differences may come from differences in education that reproduce gender stereotypes. The biological-evolutionary and the social perspectives are not mutually exclusive and biological differences may exist between the sexes that are then reinforced by socialization (Guerrero & Reiter, 1998). We know that across their development, boys are encouraged to inhibit the expression of most emotions, while girls are encouraged to inhibit the expression only of socially unacceptable emotions (e.g., anger) (Brody, 1985). It has been shown that parents discuss positive emotions more often with girls than they do with boys, and that they also exhibit more

facial expressions to girls (Brody, 1993). Many authors show that parents even unintentionally lead boys and girls to express different emotions (e.g., Fivush, 1989; Fuchs & Thelen, 1988; Stewart, 1990) by, for instance, encouraging girls to be more socially oriented and thus to smile more (e.g., Block, 1973; Cherry & Lewis, 1976). Even if some of the research in this field is more than twenty years old, and societal changes during the last decades could maybe lead to different results if these studies were conducted today, these results suggest ways by which education and socialization of boys and girls lead to differences in the expression of emotions.

Gender role expectations and display rules (culture-specific norms for when, how, and to whom to visibly express specific emotions; Ekman & Friesen, 1971; Hochschild, 1983; Levy, 1984) could explain gender differences in the expression of emotion. Women in Western societies expect negative social sanctions when they express negative emotions toward third persons, whereas this is not the case for men (Stoppard & Gunn Grunchy, 1993). Interestingly, when emotions are measured immediately after a social interaction, men and women do not differ in their average experience; only when retrospective accounts are given does the gender difference show (Feldman Barrett, Robin, Pietromonaco, & Eyssell, 1998; Robinson, Johnson, & Shields, 1998). Furthermore, the physical or imagined presence of an audience heightens the probability that an individual will describe his or her feelings in a gender-stereotypical way (e.g., Berman, 1980; LaFrance & Banaji, 1992). These elements show that there is a constant social influence upon the way men and women express their emotions, strengthening differences that sometimes may not exist, or that are not so large at the level of personal experience.

Gender role expectations seem to explain some gender differences because negative consequences are to be expected in men and women who do not conform to those expectations. For instance, it has been shown that for women in powerful positions it is important to adopt a gender-congruent interpersonal style, in order to be evaluated positively. Eagly and Karau (Eagly & Karau, 2002) have shown that women who adopted a masculine style (e.g. more dominant) were perceived less favorably than men who adopted the same style. In the clinical context, patients are more satisfied with female phy-

sicians who adopt a gender-congruent role, thus gaze more, lean forward more, and speak in a softer voice (Schmid Mast, Hall, Klöckner, & Choi, 2008) Furthermore, same nonverbal behaviors (e.g., not smiling or not gazing) are judged as more dominant when expressed by a female physician rather than a male physician and lead to lower patient satisfaction, probably because dominance contradicts female role expectations (Schmid Mast, Hall, Klöckner Cronauer, & Cousin, 2010).

The same phenomenon appears in the nonverbal expression of emotions that are congruent or incongruent with gender role expectations. Women are seen as more prone to happiness, sadness, and fear than men, and men as more prone to anger, contempt, and disgust than women (Brody & Hall, 1993; Shields, 1987). Those who violate these gender expectations regarding the expression of emotions must sometimes expect negative consequences in the form of social exclusion or negative evaluations (Fiske & Stevens, 1993). For instance, research shows that boys who express sadness have lower peer acceptance, while girls' expression of sadness is not related to their peer acceptance (Perry-Parrish & Zeman, 2011). Male managers whose nonverbal behavior (i.e., voice, demeanor, and gestures) expresses anger when hearing of a problem are perceived as more competent than male managers whose nonverbal behavior is neutral, while female managers whose nonverbal behavior expresses anger are perceived as less competent than female managers whose nonverbal behavior was neutral; also, male managers are perceived as less competent when nonverbally expressing sadness, while this is not the case for female leaders (Lewis, 2000). Since anger is generally associated with men and sadness with women (Shields, 1987), emotional expressions that are gender-congruent seem to lead to more positive evaluations than emotional expressions that are gender-incongruent. Also, regarding the ability to accurately perceive emotions in others, research shows that female managers, but not male managers, who decode others' emotions more accurately are evaluated more positively by their supervisor (Byron, 2007). This testifies to the fact that expectations regarding men and women's nonverbal expression of emotions and skills in decoding emotional cues have potential consequences on their social life.

Conclusion

Gender differences in the nonverbal expression of emotions are documented in the literature, which show for instance that men tend to inhibit the expression of sadness, and that women tend to inhibit the expression of anger. Moreover, people hold precise gender role expectations regarding the expression of emotions. Gender-congruent emotional displays lead to more positive evaluations of men and women, which could encourage men and women to express their emotions according to gender expectations, in order not to be socially excluded or evaluated negatively.

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Q&A Box: Gaetan Cousin and Marianne Schmid Mast

Based on your research, where do gender differences in emotion come from – socialization and culture or biological differences between women and men?

Past research suggests that both phenomena are at stake. Biological differences may exist, and come from evolutionary processes, but socialization may reinforce these differences. There may be biological differences between boys and girls in how prone they are to experience and express emotions, but also know that boys are encouraged to inhibit all kinds of emotions (and especially sadness), while girls are encouraged to inhibit only certain emotions (like anger). Our research focused more on gender display rules in nonverbal behavior, and thus adopts a social perspective. We thus see gender differences in the expression of emotions as social constructions.

What is the finding on gender differences (or lack of, thereof) that surprised you the most in your own research?

What surprised us the most was the fact that people seem to judge women more severely than men when it comes to certain nonverbal behaviors or interpersonal skills. In one of our studies, we demonstrated that the very same behaviors were judged as more dominant in female physicians than in male physicians, and had a more detrimental effect on patient satisfaction when expressed by female physicians rather than male physicians. In a parallel way, Byron (2007) showed that the ability to infer other's emotions played a role in a supervisor's ratings of female managers' competence, but not in the ratings of male managers' competence. This shows that even when men and women behave similarly, the criteria people use for judging their behavior are different.

What should everybody know about gender differences in emotion? What are, in your view, the most important findings in this literature so far? – with the most important applied consequences, maybe.

In our view, the most important findings are about the existence of different display rules for expressing emotions for men and women, and about the different consequences men and women have to expect when expressing certain emotions. As a general observation, men are expected to be less expressive than women. The expression of sadness, for instance, is less accepted in men than it

is in women. However, for some emotions, it is the opposite: the expression of anger, for instance, is less accepted in women than it is in men. These display rules have very practical implications in that women and men who break these rules must expect negative social consequences. For instance, boys who express sadness have lower peer acceptance, and female managers who expresses anger are perceived as less competent. Being conscious of these display rules and their consequences is the first step in adapting or resisting to what could be seen as gender discriminations in the expression of emotions.

6. Gender Differences in Risk Aversion – The Role of Emotions

EVA RANEHILL and ANNE BOSCHINI

Women are most often found to take on less financial risk than men. However, only small differences or no differences at all, are found in some subgroups of the general population, most notably managers and professionals. This may be partly explained by knowledge disparities between genders pertaining to financial literacy or to gender differences in confidence. Empirical studies also suggest that women perceive risks as greater than men and that women judge the consequences of negative outcomes as more severe when it comes to financial gambles as well as other types of risky situations (with the exception of social risk taking). The relatively greater tendency by women to react by fear and by men to react by anger to uncertainty may also cause the genders to make different risk assessments.¹ Similarly a small body of research suggests that gender differences in risk taking are influenced by gender inequality and male and female relative status. Having a higher social status as a group, men also exert a higher control and may thus perceive risks as more manageable.

1. Introduction

Women's economic and political opportunities have long been more restricted than men's. This situation has gradually improved, but economically important and unexplained gender gaps still exist in society. For example, large gender gaps that persist over time are found pertaining to professional and economic outcomes. The last

1 Little is known about the causes of these differences themselves, however biological factors such as hormonal influences may account for some of the variation between genders.

decades have seen a significant stagnation in the pace at which the gender wage gap closes, despite continuous advances in female educational attainment (Blau & Kahn, 2006; Fortin, 2008; O'Neill, 2003). Female educational attainment has caught up, and in many countries surpassed, that of male, but men still occupy the majority of leading positions in society (Arulampalam, Booth, & Bryan 2007; Bertrand & Hallock 2001; OECD Family Database 2011). Lately it has been proposed that this discrepancy may be at least partly due to gender differences in psychological traits and economic preferences (Bertrand, 2010; Croson & Gneezy, 2009; Niederle & Vesterlund 2011). In this literature, the most robust gender differences are found in four areas: preferences for risk, competition, negotiation, and to some extent other regarding preferences (see Bertrand 2010; Croson & Gneezy, 2009; Eckel & Grossman 2008a, 2008b; Niederleand & Vesterlund 2010 for overviews). Generalizing across studies, men are found to be more risk seeking and competitive, to initiate negotiation more often, and to be more concerned about efficiency as opposed to equality than women. Gender differences in the labor market would then arise independent of formal, or informal, discrimination if, for example, leading positions imply fierce competition and a variable and risky payment, and this causes women to be relatively less inclined to aim for these positions than men. A small, but growing, body of research has also associated these preferences with the gender gap in labor market outcomes (See for example Dohmen et al., 2011; Bonin, Dohmen, Falk, Huffman, & Sunde, 2007; Flory, Leibbrandt, & List, 2010; Fortin, 2008).

This chapter aims at reviewing the existing experimental literature on gender differences in preferences in one of these areas, economic risk behavior, while drawing on research in economics and other fields to try to tease out part of the answer to why this gender gap is observed. In addition to the explanations of the observed gender gap more commonly proposed in economics, we will pay particular attention to the importance of emotions as a potential mechanism driving gender differences in risk behavior.² Since the

2 Many other mechanisms may cause gender differences in economic behavior, and emotions may themselves be the result of other underlying factors. For

behavioral revolution in economics in the 1980s, important progress has been made to incorporate emotions into an economic framework by a number of scholars (see for example Loewenstein, 2000, or Rick & Loewenstein, 2008 for an introduction to this literature). Still, in spite of the rise in the number of studies investigating emotions as a motivator for behavior (Croson and Gneezy, 2009; Weber & Johnson, 2009), the role of emotions in economic choices is in need of further research.

Standard economic theory assumes that individuals have stable preferences over outcomes and choose actions so as to maximize their utility. However, more recent studies indicate that preferences at least to some extent are endogenous, and that varying emotional states may induce different economic choices. For example, Ariely and Loewenstein (2006) and Wilson and Daly (2003) study how preferences are influenced by sexual motivation and find that this has implications for moral behavior as well as risky behavior and patience. The importance of emotions for economic choices has also been put forward by for example Bowles and Gintis (2003) and Frank (2004) who argue that emotions can be viewed as “commitment devices” in that they trigger the expected (social) behavior. This implies that individuals adhere to a social norm not only because they fear punishment by others in society, but also because norms are internalized, and violating a norm causes negative emotions such as shame, guilt and regret.

Thus, to the extent that women and men exhibit different emotional response to context, actions or outcomes, emotions may be an important explanatory factor to gender differences in economic preferences that has received little interest thus far. This may be

example, a growing literature investigates the genetic and hormonal influence, as well as the interplay between genetic and environmental factors, on gender differences in mood and behavior. Although we consider this research very promising, it will not be covered in this chapter. In addition, insights from developmental psychology may provide important clues to the mechanisms behind the gender gap observed among adults by shedding light on the development of the gender gap among children and adolescents. In this chapter we will just briefly touch upon some economic studies on children and adolescents as a comparison to the literature using adult participants.

particularly relevant for gender differences in contexts where norms are gender specific and emotions are likely to trigger different behavioral response among men and women. This idea has for example been introduced in economics through the concept of identity (Akerlof & Kranton, 2000).

The remainder of the chapter is structured as follows. Section 2 below reviews the existing literature on gender differences in risk behavior. Section 3 discusses the potential explanations for this. The chapter then ends with a summary in section 4.

2. Gender differences in risk aversion

Most economic decisions involve risk in some way and financial risk behavior has received a lot of interest in behavioral economics. In its most stylized form, attitudes to risk are studied in the laboratory, and are typically measured through a series of real or hypothetical binary choices that systematically vary the risk (the variation in payoff). For example, individuals may decide between two small stake gambles, where each gamble presents two possible payoffs realized with known probabilities. One of the two gambles may have a larger expected payoff, but simultaneously present a larger risk through a larger variation in the final payoff possibilities. In a similar way, participants may also decide between a small stake gamble with known probabilities and a safe option where the proposed sum is realized with certainty. The average individual is risk averse, meaning that in the latter case, for example, most individuals prefer a safe option in comparison to a gamble with a similar expected value, but with a larger variation in payoffs. The higher the certainty equivalent, i.e. the higher the safe amount is that an individual views as equally desirable as a specific gamble, the less risk averse that individual is considered to be.

The large experimental literature on gender differences in risk behavior has recently been reviewed in Eckel and Grossman (2008a) and Croson and Gneezy (2009). Together they find a large majority

of studies indicating that men have a higher propensity to make risky choices than women, both in incentivized and hypothetical tasks. For example, Levin, Snyder, and Chapman (1988) asked students about their hypothetical willingness to take each out of 18 different gambles. They find that men, on average, respond positively to a larger share of gambles than women. Similarly, Eckel and Grossman (2002, 2008c) find that men enter into a larger share of incentivized gambles, both in the gain and loss domain, in comparison to women. In a more recent paper, Charness and Gneezy (2012) compare male and female investment decisions in 15 different studies using the same investment game. In this game, participants receive a sum of money and are asked to choose how much of it they wish to invest in a risky option. The risky option yields a dividend larger than 1 with probability p . With probability $1-p$, the money invested is lost. Any money not invested is kept by the decision-maker. Among the included studies, ten use students as participants, whereas the remaining five report the behavior of a sample of experienced bridge players, a sample of professional traders, a sample of villagers from Tanzania and India, as well as two samples of villagers from China. All of the studies, except the one using behavioral data from Tanzania and India, find that men put a larger share of their initial resources in the risky investment.

Although results are slightly less consistent, studies using less restricted samples find either no gender differences in risk, or that men are less risk averse than women. Hartog, Ferrer-I-Carbonell, and Jonker (2002) elicit hypothetical willingness to pay for different high stake gambles in three different surveys, each with a large number of respondents. Women's estimated parameter for risk aversion is assessed to be 10–30% higher than men's. Also Dohmen et al. (2011) find a lower risk propensity among women than men in a large representative sample of the German population. In their study the participants answer a hypothetical question about their general risk propensity, and in an accompanying experiment a representative subsample of 450 individuals also make choices over real stake gambles. Dohmen et al. (2011) find that self-assessed general risk propensity predicts actual risk-taking among the individuals in the sub-sample, and that the gender difference in self-reported risk pro-

propensity corresponds to about a quarter of a standard deviation. However, two recent studies looking at gender differences in risk behavior in a representative sample of 233 Danes (Harrison, Lau, & Rutstrom, 2007), and a representative sample of 1003 Swedes (unpublished data, Boschini, Dreber, von Essen, Muren, and Ranehill, 2012) find no gender differences. Both Denmark and Sweden score high on gender equality, but whether this or other reasons lies behind the observed results remains an open question.

The gender gap in risk behavior further seems robust across ages (in Western cultures).³ In a sample of 661 Austrian children and teenagers aged 10–18, Sutter, Kocher, Glätzle-Rüetzel, and Trautmann (2013) find that girls are more risk averse than boys. A similar result is found among Swedish children and youths aged 9–12 and 16–18 years old as well as Colombian children aged 9–12 years old (Cárdenas, Dreber, von Essen, & Ranehill 2012; Dreber, von Essen & Ranehill, forthcoming), Dutch youths aged 15–16 (Borghans, Golsteyn, Heckman, & Meijers 2009), Chinese youths in middle and high school, on average 15 and 18 years old (Zhang, 2010), as well as British youths aged 15 years (Booth & Nolen, 2009).

To the best of our knowledge, no study finds that women are more risk taking than men, but a small number of studies in addition to those already mentioned find no gender differences, or that the degree of gender differences in risk aversion varies between contexts and groups.⁴ For example, Holt and Laury (2002) investigate risk attitudes in binary choices of gambles of different risk. In a low

3 As few studies use non-Western participants, generalizations should be made cautiously.

4 For additional examples of studies that do not find a gender difference in risk taking, see Harbaugh et al. (2002), which present 234 individuals ranging from 5–64 years with a choice between real gambles and a safe option. In a similar study, Levin and Hart (2003) also find no gender differences in risk preferences in a sample of 5–8 year olds. Contrary to Harbaugh et al. (2002) they find a gender difference in risk propensity in the loss domain, i.e. when gambles are framed as losses and not as gains, where boys take more risky choices to avoid losses than girls. However, gender differences seem less clear in the loss domain (see for example Schubert et al. 1999 for a study that finds women to show a higher risk propensity in the loss domain). Also Almås et al. (2012) find no gender differences in a sample of 14–15 year old Norwegian youths.

payoff treatment they find that men have a higher risk propensity. However, in a high payoff condition, gender differences in risky choices are no longer present. The size of the gender gap also seems to vary by environment and culture. In the study by Booth and Nolen (2009), the authors compare participants from single-sex schools with participants from mixed-sex schools, and find that girls in single-sex schools take on as much risk as boys in mixed or single-sex schools. Girls from mixed-sex schools, however, are more risk averse than boys. Further, girls in all girls groups are more risk taking than girls in mixed groups. These results are also corroborated in a later study by Booth, Cardona, Sosa, and Nolen (2011). In a controlled experiment, first year college students were randomly assigned to all male, all female, or mixed groups. Risk preferences were measured at the onset of the study, as well as after eight weeks. Although women made less risky choices at both occasions, women in all female groups made significantly more risky choices at the latter stage than women in mixed groups, suggesting that environment does influence gender differences in behavior. A larger gender gap is also found among Colombian than among Swedish children in Cárdenas et al. (2011). A fact that the authors hypothesize arises due to the larger discrepancy in gender roles and position in the Colombian society than in the Swedish. Similar results are reported by Gong and Yang (2012), comparing the gender gap in risk taking among members of the matrilineal Mosuo and the patriarchal Yi societies in China. They find that although women in both cultures are more risk averse than men, the gender gap is smaller among the Mosuo; a result indicating that gender stereotypes and gender equality may influence the gender gap in risk behavior.

Results on risk behavior from laboratory experiments have been questioned on the basis that many studies report evidence from gambles over relatively small stakes, and that gender differences found may not generalize to decisions of greater importance. However, studies on larger stake decisions generally confirm that gender differences carry over to this domain. According to data, women tend to make more conservative stock market investments and pension savings choices than men (see for example Bajtelsmith & Van Derhei, 1997; Bernasek & Shwiff, 2001; Hinz, McCarthy, & Turner, 1997;

Jianakoplos & Bernasek, 1998; Neelakantan, 2010; Sundén & Surette, 1998). This result seems to hold both for married and single women and remains also when the household financial decision-making process is taken into account (Bernasek & Shwiff, 2001).⁵ The same tendency is also found for the vast majority of choices and environments documented in earlier surveys in psychology (Byrnes, Miller & Schafer, 1999). A possible exception to this general result is when risk preferences are measured outside of the lab in subpopulations such as professionals and managers. In these populations, gender differences in risk behavior are found to be attenuated or non-existent (Atkinson, Baird, & Frye 2003; Birley 1989; Johnson & Powell, 1994; Master & Meier, 1988). It is an open issue whether this is due to self-selection, adaptive behavior or other factors.

A few explanations to the observed gender differences in financial risk propensity have been proposed in the literature, most notably gender differences in financial literacy, confidence, or the emotional response to risky situations. These are discussed below.

3. Why do women take less risk than men?

3.1 *Financial literacy*

Financial literacy is correlated with economic behavior such as owning stocks or saving for retirement, and women have been found to be less knowledgeable than men regarding financial issues (Lusardi and Mitchell 2008, 2011; van Rooij, Lusardi & Alessi 2011). The discrepancy in financial risk behavior between the genders has also been found to diminish as financial literacy is taken into account. For

5 With respect to the economic consequences of gendered behavior, studies come to different conclusions. Barber and Odean (2001) and Agnew et al. (2003) find that the actual return on the investments made by men and women appears to be the same. However, Neelakantan (2010) estimate that the gender difference in risk tolerance accounts for about 10% of the gender difference in accumulated wealth.

example, Dwyer, Gilkeson, and List (2002) study the gender difference in investment choices among mutual fund investors and find that gender differences among mutual fund investors are significantly attenuated when controlling for financial knowledge. A related result is found in Almenberg and Dreber (2012) in a study examining the link between financial literacy and stock market participation in a representative sample of the Swedish population. Controlling for financial literacy, gender differences in stock market participation disappears, even though gender differences in reported risk taking remains. However, while differences in financial knowledge may explain part of the observed gender gap in for example stock market participation, it seems more difficult to explain the observed gender difference pertaining to simple choices over different risky options with known probabilities so often found in experimental studies.

3.2 *Overconfidence*

Gender differences in risk propensity have also been discussed in the light of gender differences in overconfidence (see e.g. Bertrand, 2010; Croson & Gneezy, 2009). In this literature, overconfidence has been measured in different ways, for example as the difference between actual and self-assessed performance, as well as by measuring perceptions of knowledge accuracy. In the latter case, individuals are asked to provide a confidence interval in which the true answer to a factual question, or the individual's performance, lies. Overconfidence is then measured as the difference between the actual error rate and the one predicted by the confidence interval. If men are more overconfident, and systematically overestimate their performance or knowledge relative to women, this may lead to gender differences in risk taking in areas where the outcome depends, or is perceived to depend, on own ability or judgment.⁶

6 See however Cesarini et al. (2006) who presents a critique against the interval estimation task as a good measurement of overconfidence. They find that using frequencies and monetary incentives reduces overconfidence by approximately 65%.

The general result found in this literature is that both men and women are overconfident, but that men tend to be more so (see Bengtsson, Persson, & Willenhag, 2005; Deaux & Farris, 1997; Estes & Hosseini, 1988; Lundeberg, Fox, & Puncchohar, 1994; Soll & Klayman 2004).⁷ Furthermore, there are indications that gender differences are the greatest in masculine tasks and during situations of greater uncertainty (Beyer, 1990; Beyer and Bowden, 1997; Correll, 2001; Deaux and Farris, 1997; Lundeberg et al. 1994). Pertaining to financial risk taking, men have been found more confident than women in the realm of investment knowledge (Bhandari & Deaves, 2006) and theoretical and empirical research has associated overconfidence with higher risk taking and larger trading volumes (Barber and Odean, 2001; Deaves, Luders, & Lou, 2009; Glaser & Weber, 2007; Odean, 1998).⁸ However, also in this case it seems difficult to argue that gender differences in overconfidence explain the gender gap in risky choices in controlled experiments in the laboratory.

3.3 *Emotions*

In addition to financial knowledge and overconfidence, gender differences in emotional reactions have lately been proposed as an explanation to the observed gender gap in risk behavior. For a long time, economists viewed choices under risk and uncertainty as a cognitive activity. Individuals were assumed to evaluate the consequences of different outcomes and associated probabilities (with or without subjectivity and errors), and to arrive at a decision through an expected utility framework. Later research underlines the importance of emotions as an integral part of the decision-making process and, on the contrary, that the absence of emotional reactions may

7 Some recent papers on Swedish data slightly modify this picture by finding that both boys and girls sometimes are underconfident, or that girls sometimes are underconfident and boys overconfident, and that this pattern may depend on the task on which the judgments are based. See also Cesarini et al. (2006) who do not find a gender difference in confidence.

8 Deaves et al. (2008) find that overconfidence generates more trade, but fail to find significant gender differences in overconfidence.

significantly impair risky decision-making (See Damasio, 1994; and Peters & Slovic, 2000, for some early contributions to this literature. See also Loewenstein, Weber, Hsee, & Welch, 2001, for an overview of early literature pertaining to emotions and risky decision-making in particular). Emotions may influence decision-making under risk in many ways. Emotional reactions may for example influence the perceived value attached to a particular outcome, or the perceived probabilities associated with it. Previous literature suggests that both processes may occur (Weber & Johnson, 2009).

Gender differences in the perception of probability

Weber, Blais, and Betz (2002) assessed risk taking and the perception of risk associated with five different domains (financial, health/safety, recreational, ethical and social). The authors found that women stated that they were more risk averse, and reported higher perceived risk in all domains except social risk. A similar result is found in Harris, Jenkins, and Glaser (2006) who find that women judge negative effects as more likely to occur in relation to risky behavior pertaining to gambling, health and recreational domains, but not the social domain. Slovic (1999) proposes one explanation to this phenomenon. Discussing the psychological aspects of risk in general, he pointed out that social status, power and perspective may influence the perception of risk. Individual heterogeneity in risk perception may depend on the perception of risk as controllable or not. When risk is perceived as controllable, feelings associated with the specific risk factor are less discomforting. In relation to the result in Flynn, Slovic, and Mertz (1994)⁹, who found that the lower risk perception of white men in comparison to black women and men as well as white women is mainly driven by a sample of 30% well educated and conservative males with high incomes, Slovic (1999) proposed that white males may judge many societal and technical

9 A similar result is found in Finucane et al. (2000), who find that white males in the US judge different hazards to pose lower risks than other groups. See also Olofsson and Rashid (2011) for a recent discussion of the “white male effect”.

risks as inferior as they “create, manage, control, and benefit from many of the major technologies and activities”.

Gender differences in emotions attached to risky choices and their outcomes

Previous studies in psychology have also proposed that women experience stronger emotional reactions than men to outcomes in general (Harshman & Paivio, 1987; Simon & Nath, 2004). Drawing on this, Eriksson and Simpson (2010) suggest that the structure of risky situations, where the probability of a negative outcome is often much larger than that of a positive outcome, simply leaves more scope for negative affect to guide a decision. They therefore hypothesize that while women experience a stronger emotional response both to a win and a loss, only negative affect pertaining to losing will mediate decisions to join for example a lottery. In a sample of 840 individuals recruited at an online labor market, they find support for these hypotheses; gender differences in the negative emotion associated with a loss explains about a third of the gender differences in entering a lottery. Positive emotions associated with a win do not explain any share of the gender gap in behavior.

It has also been proposed that men and women experience different affective reactions to negative outcomes in particular. Women report more nervousness and fear than men when anticipating negative scenarios (Brody, 1993; Fujita, Diener, & Sandvik, 1991), and research indicates that different emotional reactions may cause men (via anger) to under-weight risky outcomes, and women (via fear) to over-weight risky outcomes (Grossman & Wood, 1993; Lerner, Gonzalez, Small, & Fischhoff, 2003). In the aftermath of September 11th, Lerner et al. (2003) investigated how the emotional response to the tragic events influenced risk perceptions associated with future attacks in a representative sample of Americans. The experiment studied both naturally occurring and induced emotions, and found that male Americans expressed less pessimism after September 11th than women. Controlling for emotions (men experienced more anger and women experienced more fear) explained 60–80% of the variance in gender differences across all risks.

Another strand of research suggests that men and women differ in their assessment of success and failure. Whereas men are more likely to view a failure as the result of bad luck, and a success as a result of their own ability, women have a higher propensity to attribute failure to lack of ability and success as a result of luck (Ryckman & Peckham, 1987; Stipek & Gralinski, 1991). Risky decisions with an outcome related to own ability, such as for example investment decisions, may thus imply higher personal costs and lower benefits for women than men. Further, risky situations may have different implications for male and female identity. Challenges have been proposed to present more ego-involved situations that better corresponds to male motivation than female (Block, 1983). In a similar argumentation, Arch (1993) proposes that men see risky situations as challenges that encourage participation, whereas women understand them as a threat encouraging avoidance.

Gender differences in mood

Emotions unrelated to a specific judgment, or decision, have also been shown to influence choice (Weber & Johnson, 2009). For example, it has been found that a specific emotional state increase the frequency estimates of unrelated events with a similar affective connotation (see references in Lerner & Keltner, 2001). This suggests that risky decision-making may be shaped by individual differences in affective processing and the propensity to experience a specific emotional state. Lerner and Keltner (2001) test the implication on risky decision-making by two emotions; fear and anger. Their results corroborate this reasoning; fearful people make pessimistic risk assessments, whereas angry people make positive risk assessments. A similar result is found in a number of other studies. Anger has been related to an increased tendency to feel optimistic and less vulnerable, and to perceive situations as predictable and under individual control (Ellsworth & Scherer, 2003; Quigley & Tedeschi, 1998). Anxiety, on the other hand, causes increased focus on threat-related information and a more pessimistic interpretation of ambiguity (Bar-Heim, Lamy, & Glickman, 2005; Gu, Ge, Jiang, & Luo, 2010) and feelings of little control (Smith & Ellsworth, 1895). Later research confirms

these findings in both financial and non-financial situations, showing that anxious people have a lower propensity to make risky choices compared to less anxious people (Maner et al. 2006) and that happy and angry people have a higher propensity to make risky choices than sad people (Au, Chan, Wang, Vertinsky, 2003; Chou, Lee, & Ho, 2007; Gambetti & Giusberti 2012).¹⁰ To the extent that men and women differ on the traits that enhance our perception of risk, we would thus also expect differences in risk propensity by men and women. It is, for example, well established that women suffer from more anxiety, and anxiety disorders, than men (Craske, 2003).

4. Summary

In sum, a large majority of studies find that women take on less economic risk than men, and that this effect seems robust across incentivized and hypothetical tasks, high or low stakes, and age. However, the gender gap in risk behavior seems the most robust in laboratory studies using students as participants. Only small differences or no differences at all, are found in some subgroups of the general population, most notably managers and professionals. This may be partly explained by knowledge disparities between genders pertaining to financial literacy or to gender differences in confidence. Further, the size of the gender gap in risk preferences seems to vary with culture and environment. Though more research is needed, these results seem largely consistent with the proposition that the gender gap in financial risk behavior decreases as gender equality increases.

Empirical studies also suggest that women perceive risks as greater than men and judge the consequences of negative outcomes as more severe, both when it comes to financial gambles as well as other types of risky situations (with the exception of social risk tak-

10 In the study by Au et al. (2003) traders in financial markets who were induced to a good mood were found to be more overconfident, and to take on more risk than traders induced to a bad mood.

ing). Further, it has been found that women experience stronger negative affect in response to negative outcomes. The relatively greater tendency by women to react by fear and by men to react by anger to uncertainty may also cause the genders to make different risk assessments. This finding is related to the result that individuals who are prone to experience negative emotions such as fear or anxiety, are also less likely to take on risk. Finally, a small body of research suggests that gender differences in risk taking are influenced by male and female relative status. Having a higher social status as a group, men also exert a higher control and may thus perceive risks as more manageable.

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Q&A Box: Eva Ranehill and Anne Boschini

Based on your research, where do gender differences in emotion come from – socialization and culture or biological differences between women and men?

As always, the answer to this question is that gender differences probably come a little bit from both nature and nurture, and importantly, that nature and nurture constantly influence each other. What we think is interesting at the moment is that new ideas and technologies allow us to pin down the mechanisms influencing preferences and emotions to a higher degree than before, for example through hormonal, genetic or neurological studies. However the nature/nurture debate is likely to be around for quite some time.

Where do you see the field of gender and emotions going in the next 20 years?

With a background in behavioral economics, we see two main directions for future research, and this development is already ongoing. First, we think researchers will look more closely at the economic importance of individual preferences (and thus also gender differences in preferences and emotions) for market behavior, and thus, their impact on “real” individual economic outcomes. Second, better and better experimental paradigms using techniques from other disciplines will also be developed to dig deeper and understand more about the mechanisms behind gender differences that we see in economic decision-making.

What is the finding on gender differences (or lack of, thereof) that surprised you the most in your own research?

It is probably easier to remember and sort (and maybe to publish) results on gender differences that report clear differences and which are easy to interpret. However, the results of our research on gender differences in economic preferences are less consistent with common perceptions than we expected. For example, together with the coauthors we expected gender differences to be smaller in a more gender-neutral country such as Sweden, in comparison to, for example, a country like Colombia. However, whereas this was the case according to some measures, it was not true in others, and in particular not when it came to confidence or to competitiveness measured through self-selection into competitive schemes vs piece-rate schemes. Another thing that surprised us was that we cannot confirm the established result of a gender difference in risk taking in a large representative sample of about 1000 Swedes.

7. Gender and Shame: A Philosophical Perspective

RAFFAELE RODOGNO

This entry aims to offer a critical summary of philosophical research at the intersection of gender studies and the particular emotion of shame. Among the emotions, shame attracts particular interest from philosophers interested in gender studies who have primarily focused on the various facets of the oppression and domination of women by men. In this context, shame is often considered as part of the phenomenology of oppression. As a result of the subordinated position of women in society, shame is gender-specific in at least two important senses, which will be the object of this entry. In the first sense, women are more shame-prone than men. This idea will be the object of Section 2. In the other more radical sense, shame is experienced and therefore conceptualized rather differently by different genders due to the different social positions they tend to occupy. This idea will be the object of Section 3.

1. Introduction

Philosophy was an early contributor to research at the intersection between the emotions and gender studies. Already in 1949, Simone de Beauvoir claimed that gender-specific norms on emotional experience and expression are a standard means of maintaining inequality among the sexes in many cultures. This entry aims to offer a critical summary of philosophical research at the intersection of gender studies and the particular emotion of shame. Among the emotions, shame attracts particular interest from philosophers interested in gender studies who have primarily focused on the various facets of the oppression and domination of women by men.¹

1 This sentence should not be read as meaning the oppression and domination are in all or even most instances actively pursued by men. Also, for the purposes of this entry, 'woman' and 'man' refer to a particular gender as much as to a particular sex.

In this context, shame is often considered as part of the phenomenology of oppression. As a result of the subordinated position of women in society, shame is gender-specific in at least two important senses, which will be the object of this entry. In the first sense, women are more shame-prone than men. This idea will be the object of Section 2. In the other more radical sense, shame is experienced and therefore conceptualized rather differently by different genders due to the different social positions they tend to occupy. This idea will be the object of Section 3.

2. Gender-specificity as shame-proneness

The claim here is to the effect that women are more shame-prone than men. Greater shame-proneness may in turn be understood in terms of (a) higher-frequency and stronger intensity – women typically undergo more episodes of shame than men – and/or (b) a more diversified intentionality – there are more particular objects that occasion shame in women as there are in men.² Whether any of these gender-specific trends is true is an empirical question that has enjoyed a variety of answers in the recent debate. If any of them turned out to be true, the question of their origin, biological and/or cultural, would need to be addressed. Let us briefly present the relevant literature in psychology with regard to (a) and (b) respectively.

For quite some time after Helen Block Lewis's influential *Shame and guilt in neurosis* (1971), the evidence was expected to show more frequent and intense episodes of shame for women. Lewis argued that guilt and shame represent distinct modes of perceiving and experiencing information about the self that are congruent with gender-linked differences in socialization. According to her, females would be more likely to develop a shame-prone affective style than men due

2 Lehtinen (1998, 61) believes women are more shame-prone in these two senses. She also believes that the more extensive proneness indicates *conceptual specificity*; shame signifies something different to socially subordinate individuals.

to (1) socialization experiences that promote field-dependent cognitive styles in many females and (2) the fact that such cognitive orientation increases girls' susceptibility to other pressures from the environment to conform to a traditionally feminine and passive view of the self. Through accumulated experience, the development of strong ego boundaries is impeded and females are taught to use internalizing mechanisms to defend the "self." It is the repeated tendency by females to internalize feelings of hostility and anxiety that ultimately leads to the development of a shame-prone style.³

Lewis' influential work in clinical psychology was only part of the explanation for the expectation of a greater vulnerability of women to shame. The literature on gender-role stereotypes and socialization of emotion in boys and girls suggest that Western society expects women to *experience and express* shame much more so than men, in part because of women's greater access to, and lesser denial of, many of their painful feelings (Brody, 1997, 1999). In addition, there is a significant overlap between the way children and adults stereotype women more than men – self-effacing, deferent, dependent, meek, and passive (e.g. Antill, 1987; Best & Williams, 1993) – and the way that influential psychologists such as Tangney (1995) describe experiences of shame – feeling exposed, small, worthless, passive, and unable. Socialization of boys and girls is also taken to be relevant in sensitizing women to shame-prone reactions. In various contexts girls are more frequently criticized by adults for their failures, where the criticism is directed more globally at their lack of competence as opposed to boys who are criticized less and in a more specific or situationally focused manner. (e.g., Alessandri & Lewis, 1993, 1996; Dweck & Leggett, 1988; M. Lewis 1992) This is in line with H. Block Lewis' work, who introduced a now widely accepted distinction between shame and guilt according to which shame consists in the subject's negative appraisal of the self as a whole ("I am bad") as opposed to local negative self-appraisal for guilt ("I have done something wrong").

3 I have borrowed here from Ferguson and Crowley's (1997, 21) summary of Lewis. We must note that Lewis' argument rests on some psychoanalytic assumptions accepted only within psychoanalysis.

Reviewing most of the relevant literature since Lewis (1971), however, Ferguson and Eyre (2000) concluded that the expected greater vulnerability to shame of women was consistently found only in studies using *scenario-based* assessments of the shame construct, such as the Self-Conscious Affect and Attribution Inventory (Tangney, 1990), and its successors the TOSCA (Tangney, Wagner, & Gramzow, 1989) and the TOSCA-2 (Tangney, Ferguson, Wagner, Crowley, & Gramzow, 1996). Researchers using a variety of other methods inconsistently found the anticipated gender difference in shame (Brody, 1993, 1999; Cook, 1996; Ferguson, Stegge, Miller, & Olsen, 1999; Harder, 1990, 1995; Harder, Cutler, & Rockart, 1992; Izard, 1977; Mills, Pedersen, & Grusec, 1989). In fact, in some cases (e.g., on frequency measures; cf. Harder, 1995) *men* actually report greater shame than women.

Ferguson and Eyre (2000) asked why only scenario-based assessments of shame, but not other procedures, consistently revealed the expected gender difference in line with Lewis (1971). They argued that an *unwanted identity* is the quintessential elicitor of intense shame reactions, which others variously refer to as an anti-ideal self-image or “dreaded self” (Lindsay-Hartz, de-Rivera, & Mascolo, 1995; Markus & Nurius, 1986; Olthof et al. 2004). People perceive themselves as possessing an unwanted identity when they self-attribute, or when they perceive others ascribing to them, a characteristic that undermines their self-ideals (e.g., Crozier, 1998). Ferguson and Eyre then argued that many of the hypothetical situations used in the TOSCA or SCAAI measures possibly represent much greater unwanted identities for women than men. Many of these instruments present participants with hypothetical scenarios in which, among other behaviors, the protagonist engages in fairly assertive and sometimes downright relationally aggressive or interpersonally insensitive/disrespectful actions. The literature generally shows that such behaviors and attitudes are differentially appropriate for men as opposed to women. Peers reject girls for being both relationally and overtly aggressive (e.g., Crick *et al.* 1999). Moreover, although peers will reject boys who are consistently aggressive, peers and adults less negatively evaluate boys’ relative to girls’ isolated acts of overt aggression, misbehavior, or negativism (Zahn-

Waxler, 2000). Mothers also actively encourage boys more than girls to respond in kind to anger provocations with their own anger and retaliation (Brody, 1996; Zahn-Waxler, 2000), and in addition, boys actually expect mothers to react more warmly to them when they express anger rather than sadness (Brody, 1996; Fuchs & Thelen, 1988). It is not surprising, then, that when responding to hypothetical scenarios that involve inappropriate behavior and attitudes for women but not for men, women are likelier to respond with more shame (both in frequency and intensity) than men.⁴

Ferguson, Eyre, and Ashbaker (2000) have confirmed this conclusion by devising a study in which the scripts of the scenarios were rewritten to tap identity concerns either more common to men (situations that clearly violate known identity concerns of many men, such as the desire to be agentic, independent or autonomous, physically strong, and emotionally stoic) or more common to women (situations that represent violations of traditionally prescribed behaviors or attitudes in women, such as being responsible, being responsive to others' needs, being helpful, loyal, nurturant, or caring, as well as being aware of their obligations and attachments to others, connected to them, and interpersonally sensitive). As expected, the frequency and intensity of shame is greater for men in the first type of scenarios and in women in the second. All in all, then, and contrary to theoretical expectations, there is not enough evidence to support the claim that women are more shame-prone than men in sense (a).

Some of the results reviewed so far are also relevant to the second meaning of gender-specific shame-proneness: the more diversified intentionality of shame. Although it transpires from these studies that different particular objects occasion shame in women as opposed to men, it has by no means been established that there are more such objects nor that women typically undergo more episodes of more intense shame. In neither of these two understandings, (a) or (b), is shame gender-specific. This conclusion is not in line with that part of feminist thinking (Bartky 1990; Lehtinen 1998; Manion 2003; Locke 2007) that takes a greater vulnerability of women to shame for granted. The empirical evidence is however favourable to

4 I have borrowed here from Ferguson, Eyre, and Ashbaker (2000, 135–136).

the claim that women and men, through processes of socialization, internalize distinct identity concerns or ideals and, given the connection between shame and identity, as a result the intentionality of shame is gender-specific.

3. Shame as a gender-specific experience and concept

The claim that shame is gender-specific may take the following stronger meaning: women and those in social circumstances similar to them conceptualize – understand, know about, and react to – shame differently than men do. The idea is that social position and, in particular, being in a dominant or subordinated position, differentially affects the way individuals experience and conceptualize emotions, including shame. Given that women and men tend respectively to occupy subordinated and dominating positions in society, we can expect them to have different experiences and conceptions of shame. Lehtinen (1998) further articulates this idea by means of the following argument. (1) The meaning of a concept such as shame is understood criterially (Wittgenstein, 1967). For example, pain behaviour is a criterion (partially defines the meaning) of pain.⁵ (2) Knowledge of the criteria of shame is formed by social identity. (3) Women, as a subordinated group, have a significantly different social identity than men or members of the dominant group. (4) Women conceptualize, understand, or know about shame differently than men.⁶

In particular the dominant theories of shame have been devised by individuals whose identity was not formed by “the characteristic

5 Criteria are circumstance-dependent and empirically defeasible. Hence, while during a theatrical representation we will not take the actor’s moaning as signifying that he feels pain, in the appropriate circumstances, say, in the immediate aftermath of a serious car accident, we cannot doubt that a person who is moaning actually feels pain.

6 This is a rather impoverished version of the argument and does not do full justice to Lehtinen’s original version. For our purposes, however, there will be no need to include more details.

sorts of psychological oppression on which modern hierarchies of class, race, and gender rely so heavily.” (Bartky, 1990, 97; Lehtinen 1998, 62) Such individuals will at best experience shame as an episodic adverse assessment of self, a sudden “blip across the face of an otherwise undisturbed consciousness” (Bartky, 1990, 96). Although painful and unpleasant, for such individuals shame can form an occasion for moral reaffirmation; it can be salutary. For the socially subordinate individual, however, who has partly internalized the low evaluation of herself or himself, of “people of her or his kind,” “shame is not so much a particular feeling or emotion [...] as a pervasive affective atonement to the social environment.” (Bartky, 1990, 85).

The episodic experiences, the particular feelings of shame of the subordinate are more seldom salutary than they are for the privileged individual [...] [T]hey are unconstructive and self-destructive; and they function as *confirmations* of what the agent knew all along – that she or he was a person of lesser worth. (Lehtinen, 1998, 62).

Though salutary episodes of shame are not impossible for them, “Pervasive, low self-esteem stemming from routinized shaming or derogation makes it hard for them to distinguish between justified and unjustified instances of shame.” (Lehtinen, 1998, 71, note 13)

Such pervasive and dispositional shame is left unconsidered, often not regarded as “shame proper,” in prevalent models of shame. These models often [...] take for granted [...] that the relation between shaming and shame is contingent; the moral agent is autonomously free – has a privilege – either to internalize or to defy the episodic dis-esteem and de-evaluation. (Lehtinen, 1998, 62)

From these passages, I shall highlight two aspects that allegedly demarcate gender-specific conceptualizations of shame: episodic as opposed to dispositional shame and autonomous as opposed to heteronomous shame. In particular, given the “dominant” standpoint of shame theorists, theories of shame would typically conceptualize shame as *episodic* that are *free* or *autonomous*: subjects who undergo episodes of shame can typically resist experiencing the de-evaluation implicit in shaming and shame if they decide to do so. The point, however, is that subordinated women do not have such freedom: when shamed they simply give in to shame. What is more, shame is

for them a *protracted experience* as opposed to an occurring one. The difference here is that between *Erfahrung*, or more general, enduring and protracted experiences such as “life experiences,” on the one hand, and *Erlebnis* and episodic or occurrent experiences such as “inner experiences,” “mental states, events, or processes” (Lehtinen, 1998, 64–65) on the other hand. Let us say a few words on both aspects in turn, beginning with the autonomy/heteronomy question.

Though there are those who think shame is not heteronomous in any deep or interesting sense (Rawls, 1971; Deonna & Teroni, forthcoming), this view is by no means the dominant view. It is rather generally recognized by both philosophers and psychologists that shame is a heteronomous (Lamb, 1983; Kekes, 1988; Williams, 1994; Wolheim, 1999; Smith et al., 2002; Calhoun, 2004) emotion in the sense that it may be elicited by negative evaluations of the self that do not initially originate in the subject and with which the subject actually disagrees. An emotion such as fear may also include an evaluation with which the subject disagrees. I may experience fear of this spider, and hence at some level cognize or evaluate this spider as dangerous, while at the same time judging the spider to be harmless. The difference between shame and fear, however, would rest in the fact that while many consider the fear episode just described as inappropriate, unfitting, or irrational, heteronomous instances of shame are not generally considered as inappropriate, irrational, or unfitting. It is because of this particular aspect of shame that some philosophers are tempted to disqualify it as a moral emotion (Lamb 1983; Kekes, 1988).⁷

Note that the debate about the heteronomous nature of shame has been largely conducted from outside the perspective of subordinated women and feminist theory. It would seem that many “dominant” theorists of shame have themselves experienced and conceptualized the alleged heteronomous nature of shame in the same way as feminist thinkers. This suggests that there is no clear divide between autonomous/heteronomous shame along gender lines (or social position). Heteronomy is a gender-neutral alleged feature of shame. Lehtinen (1998) may yet insist that subordinated groups will mostly expe-

7 Not everyone claims that shame is heteronomous. See Deonna and Teroni (2008) for an account that shows that shame when heteronomous is so only on the surface.

rience heteronomous shame as opposed to autonomous shame. That would be an interesting claim about gender specificity only if, at the same time, (dominating) men experience significantly less heteronomous shame than women. This, however, is an empirical hypothesis that for the moment has no answer. What is more, even if confirmed, this type of gender specificity does not show a different conceptualization of shame across genders but, more modestly, a different distribution of shame episodes across genders, the explanation of which may indeed be rather important from the point of view of gender studies. The difference may be due to the fact that, as a group, women are more likely than men to be shamed and thus on the whole more likely to feel heteronomous shame even though they are not more prone to feel it than other groups. Alternatively, we may perhaps hypothesize that a greater proportion of women than men will react with heteronomous shame when shamed because boys more than girls are socialized to respond in kind to anger provocations with their own anger and retaliation (Brody, 1996; Zahn-Waxler, 2000).

The conclusions drawn in the last paragraph may be thought unwise for failing to consider the heteronomous nature of shame for women *in connection with* its dispositional nature for women. The argument just presented was conducted at the episodic level. However, the heteronomous shame of women, the objection would go, should not be studied at the episodic level, for “shame is not so much a particular feeling or emotion [...] as a pervasive affective atonement to the social environment.” (Bartky, 1990, 85). If this particular ‘affective atonement’ is what shame consists in for subordinate women, then it is indeed something quite different than what it is for dominant men.

I doubt, however, that the protracted state just described can be plausibly considered as a form of shame. Philosophers and psychologists typically understand shame as well as most other emotions either as a short-lived emotional episode, or as a disposition (the sense of shame), or in terms of proneness, as in “shame-proneness”.⁸

8 The sense of shame is that out of which a person may refrain from doing something that she considers shameful. Any individual may have a sense of shame without at the time same time (a) being shame-prone in the sense discussed in Section 2 or (b) undergoing an occurrence of shame.

In none of these senses is shame the protracted type of experience referred to above, nor *a fortiori* is it something “also passed on from one generation to the next.” (Woodward, 2000, 218) It just seems that the category of “protracted or enduring experience” does not quite apply to emotions. As Lehtinen (1998, 65–66) acknowledges, a disposition to feel shame must be punctuated by shame episodes. To be identified as such, these must include a certain phenomenology, such as blushing and wanting to disappear. Does the protracted “pervasive affective atonement” of shame involve such a phenomenology in an uninterrupted way? If it does, one can safely assume that shame is what is at issue. Yet, it is unlikely that this is what Bartky (1990) or Lehtinen (1998) have in mind, for it is hard to imagine that women are experiencing such protracted blushing and desire to disappear.

Of course, there is a sense in which the disposition to feel shame with regard to matters pertaining to one’s gender is an enduring form of shame, and as such is perfectly compatible with the episodic and dispositional senses familiar from the literature. A person’s shame is enduring in this sense if she undergoes recurrent episodes – perhaps of a marked intensity – in response to the same particular object. The reason why the episodes in question are so recurrent may or may not have to do with the person’s specific affective style, e. g. a pronounced shame-proneness. In the debate that concerns us, however, these episodes are connected to the relevant social circumstances and, in particular, to the fact that others, generally in positions of power, repeatedly and successfully elicit shame in the subject with regard to some particular feature she and people of her kind embody.

In short, I have been arguing that there is no gender-specific form of shame in the sense defined in this section because heteronormativity is a gender-neutral alleged feature of shame and because neither shame, nor any other emotion, can be understood in terms of the protracted experience envisaged by some theorists. To say this much is not to deny that theorists such as Bartky and Lehtinen are describing a real phenomenon, well worthy of our attention. As argued elsewhere (Deonna, Rodogno, Teroni 2011, Ch. 8), however, this phenomenon is best referred to as “stigma” and/or “being stigmatized” rather than “shame”.

Conclusion

In conclusion, there is not sufficient reason to think that shame is gender-specific in either one of the two senses explored above. Women are not more shame-prone than men, nor is the intentionality of shame richer or more extended for women than it is for men. It is clear, however, that due to various processes of socialization, the intentionality of shame differs across the sexes and may do so in a way that is unfair or unjust to women. It is also unclear that shame is gender-specific with regard to its heteronomy and dispositional nature. Heteronomy is generally considered a feature of shame irrespective of the gender and/or social position of those who experience it. As for the phenomenon called “protracted shame”, it would seem that other non-emotional expressions would be more felicitous in referring to it.⁹

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Q&A Box: Raffaele Rodogno

Based on your research, where do gender differences in emotion come from – socialization and culture or biological differences between women and men?

My answer is circumscribed to the case of shame. The empirical evidence is favorable to the claim that women and men, through processes of socialization, internalize distinct identity concerns or ideals and given the connection between shame and identity it follows that the intentionality of shame i. e., the particular things we feel ashamed of, is to some extent gender-specific. Due to socialization and culture there are some differences in the kinds of things that tend to elicit shame in men and women.

What is the finding on gender differences (or lack of, thereof) that surprised you the most in your own research?

Rigorous conceptual work and up-to-date empirical psychology together show that the issue of gender-specificity surrounding the emotion of shame is much more circumscribed than hitherto thought. In particular, contrary to expectations, women are not clearly more prone to episodes of shame than men, nor is there reason to think that they experience shame in ways that are fundamentally different from men.

What should everybody know about gender differences in emotion? What are, in your view, the most important findings in this literature so far?

Interdisciplinary work at the intersection between gender and the particular emotion of shame brings to light the importance of carefully defining the terms. Philosophers studying the gender-specificity of shame may not be studying the same phenomenon as their colleagues from psychology. Even when these definitional issues are straightened out, however, one trend seems to emerge: gender-specificity is a matter of socialization and to that extent conditional to the social position occupied by various individuals. This is clearly a momentous conclusion with regard to its applied consequences. If, due to socialization, different particular objects cause shame in women as opposed to men and we have reason to think that it would be unjust or morally bad for women to feel shame with regard to these objects, society can intervene in order to influence the norms of socialization in the relevant desirable or just way.

8. Gender and Emotion: An Anthropological and Historico-Religious Approach (Mesopotamia, Egypt, Ancient Judaism, Greece, and Rome)

DELPHINE EGGEL

The present review surveys the state of research in the context of the Ancient world with respect to the issue of gender, more particularly in connection with emotions. The purpose is to provide a brief picture of research starting with the initial interest in the aforementioned issue, up to to the real historiographical turn constituted by the Foucauldian work and the more general interest in the issue that emerged in Europe the 1990s. The issue of gender in the Ancient world relies on our use of ancient sources and documents that have come down to us and which have to be dealt with much care and caution. Scholars have to determine with precision the vocabulary used by the Ancients themselves when dealing with such issues as gender and emotion, in order to render accessible their mentality or worldview, social behavior and convention. The issue at task can help us get a better grasp of Ancient societies. Thus the analysis of suffering, as an emotion, and the expression of suffering in Ancient sources and documents from the Mediterranean world, can give us access to the voice of women, and allow us to have a better picture of gender relations. The literature presented here wishes to provide those interested in the issue at task a comprehensive review of works which enable us to access this issue through the eyes of the Ancients, without the bias of modern categories, and to enter in dialogue with them.

The initial interest in gender studies was sparked by the feminist movement, starting in the 60s. In the academic world, however, one may want to find the first stirrings of such an enterprise even earlier; for instance with the ordination of the first female minister, Reverend Antoinette Brown in 1853 (*Encyclopaedia of Religion*, 2005, p. 3310).

But in the field of Classics, the first studies properly conducted with an interest in the gender problematic were brought about in English and American universities, the prime example being the publication in 1990 of *Before Sexuality*, a collection of essays about gender and sexuality under the direction of David Halperin, John Winkler and Froma Zeitlin. This new way of approaching history was notably inspired by the works of Michel Foucault, especially his three-volumes *Histoire de la sexualité* (1976–1984). As John Winkler observes in his *Constraints of Desire*, Foucault described the notion of the “self”, a distinctively modern construction from 19th and 20th century, as built around sexual characters and desires. Winkler also notes that since ‘sexuality’ in this sense is a recent invention, Foucault’s first volume, setting out the thesis about the nineteenth century’s obsession with speaking about sex, had no reference to the ancient world. The next volumes, however, reflect his growing curiosity about how individuals came to inspect their own states of desire as if their desire were a central problem, and about the Greco-Roman context in which problems of desire had not yet been seen as problems of the *self* (Winkler, 1990, p. 5). The researchers specializing in Antiquity whose works were compiled in the above-quoted volume of Halperin, Winkler and Zeitlin then took up the arguments proposed by Foucault in *Histoire de la Sexualité*.

In the 90s, studies such as those carried out by Paul Veyne, Eva Cantarella or Sara Lilja represented in Europe a new point of view about sexuality in Antiquity¹. In the same vein, the research of Caroline Walker Bynum, Steven Harrell and Paula Richman more specifically explored the connection established between gender studies and the field of religion. They noted that “given the scope and passionate engagement of Gender scholarship in the late twentieth century and early twenty-first century, it is to be hoped that the task is taken up with the same commitment to social justice and transfor-

1 For a comprehensive bibliography concerning the study of the feminine body and its role in the emergence and construction of Christianity, cf. Peter Brown’s research on the topic (1988), with a very good survey of the influences by the various trends of monotheistic and pagan religious movements.

mation that has guided the field from its beginning” (*Encyclopedia of Religion*, 2005, 3314–3315). According to the words of Ursula King in the introduction to her book entitled *Religion and Gender*: “Religion cannot be understood without its history and the multi-layered pluralism through which it has found complex social and cultural expression” (King, 1995, p. 4). However, the danger of an overemphasis on feminism sometimes distorts the objective vision that a researcher must maintain. Despite their considerable attributions in the field of research on Antiquity, the studies undertaken seem to continually require redefinitions in order to avoid losing their logical sense. Numerous interdisciplinary studies can help to redefine this research, some specializing in Antiquity such as archaeology, ancient history, papyrology and history of religion. But specialists in the fields touching on neuroscience, behavioural psychology, medicine and law, explore as well the different layers of history and add another perspective to studies concerning the relations between different genders in the past.

Sandra Boehringer, who offers a brief historiography of gender studies, analyses the pertinence of this field in the context of the Ancient world. She brings to light the difficulty of thinking about ancient mentality through modern categories. Indeed, talking about “sex” when assessing gender in the Ancient world is not pertinent. The researcher should try to learn how gender and sex work together in the eyes of the Ancients, and through which emic categories. The author thus concludes: “studying the ancient systems of gender allows us both to better understand how people think of Greek and Roman societies, and to understand the values around which these societies were built” (Boehringer, *Kentron* 21, 2005, p. 104–106). Through this perspective, we are now allowed to consider the following argumentation. In the field of studies in the ancient world, as it has been raised by Anne Biemann, the gender problematic is connected to the study of women’s participation in public life. This activity is readable through male and female public actions, disparities existing in relationship to power depending on sex, the female specificity definition when accomplishing public tasks, the social and family status of women involved on the public stage, and finally the influence of women on contemporaries and future generations

(Bielmann, 2003, p. 10). In fact, the idea of defining with precision the role of each sex/gender and not solely defining that of women in ancient Mediterranean societies, be it in the “public” or “private” sphere, determines the turning point in discussions and research in this domain. However, this perspective in itself raises numerous difficulties, as we need to determine what the public domain is and where it ends. Another difficulty arises in the constitution of our argument. In effect, the sources we currently have at our disposal, despite the production of other sources such as papyri, inscriptions and coins (Bielmann, 2003, p. 12), are mainly derived from literature created and imagined from an essentially masculine point of view. The line between rigorous research and a mistaken interpretation of these sources is easily crossed. Given this, a strict methodology, in addition to a great degree of humility, is necessary for investigations undertaken at any level.

To define the role of women, or to be more accurate to define the impression left by women during the Antiquity, the study of emotional expression seems to be an interesting viewpoint. The anthropologists who studied non-European societies were the first to take an interest in emotion as a social reality:

They discovered in the language the imaginary and social practices this absence of division between reason and emotion, between soul and body and at the same time an additional proof of occidental and ethno-centricity in our old representation and moreover our subject. This explains why constructivism and cognitivism have become the epistemological references to study affectivity and its social implication (Boquet et Nagy, in *Ecrire l'histoire 2*, p. 18–19).

When Antiquity began to be viewed from an emotional angle, the anthropological and historical branches developed a series of studies analyzing the religious, social, political and even economic interaction between the sexes. These works deal with themes such as marriage and family descent, among others. In Rome, for example, the studies of Michel Corbier attempt to understand the role of important female figures in the matrimonial strategies used to gain access to power by determining the relationships between these women and their husbands and the role that these women had.

From another perspective, on the occasion of grieving ceremonies and funerals, there was a variety of public emotional manifestations. These ritualized emotions implied the participation of all present and in particular groups of “weepers” which were found all over the Mediterranean and the ancient Middle Eastern civilizations. Thus, personal and individual emotion is taken over and manifested to the point of paroxysm as a result of the ceremony (on this point, cf. the special issue of *RHR* 225, edited by Philippe Borgeaud). There, in his article “Ritual expressions of sadness and weeping in ancient Egyptian mourning,” Youri Volokhine defines emotion, or the representation of emotion in Pharaonic Egypt as a codified representation without any room for the individual. This expression is therefore collective. He extends his consideration to ancient groups of weepers as far the Mediterranean basin and describes it as: “compliant to all ethnological testimony, modern or ancient [...] This example”, he adds, “puts us in a theatricalized representation, a codified drama, exploiting behaviour” (Volokhine, in *RHR* 225 fasc. 2, 185–186.) On the other hand, as Anne-Caroline Rendu suggests it in “Cri ou silence: deuil des dieux et des héros dans la littérature mésopotamienne” (same special issue of *RHR* 225, fasc. 2, p. 199–221), we can also take from ancient writings referring to bereavement and its consequences that it is possible to find in Mesopotamian² literature a complete theme of the emotions expression, male and female. She adds that: “gestures and attitudes reproduce themselves from one text to another, suggesting codified emotional demonstrations. Despite constraints and stereotyped narrative formulas, stories respond exactly to the image we had from a person in the grip of affliction, and we cannot doubt it gives a testimony of the individual and intimate pain in front of death”(A.-C. Rendu, p. 201–202). Through these two viewpoints, Egyptian³ and Mesopotamian, emotion is

2 On women and the representation of their status in ancient Mesopotamia, cf. the many works of Ascher-Greve (1985; 1998; 2002; 2003).

3 For a more global approach on women in ancient Egypt, cf. most notably Johnson (1997) on their depiction, Graves-Brown (2008) on their status, and Rowlandson (1998) for a survey of their situation throughout Egyptian history.

clearly defined as a tool to understand the individual and the group in ancient Middle East civilizations⁴.

In Greece the same picture can be reconstructed. Ritualization is intended to contain the pathos of mourning. Nicole Loraux has showed how this “pleasure of tears”, whose most violent expression is female, threatens politics in its positivity, and how, rejected outside of the male political space, it finds a way to manifest itself in the theatre. When the topic of motherhood is featured in the ancient Athenian discourse, it is usually understood as the earthy motherhood of the fatherland, which defines the autochthonous citizen. The “mother” is in that case the personified Athenian soil, which tenderly and gratefully welcomes back in its bosom the children who were born from it, and then died for it. A human mother’s pain is not important at this level. In this respect, Nicole Loraux analyses the difference between the discretion of Athenian tears and the “quiet joy” shown by the Spartan mother whose son has died gloriously. This opposition between earthly and womanly motherhood implicitly brings us back to the whole of the Athenian representations of autochthony. In Athens, the Earth confiscates the maternal component of public bereavements. Everything is done to keep the female pain confined indoors, in the domestic sphere (P. Borgeaud, *RHR* 210 fasc. 3, 1993).

Alongside the question of rituals, ceremonies and representations, there emerge problems associated with the sphere of the forbidden. It is indeed highly interesting to question the definition of acceptable social behavior that is to be followed, be it in a ritual, social or judicial context. In the civilizations of Mesopotamia, Egypt, Greece or even Rome, for example, it is fascinating to analyze the codes of conduct imposed on either sex. Although it is evident that the conclusions reached by the male intellect should be accepted provisionally and seen through a well-adjusted lens, the social conventions established allow us to obtain a view of day-to-day life in these societies. Only the representation establishing guidelines for

4 For the study of women in ancient Jewish societies, cf. the authoritative books of Brooke (1992), Frymer-Kensky (1992) and Mayer (1987).

contemporary society remains, and from these we can determine “le représenté.” In other words, we can determine what females did, or did not do, through the study of what was expected of them.

In conclusion, in a world where death was an integral part of the landscape and where individuals were continually confronted by its presence, women and their body were the most exposed in the struggle against destruction: they were used as a mean to assure the survival of the *Polis* and were a barrier against oblivion. Furthermore, in the emotion area, it seems certain that “theatralization” of the image allowed a social representation of the woman, but as a concept and not as an individual. Around emotion there was also an outlined limitation between the public and private sphere, between the collective and individual expression. An approach that could help us to define the women as an individual would be archaeology for instance, observing the use of domestic space or accessories, or studying funeral epitaphs, which can provide us with demographic information and perhaps intimate details about the couple. Numismatic is also to be considered. These scattered pieces of data can show us a picture of daily female life, or at least provide us with some indications of life during Antiquity. Although far from being exhaustive, the fields mentioned above in the area of emotion and in the study of Antiquity demonstrate the evolution of different approaches to the subject. Notably, it shows us the amount of work still left to be done in reaching a complete understanding of these topics. Interdisciplinary seems to be the best tool to elaborate it.⁵

5 My thanks go to P. Matthey of the University of Geneva as well as to the whole team of the *Myths and Rites (Project 12)* research program, directed by P. Borgeaud of the University of Geneva, for their considerable bibliographical contributions and their general support. For the translation into English of the original text, thanks to Anna Nydegger and Philippe Matthey. Special thanks to Maud Panissod-Harrowsmith and Paul Harrowsmith for their suggestions and corrections. The remaining mistakes are, of course, mine.

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Q&A Box: Delphine Egge

Based on your research, where do gender differences in emotion come from socialization and culture or biological differences between women and men?

In the ancient world, gender differences between men and women in emotion are culturally determined. The big question in this domain concerns the sources of information that are available to us. These sources can render a restricted image of the daily life and civilization of the times. It is restricted, because the masculine point of view is dominant. This image is also sometimes limited by rare and scattered evidence. Indeed, women's voices can be heard and discussed only after being reconstructed. The ancient's associations of emotions for women stem from their gender expectations. These expectations are not necessarily the reality, but rather a concept of how women should be. What perhaps is decisive is that culturally, socially and behaviorally, the ideas we get about women in antiquity are not necessarily wrong, despite the scarcity of information sources. Women have certainly been formed by this imposed cultural vision, just like actors who follow the text and the instructions of the director, while at the same time internalizing them.

Where do you see the field of gender and emotions going in the next 20 years?

Undoubtedly, the decisive turn that came from Foucault's work was the starting point for a new era in the historical perspective. The work of many researchers in the field of Antiquity has currently taken very different paths both in regards to the problems of women and in regards to gender in general. This trend is evidenced by the appearance of historians of antiquity who specialize in the study of gender and more specifically by the onset of emotion-related research.

From a methodological standpoint, what would you recommend researchers who study emotion in terms of taking into account gender differences?

Regarding the methodology, I believe it is very clear that interdisciplinary work will be able to address this area of gender studies and emotion in a concrete way, with the clearest vision possible. The emotion is visible in the texts, of course, but can also find a way of expression in images and iconography, as well as in simple archeological remains such as a blush, comb, or perfume. The traces left

by the funeral epitaph of a husband bidding farewell to his wife are one of the countless pieces of evidence that can be collected and analyzed. All these data from the past should therefore be studied specifically from the point of view of the historian of religions, archeologist, numismatist, and art historian. Within the interdisciplinary approach, the final work will offer us a kaleidoscopic image of the subject, allowing us to reconstruct a relatively precise and accurate image. Methodologically, I believe that studying women's emotions should not become a workhorse in a feminist struggle. The argument could be greatly impoverished and biased

Q&A Box: Agneta Fisher

Based on your research, where do gender differences in emotion come from – socialization and culture or biological differences between women and men?

No difference in emotion between men and women can be traced back to either cultural or biological differences. Gender differences in emotion start small and become larger as the gap between the worlds of boys and girls increase. For example, there is a difference in temperament from birth onwards, with boys being more physically active, and at a later age engaged in more physical, so-called rough and tumble play. This not only characterizes some emotion expressions, but also influences how parents, and later teachers deal with the emotions of boys and girls. Boys are also responded to more with physical activity, mostly by their fathers. Girls are more physically relaxed, which gives room for more face-to-face interactions with adults. This may also be one of the origins of girl's greater ability to recognize emotions from the face: they simply have a longer experience with looking at faces, resulting in a greater interest in what is going on in the minds of other people.

An interesting observation is that whereas boys are more easily upset in childhood, women end up being the emotional sex. A universal, and partly biologically based sex difference is that women cry more often and in different situations than do men. Although there are differences in frequency and intensity, there is no country in the world where men cry more than women. Of course gender differences in crying may partly be explained by different gender roles and associated norms, allowing women to show their sensitivity more than men. However, other gender-role based emotional behaviors, such as physical and verbal aggression have been changing in recent years, due to societal changes in gender roles. The fact that changes in actual crying are less prominent, suggests that crying is more affected by biological than cultural factors.

From a methodological standpoint, what would you recommend researchers who study emotion in terms of taking into account gender differences?

The first most important advice is to be specific when studying gender differences in emotion. Previous research has shown that the largest differences are found when using global constructs, such as 'emotionality,' or 'emotional expressiveness.' This typically indicates that the researchers studied stereotypes rather than actual differences in emotional reactions. On the other hand, stereotypes always play a role when interpreting mental states, expressions or

behaviors, because emotions are not natural entities, but states that can be interpreted in different ways. Thus a tremble in one's voice, together with a staring gaze, can be easily interpreted as anger in some contexts, but it could reflect anxiety, or a competitive attitude in other contexts. It is therefore important to compare the same behaviors or expressions in men and women in order to draw any conclusions about gender differences in emotion.

A second important recommendation is to always take into account the context in which the emotional reaction takes place. There is, for example, abundant research on gender differences in anger and aggression that shows either stronger anger expressions by men or by women, or sometimes no differences at all. One of the explanations for these inconsistencies is that those gender differences largely depend on contexts. Apart from some very robust gender differences as crying, most gender differences vary with social roles, intimacy, power relations, or more generally the expected social implications of one's own emotions, so-called social appraisals.

Where do you see the field of gender and emotions going in the next 20 years?

Parallel with other fields in emotion psychology, there will be an increase in research on gender differences in the activation of different areas in the brain that are related to emotional response. This is important research and may explain some differences in emotions between men and women. One area of interest is differences in executive control functions, and how these develop differently in men and women. One of the hypotheses of current and future interest is how individuals gain control over their emotional impulses, and how they can learn to cope with intense emotions. Brain research is an important tool to gain more insight into this important problem.

On the other hand, I also believe that many of the interesting differences between the emotions of men and women do not necessarily require research in the brain, because they develop in social interactions during one's life. Despite the fact that in the Western world relations between the sexes have become increasingly egalitarian, there are still huge differences in the social and emotional styles that are typical for men and women. Listen to women's talk versus men's talk, look at their facial expressions and bodily movements! These differences become apparent in same-sex groups, for example in traditional work settings, in sport settings, and more generally in friendships, and it will become more and more important to develop tools to investigate gender differences in emotions during specific social interactions.