Anxiety Disorders: Sex Differences in Prevalence, Degree, and Background, But Gender-Neutral Treatment

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ABSTRACT

Background: Anxiety disorders are more prevalent among women than among men.

Objective: The aim of this paper was to investigate to what degree current psychological theories and treatment of anxiety disorders incorporate sex and gender considerations.

Methods: Relevant English, Dutch, German, or French empirical articles published until November 2006 were identified using the PsycINFO and PubMed databases as well as manual searches. The following search terms were used: anxiety disorders and sex differences, anxiety disorders and gender, anxiety disorders and women, anxiety disorders and men; combinations of these terms were used with prevalence, phenotypes, treatment, and therapy. In addition to all the aforementioned combinations, we replaced anxiety disorders with agoraphobia, panic disorder, social phobia, specific phobia, obsessive-compulsive disorder, posttraumatic stress disorder, acute stress disorder, and generalized anxiety disorder.

Results: Whereas widespread attention has been paid to sex differences in the prevalence of anxiety disorders and their possible origins, scant attention has been given to these differences in terms of treatment.

Conclusions: Prevention and treatment of anxiety disorders might be more effective if the available knowledge about sex and gender specificity was implemented. Concomitantly, treatment effect studies could be improved by greater consideration of sex and gender throughout the research process. More fundamental research is needed regarding the relationship between sex, gender, and anxiety disorders, particularly in association with other mental disorders that have an unequal prevalence between the sexes. (Gend Med. 2007;4[Suppl B]:S178–S193) Copyright © 2007 Excerpta Medica, Inc.

Key words: anxiety disorders, phobia, panic, obsessive-compulsive, gender, sex differences, prevalence, treatment, therapy, cognitive-behavioral therapy, pharmacotherapy.
INTRODUCTION

Anxiety and mood disorders are the most common mental disorders, and their prevalence is substantially higher in women than in men. To further understanding and increase the effectiveness of prevention and treatment, this article examined the extent to which current psychological theories and therapies consider the unequal proportion of anxiety disorders between the sexes.

We define sex as the biological features distinguishing male and female animals and human beings, whereas gender consists of the sociocultural aspects of defining people's identity in relation to sex.1,2 Gender characteristics can thus vary considerably between individuals of the same sex, but they can also be similar between individuals of opposite sexes.

Our review begins with a critical consideration of current data regarding the prevalence of the various anxiety disorders in both sexes, bearing in mind that sources of gender bias may be operative. Comorbid disorders and their prevalence in men and women are examined. Thereafter, several theories about anxiety disorders are discussed, with an emphasis on their power to explain sex differences in prevalence. In addition, sex-specific effects of various treatments are reviewed from available data.

METHODS

Relevant empirical articles published until November 2006 were selected using computer and manual searches. Computerized searches were performed in the PsycINFO and PubMed databases using the following terms: anxiety disorders and sex differences, anxiety disorders and gender, anxiety disorders and women, anxiety disorders and men. Combinations of these terms were used with prevalence, phenotypes, treatment, and therapy. We also used all the aforementioned combinations and replaced anxiety disorders with agoraphobia, panic disorder, social phobia, specific phobia, obsessive-compulsive disorder, posttraumatic stress disorder, acute stress disorder, and generalized anxiety disorder. In addition, we conducted several more detailed searches (eg, prevalence, anxiety disorders, sex differences, and alcohol abuse). Studies were selected if they investigated sex differences in anxiety disorders or if they provided relevant contextual information. We excluded: studies in which anxiety disorders were not the main focus but were comorbidities; animal and biomedical research; studies targeted at children and adolescents; studies without any reference to gender and/or sex differences or similarities; articles not written in English, Dutch, German, or French; and articles that were not available.

ANXIETY DISORDERS: PREVALENCE, SUBTYPES, AND SEX RATES

The category of anxiety disorders in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)3 encompasses agoraphobia with and without a history of panic disorder (PD), PD with and without a history of agoraphobia, specific phobia, social phobia, obsessive-compulsive disorder (OCD), posttraumatic stress disorder (PTSD), acute stress disorder, generalized anxiety disorder (GAD), anxiety disorder due to a general medical condition, substance-induced anxiety disorder, and anxiety disorder not otherwise specified. In clinical or community samples, almost all subtypes are more likely to be diagnosed in women than in men.3,4

Tables I and II show all Western subtypes of anxiety disorders and their lifetime prevalence, based on research in community samples, and the percentages of women and men suffering from these subtypes. Table I uses the reports given in DSM-IV-TR,3 but where the manual lacks data, other sources were consulted in the literature. Table II is a shortened adaptation of the overview developed by Wittchen and Jacobi8 for the European countries.

Table I shows that almost all subtypes of anxiety disorders are substantially more prevalent in women. Social phobia and OCD may be exceptions, in that they may affect both sexes equally, but results of studies are mixed. Social phobias differ between the sexes based on the type of situation. For example, women reported...
greater fear than did men when talking to authority figures, speaking before an audience, and working while being observed. Men’s anxiety was reported to be higher for urinating in public bathrooms and returning goods to a store (these findings for urinating in public bathrooms may be confounded by the lack of opportunities for women to engage in similar behavior). OCD differs between the sexes in the type of compulsive acts (eg, compulsive washing occurs predominantly in women and ritualistic controlling more often in men).10

In addition, comparing women and men within the specific types of anxiety disorders generally reveals more serious symptoms among women. For example, women appeared more impaired and more dependent than did men in the requirement that they have a companion when they leave home, whereas the overall profile of agoraphobic situations was similar for women and men.11 The relapse rate of PD after 8 years of observation was 3-fold higher in women than in men.12 Social phobias have also been reported to be more severe in women.9 A higher prevalence of PTSD, even after controlling for cases of sexual trauma,13 as well as a longer persistence of symptoms,7,14,15 was reported in women.

Community studies have noted that the generally higher prevalence of anxiety disorders in women compared with men continues throughout life.8,16 The unequal sex rates appeared to be independent of specific health care settings in the countries where such data have been collected, indicating that biological and psychosocial factors, either interacting or working alone, are responsible for the sex/gender differences in the prevalence of these disorders.17

**Potential Sources of Gender Bias in Sex Differences in Prevalence**

Most data on prevalence of anxiety disorders are based on self-reports, and various authors have hypothesized that observed sex differences are due, at least partly, to less willingness in men to report symptoms of anxiety.6,16 Traditional masculine sex-role stereotypes might make it difficult for men to openly display weakness in general (eg, crying18 and admitting feelings of agoraphobic anxiety19). One might argue that the data regarding social phobia (women:men = 1:1) do not support this assumption.3 Again, the
Table II. Twelve-month prevalence of anxiety disorders in Europe by gender and age. Data are expressed as medians (ranges). Adapted with permission from Wittchen and Jacobi. 8

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total, 18–34 y, 35–49 y, 50–65 y,</td>
<td>Total, 18–34 y, 35–49 y, 50–65 y,</td>
</tr>
<tr>
<td>Any anxiety disorder</td>
<td>16.3 (14.8–18.0) 17.0 (14.4–20.0) 15.9 (13.4–18.6) 16.2 (13.6–19.1)</td>
<td>7.8 (6.6–9.1) 7.0 (5.2–9.2) 8.0 (6.2–10.4) 8.4 (6.4–10.8)</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>3.0 (0.2–3.8) 3.4 (2.3–5.0) 3.4 (2.3–4.9) 2.4 (1.5–3.6)</td>
<td>1.7 (1.2–2.4) 1.0 (0.5–2.0) 2.0 (1.1–3.7) 2.1 (1.3–3.5)</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>3.1 (2.4–3.9) 2.0 (1.2–3.4) 2.9 (1.9–4.3) 4.4 (3.1–6.0)</td>
<td>1.0 (0.6–1.5) 0.9 (0.4–1.9) 0.9 (0.5–1.9)</td>
</tr>
<tr>
<td>Social phobia</td>
<td>2.7 (2.1–3.4) 3.1 (2.0–4.6) 2.7 (1.8–4.2) 2.2 (1.3–3.6)</td>
<td>1.3 (0.9–2.0) 1.9 (1.0–3.4) 0.7 (0.3–1.8) 1.4 (0.7–2.7)</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>2.1 (1.5–2.8) 1.1 (0.6–2.3) 2.9 (1.9–4.3) 2.2 (1.2–3.8)</td>
<td>1.0 (0.6–1.5) 0.5 (0.2–1.2) 0.9 (0.4–1.9) 1.8 (0.9–3.2)</td>
</tr>
<tr>
<td>Specific phobia</td>
<td>10.8 (9.5–12.2) 11.9 (9.7–14.6) 9.7 (7.8–12.1) 10.7 (8.6–13.3)</td>
<td>4.5 (3.7–5.6) 4.2 (2.9–6.0) 4.7 (3.3–6.8) 4.6 (3.2–6.6)</td>
</tr>
<tr>
<td>Obsessive-compulsive disorder</td>
<td>0.9 (0.6–1.4) 1.0 (0.5–1.9) 0.9 (0.4–2.0) 0.8 (0.4–1.6)</td>
<td>0.6 (0.3–1.0) 0.4 (0.1–1.2) 1.0 (0.5–2.0) 0.3 (0.0–1.0)</td>
</tr>
</tbody>
</table>

**Expert Ratings†**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total, Median, Within Range, Lower, Higher, Not known, N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any anxiety disorder</td>
<td>12.0 (11.1–13.0) – – – –</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>2.3 (1.9–3.8) 1.8 (0.7–2.2) 67 25 8 5</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>2.0 (1.7–2.5) 1.3 (0.7–2.0) 55 37 8 6</td>
</tr>
<tr>
<td>Social phobia</td>
<td>2.0 (1.6–2.5) 2.3 (1.1–4.8) 58 17 25 5</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>1.5 (1.2–1.9) 1.7 (0.8–2.0) 67 8 25 4</td>
</tr>
<tr>
<td>Specific phobia</td>
<td>7.6 (6.9–8.5) 6.4 (3.4–7.6) 73 27 0 4</td>
</tr>
<tr>
<td>Obsessive-compulsive disorder</td>
<td>0.7 (0.5–1.0) 0.7 (0.5–1.1) 90 0 10 7</td>
</tr>
</tbody>
</table>

*Medians of all available European data with interquartile ranges. No median could be calculated for some aggregated diagnoses [any substance dependence, any mood disorder, any anxiety disorder, any mental disorder].
†Expert ratings of whether the prevalence in their own country can be regarded as within range/lower/higher as the listed (total) CIs; percentages based on N = 3 (eating disorders) to N = 14 (major depression) expert statements.
‡Number of experts (N = 17) who gave the rating that population-based prevalence is not known for the respective country.
Gender Medicine

possibility that the true proportion of males with social phobia is higher than that of females cannot be ruled out because of the role shame may play in males.

Bekker reviewed 2 other sources of bias that may result in an underestimation of the total number of males with (agoraphobia. One source is men's generally higher level of alcohol abuse, possibly in response to anxiety. The literature reviewed supports this hypothesis. For example, a study in Mexico indicated that the prevalence of PTSD in men is underestimated because of alcoholism. Especially for men, the number of potentially traumatic events during youth appeared to be related to alcohol abuse. Previous substance abuse also increased the risks of exposure to trauma. However, for women, underestimation of agoraphobia may also result from the use of anxiety-reducing drugs (eg, tranquilizers) or from behaviors (eg, bingeing), both of which are more frequent in women than in men.

The other source of gender bias is the sex-specific division of socioeconomic roles between men and women that might hamper avoidance tendencies in men. Men more than women may be affected by the demands of having and keeping a job outside the home. Women might adapt to agoraphobia by limiting excursions outside of the home more easily than do men. On the other hand, practiced agoraphobia might result in a poorer socioeconomic position for women. A large Australian study found significant gender effects in the interactions between social phobia and employment status. Unemployed women were more likely than unemployed men to have social phobia. In a group self-classified as “not in the labor market,” of which the majority were full-time parents (ie, mothers, a relatively large group in Australia), women were half as likely to have social phobia as were men. Thus, a coincidental overrepresentation of one demographic group might artificially distort prevalence figures.

An additional source of bias concerns definitions and statistics. For instance, different prevalences of PTSD were found when using either of the 2 main diagnostic systems and associated epidemiologic instruments. Females were twice as likely as males to receive a diagnosis of PTSD according to the International Statistical Classification of Diseases, 10th Revision, whereas no overall sex difference was found when PTSD was defined by DSM-IV criteria.

Comorbidity

Studies have consistently reported that people with one anxiety disorder are likely to experience several other subtypes of anxiety disorders during their lifetime. The coexistence of anxiety disorders with several other comorbid disorders has repeatedly been described. Wittchen and Jacobold and Kessler et al found that 30% to 40% of all patients with an anxiety disorder also had a depressive disorder and vice versa. Because mood disorders occur twice as often in women as in men, it seems worthwhile to examine sex rates of prevalence of the various patterns of coexisting syndromes. Also, the comorbidity of anxiety and depression raises the question of which condition occurs first. It is conceivable that depression results from having an anxiety disorder; conversely, being depressed might lead to anxiety. Alternatively, both conditions might develop from a common source (eg, traumatic experiences).

Support for a closer link of anxiety disorders with female sex compared with male sex comes from a community study on the role of sex differences in anxiety disorders and depression. The findings indicated that both female sex and preceding anxiety contributed significantly to the later onset of both major depression and dysthymia, but that the contribution of preceding anxiety was stronger. Further examinations are needed of preexisting anxiety disorder as a potential factor in the emergence of sex differences in major depression. An additional source of bias concerns definitions and statistics. For instance, different prevalences of PTSD were found when using either of the 2 main diagnostic systems and associated epidemiologic instruments. Females were twice as likely as males to receive a diagnosis of PTSD according to the International Statistical Classification of Diseases, 10th Revision, whereas no overall sex difference was found when PTSD was defined by DSM-IV criteria.

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(cluster B), dependent, and personality (cluster C [anxious–fearful]) disorders.

Anxiety disorders have also been reported to have a high comorbidity with substance abuse, and subtypes of anxiety disorder, for example, OCD, are comorbid with learning disorders, disruptive behavior disorders, and disorders such as Tourette's syndrome or tics.3

The possibility that clusters of syndromes occur, including ≥1 anxiety disorder, and that these clusters have sex-specific elements seems to support a “lumping” viewpoint (ie, taking syndromes together and using a dimensional approach) instead of a “splitting” viewpoint, which is more categorical.28 The former perspective might be helpful in guiding future research on gender and psychopathology, including anxiety disorders.

SEX DIFFERENCES IN PSYCHOLOGICAL MODELS OF ANXIETY DISORDERS

Our overview of theories of anxiety disorders focuses on the following questions: To what degree do the models explain sex differences in prevalence? What are the implications for practice?

We begin with the learning perspective, which is the most extensively studied perspective in the field of anxiety disorders. We then discuss sex role theories, which center on the existence of sex differences in prevalence. In addition, we discuss attachment and schema theory because of the interesting gender-specific variants available.

Learning Perspective

Because learning theory is the most extensively studied perspective on anxiety disorders, the dominant type of treatment of these disorders, cognitive-behavioral therapy (CBT), is generally considered to be the only evidence-based treatment in the field.

The core element of CBT is that originally neutral stimuli presented during a fear-arousing experience (eg, a bus or train in agoraphobia) can become fear-eliciting and then provoke a fear response themselves (ie, a conditioned response). Moreover, the predominant reaction of avoidance, which results in stress reduction, reinforces future avoidance tendencies, including anticipatory avoidance. The fear-arousing experiences can include direct traumas, as in the case of PTSD, but also thoughts and/or memories, cognitions, and fear of one's own bodily reactions (eg, panic).10

From this perspective, one could question why more women than men develop phobic fear responses and/or phobic avoidance behavior. Given the large body of literature in the fields of anxiety disorders, learning processes, and conditioning, remarkably few studies have been devoted to this question. Using the search terms conditioning (or learning) and anxiety disorders and gender (or sex differences) provides few clues. Authoritative works on anxiety disorders do not offer gender-specific viewpoints on the etiology of learned behavior, even if they consider sex differences in prevalence and their possible background.10

It has been hypothesized that women are more vulnerable to being conditioned to fear responses. Hedlund and Chambless29 found that compared with men, women were more responsive to both positive and negative conditioned stimuli during both acquisition and extinction. The traditional hypothesis that this effect was due to higher arousal levels in women during premenstruation was not confirmed, because premenstrual women were not more easily conditioned than were intermenstrual women. Years later, Kelly et al30 found higher levels of evaluative distress, but not autonomic arousal, in women compared with men during exposure, and 30 minutes after exposure, to an acute panicogenic stimulus. Thus, women might experience and/or report more psychological and behavioral disruption and impairment after panic and other acute aversive events than do men. This idea is consistent with the findings of Nolen-Hoeksema and Jackson31 that women have higher levels of rumination than do men (accounting for the higher proportion of depression in women versus men) and with Bekker’s6,32 assertion that women more than men respond to bodily sensations with cogni-
tive responses, implying the experience of lack of control over their bodies.

There is evidence supporting an exposure hypothesis (women compared with men are more frequently exposed to anxiety-evoking traumas) and a vulnerability hypothesis (women’s response to trauma expresses more vulnerability for anxiety disorders). Women’s more frequent exposure to sexual violence has repeatedly been mentioned, as well as domestic violence against women, rape, and poverty, all of which support the exposure hypothesis.21,32

Several studies have confirmed this. From a screening of women aged >18 years regarding sexual assault histories during childhood, childhood rape victims appeared more likely than nonvictims to have ever met the DSM-III diagnostic criteria for agoraphobia and other mental disorders.33 A comparison between a sample of patients suffering from anxiety disorders (PD with or without agoraphobia, social phobia, or OCD) and a matched community sample revealed a higher frequency of physical abuse in both men and women in the groups with anxiety disorders.34 Childhood sexual abuse was higher among women with anxiety disorders than among comparison women and highest among women with PD. Even after controlling for higher exposure to sexual violence, women’s prevalence of internalizing disorders (ie, anxiety and depression) remained twice as high as men’s.13,35

In addition to women being exposed to the trauma of sexual violence more often than are men, other aversive stimuli more frequently occur in women’s lives and/or might provoke more fear in them. Bekker6,32 listed several potentially fear-arousing characteristics of agoraphobic situations (eg, lack of affirmation of one’s personal identity, going out as “not done” [ie, not in line with existing norms], and going out as “not learned” [ie, not having acquired the skills needed in public, anonymous situations]). Future research could focus on the gender-specific meanings of the situations being feared and avoided and relate these to their significance for specific demographic and individual differences and also for various subgroups of women.

Sex/Gender Role Perspective

From the sex-role perspective, phobic avoidance behavior is an inevitable product of Western culture. The traditional feminine sex role discourages assertiveness and self-supportive behavior in women and prescribes them to react to stress with dependence and helplessness.36–41

This sex role perspective on anxiety disorders has been studied since the 1970s, mainly in relation to agoraphobia. Agoraphobias in women were expected to decrease in frequency as Western culture placed more demands on women to be employed outside the home and to be self-reliant and assertive.19 From this perspective, the sex role not only comprises the gender role (ie, what is to be expected from women and men in terms of sociocultural femininity and masculinity) but also the socioeconomic sex role (ie, what socioeconomic positions society expects women and men to take).

Two epidemiologic studies42,43 supplied evidence for the hypothesis that the frequency of phobia among women would decrease as their employment increased.6,32 However, to our knowledge, this relationship has not been investigated during the past decade. Nevertheless, it seems worthwhile to use such findings to more thoroughly study the relationship between these variables. This effort may be hindered by the research problem that data on female employment and sex-specific agoraphobia prevalence seem to have stabilized. Although studies over time on the changing interrelationships between phobia frequency, gender, and employment since 1996 were not available, we did find a recent cross-sectional study of these relationships at one specific time.44

Being unemployed, as well as not being married, appeared to be associated with higher rates of mental disorders, including anxiety disorders, in both sexes, but the association was stronger in men than in women. However, the authors concluded that sex differences in the prevalence of mental disorders (including anxiety disorders) could not be explained by the sociodemographic factors they examined.

Another approach within the sex-role perspective is to focus on a culture’s masculinity
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and femininity. Based on the aforementioned assumption that sex roles and phobia within Western culture are frequently related, the degree of masculinity/femininity in 11 countries was compared (in high-masculinity countries, social gender roles are clearly distinct; in countries with low masculinity/high femininity, gender differentiation is weak). High masculinity predicted higher national levels of agoraphobia and several specific fears, but no cross-national difference in social fears. In addition, various studies investigated the relationship between agoraphobia and sex roles at the individual level, although from different theoretical backgrounds. The first studies measured sex role stereotyping using adjectives that were a priori determined as expressing masculinity, femininity, or a gender-neutral self-image (Bem’s Sex Role Inventory; Personal Attributes Questionnaire). Two studies in this area failed to find any relationship between femininity and agoraphobia, but some associations were observed with masculinity. The first study found a negative correlation of masculinity with self-reported seriousness of agoraphobia; the second also found negative correlations for both sexes between masculinity and most measures of psychopathology (e.g., severity of avoidance behavior, trait anxiety, and depression). One could question how such findings should be interpreted. Could they primarily reflect the effects of being agoraphobic on an individual’s sense of competence? Or might the association between masculinity and increased agoraphobic symptoms reflect our current cultural definition of psychopathology in terms of low masculinity (e.g., fearfulness and the tendency to avoidance behavior)?

The absence of a relationship with femininity and the existence of a negative association with masculinity were confirmed in a clinical sample of children aged 6 to 11 years with anxiety disorders.

Another individual-level, gender-role approach to anxiety and other disorders (e.g., eating disorders) focused on gender-role stress (GRS). This approach places more emphasis on the stressful side of the gender role than does the sex-role model, which uses more neutral femininity and masculinity characteristics. The original authors defined GRS as stress resulting from a rigid commitment to gender roles, together with inherently dysfunctional coping. Masculine GRS components are (fear of) physical inadequacy, emotional expressiveness, subordination to women, intellectual inferiority, and performance failure. Arrindell et al. found all 5 masculine GRS components to be predictive for agoraphobic fears, blood-injury fears, social fears, and obsessive checking and washing compulsions. However, their study lacked both a measure of feminine GRS and a stress measure that might be more gender neutral. Therefore, it remains unknown whether the association would have been found for stress regardless of gender-bound nature, or it is specifically true for masculine GRS.

**Attachment and Schema Theory: Gender Neutral and Gender Specific**

Schemata are the inner working models of others that children develop in relation to their primary caregivers. If children experience their primary caregivers as insufficiently available or responsive to their needs, they develop a condition of insecure attachment. Their inner working models become early maladaptive schemata (i.e., others are experienced as unworthy of trust, empathy, and concern).

In the case of anxiety disorders, the insecure attachment might predominantly involve a fearful or avoidant attachment style. This can lead to a broad range of problem behaviors and separation anxiety that can take the form of school phobia, a precursor of agoraphobia at a later age. Other authors also found relationships between early attachment relationships and anxiety disorders. A review of parental attachment styles that patients with anxiety disorders had experienced concluded that particularly overprotectiveness and low care or warmth had been key elements. Most studies on attachment and anxiety disorders failed to report sex differences in the patterns of insecure attachment styles.
original theory on attachment (as well as the schema theory) is gender neutral.

With feminist neopsychoanalytic theory, a gender-specific version of the attachment theory has become available. Authors from this tradition consider the fact that the primary attachment person in children’s lives is usually a woman—their mother—which provides a source of sex differences in autonomy development. Considered from this perspective, the early same-sex mother–daughter relationship would imply that the symbiotic phase with the mother is longer, more enduring, and more intense for girls than it is for boys. As a result, girls would meet more problems with individuation and separation, boys with commitment and displaying their dependency needs.

The fact that insecure attachment might be expressed in sex-specific insecure attachment styles and patterns of autonomy connectedness may contribute to the unequal prevalence of many mental disorders, including anxiety disorder, between the sexes. Various studies (eg, Bekker and van Assen) have found empirical evidence for this idea.

**TREATMENT EFFECTS**

As previously mentioned, if gender roles deserve more attention in anxiety disorder therapies, it is not reflected in the research literature on treatment. In Europe, 26.1% of individuals with an anxiety disorder used formal health services, and among those, 30.8% received only drug treatment, 19.6% only psychological treatment, and 26.5% a combination. None of these percentages were specified for men and women separately.

Empirical research on the influence of sex/gender on treatment appears to be rare. Most of the 33 studies we identified in our literature search that initially seemed relevant appeared to avoid sex/gender-specific analyses, although they provided data about sex distribution within the sample. Consequently, it remains unclear whether no sex-specific effects were found or whether the researchers omitted a comparison of the effects for both sexes. Table III shows the findings of the 4 studies examining the influence of gender on anxiety treatment.

The studies by Clayton et al and Steiner et al concern pharmacologic treatment with sertraline. Both studies reported that sertraline was more effective than a placebo in both women and men when used to treat PD or GAD. According to Clayton et al, this is in contrast with earlier findings that women may have a worse prognosis and a somewhat lower short-term treatment response than do men. In the PD study, women improved more than men did in panic frequency and time spent worrying about having a panic attack, but this may be due partly to a lower placebo response in men. It should be noted that there were no sex differences in the other outcome measures.

Cottone et al focused on the role of gender (for clients, therapists, and psychotherapy dyads) in the reduction of symptoms and the duration of therapy in CBT or psychodynamic therapy. No sex differences occurred for the duration of therapy. However, male clients were more likely to withdraw from therapy after the initial intake assessment. If they participated, they showed a greater reduction of trait and state anxiety symptoms than did women; their reduction of trait anxiety symptoms was greater when the therapist was a woman (mean [SD], −29.50 [14.85]). (Lower scores reflect a greater reduction in symptoms.) For women with male or female therapists, the scores were (−3.00 [10.58] and −2.33 [8.57], respectively). However, the sample was very small (N = 12), and the analysis did not account for a possible interaction effect between gender and orientation of the therapist. Moreover, the authors reported that theirs was not a true effect study because the therapy was not terminated at the moment of assessment.

Predictors of treatment came from a study of intensive residential treatment encompassing intensive behavioral therapy combined with medication and milieu treatment for OCD patients. Whereas male and female participants had similar demographic and clinical characteristics, being female appeared as a positive and important predictor for decrease of
Table III. Overview of studies on the influence of gender on anxiety treatment of adults.

<table>
<thead>
<tr>
<th>Author</th>
<th>Type of Disorder</th>
<th>Type of Treatment</th>
<th>Sample</th>
<th>Method</th>
<th>Instrument</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clayton et al</td>
<td>PD with/without</td>
<td>Sertraline</td>
<td>F (n = 338); M (n = 335)</td>
<td>RCT, double-blind</td>
<td>HAM-A; CGI; PDSS; POMS; Q-LES-Q</td>
<td>Sertraline exceeded placebo; women profited more than men</td>
</tr>
<tr>
<td></td>
<td>agoraphobia</td>
<td></td>
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</tr>
<tr>
<td>Steiner et al</td>
<td>GAD</td>
<td>Sertraline</td>
<td>Sertraline (n = 182) F:M = 59%;41% Placebo (n = 188) F:M = 51%;49%</td>
<td>RCT, double-blind RA</td>
<td>HAM-A; CGI</td>
<td>Sertraline exceeded placebo; no sex differences</td>
</tr>
<tr>
<td>Cottone et al</td>
<td>AD</td>
<td>CBT or psychodynamic gender therapy</td>
<td>Patients (N = 46) F:M = unknown Therapists (N = 89)</td>
<td>RA</td>
<td>STAI</td>
<td>Men withdrew more often, showed more symptom reduction, and profited more with woman therapist</td>
</tr>
<tr>
<td>Stewart et al</td>
<td>OCD</td>
<td>Intensive residential therapy</td>
<td>(N = 476) F:M = 58.7%;41.3% Age: M = 32.5 y</td>
<td>MRA models (scatter plots); multiple RA</td>
<td>YBOCS; WSA; SOS-10; PGI</td>
<td>Female gender predicts decrease in complaints</td>
</tr>
</tbody>
</table>

PD = panic disorder; F = female; M = male; RCT = randomized, controlled trial; HAM-A = Hamilton Anxiety Scale; CGI = Clinical Global Impression-Improvement; PDSS = Panic Disorder Severity Scale; POMS = Profile of Mood States; Q-LES-Q = Quality of Life, Enjoyment, and Satisfaction Scale; GAD = generalized anxiety disorder; AD = anxiety disorder; CBT = cognitive-behavioral therapy; RA = regression analysis; STAI = State-Trait Anxiety Inventory; OCD = obsessive-compulsive disorder; MRA = multiple regression analysis; YBOCS = Yale-Brown Obsessive-Compulsive Scale; WSA = Work and Social Adjustment Scale; SOS-10 = Schwarz Outcome Scale-10; PGI = Patient Global Impression Scale.
complaints, as did lower OCD severity and better psychosocial functioning at baseline.

Additional searches that we performed for sex-specific studies of CBT in general (ie, not specifically connected to anxiety disorders) did not yield new or relevant information.

Subsequently, 36 meta-analyses encompassing treatment of anxiety disorders that were published after 1995 were manually reviewed for possible sex/gender information. Three relevant publications emerged that reported sex in relation to prevalence and demographics.71–73 These analyses of controlled trials examining anxiety disorders reported, at minimum, the sex distribution of the study participants: 60.2%, 60%, and 72.2% women, respectively.

Gould et al71 found that CBT and pharmacotherapy did not differ significantly in effect size for anxiety severity, but CBT was comparatively more effective for depression severity and maintenance of treatment gains. Interestingly, from a methodologic point of view, the authors dichotomized their sample of 33 studies into those with >50% male participants (n = 12) and those with <30% male participants (n = 11). Using a t test to analyze anxiety severity outcome between these 2 groups of studies, they were able to analyze the relationship between gender and effectiveness of the active treatment. The results appeared to be nonsignificant, indicating that there was little or no relationship.

One study examined self-help interventions (eg, books, audio/videotapes, and computer/Internet-based programs).73 According to the effect sizes, the effectiveness of self-help was higher than for control groups without treatment but lower than for therapist-directed interventions. Given the sex distribution of their sample (72.2% women), these findings relate mainly to women. Unfortunately, however, a check for sex differences was missing.

CONCLUSIONS
Epidemiologic Data

A substantially higher prevalence of anxiety disorders in women compared with men has repeatedly been reported, particularly for agoraphobia, PD, specific phobia, PTSD, and GAD, and all their combinations. Results of prevalence studies are mixed for social phobia and OCD. In addition, sex differences in disorder subtypes and severity of symptoms have been reported. The sex differences in prevalence are constant throughout life and are independent of health care settings, wherever relevant data were obtained. This suggests that biological, psychosocial, and cultural factors are responsible, either interacting or working alone.

Explanatory Factors

One explanation refers to the lower levels of assertiveness and self-support in women compared with men, and men’s lower levels of inclination to dependency and helplessness, all factors that contribute to anxiety complaints. Also, alcohol abuse appeared to be a masculine (thus gendered) masking strategy. Analogously, using tranquilizers or engaging in bingeing can be assumed to be feminine masking strategies.

Gendered aspects of daily life can play a role as well. For example, the division of social and socioeconomic roles between the sexes can result in women who are not employed having their main activities inside the home. Marital status and masculine GRS were identified as subfactors possibly contributing to the differences in prevalence. However, neither the role of feminine GRS nor the interaction with gender-neutral stress has yet been studied in relation to these factors.

Also, similar to other mental health disorders, sexual and physical assaults must be acknowledged as etiologic factors, with the unchallenged fact that the percentage of women survivors surpasses that of men by almost 10-fold. This explains only a small part of the sex differences in the general prevalence of anxiety. It is plausible that other psychological and biological factors (which were beyond the scope of the current review) are also important, such as a more feminine pattern of reacting to bodily sensations in interaction with specific attachment styles. More research remains to be done in these areas.
From a methodologic point of view, prevalence differences may be an artifact associated with men's inhibition to report symptoms, again ensuing from masculinity standards. The type of self-report measure utilized may influence the degree to which sex differences emerge. Furthermore, the relationship between psychopathology and femininity is in itself a matter for discussion, because one may assume that masculine behavior is often, but erroneously, taken as the standard for mental health.

**Treatment**

The overall assessment that both pharmacotherapy and CBT contribute to improvement of anxiety disorders, from pretreatment to posttreatment, seems to be true for women and men. However, there is a remarkable lack of information regarding the sex-specific effects, not to mention the gender-specific effects, of treatments.

Regrettably, the available sex-specific studies of psychosocial treatment are lacking in at least 2 respects. From a gender point of view, they lack a thorough reflection on possible gender bias in sampling procedures, measurement, and analysis, and they disregard gender-specific context. From a treatment research point of view, they do not meet a criterion for inclusion in meta-analyses—that of being a randomized, controlled trial. Moreover, most of the available meta-analyses appear to fail to systematically consider the sex distribution of the included studies, much less the calculation of possible sex differences in effect sizes. Butler et al highlighted this deficiency in their review of meta-analyses. The authors also mentioned inattention to possible moderator variables (eg, gender differences) as a frequent limitation of the meta-analysis procedure.

**Directions for Future Research**

**Overcoming Limitations**

Our study has some serious limitations that can be translated into recommendations. We did not consider ethnicity and we paid little attention to culture. There were unacceptable deficiencies in sex-specific information on the prevalence of the common DSM anxiety disorders in specific ethnic groups, as well as in information about the prevalence of non-Western anxiety disorders in and outside of Western countries, including their gender distribution.

To explore the role of culture and ethnicity, future research should determine whether and to what extent changes are occurring in the distribution of specific subtypes of anxiety disorders and in the more general sex-specific patterns of mental disorders in both sexes. Specific data in this area may contribute to insights into the relationship between sex-specific patterns of disorders and demographic, socioeconomic, and cultural factors, particularly those relating to employment and to the use of anxiety-reducing substances. Apart from such historical investigations, studies of non-Western anxiety disorders must be undertaken.

Another serious limitation was our focus on psychological factors and theories only; genetic, neurobiological, and bioenvironmental factors were not taken into account. Undoubtedly, an interdisciplinary research approach to sex/gender factors in anxiety would be an important step forward.

We did not explore the complex issue that causal factors themselves may be gendered, thus amplifying or dimming "simple" patterns of sex/gender differences. In our opinion, the state of the art in empirical research did not permit a review of this kind of complex causation path; it could only result in speculations.

We also did not extensively cover the possible influence of power differences and hierarchy on the etiology and treatment of anxiety. Nevertheless, it has become clear that sexual and physical violence contribute to the development of anxiety and other mental disorders. Therefore, recommending that future studies consider other types of violence (eg, psychological, social, and cultural) is justified.

**Psychological Research**

To gain insight into risk and protective factors by group, more research is needed on the
division of the full variety of anxiety disorders among men and women of various populations (ie, gender × ethnic group interaction, interaction of gender × other subgroups [eg, unemployed/full-time parents], and gender × age group interaction).

To avoid possible bias in the available data, future research should use a multiple-method approach (ie, self-reports in combination with observers, clinical raters, and other informants), while being alert to their sex/gender-specific influences.75

The learning perspective must be challenged to clarify why more women than men acquire phobic fears and avoidance behavior, and why fewer men than women acquire these fears and behaviors. The sex/gender role perspective deserves further testing, especially the relationships between anxiety disorders, gender roles and/or GRS, and gender-relevant individual differences. What sex- or gender-specific patterns emerge in attachment styles and experiences? How predictive are they for anxiety disorders and for other clusters of mental disorders with unequal prevalence between the sexes (ie, the lumper’s perspective)?

Regarding treatment, several types of study are needed to guarantee better evidence-based care for women and men suffering from anxiety disorders. First, gender roles should be given more attention in therapy research. Second, the possible biases in sampling (eg, initial withdrawal) and in anxiety measures and procedures must be listed and adapted, if necessary. Third, more data should be collected on the gender characteristics of clients, therapists, and therapeutic relationships, instead of sex characteristics only. Fourth, randomized controlled trials should be performed for sex-stratified samples, thus providing information about men and women separately. Last, more meta-analyses should be performed using a sex- and gender-conscious approach, particularly with a dichotomization of the sampled studies according to the percentage of male participants, and subsequently with a comparison of treatment effectiveness by sex.

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