Co-Occurring Eating and Psychiatric Symptoms in Taiwanese College Students: Effects of Gender and Parental Factors

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Objective: To test whether gender and parental factors moderate the relationships between symptoms of eating disorder (ED) and other psychiatric symptoms. Methods: A total of 5,015 new entrants completed several questionnaires and 541 individuals with ED symptoms were identified by the Adult Self-Report Inventory-4 that assessed a wide range of Diagnostic and Statistical Manual of Mental Disorders Fourth Edition psychopathology. The participants also reported on their parents’ attitude toward them before their ages of 16. Results: ED symptoms, female gender, less parental care, and more parental protection were associated with more severe co-occurring psychiatric symptoms. Gender and parental factors also demonstrated differential moderating effects on the relationships between ED and co-occurring psychiatric symptoms. Conclusions: Parenting counseling may be individualized to young adults with ED symptoms and different co-occurring psychiatric symptoms. © 2013 Wiley Periodicals, Inc. J. Clin. Psychol. 70:224–237, 2014.

Keywords: eating symptoms; parenting style; co-occurring psychiatric symptoms; college students

Eating disorders (EDs) frequently co-occur with mood disorders (John, Meyer, Rumpf, & Hapke, 2006; McElroy et al., 2011), anxiety disorders (Godart et al., 2003; Kaye, Bulik, Thornton, Barbarich, & Masters, 2004), and obsessive-compulsive disorder (OCD) in clinic-based and community-based samples (Hudson, Hiripi, Pope, & Kessler, 2007; John et al., 2006). Most of the previous research examined either the rates and patterns of co-occurring psychiatric disorders among individuals with EDs in cross-sectional studies (Gadalla & Piran, 2008; Hudson et al., 2007; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011; Zaider, Johnson, & Cockell, 2002) or the chronology of onset of ED and comorbid conditions in longitudinal studies (Johnson, Cohen, Kotler, Kasen, & Brook, 2002; Zaider et al., 2002). Among those studies investigating the comorbid conditions of eating disorders or symptoms, few examined moderating variables, such as gender and parental factors, and their influence on the relationships between eating disorders/symptoms and other psychiatric disorders/symptoms (O’Brien & Vincent, 2003).

Family functioning and parenting styles have been postulated to play an important role in the development and maintenance of several psychiatric conditions originated from childhood and adolescence such as anxiety disorders (Gerlsma, Emmelkamp, & Arrindell, 1990; Parker, 1981), depression (Parker, 1979; Parker, Barrett, & Hickie, 1992), OCD (Cavedo & Parker, 1994; Turgeon, O’Connor, Marchand, & Freeston, 2002), and EDs (Calam, Waller, Slade, & Newton, 1990; Turner, Rose, & Cooper, 2005). Empirical study of the relationship between parenting...
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experiences and mental problems has been greatly facilitated by the development of reliable and valid measures of parental behaviors. Although a variety of such measures have been developed, the parental bonding instrument (PBI) has been the most widely used (Parker, 1979). The PBI, comprising two principal dimensions of care and protection, was developed to measure respondents’ perceived manner of being raised by each parent (Parker, 1979). Two recent large-scale studies using PBI indicated that individuals’ recollections of parental overprotection and lack of care were consistently associated with adult mental disorders in a nonspecific way (Enns, Cox, & Clara, 2002; Overbeek, ten Have, Völlebergh, & de Graaf, 2007).

The few large-scale studies examining the relationship between parenting styles and eating disorders/symptoms revealed inconsistent results (Kendler, Myers, & Prescott, 2000; Walters & Kendler, 1995). In summary, compared with healthy controls, individuals with EDs reported less care from their parents (Bulik, Sullivan, Fear, & Pickering, 2000; Calam et al., 1990; Canetti, Kanyas, Lerer, Latzer, & Bachar, 2008; De Panfilis, Rabbaglio, Rossi, Zita, & Maggini, 2003; Leung, Thomas, & Waller, 2000; Furnham & Husain, 1999; Haudek, Rorty, & Henker, 1999; Kendler et al., 2000; Palmer, Oppenheimer, & Marshall, 1988; Steiger, Feen, Goldstein, & Leichner, 1989) and more overprotection from their fathers (Calam et al., 1990; Canetti et al., 2008; De Panfilis et al., 2003; Leung et al., 2000); maternal overprotection was correlated with the severity of eating symptoms (Ahmad, Waller, & Verduyn, 1994; Furukawa, 1994; Lavik, Clausen, & Pedersen, 1991; McCourt & Waller, 1995; Rhodes & Kroger, 1992; Turner et al., 2005; Walters & Kendler, 1995).

Eating disorders have been reported to be one of prevalent psychiatric disorders in Asian countries including Taiwan (Tseng et al., 2007); eating symptoms were not uncommon in Taiwanese young adult populations (Chien, Gau, & Gadow, 2011). Although less affective/caring and more controlling and overprotective parenting styles were found in parents of children and adolescents with attention-deficit hyperactivity disorder (Chang, Chiu, Wu, & Gau, 2012; Gau, 2007) and those with autism (Gau et al., 2010) in Taiwan, little is known about the influence of parenting style on the development of symptoms of EDs and other psychiatric disorders among young adults in Asian population. Previous studies reported lower parental care scores and higher parental overprotection scores in Asian (Indian subcontinent) than in Western countries (Ahmad et al., 1994; Furnham & Adam-Saib, 2001; Haudek et al., 1999; McCourt & Waller, 1995).

Western studies on the EDs comorbidities were mainly restricted to adult clinical patients who had one or two specific psychiatric disorders, and they were overwhelmingly predominant in female gender. Small sample size and selection bias were major limitations of those clinical studies. Community-based studies of EDs were mostly conducted in adolescent samples with small proportion of females; only few studies investigating the relationships between EDs and other psychiatric disorders were conducted in adult community samples with both sexes (Hudson et al., 2007; Preti et al., 2009).

College freshmen, before encountering adjustment issues related to college life, is an ideal sample to study the associations of parenting and family functioning on ED symptoms and co-occurring psychiatric symptoms, because ED is a prevalent mental health problem on campus and most patients with anorexia nervosa and bulimia nervosa had similar demographics and their age of onset younger than 20 years of age (Favaro, Caregaro, Tenconi, Bosello, & Santonastaso, 2009; Preti et al., 2009). A better understanding of the co-occurring patterns of ED symptoms and psychiatric conditions in this population may help with the designing of primary prevention programs on campus, providing a more comprehensive characterization of individuals at risk for EDs and facilitating the development of more specific and effective treatment strategies in clinical settings.

The goals of the present study were (a) to examine the magnitude of the associations between ED symptoms and a range of common psychiatric symptoms in a large sample of incoming college students in Taiwan; (b) to investigate the associations of both parents’ parenting styles and family process in the risk for ED symptoms and other common psychiatric symptoms; and last, (c) to examine the moderating effects of gender, parental education, parenting style, and family function on the relationships between ED symptoms and co-occurring psychiatric symptoms. We hypothesized that parental and family factors would be associated with ED
symptoms and other psychiatric symptoms and would moderate the relations between ED symptoms and other psychiatric symptoms.

Methods

Participants and Procedures

The participants comprised 5,015 first-year college students (male: 51.6%, mean age, 19.0 years; standard deviation [SD] = 2.7) recruited from a national university in northern Taiwan. The Research Ethics Committee of the National Taiwan University Hospital approved this study prior to implementation. A research invitation letter was mailed to the newly accepted students by Student Counseling Center of the university that was directed by the corresponding author. They were informed that participation in the survey was completely voluntary and the issue of confidentiality was assured. There was no information about the proportion of eligible students who received the letter. Out of a total of 7531 new entrants in the 2 consecutive years, 5,015 (participation rate, 66.6%) consented to the study and completed the questionnaires at the arranged auditoriums in the first weeks of the fall semesters. The school counselors provided clear instructions on self-administration before the participants started to complete the questionnaires. Trained research assistants then checked the questionnaires right after the participants turned in the questionnaire to minimize missing data.

Measures

Adult Self-Report Inventory-4 (ASRI-4). The ASRI-4, a 136-item self-report or interview scale, is derived from the Youth Self-Report Inventory (Gadow et al., 2002) for the purpose of making the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) referenced psychiatric diagnosis in adults. Symptom from the DSM-IV diagnostic categories are as follows: generalized anxiety disorder, social phobia, posttraumatic stress disorder, schizophrenia, major depressive disorder, dysthymic disorder, bipolar disorders, eating problems (anorexia and bulimia), sleep problems, substance use, somatization disorder, borderline and schizoid personality disorder, attention-deficit hyperactive disorder, oppositional defiant disorder, conduct disorder, and several impulse-related behaviors.

There are also individual screening items for specific phobia, agoraphobia, panic attack, compulsions, obsessions, hypochondria, body dysmorphia, motor tics, and vocal tics. The most commonly used instruments for the assessment of mental problems are rating scales (dimensional measures) and structured psychiatric interviews (categorical measures). Structured interviews have the advantages of considerable content validity and easily interpreted findings, but are time-consuming and often costly. Dimensional scales are generally cost-effective and easy to use, but it is difficult to extrapolate information from scale scores to clinical diagnoses.

To maximize the advantages of both categorical and dimensional models, two scoring procedures are applied in the ASRI-4: the Symptom Count score (number of DSM-IV-specified symptoms) and the Symptom Severity score (a dimensional scoring). For the symptom count scores, a specific symptom is generally considered to be clinically significant if it is rated as occurring “often” or “very often.” Notably, ASRI-4 cutoff scores do not signify a clinical diagnosis because the ASRI-4 does not include additional diagnostic criteria such as age of onset of symptoms or impairment of functioning in all symptom categories. On symptom severity rating, each item was assigned to one of four responses: 0 for never, 1 for sometimes, 2 for often, and 3 for very often. Most ratings assess current (recent 6 months) conditions, except those for impulse-control disorders, depression, and manic episodes, which are rated on a lifetime basis.

There were three questions tapping anorexia symptoms: (a) I eat less than what people think I should; (b) People think that I worry too much about gaining weight; (c) I feel that I have to be thin to like myself. Another three questions tapping bulimia symptoms were as follows: (a) I have eating binges and then make myself vomit; (b) I struggle hard with trying to control how much I eat; and (c) I take laxatives, over-exercise, or take pills to stay thin. If a participant responded two or more of the three questions as being of concern (i.e., as occurring “often” or
“very often”), he/she will be categorized as having symptoms of anorexia or bulimia. We also summed up the score of each item for a specific psychiatric condition as symptoms severity.

The Chinese translation of the ASRI-4, with the permission of its developers (Gadow, Sprafkin, & Weiss, 2004; Sprafkin, Gadow, Weiss, Schneider, & Nolan, 2007), was prepared with culturally relevant colloquial expressions by Gau and colleagues with the performance of a two-way translation, ensuring satisfactory linguistic and content validity. The psychometric properties of the ASRI-4 were first established in a sample of 2,371 young adults (Chien et al., 2011). Using 141 college students, the results showed moderate to high test-retest reliability as dimensional (Pearsons’ correlations = 0.68, 0.74, 0.73; ICC = 0.72, 0.72, 0.76) or categorical analysis (kappa = 0.60, 0.66, 0.58) for anorexia, bulimia, and eating disorders symptoms, respectively. The detailed psychometric properties of the Chinese ASRI-4 were described elsewhere (Chien et al., 2011).

We further examined the internal consistency (Cronbach’s α) of ED symptoms in another independent sample of 3,197 college students from two private universities and found moderate internal consistency for anorexia (α = 0.55) and bulimia (α = 0.54) symptoms. The internal consistency of the eating symptoms (6 items) including anorexia and bulimia symptoms was high (α = 0.68). This Chinese ASRI has been used in studies on gender dysphoria (Lai, Chiu, Gadow, Gau, & Hwu, 2010), gender differences on psychopathology (Chien et al., 2011), the association between chronotypes and psychopathology (Hsu, Gau, Shang, Chiu, & Lee, 2012), and parental psychopathology in children with ADHD (Chang, Chiu, Wu, & Gau, 2012).

**PBI.** The PBI is a 25-item instrument (items are rated on a 4-point Likert scale from “very likely” to “very unlikely”) measuring the parents’ behaviors and attitudes toward their child during that child’s first 16 years (Parker, 1979). It comprises two principal dimensions: Care (12 items) and Protection (13 items, including Authoritarianism and Overprotectiveness). A high score on the Care scale reflects affection and warmth, whereas a low score indicates rejection, coldness, or indifference. The Authoritarianism subscale reflects either a discouragement or an encouragement of a child’s behavioral freedom (i.e., degree of control over the child’s behavior), and the Overprotectiveness scale reflects overprotective parenting and denial of the child’s psychological autonomy (Cox, Enns, & Clara, 2000). The Chinese PBI is a reliable and valid instrument (Gau et al., 2006) and has been widely used in Taiwanese studies (Chang et al., 2012; Gau, 2007; Gau et al., 2010; Hsiao, Tseng, Huang, & Gau, 2013).

**Family APGAR.** Family APGAR, a five-item measure, is designed to assess family function. Five dimensions of perceived family support were measured by the following: (a) “I am satisfied with the help that I receive from my family when something is troubling me” (Adaptation); (b) “I am satisfied with the way my family discusses items of common interest and shares problem-solving with me” (Partnership); (c) “I am satisfied that my family accepts my wishes to take on new activities or make changes in my lifestyle” (Growth); (d) “I am satisfied with the way my family expresses affection and responds to my feelings such as anger, sorrow, and love” (Affection); and (e) “I am satisfied with the amount of time my family and I spend together” (Resolve).

Each item was rated on a 3-point Likert scale, ranging from 0 (hardly ever) to 2 (almost always). A higher score indicates a more highly functional family (Smilkstein, Ashworth, & Montano, 1982). Scores of 7 to 10, 4 to 6, and 0 to 3 suggest a highly functional family, a moderately dysfunctional family, and a severely dysfunctional family, respectively. The Chinese Family APGAR has been used in assessing perceived family support for individuals with mental problems (Gau, 2007) and for community survey (Gau et al., 2008; Gau et al., 2009) in Taiwan.

**Statistical Analysis**

We conducted the statistical analysis using SAS 9.1 (SAS Institute Inc, Cary NC, USA). The demographic characteristics were presented as frequencies and percentages for the categorical variables with the chi-square test used to test statistical significance, and mean and standard deviation for continuous variables with analysis of variance (ANOVA) used to test statistical
significance. The comparison groups were the participants with ED symptoms (presence of either anorexia or bulimia symptoms) and participants without ED symptoms (absence of anorexia or bulimia symptoms).

We first compared the mean symptom number of each psychiatric syndrome assessed by the Chinese ASRI-4 between the two groups using ANOVA and computed the Cohen's $d$ for the standardized mean score difference between the two groups with small, medium, and large effect sizes as Cohen's $d$ 0.3 to 0.5, 0.5 to 0.8, and ≥0.8, respectively (Cohen, 1988). A multiple linear regression analysis including participants’ age and sex, parental educational level, and job types, participants’ perceived family support, and their father’s and mother’s parenting styles as independent variables, was used to identify significant correlates for the severity of ED symptoms.

Hierarchical multiple regression models were also used to determine the effect of having ED symptoms on the symptom severity of four psychiatric conditions: anxiety, depression, obsession-compulsion, and somatoform symptoms measured by the Chinese ASRI-4. In addition to including main effects of presence of EDs, gender, perceived family support, parental education, father’s and mother’s parenting styles, we also conducted moderation analysis to probe the significant two-way interactions between EDs symptoms and the abovementioned covariables (Hayes, 2013).

**Results**

**Demographics and Characteristics of the Individuals With ED Symptoms**

According to the DSM-IV criteria, we generated two groups: (a) college students with ED symptoms ($n = 541$) and (b) college students without ED symptoms ($n = 4474$). Among the participants of the ED group, there were 485 with anorexia symptoms, 20 with bulimia symptoms, and 36 with symptoms of both anorexia and bulimia. The rates of having anorexia symptoms ($n = 521$, female: 58.7%) and bulimia symptoms ($n = 56$, female: 71.4%) in our college student population were 10.4%, and 1.1%, respectively. Table 1 shows the characteristics of college students with and without ED symptoms. College students with ED symptoms were younger and female predominant and had less perceived family support as assessed by the Family APAGA compared with those without ED symptoms. Parents of the ED group were younger ($p < 0.05$), but they did not differ in education or employment status as compared with those of college students without ED symptoms ($p$ ranging from 0.126 to 0.907). College students with ED symptoms obtained less affection and care and more protection from their parents before 16 years of age than those without ED symptoms.

**Co-Occurring Psychiatric Symptoms Among College Students With ED Symptoms**

The ED group had significantly more severe symptoms of psychiatric conditions, as follows: anxiety disorders (generalized anxiety disorder, social phobia, specific phobia, agoraphobia, and panic disorder); OCD; tics; depressive disorders (dysthymia and major depressive disorder); bipolar disorder; somatoform disorders (somatization, hypochondriasis, and body dysmorphic); posttraumatic stress disorder; and dissociation with small to medium effect sizes (Table 2).

**Demographics and Parent/Family Variables for ED Symptoms**

A multiple regression model including all the demographic, parental, and family variables as predictors revealed that female gender, paternal educational level lower than college degree, lack of paternal care, younger maternal age, and maternal overprotection had statistically significant associations with more severe symptoms of EDs (Table 3).
### Table 1
Demographic Characteristics

<table>
<thead>
<tr>
<th>Eating symptoms</th>
<th>Yes</th>
<th>No</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%) or n (%) or Mean ± SD</td>
<td>n (%) or Mean ± SD</td>
<td>F(1, 4997)</td>
<td>p value</td>
</tr>
<tr>
<td>Age (in years)***</td>
<td>18.6 ± 1.1</td>
<td>19.1 ± 2.8</td>
<td>14.93</td>
</tr>
<tr>
<td>Gender***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>222 (41.1)</td>
<td>2354 (52.8)</td>
<td>26.53</td>
</tr>
<tr>
<td>Female</td>
<td>318 (58.9)</td>
<td>2101 (47.2)</td>
<td></td>
</tr>
<tr>
<td>Family APGAR**</td>
<td>6.6 ± 3.0</td>
<td>7.0 ± 2.8</td>
<td>7.51</td>
</tr>
<tr>
<td>Fathers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (in years)*</td>
<td>49.8 ± 4.3</td>
<td>50.3 ± 4.9</td>
<td>4.68</td>
</tr>
<tr>
<td>Parenting style</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affectionate and care***</td>
<td>22.7 ± 7.3</td>
<td>23.8 ± 7.0</td>
<td>10.95</td>
</tr>
<tr>
<td>Protection**</td>
<td>10.2 ± 7.0</td>
<td>9.4 ± 6.5</td>
<td>8.44</td>
</tr>
<tr>
<td>Mothers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (in years)**</td>
<td>46.9 ± 3.7</td>
<td>47.5 ± 4.3</td>
<td>9.55</td>
</tr>
<tr>
<td>Parenting style</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affectionate and care*</td>
<td>26.2 ± 6.7</td>
<td>26.8 ± 6.1</td>
<td>5.16</td>
</tr>
<tr>
<td>Protection***</td>
<td>12.7 ± 7.6</td>
<td>11.6 ± 6.7</td>
<td>11.60</td>
</tr>
</tbody>
</table>

Note. SD = standard deviation. Family APGAR = Family function in Adaptation, Partnership, Growth, Affection, and Resolve.  
*p < .05. **p < .01. ***p < .001.

### Table 2
Co-Morbid Psychiatric Symptoms With Eating Disorder Symptoms

<table>
<thead>
<tr>
<th>Eating symptoms</th>
<th>Yes</th>
<th>No</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%) or Mean ± SD</td>
<td>n (%) or Mean ± SD</td>
<td>F valuea</td>
<td>Cohen d</td>
</tr>
<tr>
<td>Anxiety disorders</td>
<td>15.02 ± 6.05</td>
<td>11.56 ± 5.46</td>
<td>189.55</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>9.82 ± 3.86</td>
<td>7.81 ± 3.56</td>
<td>150.69</td>
</tr>
<tr>
<td>Social phobia</td>
<td>3.07 ± 1.90</td>
<td>2.18 ± 1.69</td>
<td>130.91</td>
</tr>
<tr>
<td>Specific phobia</td>
<td>0.85 ± 0.91</td>
<td>0.61 ± 0.75</td>
<td>46.08</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>0.54 ± 0.77</td>
<td>0.41 ± 0.64</td>
<td>19.10</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>0.73 ± 0.68</td>
<td>0.54 ± 0.61</td>
<td>45.33</td>
</tr>
<tr>
<td>Obsession-compulsions</td>
<td>1.55 ± 1.38</td>
<td>1.06 ± 1.15</td>
<td>80.95</td>
</tr>
<tr>
<td>Tics</td>
<td>1.57 ± 1.39</td>
<td>1.13 ± 1.19</td>
<td>63.49</td>
</tr>
<tr>
<td>Depressive disorders</td>
<td>17.75 ± 7.85</td>
<td>13.33 ± 7.06</td>
<td>184.17</td>
</tr>
<tr>
<td>Major depression</td>
<td>8.89 ± 4.21</td>
<td>6.66 ± 3.72</td>
<td>168.34</td>
</tr>
<tr>
<td>Dysthymia</td>
<td>8.86 ± 3.81</td>
<td>6.68 ± 3.45</td>
<td>189.26</td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>6.20 ± 4.57</td>
<td>4.50 ± 3.72</td>
<td>95.93</td>
</tr>
<tr>
<td>Somatoform disorders</td>
<td>4.81 ± 2.56</td>
<td>3.47 ± 2.21</td>
<td>171.26</td>
</tr>
<tr>
<td>Somatization</td>
<td>2.71 ± 1.76</td>
<td>2.16 ± 1.50</td>
<td>63.54</td>
</tr>
<tr>
<td>Hypochondriasis</td>
<td>0.65 ± 0.78</td>
<td>0.47 ± 0.65</td>
<td>37.24</td>
</tr>
<tr>
<td>Body dysmorphic</td>
<td>1.44 ± 0.91</td>
<td>0.84 ± 0.75</td>
<td>292.06</td>
</tr>
<tr>
<td>Posttraumatic stress</td>
<td>7.94 ± 3.88</td>
<td>6.00 ± 3.43</td>
<td>149.43</td>
</tr>
<tr>
<td>Dissociation</td>
<td>0.99 ± 1.35</td>
<td>0.62 ± 0.98</td>
<td>62.67</td>
</tr>
</tbody>
</table>

SD = standard deviation.  
aAll p values < .0001.
Effects of Gender and Parental Factors on the Co-Occurring Relationships Between ED Symptoms and Other Psychiatric Symptoms

In multiple linear regression models, more severe ED symptoms were consistently associated with more severe symptoms of four commonly co-occurring psychiatric disorders, i.e., symptoms of anxiety disorders, OCD, depressive disorders, and somatoform disorders (Table 4). In addition, lower perceived family support was consistently associated with more severe symptoms of these four psychiatric conditions.

For anxiety symptoms, female gender and lower paternal education level were related to more anxiety symptoms; lower levels of care and higher levels of protection from both parents were associated with more anxiety symptoms. There were no moderating effects of gender and parental factors on the relationships between ED symptoms and anxiety symptoms.

For OCD symptoms, male gender and lower maternal educational level were associated with more OCD symptoms; lower levels of care from the fathers and higher levels of protection from both parents were associated with more OCD symptoms. Paternal education moderated the association between ED symptoms and depressive symptoms such that this association was stronger for those with lower paternal education (B = 0.42, p < .001) than for those with higher paternal education (B = 0.70, p < .001) and for those with lower parental care (B = 0.70, p < .001) than for those with higher parental care (B = 0.42, p < .001).

Similar to anxiety symptoms, female gender and lower levels of care and higher protection from both parents were associated with more depressive symptoms. Parental educational levels were not associated with severity of depressive symptoms. But like OCD symptoms, paternal education moderated the association between ED symptoms and depressive symptoms such that this association was stronger for those with lower paternal education (B = 4.65, p < .001) than for those with higher paternal education (B = 4.23, p < .001).
Table 4
Effects of Gender and Parental Factors on the Co-Occurring Relationships Between Eating Disorder Symptoms and Other Psychiatric Symptoms

<table>
<thead>
<tr>
<th></th>
<th>Anxiety symptoms</th>
<th>Obsessive-compulsive symptoms</th>
<th>Depressive symptoms</th>
<th>Somatoform symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$ (SE)</td>
<td>$p$</td>
<td>$\beta$ (SE)</td>
<td>$p$</td>
</tr>
<tr>
<td>Intercept</td>
<td>14.55 (0.31)</td>
<td>&lt;.001</td>
<td>1.27 (0.07)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Eating symptoms</td>
<td>2.46 (0.88)</td>
<td>.005</td>
<td>0.70 (0.19)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Gender (male vs female)</td>
<td>-0.59 (0.17)</td>
<td>&lt;.001</td>
<td>0.30 (0.04)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Family APGAR</td>
<td>-1.11 (0.19)</td>
<td>&lt;.001</td>
<td>-0.19 (0.04)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Paternal education of college and higher</td>
<td>-0.52 (0.21)</td>
<td>.014</td>
<td>-0.04 (0.04)</td>
<td>.343</td>
</tr>
<tr>
<td>Maternal education of college and higher</td>
<td>-0.33 (0.22)</td>
<td>.131</td>
<td>-0.11 (0.05)</td>
<td>.018</td>
</tr>
<tr>
<td>Paternal care</td>
<td>-1.39 (0.25)</td>
<td>&lt;.001</td>
<td>-0.22 (0.05)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Paternal protection</td>
<td>1.18 (0.26)</td>
<td>&lt;.001</td>
<td>0.25 (0.06)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Maternal care</td>
<td>-0.89 (0.26)</td>
<td>&lt;.001</td>
<td>-0.06 (0.06)</td>
<td>.245</td>
</tr>
<tr>
<td>Maternal protection</td>
<td>1.01 (0.25)</td>
<td>&lt;.001</td>
<td>0.11 (0.05)</td>
<td>.037</td>
</tr>
<tr>
<td>Eating symptoms $\times$ Gender</td>
<td>0.93 (0.51)</td>
<td>.069</td>
<td>0.22 (0.11)</td>
<td>.049</td>
</tr>
<tr>
<td>Eating symptoms $\times$ Family APGAR</td>
<td>1.04 (0.56)</td>
<td>.065</td>
<td>0.13 (0.12)</td>
<td>.294</td>
</tr>
<tr>
<td>Eating symptoms $\times$ Paternal education</td>
<td>-0.69 (0.65)</td>
<td>.289</td>
<td>-0.28 (0.14)</td>
<td>.041</td>
</tr>
<tr>
<td>Eating symptoms $\times$ Maternal education</td>
<td>0.65 (0.67)</td>
<td>.334</td>
<td>0.24 (0.14)</td>
<td>.097</td>
</tr>
<tr>
<td>Eating symptoms $\times$ Paternal care</td>
<td>0.13 (0.69)</td>
<td>.853</td>
<td>-0.31 (0.15)</td>
<td>.036</td>
</tr>
<tr>
<td>Eating symptoms $\times$ Paternal protection</td>
<td>0.72 (0.72)</td>
<td>.315</td>
<td>-0.10 (0.15)</td>
<td>.529</td>
</tr>
<tr>
<td>Eating symptoms $\times$ Maternal care</td>
<td>-0.58 (0.74)</td>
<td>.434</td>
<td>-0.08 (0.16)</td>
<td>.626</td>
</tr>
<tr>
<td>Eating symptoms $\times$ Maternal protection</td>
<td>0.54 (0.70)</td>
<td>.440</td>
<td>0.07 (0.15)</td>
<td>.659</td>
</tr>
</tbody>
</table>

Note: $\beta$ = estimated regression coefficient; SE = standard errors.
For somatoform symptoms, female gender, less care/affection from both parents, and more paternal protection were associated with more somatoform symptoms. Gender and parental factors did not moderate the relationship between ED symptoms and somatoform symptoms.

Discussion

As the first study investigating the moderating role of gender, parenting, and family process on the links between eating symptoms and co-occurring psychiatric symptoms, our findings are consistent with Western studies and lend evidence to support our hypothesis. We found that ED symptoms were associated with several co-occurring psychiatric symptoms (Hudson et al., 2007; Preti et al., 2009; Swanson et al., 2011) and the severity of ED symptoms was positively correlated with the severity of mood, anxiety, OCD, and somatoform symptoms.

Moreover, our results add new evidence that lower paternal educational level, lower paternal care, and younger maternal age but higher maternal overprotection were associated with more severe ED symptoms in incoming Taiwanese college students. We also found that low levels of care and high levels of overprotection from parents were consistently associated with other non-ED common psychiatric symptoms. The current study has novel findings: male gender, lower paternal care, and lower paternal educational level increased the magnitude of associations between ED symptoms and the severity of OCD symptoms; and lower paternal education level significantly increased the magnitude of relationship between ED symptoms and depressive symptoms.

Previous studies revealed that the performances of an investigator-based interview and a self-report questionnaire are similar with respect to the assessment of unambiguous behavioral features of ED symptoms such as self-induced vomiting and dieting, but the self-report questionnaire generated higher scores than the interview when assessing binge eating and concerns about shape (Fairburn & Beglin, 1994; Mintz & O’Halloran, 2000). Similar to the previous findings, screening items for bulimia in the ASRI-4 are more accurate to detect a case with clinical diagnosis in contrast to the screening items for anorexia that appear to measure attitudes and behaviors shown by those in the anorexic population. This explains a much higher rate of anorexia symptoms (10.4%) but a comparable rate of bulimia symptoms (1.1%) found in this present study as compared with the results of our recently published work using a two-phase method (0.1% for anorexia nervosa and 1% for bulimia nervosa) (Tseng et al., 2007).

Although using various methods for detection of individuals with EDs or ED symptoms, our study showed that ED symptoms were prevalent in college students in Taiwan and comparable to those of Western countries (around 1% for bulimia and ranges of 7.3% to 20.8% with an average of 11% for ED symptoms; Gutzwiller, Oliver, & Katz, 2003; Pemberton, Vernon, & Lee, 1996; Sepulveda, Carrobles, & Gandarillas, 2008; Zivin, Eisenberg, Gollust, & Golberstein, 2009). Notably, self-rating questionnaires cannot replace investigator-based interview in the detection of true ED cases in epidemiological studies.

Our findings lent evidence to support previous observation that maternal overprotection predicted the severity of anorexia or bulimia in nonclinical samples (Lavik et al., 1991; McCourt & Waller, 1995; Rhodes & Kroger, 1992; Turner et al., 2005; Walters & Kendler, 1995), but also provided evidence that paternal factors (paternal educational level and paternal care) may play important roles in ED symptoms severity. Our findings, consistent with previous research, suggest that low affection (Johnson, Cohen, Kasen, & Brook, 2002a; Wonderlich, Ukestad, & Perzacki, 1994) and care from the fathers (Calam et al., 1990; Kendler et al., 1995; Steiger et al., 1989; Turner et al., 2005) are associated with ED symptoms.

Moreover, similar to Johnson et al.’s study (Johnson, Cohen, et al., 2002a), our results suggest that low parental education was associated with eating symptoms in young adulthood. Reflecting on the findings of the influence from fathers’ decreased affectionate care and mothers’ overprotection during adolescence on ED symptoms in young adulthood, an intervention program targeting at improving paternal care and decreasing maternal overprotection might help reduce ED symptoms.

Although our data of female predominance for eating symptoms are similar to previous reports in adult (Hudson et al., 2007) and adolescent (Preti et al., 2009; Swanson et al., 2011)
populations, we found that there was a significant association between ED symptoms and OCD symptoms for both genders, but such association was stronger in male than female college students. Despite equal gender distribution in OCD (Fontenelle & Hasler, 2008), young men with eating symptoms were significantly more likely to have OCD symptoms than young women with eating symptoms. Our new findings provide evidence to consolidate the previous etiological models of EDs/OCD comorbidity (Altman & Shankman, 2009) among young men and also implies that we should not underestimate the coexistence of OCD symptoms among young men with eating symptoms.

Similar to previous studies (Enns et al., 2002; Heider, Matschinger, Bernert, Alonso, & Angermeyer, 2006; Overbeek et al., 2007), our findings support that low affectionate/caring and high overprotective parenting styles from fathers and/or mothers before 16 years of age were associated with the severity of anxiety, OCD, and depressive symptoms. In addition, the associations of ED symptoms with co-occurring OCD symptoms and depressive symptoms varied across levels of paternal educational and/or paternal care. Fathers’ care and education level is not only a correlate of having ED symptoms but also a moderator in the co-occurrence of OCD symptoms and/or depressive symptoms among individuals with ED symptoms.

Although family therapy has been demonstrated to be effective in the treatment of EDs (Eisler, 2005), our study results provided clues for more specific and distinct paternal and maternal roles in the treatment of comorbid psychiatric symptoms. Early initiation of parenting counseling to increase adequate parental care at childhood and adolescence and to raise awareness of mental health issues (related to education level) may help to minimize the severity of ED symptoms and co-occurring OCD and depressive symptoms at young adulthood.

Eating symptoms/disorders have etiologies and symptomatology in common with somatoform symptoms/disorders in general. Two prospective studies have reported that adolescents with EDs were at an increased risk for developing physical problems or persistence of somatoform symptoms/disorders during early adulthood (Johnson, Cohen, Kasen, & Brook, 2002b; Lieb et al., 2002). Both somatoform and EDs symptoms have been demonstrated to share common childhood antecedents including traumatic events, environmental adversities, insecure attachment, and parental overprotection across studies (Baker & Merskey, 1982; Fairburn, Welch, Doll, & O’Connor, 1997; Lieb et al., 2002; Stuart & Noyes, 1999).

These somatizing patients often manifest persistent attempts to draw attention from their families and physicians: self-perceived love and caring from parents have been demonstrated to be associated with reduced psychiatric and somatic symptoms (Russek, Schwartz, Bell, & Baldwin, 1998; Stuart & Noyes, 1999). These earlier observations regarding the effects of parental factors on somatizing patients were replicated utilizing standardized measures in the present study. Unlike one previous study (Buddeberg-Fischer, Bernet, Schmid, & Buddeberg, 1996), we did not find gender difference on the severity of somatoform symptoms among college students with ED symptoms.

This cross-sectional study has the following limitations. First, the study population was a convenient sample (incoming college students); findings in the present study may have questionable generalization. However, our college students comprising nationwide high school graduates and our study purpose were not for the prevalence of each psychiatric disorder but for the moderating effects of gender and parental factors on the comorbid patterns of ED symptoms and common psychiatric symptoms. Internal validity was presumed to be good despite possible existence of selection bias.

Second, no psychiatric interview was conducted in this college-based study to identify young adults with psychiatric disorders. The main purpose of this study was not to identify threshold cases with ED or other common psychiatric disorders, but to identify the correlates of these psychiatric conditions. Eating disorders have been speculated to be a spectrum disorder and subthreshold cases were not different from threshold cases in high endorsement of mental health service use and functioning impairment (Patton, Coffey, Carlin, Sanci, & Sawyer, 2008; Swanson et al., 2011).

Third, the questionnaires used to assess parental care were self-reported by the students; parents were not asked about their own perceptions of their parenting styles. Fourth, alternative explanations that family/parental dynamics are affected by a student’s ED or other psychiatric
symptoms may be true for the results of this cross-sectional study. No causal relationships between parenting skills and ED or other psychiatric symptoms were inferred in this present study. Finally, based on the potential differences of parenting styles in different cultures, our findings need to be interpreted carefully when applied to Western and other Asian populations.

Several features of this study constituted its strengths, including large sample size with equal distribution of gender and use of a standardized questionnaire to examine the co-occurring conditions between symptoms of EDs and a wide range of common psychiatric symptoms examined in one study.

Our findings indicated that ED symptoms were associated with lower paternal care, lower paternal educational level, younger maternal age, higher maternal protection, and many other co-occurring psychiatric symptoms. Parents’ demographics and parenting styles played an important role in moderating the association between ED symptoms and co-occurring other psychiatric symptoms. Primary prevention on campus and intervention for college students with ED symptoms in college and clinical settings need to incorporate family work or parenting counseling and comorbidities management in the treatment planning. Our study also suggested that parenting counseling may be individualized to individuals with ED and different comorbid psychiatric symptoms.

References


