Family Structure and Adolescent Eating Disorder Tendencies

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ABSTRACT. The current study examined (a) the current status of eating problems (eating disorder tendencies: EDT) in Japanese adolescents and (b) the association between adolescent EDT and a family structure consisting of three dyadic subsystems (marital, father-adolescent, and mother-adolescent). Participants were 663 high school and university students (341 males and 322 females) in Japan who completed a self-report questionnaire. Survey results revealed that 19 out of 341 males (5.57%) and 53 out of 322 females (16.46%), or 72 out of 663 participants (10.86%) in the entire sample, were categorized as having EDT according to the EAT-26. The male-to-female ratio of participants with EDT was 1 to 2.8. Many of the female adolescents with lower EAT-26 scores had a highly cohesive family structure with a balance of power in all dyads. The current findings suggested that adolescent eating problems are related to an unbalanced family structure. The clinical implications of these findings for family therapy are discussed.

KEY WORDS: family structure, adolescent eating problems, eating disorder tendencies

Introduction

In the field of psychosomatic disease, eating disorders are a prevalent stress reaction in adolescence (Garner & Garfinkel, 1997). Adolescents with eating disorders have long been treated with psychotherapy in Japan. A core component of an eating disorder is a fixation upon eating in relation to a distorted body image. Eating disorders often develop in the teens to early 20s and are more prevalent in females (American Psychiatric Association, 2013). Anorexia nervosa (AN), bulimia nervosa (BN), and binge eating disorder (BED) are the most common eating disorders and cause serious health problems for adolescents.

An eating disorder has no single cause and develops as a result of the complex interaction of several factors; biological, psychological and social factors all play a part (American Psychiatric Association, 2013; Garner & Garfinkel, 1997). Some studies have claimed that family relationships play a significant role as a risk factor for and as a factor protecting against the development of eating disorders and eating problems. Some clinicians and researchers have addressed this problem and developed therapeutic techniques by examining the association between family relationships and eating problems (e.g., Selvini-Palazzoli, 1974; Minuchin, Rosman, & Baker, 1978; Fish & Schlanger, 1999).

Previous studies involving clinical samples took the approach that family relationships
were related to recovery from and worsening of an eating disorder. For example, a good prognosis for an adolescent eating disorder is associated with improved family functioning (Woodside, Lackstrom, Shekter-Wolfson, & Heinmaa, 1996) and a positive view of family relationships (Wewetzer, Deimel, Herpertz-Dahlman, Mattejat, & Remschmidt, 1996). From a therapeutic point of view, family therapy has been found to be particularly effective in treating youth diagnosed with non-chronic AN (e.g., Minuchin et al., 1978; Russell, Szmukler, Dare, & Eisler, 1987; Stierlin & Weber, 1989).

However, the fact that adolescent eating disorders are not attributable to family relationships needs to be discussed. Garner (1993) pointed out the vicious cycle in which symptoms are maintained through stressful life events, dieting, and feedback from others, based on individual factors such as psychological, genetic, physical, and biological factors, dysfunctional family relationships, and cultural factors as evinced by a desire to be thin. In addition, Minuchin, Nichols, & Lee (2007) argued that the cyclical interaction of family relationships causes stress within the family that induces a physiological response, exacerbating an eating disorder in adolescents. Therefore, the pathology of an eating disorder in adolescents might be exacerbated by some specific family interactions or relationships based on personal vulnerability. Dysfunctional family interactions and relationships might be a result of an eating disorder rather than a cause. Thus, some adolescents may have eating problems regardless of their family relationships. The interaction between family relationships and adolescent eating problems needs to be discussed.

Adolescents with eating problems might not seek medical attention even though they have an eating disorder (Nakai, 2000, 2003, 2010; Nakai, Sato, Tamura, Suguri, & Hayashi, 2003; Nakai, Sato, Tamura, Suguri, & Hayashi, 2004), so surveys of the general population are important. Nakai et al. (2004), for example, reported that one-third to one-half of female adolescents and one-fifth of male adolescents had eating problems. Moreover, Nakai (2010) conducted a large-scale survey of female high school and university students in 1982, 1992, and 2002. Nakai reported that (1) the number of under-weight or over-weight adolescents, (2) the percentage of the adolescents desiring to be thin, (3) eating problems, such as limited food intake, binge eating, and purging, (4) the frequency of amenorrhea, and (5) the estimated incidence of eating disorders all increased. Several studies also noted that an eating disorder was likely to develop from a desire to diet (e.g. Kobayashi & Kurita, 2005). These findings suggest that typical female adolescents might develop an eating disorder and that an eating disorder might prolong eating problems. Hence, eating problems are an important subject that require a broader understanding of the psychological and social context beyond the framework of a psychiatric disorder, i.e. whether an eating problem meets diagnostic criteria.

As noted in the beginning of this paper,
eating problems are a pathology that develops through the complex interaction of several factors, such as biological, psychological, and social factors (American Psychiatric Association, 2013; Garner, 1997). Family relationships that adolescents encounter in their everyday lives and that continue throughout their lives are particularly important environmental factors. When severe, eating problems are likely to threaten the lives of adolescents, so family relationships are more of an issue for adolescents. Accordingly, adolescent eating problems might foster negative family relationships (Archibald, Linver, Graber, & Brooks-Gunn, 2002). In any case, the family relationships of adolescents with eating problems need to be examined to understand the process by which an eating problem develops and progresses and its prognosis and to facilitate prevention and support.

Minuchin et al. (1978) is a leading study that exhibited a comprehension of psychosomatic disorders arising from the interaction of family relationships and that described a theoretical system of treatment. Minuchin suggested that families of patients with psychosomatic disorders were characterized by (1) enmeshment, (2) parental over-involvement, (3) rigidity, and (4) an inability to resolve conflicts, and he pointed out that a pattern of dysfunctional family interaction promoted somatization. He also proposed an important concept of the boundary between sub-systems such as the marital dyadic relationship or mother-child dyad, and he suggested that violation of that boundary led to the enmeshment of family members. Moreover, Minuchin et al. (2007) also argued that the cyclical interaction of family relationships exacerbated illness, i.e. that stress within the family exacerbated symptoms. In Japan, Kobayashi & Kurita (2005) surveyed female adolescents and indicated that adolescents with eating disorder tendencies (EDT) feel highly stressed within interpersonal relationships, including pressure from parents.

Several previous studies that investigated the association between EDT and family relationships in non-clinical samples indicated that authoritarian parents (Abrantes, Strong, Ramsey, Lewinsohn, & Brown, 2006), unstable family relationships (McGuire, Story, Newmark-Sztainer, Halcon, Campbell-Forrester, & Blum, 2002) or conflicted family relationships (Byely, Archibald, Graber, & Brooks-Gunn, 2000) were associated with EDT, such as dieting and concern about one’s body image. In contrast, Mellin, Neumark-Szrainer, Story, Ireland, & Resnick (2002) found that family cohesion suppressed unhealthy eating by obese adolescents. Several studies have focused on a single dyadic relationship, such as the father-adolescent dyad or the mother-adolescent dyad. Kobayashi & Kurita (2005) reported that adolescents with EDT received less social support from their fathers, and Katena, Imai, & Shimazaki (2004) noted that father over-involvement to some extent suppressed the EDT of adolescents. A mother’s values, appearance, or concern about her body type (Mukai, 2010) and a mother’s attitudes about
eating (Saito, 2004) were found to be associated with adolescent EDT.

Although previous studies focusing on the association between family relationships and EDT noted the importance of family relationships, those studies merely examined the association between EDT and a single dyad, such as the father-child dyad or the mother-child dyad. If one views a group, i.e. the family, as “a system based on complex interactions” (e.g. Hasegawa, 1987), then dyads that facilitate other dyads, i.e. the marital dyad facilitating the father-child dyad or the mother-child dyad, need to be examined comprehensively and in detail.

Thus, the current study focuses on how adolescents view and experience relationships with their family (Shimosaka, 1988; Katena et al., 2004), and this study views the family as a combination of three dyadic sub-systems (marital dyad, father-adolescent dyad, and mother-adolescent dyad) from an adolescent’s viewpoint. This study views EDT as an indication of adolescent maladaptation and it examines the association between EDT and family structure.

Several recent studies investigated male adolescent EDT (Hayano, 2002) and examined sex differences in the desire to be thin (Uragami Kojima, Sawamiya, & Sakano, 2009). Hayano (2002), for instance, reported that the ratio of males with EDT was one-third that of females in a survey of 245 male university students. Nevertheless, few studies have reported the current status of EDT in both males and females would be meaningful. In addition, previous studies indicated that adolescent EDT was associated with stressors arising from trouble in the parent-adolescent relationship (Minuchin et al., 2007) or inside or outside of the family (Kobayashi & Kurita, 2005). Kozuka (2011) examined each dyadic relationship (marital, father-adolescent, and mother-adolescent) in detail in non-clinical sample. Results indicated that family relationships generating little stress for adolescents were, based on close cohesion in each dyad, equal, i.e. each member had a similar amount of influence. Previous studies found an association between family relationships and EDT (Abrantes et al., 2006; McGuire et al., 2002; Byely et al., 2000; Mellin et al., 2002) and that adolescents perceive stressors inside or outside of the family (Minuchin et al., 2007; Kobayashi & Kurita, 2005). Those findings were synthesized with the findings from Kozuka (2011), who found an association between family relationships and stressors as perceived by adolescents, to formulate a hypothesis.

The current study had 2 aims. The first was to investigate the current status of EDT in Japanese adolescents. The second was to test the hypothesis that there are fewer adolescent EDT in a family with a highly cohesive structure and a balance of power and greater adolescent EDT in a family with a less cohesive structure and a power imbalance.

Methods

1. Participants and survey period
Seven hundred and fifty-five adolescents at 2 high schools in the Tohoku region and 4 universities in the Kanto, Tohoku, and Kansai regions were surveyed. Questionnaires were distributed 1) to high school students via their classes or homeroom or 2) to university students during class. Participation in this study was voluntary. A total of 663 data sets, excluding those with missing data and data from single-parent families, were analyzed.

The sample consisted of 333 high school students (197 males, 136 females) and 330 university students (144 males, 186 females). The mean age of the high school student sample was 16.62 years, \(SD = .73\) (males: \(M = 16.66, SD = .67\); females: \(M = 16.5\) years, \(SD = .80\)). The mean age of the university student sample was 20.03 years, \(SD = 1.57\) (males: \(M = 20.15\) years, \(SD = 1.83\); females: \(M = 19.93\) years, \(SD = 1.33\)). The mean age of all participants was 18.32 years, \(SD = 2.09\) (males; \(M = 18.13\) years, \(SD = 2.16\); females; \(M = 18.51\) years, \(SD = 2.09\)).

2. Measures

1) Demographic characteristics

Participants were asked to fill in their age, sex, and living arrangements (living with one’s family, living alone, or some other arrangement).

2) Family structure

The Inventory for Character of Intra-Inter Generation in Kinship (ICHIGEKI: Noguchi, Kozuka, Usami, & Wakashima, 2009) was used to assess the routine family structure as perceived by adolescents. The ICHIGEKI was developed to conduct higher-level systems research on families. It can efficiently and comprehensively assess each dyadic relationship in a family and depict each dyad (marital, father-adolescent, and mother-adolescent) as a single item with little burden for participants. The ICHIGEKI has demonstrated adequate validity (Noguchi et al., 2009). The ICHIGEKI has a four-factor structure that includes cohesion, interests, power, and openness. The current study used two of those factors, cohesion and power, because these were considered to be main aspects in assessing family structure. Noguchi et al. (2009) reported that a single item on the ICHIGEKI was closely correlated with cohesion and power as measured with multiple items (cohesion: \(r = .70\); power: \(r = .52\)) and that a single item had a certain level of validity. Noguchi et al. noted an inverse correlation between interests and cohesion \((r = -.54)\) and viewed interests as a concept in contrast to cohesion. Therefore, interests were excluded from the current study because of the burden on participants and the complexity of ascertaining each dyad. Openness indicates the relationships that family members have with people outside the family and was similarly omitted.

Cohesion, a sub-scale of the ICHIGEKI, indicates togetherness, intimacy, and a sense of solidarity in each dyad. Cohesion was measured on a six-point scale ranging from “completely disagree” to “completely agree.” Higher cohesion scores indicated a higher level of cohesion in each dyad. Power, a sub-scale of the ICHIGEKI, indicated the degree of
influence, one’s ability to speak, and one’s ability to make decisions and was estimated on a six-point scale ranging from “completely disagree” to “completely agree.” Power was assessed in both directions in each dyad (six directions in total) to clarify who had power over whom. Participants were asked to recall routine situations (“what you feel are routine/ordinary family relationships”) and to respond with a number. The higher the score for power, the stronger the relative power in each dyad.

3) EDT

In the current study, EDT were defined as eating problems that nonetheless did not meet diagnostic criteria for an eating disorder. Adolescent EDT were estimated using the Japanese version (Mukai, 2001) of the 26-item Eating Attitudes Test (EAT-26) developed by Garner et al., 1982. The EAT-26 has been used as a screening tool to differentiate healthy individuals, individuals with a clinically significant eating disorder, and at-risk individuals. The EAT-26 has been used to assess severity in individuals with a clinically significant eating disorder and to measure EDT in a sample consisting mostly of healthy individuals (Mukai, Cargo & Shisslak, 1994). The validity of this scale has been examined in Japan (e.g. Mukai et al., 1994), and it has been used to assess eating disorders and as an indicator of eating problems in studies involving non-clinical samples (e.g. Mukai, 2010).

The EAT-26 consists of 26 statements such as “I am terrified about being overweight,” “I avoid eating when I am hungry,” and “I find myself preoccupied with food,” and responses are given on a six-point scale ranging from “always” to “never.” A response of 1, 2, or 3 is given a score of 0, 4 is scored as 1, 5 is scored as 2, and 6 is scored as 3. The cut-off score for all 26 items is 20 points. Nakai (2003) examined the validity of the EAT-26 in a Japanese sample and suggested that a score of 15 points was an appropriate cut-off score in Japan. Therefore, a score of 15 points on the EAT-26 served as the cut-off score in the current study.

Results

1. Descriptive statistics

Descriptive statistics for cohesion and power assessed with the ICHIGEKI were examined in each dyad (marital, father-adolescent, and mother-adolescent).

The EAT-26 was scored using the scoring method described earlier. The 25th item, “I enjoy trying new rich foods”, was reverse-coded (Garner & Garfinkel, 1997). Cronbach’s alpha coefficient is a measure of reliability and was $\alpha = .73$ for all 26 items, so adequate reliability was confirmed. Table 1 shows the descriptive statistics for cohesion and power in each dyad (marital, father-adolescent, and mother-adolescent) and EAT-26 scores.

2. Adolescent EDT
Based on the findings of Nakai (2003) as were mentioned earlier, the cut-off score on the EAT-26 was 15 points in the current study. Participants with a score higher than 15 points were categorized as having higher EDT (higher scores on the EAT-26) and those who scored below 15 points were categorized as lower EDT (lower scores on the EAT-26). Table 2 shows the grouping of high school students, university students, and the total sample.

In the high school student sample, 10 out of 197 males (5.80%) and 28 out of 136 females (20.59%), or 38 out of 333 participants (11.41%), were categorized as having higher EDT (higher scores on the EAT-26). In the university student sample, 9 out of 144 males (6.25%) and 25 out of 186 females (13.44%), or 34 out of 330 participants (10.30%), were categorized as having higher EDT (higher scores on the EAT-26). In the total sample, 19 out of 341 males (5.57%) and 53 out of 322 females (16.46%), or 72 out of 663 participants (10.86%), were categorized as having higher EDT (higher scores on the EAT-26). The male-to-female ratio overall was 1 to 2.8. The sex ratio in the high school student sample and in the university student sample was similar to that in the total sample.

3. Association between family structure and adolescent EDT

|                  | high school students | University students | Total sample |
|------------------|----------------------|---------------------|--------------|
|                  | males                | females             | males        | females               | males              | females               | males              | females               |
|                  | (N=197)              | (N=136)             | (N=144)      | (N=186)            | (N=341)           | (N=322)            | (N=333)           | (N=663)            |
| ICHIGEKI         |                      |                     |              |                     |                   |                   |                   |                   |
| cohesion         |                      |                     |              |                     |                   |                   |                   |                   |
| between father and adolescent | 3.81 (1.32) | 3.71 (1.53) | 3.72 (1.24) | 3.65 (1.41) |                   |                   |                   |                   |
| between mother and adolescent | 4.19 (1.12) | 4.68 (1.25) | 4.37 (1.08) | 4.87 (1.13) |                   |                   |                   |                   |
| between father and mother | 3.92 (1.33) | 3.99 (1.44) | 3.94 (1.41) | 3.97 (1.39) |                   |                   |                   |                   |
| power            |                      |                     |              |                     |                   |                   |                   |                   |
| adolescent vs. father | 2.91 (1.30) | 3.35 (1.35) | 3.09 (1.13) | 3.20 (1.28) |                   |                   |                   |                   |
| adolescent vs. mother | 3.23 (1.25) | 3.29 (1.23) | 3.49 (1.18) | 3.58 (1.20) |                   |                   |                   |                   |
| father vs. adolescent | 3.74 (1.42) | 3.38 (1.41) | 3.64 (1.24) | 3.49 (1.31) |                   |                   |                   |                   |
| father vs. mother | 3.44 (1.39) | 3.39 (1.33) | 3.51 (1.45) | 3.66 (1.36) |                   |                   |                   |                   |
| mother vs. adolescent | 3.89 (1.19) | 4.10 (1.12) | 3.73 (1.22) | 3.99 (1.17) |                   |                   |                   |                   |
| mother vs. father | 3.61 (1.39) | 3.57 (1.35) | 3.65 (1.21) | 3.62 (1.25) |                   |                   |                   |                   |
| EAT-26           | 6.81 (4.80)         | 10.06 (7.38)        | 6.40 (4.26) | 9.14 (6.96)        |                   |                   |                   |                   |
Family structures were classified in order to examine the association between family structure and adolescent EDT. There were marked sex differences in EDT according to the EAT-26, so only female data were used. The percentage of males with higher EDT (higher scores on the EAT-26) was less than 10% among both high school and university students. Given the frequency with which female adolescents routinely interact with their families, those relationships were assumed to play more of a role for female adolescents living with their families than those living apart. Therefore, 88 females who living alone or apart from their family were excluded, and data on 234 females (mean age: 18.24 years, SD = 2.13) were analyzed. A Q-mode cluster analysis of the two sub-scale scores on the ICHIGEKI was performed for the marital, father-adolescent, and mother-adolescent dyads\(^1\). The number of clusters were varied

\(^1\) The score for power, a sub-scale of the ICHIGEKI developed by Kozuka (2011), in the marital dyad was obtained by subtracting the score for the mother vs. the father from the score for the father vs. the mother. Similarly, the score for power in the father-adolescent dyad (and mother-adolescent dyad) was obtained by subtracting the score for the adolescent vs. the father (mother) from the father (mother) vs. the adolescent. A higher score in the marital dyad indicated a more powerful father. A higher score for power in the

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Table 2. Groupings based on Eat-26 Scores

|       | EAT-26 |       |
|-------|--------|-------|
|       | high   | low   |
|       | 15 points or more | 14 points or less |
| high school students |       |       |
| males | 197    | 100.00 | 10  | 5.80  | 187  | 94.92 |
| females | 136   | 100.00 | 28  | 20.59 | 108  | 79.41 |
| total | 333    | 100.00 | 38  | 11.41 | 295  | 88.59 |

The ratio of male to female participants with higher EAT-26 scores (higher EDT) \(1 : 2.8\)

| university students |       |       |
|---------------------|--------|-------|
| males               | 144    | 100.00 | 9   | 6.25  | 135  | 93.75 |
| females             | 186    | 100.00 | 25  | 13.44 | 161  | 86.56 |
| total               | 330    | 100.00 | 34  | 10.30 | 296  | 89.70 |

The ratio of male to female participants with higher EAT-26 scores (higher EDT) \(1 : 2.8\)

| whole               |       |       |
|---------------------|--------|-------|
| males               | 341    | 100.00 | 19  | 5.57  | 322  | 94.43 |
| females             | 322    | 100.00 | 53  | 16.46 | 269  | 83.54 |
| total               | 663    | 100.00 | 72  | 10.86 | 591  | 89.14 |

The ratio of male to female participants with higher EAT-26 scores (higher EDT) \(1 : 2.8\)
from 2 to 5, and 4 distinct clusters were identified. The number of participants in each cluster and the interpretability of each cluster were examined. The results of cluster analysis are shown in Figure 1.

CLU. 1 consisted of 65 participants (28%) from the sample and was designated “a highly cohesive structure with a balance of power” because cohesion in each dyad was more than .50SD and power in each dyad was between -.50SD and +50SD, so it was almost balanced in each dyad. CLU. 2 consisted of 54 participants (28%) from the sample. In CLU. 2, cohesion in the marital and father-adolescent dyads was less than -1.00SD, and father-adolescent dyad (or mother-adolescent dyad) indicated a powerful father (or mother).

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CLU. 3 consisted of 97 participants (41%) from the sample, and cohesion was average in all of the dyad. Adolescents had slightly more power in the father-adolescent dyad, but power was almost balanced in each dyad in comparison to the other clusters. Thus, CLU. 3 was designated “a structure with average cohesion and a balance of power.” CLU. 4 was a small group of 18 participants (8%) from the sample, and it was designated “a structure with less mother-adolescent cohesion and a powerful mother.”

CLU. 1 = a highly cohesive structure with a balance of power; CLU. 2 = a less cohesive structure with a powerful father; CLU. 3 = a structure with average cohesion and a balance of power; CLU. 4 = a structure with less mother-adolescent cohesion and a powerful mother.

Note. CLU. 1 = a highly cohesive structure with a balance of power; CLU. 2 = a less cohesive structure with a powerful father; CLU. 3 = a structure with average cohesion and a balance of power; CLU. 4 = a structure with less mother-adolescent cohesion and a powerful mother.
mother.” In CLU. 4, mother-adolescent cohesion was less than -1.00SD. The father’s power in the father-adolescent dyad was less than -1.50SD, and the mother’s power in the mother-adolescent dyad was more than +1.50SD. Roughly speaking, CLU. 1 has a highly cohesive structure with a balance of power, while the other clusters had a structure with a power imbalance and average or less cohesion. Although CLU. 3 is similar to CLU. 1, cohesion in each dyad was not particularly strong in CLU. 3.

A chi-square test was performed with the 4 family structure clusters as independent variables and a higher score or lower score on the EAT-26 as a dependent variable (Table 3). Results revealed significant differences at the 5% level in terms of the ratio of the number of participants with higher EDT (higher scores on the EAT-26) and participants with lower EDT (lower scores on the EAT-26) between clusters ($\chi^2(3) = 13.58, p = .05$). Residual analysis revealed that the proportion of participants with higher EDT (higher scores on the EAT-26) was significantly lower at the 5% level and that the proportion of participants with lower EDT (lower scores on the EAT-26) was significantly higher at the 5% level in CLU. 1, which had a highly cohesive structure with a balance of power. In contrast, the proportion of participants with higher EDT (higher scores on the EAT-26) was significantly higher at the 1% level in CLU. 2, which had a less cohesive structure with a powerful father. In the other

| EAT-26  | CLU.1 | CLU.2 | CLU.3 | CLU.4 | $\chi^2$ |
|---------|-------|-------|-------|-------|-----------|
| high frequency | 41 | 5 | 17 | 14 | 5 |
| expected frequency | 11.39 | 9.46 | 17.00 | 3.15 |
| adjusted residual | -2.45 | 3.08 | -1.05 | 1.19 |
| low frequency | 193 | 60 | 37 | 83 | 13 |
| expected frequency | 53.61 | 44.54 | 80.00 | 14.85 |
| adjusted residual | 2.45 | -3.08 | 1.05 | -1.19 |
| total frequency | 234 | 65 | 54 | 97 | 18 |

*p < .05

Table 3. $\chi^2$ Test of EAT-26 Scores by Family Structure Cluster.
clusters, there were no associations between family structure and EDT.

Discussion

This study had 2 aims. The first was to reveal the state of EDT in Japanese adolescents. The second was to examine the association between family structure and EDT. The following hypothesis was tested: fewer adolescent EDT in a highly cohesive family with a balance of power and greater adolescent EDT in a less cohesive family with a power imbalance.

1. Adolescent EDT

In this study, 53 out of 322 female adolescents (16.46%) were classified as having higher EDT (higher scores on the EAT-26) based on a total score of 15 points or higher on the EAT-26. Nakai (2003) used a cut-off score of 15 points on the EAT-26 and found that 14.8% of 961 females ages 15 to 35 years had a score above 15 points. Even though the current results are about 2% higher than those of Nakai (2003), the current findings seem to be almost the same as those of Nakai (2003) given the difference in sample sizes. Thus, these results suggest that a certain percentage of adolescents have eating problems.

However, a look at the current sample in detail indicates that 20.59% of 136 female school students and 13.44% of 186 female university students had higher EDT (higher scores on the EAT-26). The percentage of high school students, that is, young people, is seemingly higher even when the sample size or sample population is taken into account. In contrast, 5.57% of male adolescents (19 out of 341 males) had higher EDT (higher scores on the EAT-26). Although a simple comparison of these data is not possible because few studies have examined male EDT, a number of male high school or university students have EDT. The male-to-female ratio was all 1 to 2.8 for high school students, university students, and the total sample. Epidemiological studies of eating disorders in males have reported a prevalence of one-twentieth to one-tenth that in females (American Psychiatric Association, 2013). When adolescent eating problems are viewed as a pathology, there is an extremely marked sex difference in prevalence. When those problems are viewed as EDT, however, their prevalence in males is about one-third that in females. This suggests that eating problems definitely exist in males as well as in females. Hence, a certain percentage of male and female adolescents have some form of eating problem, regardless of whether they are seen at a medical facility or whether or not they are diagnosed with an eating disorder. Eating problems need to be investigated in non-clinical samples including males and females.

2. Family structure and adolescent EDT

Family structure was classified using cluster analysis and differences in EDT by type of family structure were examined in order to reveal the association between family structure and adolescent EDT. In CLU. 1, which had a high cohesive structure with a balance of power, the ratio of participants with higher EDT (higher scores on the EAT-26) was lower and
the ratio of participants with lower EDT (lower scores on the EAT-26) was higher than in the other clusters. In CLU. 2, which had a less cohesive structure with a powerful father, the ratio of participants with higher EDT (higher scores on the EAT-26) was higher and the ratio of participants with lower EDT (lower scores on the EAT-26) was lower than in the other clusters. CLU. 1 is a family structure with a balance of power among the adolescent, mother, and father based on a higher level of cohesion in all 3 dyads. In contrast, CLU. 2 is a family structure with a powerful father based on a low level of cohesion. Therefore, families of female adolescents with fewer EDT are intimately connected. In addition, a high level of cohesion, particularly in the marital and father-adolescent dyads, and an equal relationship, i.e. each member has the same level of influence, suppress adolescent eating problems. These results generally support the hypothesis put forward. Hence, the current results imply that a highly cohesive family structure with a balance of power indicate perceived stressors as well as adolescent maladaptation in the form of EDT (Kozuka, 2011). Moreover, the current findings indicate that family cohesion helps to suppress eating problems in the general population like high school or university students and to suppress unhealthy eating by obese adolescents as reported by Mellin et al. (2002). Consequently, the current findings suggest that the nature of family relationships is associated with an adolescent’s problems during adolescence. The current results also suggest that adolescents need to be able to influence their parents, instead of parents being able to unilaterally influence adolescents, based on a highly cohesive marital dyadic relationship as well as a highly cohesive parent-adolescent dyadic relationship.

There were significant differences in the ratio of adolescent EDT among the 4 types of family structures identified in this study. An association between family structure and EDT was suggested, but all of the family structures had adolescents with higher EDT (higher scores on the EAT-26). This implies that the nature of a family’s structure or the nature of each dyadic relationship does not necessarily cause adolescent eating problems. Negative family structures (e.g. less cohesion with a power imbalance) can also presumably arise because an adolescent has eating problems. Eating problems are likely to put an adolescent’s life at risk, suggesting more marked family interactions. There is less cohesion in each dyad and parents are forced to wield power.

The current study was unable to determine whether there is a cause-and-effect between family structure and EDT. At the current point in time, however, one can reasonably view adolescent eating problems as varying with family structure and one can view interaction between adolescents and family members as the issue. Regardless, the current results suggest that family relationships are significant environmental factors associated with adolescent eating problems and that certain family relationships are likely to suppress those problems.
3. Clinical implications

During a session with family members of an adolescent with EDT, some clinicians and researchers have pointed out therapists should intervene by clarifying the boundary between sub-systems (e.g., Minuchin et al., 1978). They suggested that a clear boundary enables adolescents to express their thoughts and feelings and interact with their parents and that it creates a hierarchical structure that parents can lead. However, the current results suggest that therapists should increase cohesion in each dyad and work on the power relationship between parents and the adolescent rather than intervening in the boundary between dyadic sub-systems. When an adolescent exhibits unhealthy eating, parental action to stop it might weaken cohesion in each dyad and create a family structure with a power imbalance. When family cohesion is maintained and an adolescent has less power, therapists need to intervene in the family structure to allow the adolescent to make decisions and influence fellow family members, i.e. having family members respect the autonomy and decision-making ability of the adolescent. Problems faced by adolescents have become more complex over the past few years. Given its applicability in clinical settings, examining the association between family structure and adolescent EDT is essential to resolving those problems and helping adolescents.

4. Topics for the future

This study examined the association between adolescent EDT and family structure in only a female sample because of limitations on the sample size. Therefore, future studies should examine the current findings in light of sex differences. In addition, future studies should take account of information such as height, weight, and menstruation in order to examine the potential for adolescent eating problems to create negative family structures. The current study used a non-clinical sample to identify eating problems in the general population. Future studies should also consider whether EDT are an extension of eating disorders and then examine differences between clinical samples and non-clinical samples in detail.

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