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Chapter 3

# The Eating Attitudes and Mental Health in Japanese Female University Students

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**Abstract**

First, the relationship between eating attitudes and anxiety in Japanese female university students was examined. The results of the analysis show that especially trait anxiety significantly relates with eating disorder tendency. Following this, the interrelationship of eating attitudes, body-checking behavior cognition, and depression was examined. The results show that the obsessive thoughts body image score increases as the eating disorder tendency score also increases, indicating that inappropriate eating attitudes have a strong impact on obsessive thoughts. Finally, the relationship between eating attitudes, trust, and isolation was examined. The results of the analysis show that inappropriate eating behavior significantly correlates with distrust and isolation.

**Keywords:** eating attitudes, university students, anxiety, depression

## 1. Introduction

Eating disorders associated with a distorted body image include anorexia nervosa (AN) and bulimia nervosa (BN) (DSM-5, American Psychiatric Association, [1]). BN is characterized by a cycle of bingeing and compensatory behaviors, such as self-induced vomiting, designed to undo or compensate for the effects of binge eating. In contrast, the patients with AN deliberately lose a lot of weight through abnormal eating habits; however, there are several other physical and psychological signs related to this problem.

Nozoe et al. [2] reviewed eating disorders in Japan and showed AN exploded during the 1960s and 1970s. BN has also increased since the late 1970s. The number of patients in the younger generation (under 14 years of age) and older generation (over 30 years old) was increasing

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around the millennium. Nozoe et al. [2] theorized that the change related to eating disorders was affected by the economical and social situation of the time. For instance, during this time, there was an increase in the number of nuclear families, a decrease in communication with neighbors and relatives, increased expectations for academic achievements for children, and new diversity in mothers' and fathers' roles in the families. Past studies note a risk factor in relation to eating disorders is family issues: the divorce of the parents and lack of attachment between children and their mothers [3], overcohesiveness of family members [4], and generation gap [5].

There are other psychological factors in Japanese culture that may be potential reasons for eating disorders. Ono and Shimada [6] found that an irrational belief about dependence and self-expectation could affect eating disorders. Adolescents with highly disturbed eating patterns show stronger attitudes concerning the need to eat nutritionally balanced food and know information about food and restaurants [7]. This evidence suggests that the reason(s) for eating disorders is complex. The problem concerning inappropriate eating attitudes not only is connected with eating disorder patients but also may be with ordinary adolescents and adults.

Okabe and Inoo [8] investigated AN patients' body images and showed that they believed their body weight was heavier than it was. The same study showed that AN patients had higher demands regarding dieting behavior than the control group. In the current Japanese society, this tendency is common in nonclinical people as well. Kashima [9] states that Japanese young women daily accept information about diet behavior through magazines and TV programs. It could be argued dieting behavior is at times necessary for health, but many people seem to adapt dieting behaviors because of fashion practices rather than health matters. The number of people having inappropriate eating attitudes and behavior is increasing [10]. However, while they do not satisfy the clinical criteria of having an eating disorder, the tendency does affect their mental health.

Recent findings in other countries also suggest a significant relationship between eating attitudes and psychological aspects in adolescents and young adults. Baş and Kiziltan [11] showed female adolescents in Turkey may be more likely to display abnormal eating attitudes and dieting behaviors than males. They also found that female dieters had higher social physique anxiety and lower self-esteem than non-dieters. Bacopoulou et al. [12] showed a significant positive relationship between inappropriate eating attitudes and anxiety in Greek adolescents. This evidence tells us that investigating the relationship between eating attitudes and psychological factors and the relationship's effect on mental health is an important research topic.

Mental health is affected by physical health, and relationships between psychological and physiological factors are an important research topic in current psychology as shown above. The symptom of weight loss is no exception. It is important to investigate how we recognize our physical situation and behavior. Therefore, this study also focuses on the cognition of eating attitudes and body image and investigates how they affect our psychological aspects, such as depression and anxiety. We hypothesize that the cognition of our eating behavior affects not only our personal but also interpersonal factors. Based on the hypothesis, we use the trust and loneliness as dependent variables in the study and examine the relationship among eating attitudes and the dependent variables.

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## 2. Eating attitudes, body image, and depression in Japanese female university students

### 2.1. Introduction

The relationships between eating attitudes, body image, and depression are mainly examined through the scope of Yoshie et al.'s [13] work in this section. Body image is defined as the cognition of one's own body. Many reports have shown that the desire to be slim and tendency to obsess over one's body image are increasing [14–16] showed body dissatisfaction is associated with a greater risk of having body image distortions, which in turn is associated with being underweight or overweight. This tendency exists in female Japanese adolescents. Tazaki [17] indicated that the number of young Japanese women who skip regular meals due to dieting is increasing. He argued that as female adolescents tend to view their body image more negatively, their desire to diet increases.

Earlier studies conducted surveys that revealed the relationship between the desire for thinness and body image. Brunch [18] mentioned AN is a serious disorder because patients cannot recognize their body image correctly and become overly thin. Mountford et al. [19] studied eating disorder patients and concluded body-checking behavior was a representation of the distorted cognition in eating disorder patients. Consequently, these researchers developed the Body Checking Cognition Scale (BCCS). One engages in body-checking behavior to judge one's shape or weight [20, 21]. Body-checking behavior includes several behaviors as follows. A representative one is weighing oneself and looking at the mirror to check one's specific body parts frequently. Another examples are checking clothes whether they fit to one's body or not and compare one's body with other person [21, 22]. Further, negative body image significantly drives a wish for thinness among ordinary Japanese females [23]. As these previous studies show, cognition of body image might influence our eating attitudes, and this relationship is not specific to eating disorder patients. Thus, it is important to explore how an ordinary person's eating attitudes interrelate with body image.

Jackson et al. [24] showed the relationship between body image satisfaction and depression in midlife women. Naylor et al. [25] also found an association between exercise beliefs, obsessive beliefs, and obsessive-compulsive behaviors in an eating-disordered group. While these studies are based on the data of a specific generation and clinical groups, the tendency might apply to ordinary female university students. Therefore, the purpose of this study is to examine the interrelationship of eating attitudes, cognition of body-checking behavior, and depression in Japanese female university students. The following hypotheses are proposed:

Hypothesis 1: Eating attitudes in young Japanese women influence their body image, body-checking behavior, and mood state.

Hypothesis 2: Inappropriate eating attitudes strongly impact obsessive thought patterns more than other factors of body-checking behavior.

Body-checking behavior includes behavioral aspects, such as body control and cognitive aspects (e.g., obsessive thought). Previous studies indicated the significant correlation

between the risk of an eating disorder and obsessive thought [25]. Therefore, we hypothesized that inappropriate eating attitudes particularly impact obsessive thought patterns.

Hypothesis 3: Inappropriate eating attitudes negatively impact depression.

Furthermore, a significant correlation between eating disorders and depression has been found in clinical samples [26, 27]; the tendency is considered acceptable in eating attitudes of ordinary university students.

## 2.2. Method

### *2.2.1. Participants*

Participants were 198 female Japanese university students who voluntarily took part in the study (median age = 19.98, SD = 1.38). They were recruited in a psychology class at the university, and the purpose and ethical considerations of the study were explained to them. They agreed to the informed consent to participate in the survey.

### *2.2.2. Measures*

#### *2.2.2.1. Eating attitudes test*

The Eating Attitudes Test (EAT-26 Japanese edition; [28]) is an inventory that diagnoses eating disorders and measures eating attitudes using a six-point scale ranging from 1 (nothing) to 6 (always) and includes 26 items. All items consist of one factor, and the reliability of the scores has been confirmed ($\alpha$ = .85).

#### *2.2.2.2. Body image cognition scale*

Yoshie [29] developed the Body Image Cognition Scale (BICS) based on the BCCS [19]. The BCCS comprises four subscales: objective verification, reassurance, safety beliefs, and body control. The BICS measures cognition of body-checking behavior and basic factor structure consistently with the BCCS, but some items were added and revised to account for Japanese culture. The scale includes 22 items and 4 subscales: objective verification ($\alpha$ = .75), obsessive thought ($\alpha$ = .64), reassurance-confidence ($\alpha$ = .79), and body control ($\alpha$ = .79). All items were tested on a five-point scale ranging from 1 (disagree) to 5 (agree).

#### *2.2.2.3. Depression scale*

The Center for Epidemiologic Studies Depression Scale (CES-D), Japanese version [30, 31], is used to measure depression. It is a standardized inventory that includes 20 items using a 4-point scale ranging from 0 (disagree) to 3 (agree) to measure participants' levels of depression. The sum of the scores is treated as the depression score. Because the CES-D is a standardized inventory and its reliability and validity have been proven, the current study utilized the original version.

#### *2.2.2.4. Procedure and data analysis*

Participants were asked to answer the EAT-26, BICS, and CES-D questionnaires. Then, they were divided into three subgroups based on their EAT scores. The high group (EAT-H,

N = 14) scored three points or higher, the middle group (EAT-M, N = 78) scored between two and three points, and the low group (EAT-L, N = 105) scored two points or lower. The scores of BICS and CES-D were compared among EAT-H, EAT-M, and EAT-L groups.

### 2.3. Results

Based on the hypothesis, the scores of BICS and CES-D were compared among EAT subgroups using one-way analysis of variance. There were significant differences in all BICS's subscales: objective verification ($F(2,194) = 18.19$, $p < .01$, $\eta^2 = 0.16$), obsessive thought ($F(2,194) = 30.05$, $p < .01$, $\eta^2 = 0.24$), reassurance-confidence ($F(2,194) = 3.28$, $p < .05$, $\eta^2 = 0.03$), and body control ($F(2,194) = 23.33$, $p < .01$, $\eta^2 = 0.19$). The result of multiple comparisons showed that in objective verification, reassurance-confidence, and body control, the mean score for the EAT-M group was larger than for the EAT-L group ($p < .05$). In addition, the score of EAT-H group was higher than the EAT-L group ($p < .05$) in objective verification and body control. Regarding obsessive thought, the highest scorer was the EAT-H group, followed by the EAT-M and EAT-L groups, respectively ($p < .05$). There were also significant differences in depression scores ($F(2,194) = 5.31$, $p < .01$, $\eta^2 = 0.05$). Depression scores in the EAT-M and EAT-H groups were higher than those of the EAT-L group ($p < .05$). **Table 1** shows the interrelationship of eating attitudes, body image cognition, and depression.

### 2.4. Discussion

The general hypothesis (Hypothesis 1) of this study is that inappropriate eating attitudes influence body image, body-checking behavior, and mood state. We confirm the results of this study based on the hypothesis and evidence from previous studies.

First, the results show that the scores of the EAT-L group are lower than those of the other groups with respect to objective verification, body control, and depression. Objective verification is a factor that reflects the motivation to consider one's own body image accurately and continually. The EAT-L group does not run a risk of developing an eating disorder and maintains healthy eating behaviors. It suggests that participants with healthy eating attitudes have low levels of body checking. Body control is a matter of adjusting the amount of food or exercise to control one's weight. The EAT-L group could maintain a balance without excessively

| | **EAT-H** | **EAT-M** | **EAT-L** | |
|---|---|---|---|---|
| | **Mean (SD)** | **Mean (SD)** | **Mean (SD)** | |
| Objective verification | 4.11 (0.50) | 3.86 (0.63) | 3.32 (0.74) | L < M*, H* |
| Obsessive thought | 3.63 (1.03) | 2.87 (0.79) | 2.22 (0.72) | L < M < H* |
| Reassurance confidence | 2.45 (0.96) | 2.72 (0.92) | 2.38 (0.84) | L < M* |
| Body control | 3.97 (0.43) | 3.52 (0.70) | 2.91 (0.78) | L < M*, H* |
| CES-D | 21.07 (12.58) | 17.11 (11.19) | 13.41 (8.94) | L < M*, H* |
| | | | | *$p$ <.05 |

**Table 1.** The interrelationship of eating attitudes, body image cognition, and depression.

worrying about their weight or body image. Mitsui [32] showed that depressive tendencies are present in people with middle and high levels of eating disorders. This study also showed that depression was more frequent in the EAT-H and EAT-M groups. These results support Hypothesis 3 and indicate inappropriate eating attitudes facilitate depression not only in clinical data but also in ordinary university students. In addition, Shima et al. [30] mentioned that there is a risk of depressive disorders with participants who score over 16 points on the CES-D. Both the EAT-H and EAT-M groups satisfied these criteria. Mitsui [32] stated that self-identity is threatened because of strong anxiety and depression caused by a lack of basic trust. As these results show, participants with high EAT scores have difficulty treating their emotions as an integrated inner experience, with the result that a depressive mood increases significantly. Therefore, the hypothesis (1) that inappropriate eating attitudes increase excessive body-checking behavior and depression was supported by the results of this study.

Second, the scores for obsessive thought increase based on the participants' EAT results. This study indicates that the effect size of the analysis is the largest in obsessive thought and that inappropriate eating attitudes strongly impact obsessive thought more than any other factors of the BICS. This result supports Hypothesis 2. Halmi et al.'s [33] work showed the relationship between AN, perfectionism, and obsession. It is believed that the participants with eating disorder tendencies also have general obsessive tendencies, which extend to body-checking behavior. Yoshie et al. [34] showed that participants with high EAT scores also exhibited high levels of trait anxiety. Trait anxiety is the tendency to feel anxious and is a part of an individual's personality. As the results of this study and Yoshie et al.'s [34] outcomes reveal, people with inappropriate eating attitudes have a tendency to feel anxious easily, and such tendencies may facilitate obsessive thoughts and behaviors. These results prove Hypothesis 2 that inappropriate eating attitudes facilitate obsessive thought patterns.

The results of the analysis provided another finding. Reassurance-confidence scores were higher in the EAT-M group than in the EAT-L group. As mentioned previously, the EAT-L group did not have eating disorder tendencies and could be considered a healthy group. Alternately, the EAT-L group could also be interpreted as being careless about their eating attitudes or body image. Therefore, they rarely require reassurance and do not seek confidence through body checking. In contrast, the EAT-M group showed a moderate interest in eating attitudes. According to these results, while the EAT-L group had a low motivation to body check due to indifference, the EAT-M group sufficiently cared about their body image in daily life, and this habit brought them reassurance and confidence. Cooley et al. [35] established a relationship between eating behaviors and the seeking of reassurance. This past research supports the results of this study and also indicates that it will be necessary for future studies to investigate how reassurance seeking through body-checking behavior is suppressed in the EAT-L group.

In conclusion, results of this study provided evidence that eating disorder tendencies correlate with a risk of excessive body-checking behavior, depression, and obsessive behaviors. In addition, while previous studies focused on patients with eating disorders, this study explored the behaviors of normal participants without eating disorders, such as the individuals in the EAT-L group. Although they do not have inappropriate eating attitudes, their

carelessness about eating behavior may be a factor in suppressing the reassurance or confidence they seek through body-checking behaviors.

### 2.5. Limitations and directions for future study

This study has some limitations with regard to its settings and outcomes. First, only women participants were included in this study. Previous studies have shown the detail of symptoms in eating disorder that differ between males and females [36]. Therefore, we need to collect the data of male participants and compare the results. Second, we employed the EAT for measuring eating attitudes, but other scales have been developed to assess eating disorder tendencies from several aspects. For instance, the Eating Disorder Inventory [37] measures eating disorder tendencies using multiple factors, such as drive for thinness and body dissatisfaction. Using these other scales and further confirming the relationships between eating attitudes, body-checking behavior, and depression could supply more detailed and useful data.

## 3. Eating attitude and anxiety in Japanese female university students

### 3.1. Introduction

This section focuses on anxiety and show the relationship between eating attitudes and anxiety based on Yoshie et al.'s [29] research. Eating disorders are common in adolescents and young adults, and the tendency toward eating disorders in those age groups is increasing. Clinical criteria originally divided such disorders into anorexia nervosa and bulimia nervosa. However, there are pathologies that do not directly satisfy the criteria of eating disorders, such as obsessive dieting, a type of inappropriate eating behavior. Oshima et al. [10] showed that eating attitudes are influenced by body dissatisfaction and femininity especially in female university students. In addition, self-image, mood, and personality are the related factors of eating attitudes, too. As shown in the study of previous section, eating attitudes significantly relate with obsessive thought about body image. In the age of adolescence and emerging adult, people are sensitive to body image and often obsessive to keep their ideal body shape. Such obsessive thought and behavior sometimes drive them to the overdieting behavior and weight loss. In the period of those generations, they face the crisis of establishing their own identity as a developmental task. They feel anxious through the process, and such anxiety may be one of the predictors of inappropriate eating attitudes. Therefore, this study focused on anxiety and examined its relationship with eating attitudes in Japanese female university students. We use State-Trait Anxiety Inventory (STAI-JYZ; Hidano et al. [38]) to measure the anxiety of participants in this study. STAI includes two subscales of state and trait anxiety. The former is temporary anxiety, and the latter is constant and deeply concerns with personality and habit of the participants in contrast. The finding of the previous section showed that eating attitudes relate with objective verification and reassurance of body image in addition to obsessive thoughts. Therefore, such factors are daily and constant habits of the participants; they are considered to relate especially with trait anxiety more than state anxiety. Hence, the hypothesis of the study is that inappropriate eating attitudes are facilitated by state anxiety.

### 3.2. Method

One hundred and ninety-eight Japanese female undergraduate students (M = 19.98 years old, SD = 1.38) participated in this study. Participants were asked to answer the Eating Attitudes Test (EAT-26 Japanese edition; Mukai et al. [28]) and State-Trait Anxiety Inventory (STAI-JYZ; Hidano et al. [38]). EAT-26 is an inventory that diagnoses eating disorders and measures eating attitudes using a 6-point scale (1 (nothing) to 6 (always)) and includes 26 items. STAI is a standardized inventory that measures both state and trait anxieties. For each type of anxiety, it includes 20 items along a 4-point scale (1 (disagree) to 4 (agree)).

### 3.3. Results and discussion

According to the score of EAT-26, participants were divided into subgroups. EAT-H (N = 14) is a high group, and they had a mean score of three points and above. EAT-M (N = 78) is a middle group and the score is between 2 and 3. EAT-L (N = 106) is a low group with score of less than two points. EAT is a scale for the criteria of AN, and EAT-H group is the most risky group of inappropriate eating attitudes and AN tendency. One-way analysis of variance is conducted to compare the score of STAI among EAT-H, EAT-M, and EAT-L groups. As a result, there is a significant difference in the trait anxiety score ($F(2,195) = 3.45$, $p < .05$), and multiple comparisons showed that the trait anxiety in the EAT-H was significantly higher than in the EAT-L ($p < .05$). There was no significant difference in the state anxiety ($F(2,195) = 0.36$, ns) (**Table 2**).

The main finding of the study is that trait anxiety strongly relates to eating attitudes. The findings in previous studies support this result. As mentioned before, Baş and Kiziltan [11] found female dieters had higher social physique anxiety and lower self-esteem than non-dieters. Bacopoulou et al. [12] showed the significant positive relationship between inappropriate eating attitudes and anxiety. Becker et al. [39] especially focused on trait anxiety and examined the relationship with eating attitudes. They showed that inappropriate eating attitudes, such as fasting frequency and excessive exercises, significantly correlate with trait anxiety. Wagner et al. [40] also showed that trait anxiety was significantly higher in the AN and BN group than the control group.

Trait anxiety is the tendency to feel anxiety easily and is part of an individual's personality. In contrast, state anxiety is a temporary mood. However not all participants categorized in the EAT-H group satisfied the criteria to be diagnosed with an eating disorder; they have a certain amount of inappropriate eating attitudes and risk of AN. The result of the study indicated that these students with AN tendency live with constant and continuous anxiety and these viewpoints are useful for future clinical support.

| | **EAT-H** | | **EAT-M** | | **EAT-L** | | |
|---|---|---|---|---|---|---|---|
| | ***M*** | ***SD*** | ***M*** | ***SD*** | ***M*** | ***SD*** | |
| State anxiety | 42.79 | 12.96 | 40.67 | 12.62 | 40.00 | 11.32 | |
| Trait anxiety | 51.43 | 14.09 | 45.73 | 12.23 | 43.21 | 11.05 | EAT-H > EAT-L* |
| | | | | | | | *$p < .05$ |

**Table 2.** Relationships between eating attitude and anxiety.

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# 4. The relationship among eating attitude, trust, and loneliness in Japanese female university students

## 4.1. Introduction

We focus on the effect of eating attitudes on the relationship with others from the viewpoint of trust and isolation. From the clinical viewpoint, both trust and isolation are important factors to understand the cognitive style of eating disorder patients. Takii et al. [41] mentioned that it is difficult to recover from an eating disorder because a patient has an obsessive belief that their family and therapist do not understand their feelings. However, they cannot live without being taken care of by their family and therapists, and this process increases their isolation and helplessness. Therefore, people with eating disorders have a basic and continuous anxiety based on the belief of not being accepted by others.

Takaku and Moriya [42] showed that children who are accepted well by their parents express negative feelings to others more than children that lack acceptance. This result indicates that the basic trust and security established through the attachment relationship between children and their parents promote the expression of children's feelings and self-disclosure. In contrast, many eating disorder patients do not have the experience of being accepted by others, and this is the cause of distrust for their family and therapists. Takezawa and Kodama [43] focused on the positive aspect of dependency and developed the Interpersonal Dependency Scale and found the dependency is divided into two factors: affectional dependency and instrumental dependency. Based on their theory, excessive dependency is not good for mental health, but an adequate level of dependency is necessary to maintain good relationships with others in our daily lives. They also investigated the relationship between dependency and trust. The result of the study found that participants with high dependency have higher trust in others than participants with a lack of dependency. As the evidence shows, trust affects how we communicate and depend on each other. This mechanism might be the same in eating disorder patients and people with inappropriate eating attitudes.

The positive relationship between isolation and eating disorder tendencies in Japanese university students has been revealed [44]. Goto [44] states the recognition of individuality in the phase of adolescence, and emerging adulthood strongly concerns the relationship between isolation and eating attitudes. The relationship is not specific in the clinical samples, and it is important to investigate the mechanism of how eating attitudes affect the promotion of isolation in nonclinical samples.

## 4.2. Method

### *4.2.1. Participants*

Two hundred and three Japanese female university students (Mage = 19.18, SD = 1.10) participated in the study. Six data points were removed because they included errors. Therefore, a total of 197 data points were analyzed in the next step.

*4.2.2. Measures*

*4.2.2.1. Eating attitudes test*

The Eating Attitudes Test (EAT-26 Japanese edition; Mukai et al. [28]) is an inventory that diagnoses eating disorders and measures eating attitudes using a 6-point scale ranging from 1 (nothing) to 6 (always) and includes 26 items. However, all items of the EAT-26 originally consist of one factor; the result of the factor analysis based on the present samples showed that the loading of six items is less than 0.40. Therefore, these items were removed, and a total of 20 items were used in this study. The reliability of these 20 items was acceptable ($\alpha$ = .91).

*4.2.2.2. Trust scale*

A scale developed by Amagai [45] was used to measure trust. It includes 24 items that are divided into three factors: trust for others, trust in oneself, and distrust. Like the EAT-26, two items were removed because of the low loading (less than 0.40). The reliabilities of each factor were acceptable (trust for others ($\alpha$ = .86), trust in oneself ($\alpha$ = .89), and distrust ($\alpha$ = .90)).

*4.2.2.3. Isolation scale*

The Loneliness Scale (LSO) by Ochiai [46] was used to measure loneliness. The LSO includes two factors: LSO-U and LSO-E. LSO-U refers to empathy, and participants with a high score of LSO-U tend to believe that people have empathy and understand each other. For example, the item of "People can understand the feelings that they have for each other" is included on the scale. In contrast, LSO-E is concerned with individuality and loneliness as noted with items like "I have no one to depend on without myself." As a result of removing 2 items because of the low loading (less than 0.40), a total of 14 items were used in the following analysis. The reliabilities of LSO-U ($\alpha$ = .92) and LSO-E ($\alpha$ = .79) were acceptable.

**4.3. Results and discussion**

First, participants were divided into three groups using the EAT score. The total mean score of the EAT was 45.81, and the standard deviation (SD) was 13.30. We categorized that the average minus 1/2 SD and less was the EAT-L group (N = 63) and the average plus 1/2 SD and more was the EAT-H group (N = 46). The participants with scores between the EAT-L and EAT-H groups were divided into the EAT-M group (N = 88).

The scores of trust for others, trust in oneself, and distrust were compared between the EAT-L, EAT-M and EAT-H groups using one-way ANOVA. The results showed that there was a significant difference in distrust ($F(2,194) = 11.12$, $p < .05$) and trust for others ($F(2,194) = 3.13$, $p < .05$). Multiple comparisons showed that the score of distrust in the EAT-H group is higher than the EAT-M and EAT-L groups. The score of trust for others in the EAT-M group was higher than the EAT-L and EAT-H groups. There was no significant difference in trust in oneself ($F(2,194) = 0.69$, n.s.).

Like the trust scale, the LSO-U and LSO-U scores were compared among the EAT-L, EAT-M, and EAT-H groups. There were significant differences in LSO-U ($F(2,194) = 2.69$, $p < .05$) and LSO-E ($F(2,194) = 3.68$, $p < .05$). The LSO-U score in the EAT-M group was higher than the EAT-H group, and the LSO-E score was higher in the EAT-H group than the EAT-L and EAT-M groups (**Table 3**).

The score of distrust was the highest in the EAT-H group than the other groups. This result indicates that participants who are obsessive about their body image and eating behavior have difficulty with trusting themselves and others. The distrust factor includes items concerned with the personality trait of being suspicious of another person. This trait facilitates excessive self-consciousness, and it makes a person aware of their body image and eating attitudes at an obsessive level. The score of trust for others in the EAT-M group was higher than the other groups. Based on the categorization of this study, the EAT-H group was overly conscious of eating attitudes and in risk of developing eating disorders. In contrast, participants in the EAT-L group had no or very low interest in their eating behavior and body image. The EAT-M is group was average; they had concerns about eating attitudes at a satisfactory level. Therefore, it is possible to view this group as the healthiest with ordinary eating behaviors. Participants in the EAT-M group have confidence in their body images, and it may facilitate their self-efficacy. This promotes trust for others and establishes good relationships with others.

As with trust for others, the score of LSO-U is higher in the EAT-M group. LSO-U is connected to empathy, and it means that participants with a high LSO-U score have a feeling of being accepted and understood by others. It also means that they can share their feelings with others. The EAT-M group is viewed as people who have adequate concerns about their eating attitudes and body image. Therefore, the result of the analysis is interpreted as students who can deal with their eating attitudes appropriately have the confidence to make good relationships with others as opposed to others having obsessive and inappropriate thoughts about eating behavior. In contrast, LSO-E in the EAT-H group is the highest. LSO-E means awareness of individuality and loneliness. It mainly includes items concerned about not being accepted by others. Goto [44] examined the relationship between loneliness and eating attitudes using the LSO and showed that participants with a high LSO-E score tend to have an

| | **EAT-H** | | **EAT-M** | | **EAT-L** | | |
|---|---|---|---|---|---|---|---|
| | ***M*** | ***SD*** | ***M*** | ***SD*** | ***M*** | ***SD*** | |
| Distrust | 34.98 | 7.91 | 28.86 | 7.63 | 27.92 | 9.18 | EAT-H > EAT-M, EAT-L* |
| Trust in oneself | 30.85 | 7.24 | 32.17 | 5.39 | 31.16 | 8.30 | |
| Trust for others | 20.26 | 3.84 | 21.88 | 3.82 | 20.32 | 5.38 | EAT-M > EAT-H, EAT-L* |
| LSO-U | 33.70 | 7.19 | 36.64 | 6.38 | 35.59 | 7.40 | EAT-M > EAT-H* |
| LSO-E | 17.30 | 4.31 | 15.49 | 4.28 | 15.10 | 4.59 | EAT-H > EAT-M, EAT-L* |
| | | | | | | | *p < .05 |

**Table 3.** Relationships among eating attitude, trust, and anxiety.

eating disorder tendency. This evidence supports the result of this study. Goto [44] noted that the conflict that occurs in the process of establishing an identity during adolescence is a reason for the relationship between loneliness and inappropriate eating attitudes. In connection to what Goto [44] pointed out, the participants in the EAT-H group also have conflicts in their identities, and it facilitates anxiety in relation to their self-image and body image. Further, the eating behavior obsession occurs as a reaction formation to the anxiety.

## 5. General discussion and future application

In this chapter, we investigated the relationship among eating attitudes, body image cognition, depression, anxiety, isolation, and trust especially using the Japanese female university student samples. The results of the studies showed that inappropriate eating attitudes significantly concern with irrational belief of body image and mental health problem such as depression, anxiety, distrust, and isolation. Three studies based on different samples were conducted in this chapter. We can link these findings because all studies used same measures EAT for the index of eating attitudes. EAT is originally developed for the purpose of screening AN patients. AN patients are oversensitive to their body image and avoid to gain weight. The samples of the present study are ordinary university students, and not all participants satisfy the criteria of AN. However, EAT-H group of the present studies has a tendency of AN and risk of weight loss. The findings of the chapter indicated that the risk behavior of weight loss and inappropriate eating attitudes are not special symptoms, but they are familiar problem for adolescents and emerging adults. In addition, the symptoms have physical and psychological aspects including depression, anxiety, and loneliness. The psychological support from the viewpoint of such psychological aspects is necessary for weight loss problem of young generation.

The findings are based on limited cultural background and generation. The studies from the viewpoint of cultures, several generations, and gender difference are required for future clinical application.

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