[Paper]

# Relationship between Contingencies of Self-Worth, Contentment of Sources of Self-Worth, and Subjective Well-Being of Japanese People with Autism Spectrum Disorder

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## Abstract

The study examined the relationship between contingencies of self-worth, contentment of sources of self-worth, and subjective well-being of Japanese adults with autism spectrum disorder (ASD), through a comparison with adults in the same age group. For this purpose, a questionnaire survey was administered to a sample of 19 adults with ASD and 50 adults in the same age group (the control group). The results showed that "friendships" and "enthusiastic activity" of the participants with ASD were higher than those of the control group in terms of contingencies of self-worth and contentment of sources of self-worth. In addition, no significant correlations were found for the sub-factors of contingencies of self-worth and subjective well-being among the adults with ASD. The higher contentment of sources of self-worth, "athletic competence," and "friendships," the higher subjective well-being of the adults with ASD. The implication of the findings is that enhancing "athletic competence" and "friendships" in contentment of sources of self-worth may be effective for improving subjective well-being of adults with ASD.

**Keywords:** Autism spectrum disorder, Contingencies of self-worth, Contentment of sources of self-worth, Self-esteem, Subjective well-being

## 1. Introduction

Self-esteem has been defined as the positivity of overall evaluative feelings toward oneself (Endo, 2013). The perspectives from which self-esteem can be analyzed include contingencies of self-worth (CSW) and contentment of sources of self-worth (CSSW). The former refers to the concept of what domains take self-esteem and the estimates of one's own worth (Crocker et al., 2002; Crocker et al., 2003; Uchida, 2008). As for the latter, [*1] it has been defined as an indicator of how satisfied the sources of self-esteem are (Ito et al., 2013).

Previous research has shown that CSW are related to motivation (Ohtani, 2012). Since people are more likely to be motivated toward objects with high CSW, they will actively engage in them, resulting in a higher CSSW. For example, those for whom athletic competence is a source of self-esteem (i.e., CSW in athletic competence are high) will actively engage in exercise. They will tend to be more athletic (i.e., CSSW in athletic competence is high), and self-esteem is likely to increase. However, those for whom athletic competence is not a source of self-esteem (i.e., CSW in athletic

competence are low) will not actively engage in exercise. They will not tend to be more athletic, and self-esteem is not likely to increase. In this regard, self-esteem can be clarified by not only considering it in terms of high and low self-esteem, but also by focusing on CSW and CSSW.

As for the relationship between self-esteem and various constructs, one construct with a particularly strong relationship is subjective well-being. Previous research has defined subjective well-being as "a broad category of phenomena that includes people's emotional responses, domain satisfactions, and global judgments of life satisfaction" (Diener et al., 1999). Subjective well-being can also be divided into two domains: cognitive and affective (Diener et al., 1999). The cognitive aspect refers to the degree of satisfaction with one's life (Ito et al., 2003) and is the core concept of subjective well-being (Gilman and Huebner, 2006). On the other hand, the affective aspect consists of both positive and negative emotions such as enjoyment and sadness (Ito et al., 2003).

Baumeister et al. (2003) found a strong relationship between subjective well-being and self-esteem, with higher self-esteem leading to higher subjective well-being. Ito and Kodama (2005) considered that a dispositional cognitive style that views aspects in a positive light can result in a positive perception of both the present self and life.

Autism spectrum disorder (ASD) is a disorder related to social communication. Due to its negative psychological aspects, a number of people with ASD have been diagnosed with depressive symptoms or mental disorders in adolescence and adulthood (Kikuchi, 2010). Recent research has begun to examine the positive psychological aspects of subjective well-being among people with ASD, rather than the negative ones. For instance, Scheeren et al. (2022) conducted a longitudinal study of subjective well-being of 917 individuals with ASD over a six-year period. They found that the higher the objective psychosocial functioning is, such as employment, independent living, and friendship ratings, the higher subjective well-being is.

Studies of subjective well-being have also begun to be conducted on Japanese individuals with ASD. For example, Kojima (2018) compared the high and low subjective well-being of 27 students/working adults with ASD and 60 people in the same age group, and found little difference. They also found that the higher self-esteem of those with ASD, the higher their subjective well-being. This indicates the effectiveness of self-esteem support for enhancing subjective well-being of individuals with ASD.

Although self-esteem of adults with ASD has been reported to be lower or similar than that of typically developing adults, the findings have been inconsistent (e.g., Maras and Bowler, 2012; Nguyen et al., 2020). The reason may be due to individual differences among people with ASD (Kojima and Noutomi, 2013). Given the possibility that self-esteem of adults with ASD is lower or similar to that of typically developing adults, and the possibility of individual differences, it is likely that there are a number of adults with ASD who need self-esteem support. However, it is unclear how to provide such support. Previous research (Kojima, 2018) on self-esteem and subjective well-being of individuals with ASD has only examined the relationship between these two aspects, leaving this issue open to discussion. Thus, it is important to clarify CSW and CSSW, which are two perspectives from which self-esteem can be analyzed in more detail.

In previous studies on CSW, they used developmentally appropriate scales. For example, studies conducted on adolescents (Ohtani and Nakaya, 2010) used the CSW Scale for adolescents, while those for adults (Crocker et al., 2003; Uchida, 2008) used the CSW Scale for adults. In the present study, we only target adults with ASD who may have lower or similar self-esteem than typically developing adults.

By examining the relationship between CSW, CSSW, and subjective well-being, we can clarify

the relationship between self-esteem and subjective well-being among adults with ASD. We hope to gain insight into how to help such adults lead more fulfilling lives through self-esteem support. Therefore, this study examined the relationship between CSW, CSSW, and subjective well-being of Japanese adults with ASD, through a comparison with adults in the same age group.

## 2. Method

### 2.1 Subjects

In order to recruit a sample of adults with ASD, requests were made to 13 parent associations of children and persons with developmental disabilities in Japan, after which cooperation was obtained from eight such associations. For each association, we asked the person in charge to send a letter containing the URL and QR code of the questionnaire to their members via e-mail. While answering the questionnaire, we basically asked the respondents to assume what they would answer in person. Overall, we received 30 responses. After excluding the data with missing values, the number of respondents with ASD (without intellectual disabilities) was 19 (18 males; 1 female). Among them, 5 had coexisting ADHD and 2 had coexisting ADHD and LD. Their ages ranged from 20 to 57 years, with a mean age of 27.2 years ($SD$ = 8.2).

For the control group, which consisted of a sample of adults in the same age range, an online survey was conducted by Cross Marketing Inc. The ages of the 50 adults (45 males; 5 females) ranged from 19 to 57 years, with a mean age of 25.5 years ($SD$ = 6.2). A t-test was also performed on the ages of the adults with ASD and the control group, after which no significant differences were found ($t$ (67) = 0.95, $p$ > .05). Thus, the ages of the adults with ASD and those of the adults in the control group were similar.

### 2.2 Survey period

This research was conducted from June 2022 to September 2022.

### 2.3 Questionnaire

#### 2.3.1 Information sheet

For the adults with ASD, they were asked to state their gender, age, occupation, and diagnosis. For the control group, they were asked to provide their gender, age, and occupation.

#### 2.3.2 CSW and CSSW

In this study, the self-developed CSW Scale and CSSW Scale for adults were used. Both scales, which have shown reliability and validity, consist of five factors: athletic competence, enthusiastic activity, friendships, prosocial behavior, and appearance. Both scales were also created in correspondence with one another. For example, the item "I am satisfied with myself when I can treat people with compassion" on the CSW Scale corresponds to "I think I treat people with compassion" on the CSSW Scale (Table 1). The responses to the CSW Scale were based on a six-point scale ranging from 1 (not applicable at all) to 6 (very applicable), while the answers to the CSSW Scale were based on a five-point scale ranging from 1 (not applicable at all) to 5 (very applicable). Before developing the scales for adults with ASD, one representative of the association of parents of children and persons with developmental disabilities was asked to evaluate the contents, after which the questionnaire items were modified based on the opinions.

#### 2.3.3 Subjective well-being

This study also used the Subjective Well-Being Scale (Ito et al., 2003), based on the World Health

**Table 1** The Contingencies of Self-Worth Scale and the Contentment of Sources of Self-Worth Scale

| The Contingencies of Self-Worth Scale | The Contentment of Sources of Self-Worth Scale |
|---|---|
| Athletic competence | Athletic competence |
| 8 Have good motor skills is important to me | 8 I think I have good motor skills |
| 11 I get depressed when I don't achieve good results in sports | 11 I think I achieve good results in sports |
| 14 Being good at sports makes me confident | 14 I think I am good at sports |
| Enthusiastic activity | Enthusiastic activity |
| 4 It is important for me to work on things that interest me | 4 I think I am working on something I am interested in |
| 7 I am satisfied with myself because I have something to devote myself to | 7 I think I have something to devote myself to |
| 15 I feel confident when I am enthusiastic about something I like | 15 I think I am enthusiastic about what I like |
| Friendships | Friendships |
| 2 If I don't have friends I can talk to about anything, I don't feel confident about myself | 2 I have friends with whom I can talk about anything |
| 5 I don't mind if I don't have good friends* | 5 I don't think I have any good friends* |
| 13 It is important for me to have friends whom I can trust | 13 I think I have friends I can trust |
| Prosocial behavior | Prosocial behavior |
| 1 I feel confident when I can be kind to others | 1 I think I am kind to people |
| 3 I am satisfied with myself when I can treat people with compassion | 3 I think I treat people with compassion |
| 10 Doing things for others is important to me | 10 I think I do things for others |
| Appearance | Appearance |
| 6 Good looks is important to me | 6 I think I have good looks |
| 9 I lose self-confidence if I feel I have a bad body figure (style) | 9 I think have a good figure (style) |
| 12 I am satisfied with myself if I think I have a cool (beautiful) face | 12 I think I have a cool (or beautiful) face |

Note. *Item was reversed scoring.

Organization's Subjective Well-Being Inventory (Sell and Nagpal, 1992). The adult version of this scale consisted of one factor and 12 items, with demonstrated reliability and validity (Ito et al., 2003). The answers were based on a four-point scale, with higher scores indicating a higher subjective well-being.

### 2.4 Ethical considerations

For the adults with ASD, this study was conducted with the consent of the representative of the parent association and that of the individual. For the control group, we obtained the consent of each participant. When conducting the survey, the author explained (in writing) that the survey would be conducted based on the free will of the survey respondents, that there would be no disadvantage if they did not respond, and that privacy protection would be ensured. In addition, the research was

**Table 2** Contingencies of self-worth, contentment of sources of self-worth, and subjective well-being of adults with ASD and control group

| | Adults with ASD | Control group | *p* | *r* |
|---|---|---|---|---|
| | Median (interquartile range) | Median (interquartile range) | | |
| Contingencies of self-worth | | | | |
| Athletic competence | 3.33 (1.33) | 3.67 (1.42) | 0.74 | 0.04 |
| Enthusiastic activity | 5.00 (1.67) | 4.00 (1.75) | 0.02* | 0.29 |
| Friendships | 4.33 (1.67) | 3.67 (0.75) | 0.02* | 0.29 |
| Prosocial behavior | 4.67 (1.67) | 4.00 (2.00) | 0.44 | 0.09 |
| Appearance | 3.67 (1.33) | 4.00 (1.08) | 0.78 | 0.03 |
| Contentment of sources of self-worth | | | | |
| Athletic competence | 2.33 (1.00) | 2.33 (1.67) | 0.25 | 0.14 |
| Enthusiastic activity | 4.00 (1.00) | 3.33 (1.08) | 0.01** | 0.32 |
| Friendships | 3.67 (1.67) | 3.00 (1.42) | 0.05† | 0.24 |
| Prosocial behavior | 3.33 (1.67) | 3.33 (1.42) | 0.82 | 0.03 |
| Appearance | 2.33 (1.67) | 2.50 (1.33) | 0.19 | 0.16 |
| Subjective well-being | 2.42 (0.83) | 2.67 (0.75) | 0.53 | 0.08 |

**$p < .01$, *$p < .05$, † $p < .10$.

**Table 3** Spearman's rank correlation coefficients for the sub-factors of contingencies of self-worth and subjective well-being

| | | Contingencies of self-worth | | | | |
|---|---|---|---|---|---|---|
| | | Athletic competence | Enthusiastic activity | Friendships | Prosocial behavior | Appearance |
| Adults with ASD | Subjective well-being | −.35 | −.03 | .08 | .14 | −.17 |
| Control group | | .05 | .48** | .01 | .33* | .06 |

**$p < .01$, *$p < .05$.

conducted with the consent of the research ethics committee of the graduate school to which the author belongs (2022-71A; June 9, 2022).

### 2.5 Analysis

SPSS (version 28) and Excel programs were used to analyze the statistics.

## 3. Results

### 3.1 Basic statistics for each scale and the results of the Mann-Whitney U test

The Mann-Whitney U test was conducted on the scores of each scale for the adults with ASD and the control group (Table 2). According to the results, the scores for "enthusiastic activity" ($p < .05$) and "friendships" ($p < .05$) in CSW were significantly higher for the adults with ASD than for the control group. CSSW was also significantly higher for the adults with ASD than the control group in "enthusiastic activity" ($p < .01$). In addition, there was a significant trend in the score for "friendships" ($p < .10$) in CSSW and no significant difference in subjective well-being.

**Table 4** Spearman's rank correlation coefficients for the sub-factors of contentment of sources of self-worth and subjective well-being

| | | Contentment of sources of self-worth | | | | |
|---|---|---|---|---|---|---|
| | | Athletic competence | Enthusiastic activity | Friendships | Prosocial behavior | Appearance |
| Adults with ASD | Subjective well-being | .46* | .24 | .49* | .34 | .36 |
| Control group | | .16 | .48** | .36* | .40** | .17 |

**$p < .01$, *$p < .05$.

**Table 5** Spearman's rank correlation coefficients for the sub-factors of contingencies of self-worth and contentment of sources of self-worth

| | Athletic competence | Enthusiastic activity | Friendships | Prosocial behavior | Appearance |
|---|---|---|---|---|---|
| Adults with ASD | −.05 | .70** | .49* | .37 | −.07 |
| Control group | .74** | .57** | .52** | .73** | .25 |

**$p < .01$, *$p < .05$.

### 3.2 Relationship between CSW, CSSW, and subjective well-being

Spearman's rank correlation coefficients were calculated for the sub-factors of CSW and subjective well-being for the adults with ASD and the control group (Table 3). No significant correlations were found for the sub-factors of CSW among the adults with ASD. However, significant correlations were found for "enthusiastic activity" ($r = .48$, $p < .01$) and "prosocial behavior" ($r = .33$, $p < .05$) in the control group.

Spearman's rank correlation coefficients were also calculated for the sub-factors of CSSW and subjective well-being for the adults with ASD and the control group (Table 4). Significant correlations were found for "athletic competence" ($r = .46$, $p < .05$) and "friendships" ($r = .49$, $p < .05$) in CSSW among the adults with ASD. Meanwhile, significant correlations were found for "enthusiastic activity" ($r = .48$, $p < .01$), "friendships" ($r = .36$, $p < .05$), and "prosocial behavior" ($r = .40$, $p < .01$) in CSSW for the control group.

Finally, Spearman's rank correlation coefficients were calculated between the corresponding sub-factors of CSW and CSSW (Table 5). According to the results, there were significant correlations for "enthusiastic activity" ($r = .70$, $p < .01$) and "friendships" ($r = .49$, $p < .05$) among the adults with ASD. Significant correlations were found in "athletic competence" ($r = .74$, $p < .01$), "enthusiastic activity" ($r = .57$, $p < .01$), "friendships" ($r = .52$, $p < .01$), and "prosocial behavior" ($r = .73$, $p < .01$) in the control group.

### 3.3 Distribution of the scores for CSW, CSSW, and subjective well-being

Figure 1 presents scatter plots for the sub-factors of CSW and subjective well-being for the adults with ASD and the control group. Specifically, the scores for "enthusiastic activity" in CSW ranged from 3 to 6 for the adults with ASD, whereas those for the control group ranged from 1 to 6.

The scatter plots of the sub-factors of CSSW and subjective well-being for the adults with ASD and the control group are shown in Figure 2. For "athletic competence" in CSSW, the scores ranged from 1 to 3 for the adults with ASD, whereas the scores ranged from 1 to 5 for the control group.

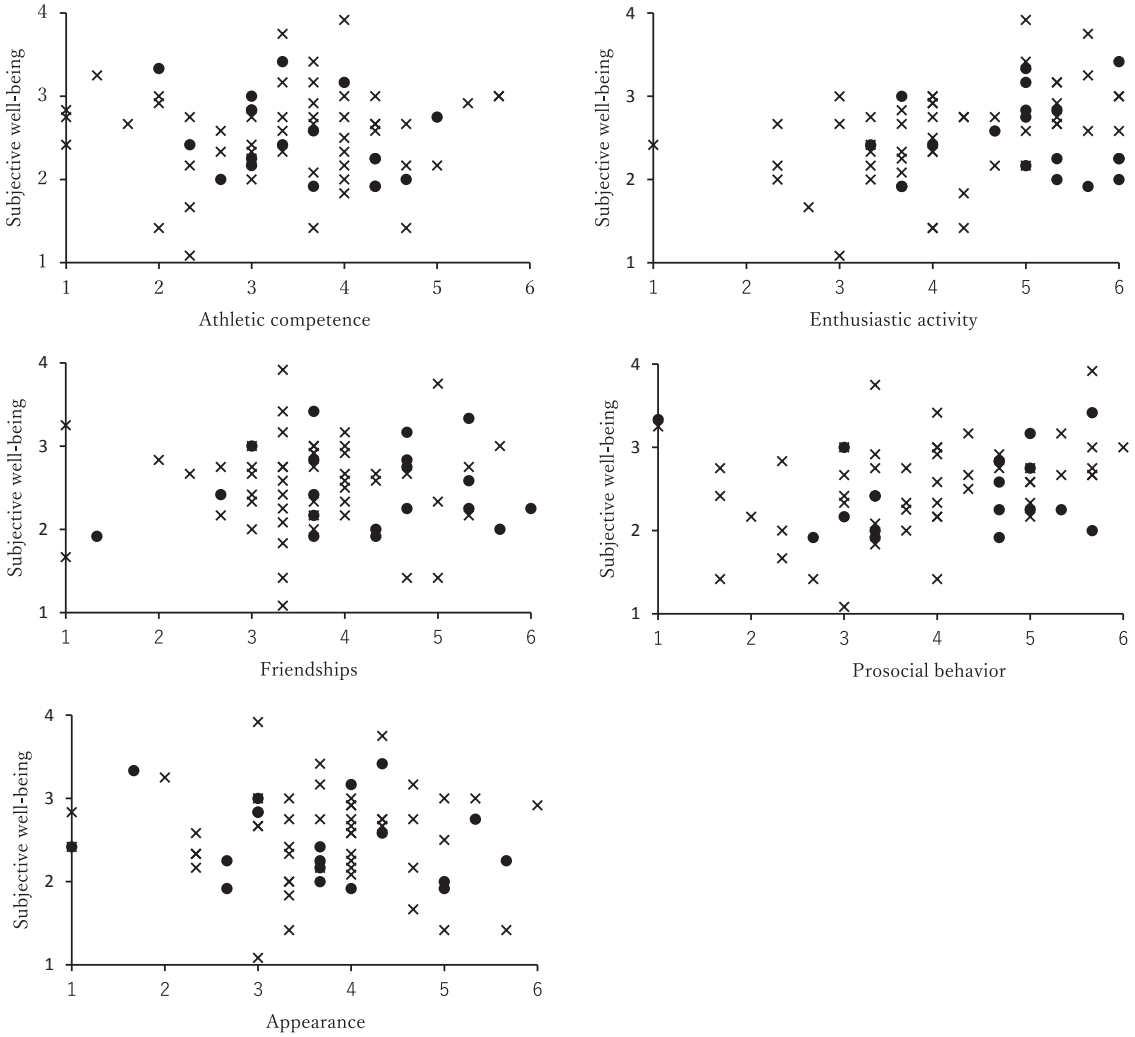


**Figure 1** Scatter plots for the sub-factors of contingencies of self-worth and subjective well-being
●Adults with ASD ×Control group

## 4. Discussion

In order to clarify the relationship between CSW, CSSW, and subjective well-being of the adults with ASD, we first examined the relationship between CSW and CSSW (Table 5). Next, we focused on the relationship between subjective well-being and CSSW, by comparing the adults with ASD and the control group. Moreover, we examined the relationship between subjective well-being and CSSW in more detail by focusing on CSW.

### 4.1 Relationship between CSW and CSSW

Upon examining the correlations between the factors in the CSW Scale and the CSSW Scale, there were significant correlations between "enthusiastic activity" and "friendships" in the adults with ASD. However, no significant correlations were found for "athletic competence," "prosocial behavior," and "appearance" among them. In the control group, except for "appearance," there were

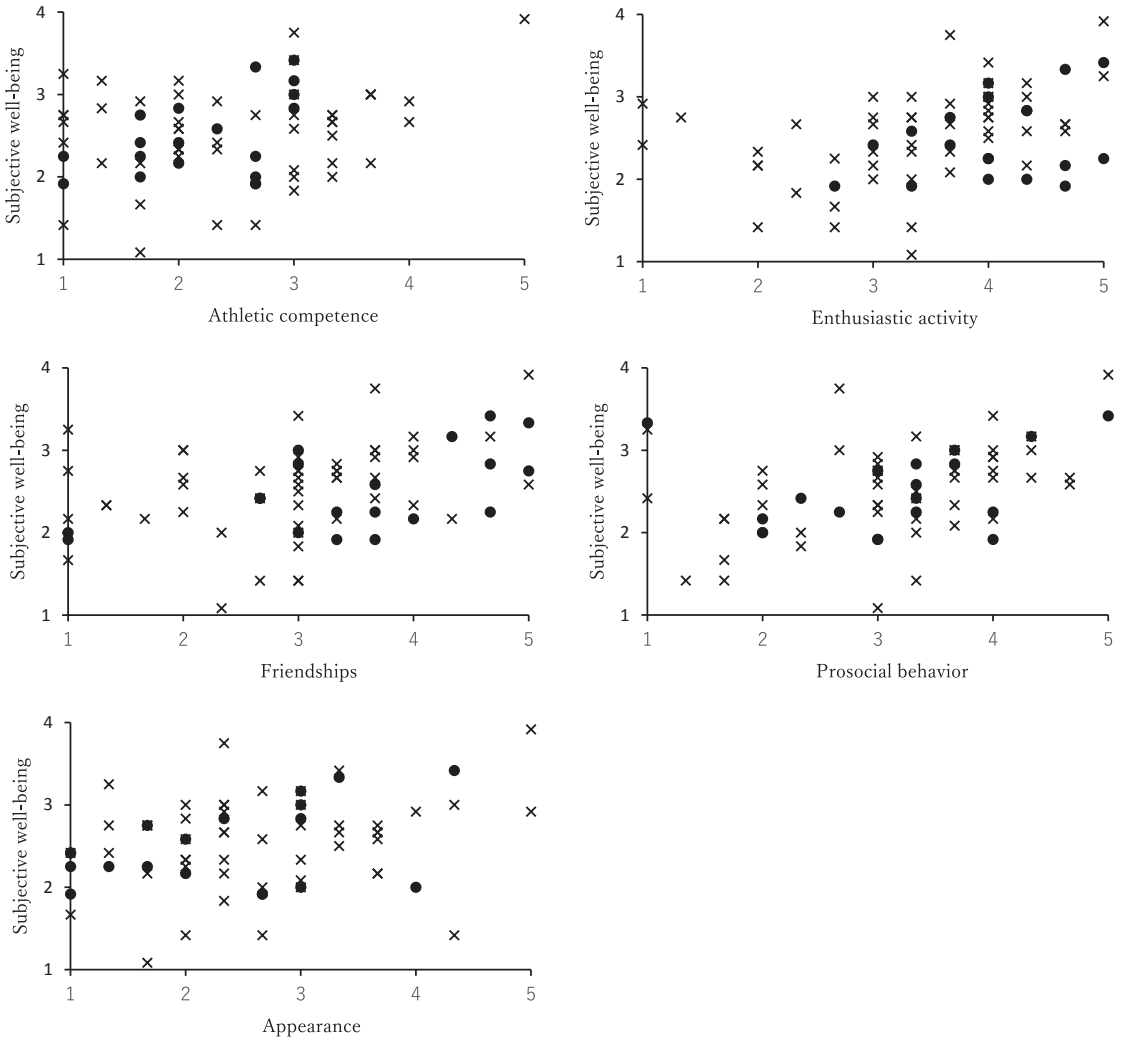


**Figure 2** Scatter Plots for the sub-factors of contentment of sources of self-worth and subjective well-being
●Adults with ASD ×Control group

significant correlations between CSW and CSSW for "athletic competence," "enthusiastic activity," "friendships," and "prosocial behavior."

Given that CSW are related to motivation (Ohtani, 2012), it is thought that people are motivated toward objects with high CSW. Thus, CSSW toward objects with high CSW may be higher. In this regard, Ito et al. (2013) found that the correlation coefficients of the sub-factors of CSW and CSSW ranged from .20 to .57, showing a weak to moderately significant correlation. In the present study, moderately significant correlations were found between CSW and CSSW for "enthusiastic activity" and "friendships" among adults with ASD, which is similar to the findings of previous research (Ito et al., 2013).

Conversely, the reason why almost no correlation was found for "athletic competence" and "appearance" in the sub-factors of CSW and CSSW among the adults with ASD may be due to the difficulty of increasing CSSW for "athletic competence" and "appearance." Even if some people with ASD have high "athletic competence" in CSW, and although they engage in physical activity, it may

not necessarily increase "athletic competence." In particular, adults with ASD have been noted to have physical clumsiness. For example, in their meta-analysis, Kimberly et al. (2010) noted that impaired coordinated movement is a characteristic of ASD. The difficulty of individuals with ASD in exercising may be one of the reasons for no correlation between the corresponding factor "athletic competence" of CSW and CSSW. Similarly, it may be that even if adults with ASD attempt to improve their appearance when CSW is high, it does not necessarily lead to an increase in their "appearance." This may be the reason why no correlation was found in "appearance" between the sub-factors of CSW and CSSW.

### 4.2 The relationship between CSW, CSSW, and subjective well-being: A comparison of high and low

#### 4.2.1 Athletic competence

The results of the correlation analysis showed that there is almost no relationship between "athletic competence" in CSW and subjective well-being among the adults with ASD. However, the higher the "athletic competence" in CSSW is, the higher subjective well-being is. In the control group, there was almost no relationship between CSW and CSSW in "athletic competence" and subjective well-being. In terms of "athletic competence" in the CSSW Scale, the better the adults with ASD were at sports/athletics, the higher their subjective well-being.

Benson et al. (2019) compared the time spent on physical activities among 15 adults with ASD, whose mean age was 22.8 years. Based on their findings, the adults with ASD spent less time on medium- and high-intensity physical activities. These results suggest that adults with ASD tend to spend less than half as much time on medium- and high-intensity physical activities, compared to typically developing adults, and that such exercise may enhance their subjective well-being. Hamm and Yun (2018) also investigated the relationship between physical activities and self-determination theory among 143 adults with ASD, whose mean age was 25 years. As for self-determination theory, humans have three basic psychological needs: 1) the need for competence; 2) the need for autonomy; and 3) the need for relatedness (Ito, 2021). The results revealed that the higher the satisfaction of three basic psychological needs in humans, the higher motivation for physical activity in adults with ASD was (Hamm and Yun, 2018). Hence, when considering support for adults with ASD, it is important to make decisions according to these three aspects.

Furthermore, as individuals with ASD have been reported to have difficulties with exercise (Watahiki et al, 2020), some may not necessarily be motivated to exercise. Therefore, while providing support to individuals with ASD in exercise, it may be necessary to consider their motivation for exercise and ensure that they are not compelled to exercise against their will.

#### 4.2.2 Enthusiastic activity

Based on the results of the Mann-Whitney U test, the adults with ASD had higher "enthusiastic activity" in terms of CSW and CSSW, compared to the control group. In terms of this sub-factor in the CSW Scale, adults with ASD stated that it was important for them to be enthusiastic about their interests and felt confident when they engaged in something they liked. Such beliefs were higher than those of the control group.

The results of the correlation analysis also showed that there was a minimal relationship between "enthusiastic activity" and subjective well-being in CSW among the adults with ASD. On the other hand, in the control group, the higher "enthusiastic activity" of CSW was, the higher subjective well-being was. Moreover, the higher "enthusiastic activity" of CSSW was, the higher subjective well-being was.

Kojima (2020) interviewed a sample of individuals with ASD, whose mean age was 19.8 years, and asked about the source of their subjective well-being. According to the findings, hobbies were the source. In a related study, Grove et al. (2018) also investigated the actual situation of special interests, and the relationship between special interests and a range of quality of life measures among 687 adults with ASD, whose mean age was 42.4 years. Note that Grove et al. (2018) define special interests in the following way: "people on the autism spectrum often have extraordinary intense or specific interests, this is what we refer to as a special interest in a topic." Their results showed that computers and music were relatively common interests for adults with ASD. Furthermore, adults with ASD with specific interests had higher life satisfaction of leisure activities than those without such interests. However, although the effect sizes were not large, it was found that the more time spent in specific interests, the lower subjective well-being.

Furthermore, Grove et al. (2018) investigated the relationship between special interest motivation and subjective well-being of individuals with ASD with an average age of 42.4 years. Results revealed that there was motivation for special interest that led to the subjective well-being of individuals with ASD as well as motivation for special interest that did not lead to the subjective well-being. The higher the two factors of "personal life values and goals" and "engagement and flow," the higher the subjective well-being of participants with ASD tended to be.

The "personal life values and goals" factor included statements such as "I chose this special interest because it allows me to reach my life goals" and "because it is a good way to learn lots of things that could be useful in other areas of my life" (Grove et al., 2016). The "engagement and flow" factor was "for the sense of sheer enjoyment I experience doing my special interest," "because I like the feeling of being totally immersed in my special interest," etc. (Grove et al., 2016).

In light of the above, one possible background factor for the lack of a significant relationship between subjective well-being and "enthusiastic activity" in CSSW for individuals with ASD may be the presence of motivation to engage in things that are interesting to them. It is possible that "personal life values and goals" and "engagement and flow" were not very high in motivating individuals with ASD, who are targeted in this study to engage in activities that they are interested in. When providing support for the "enthusiastic activity" in CSSW for individuals with ASD, it may be effective to provide support based on the motivations of the particular interests of individuals with ASD.

#### 4.2.3 Friendships

Based on the results of the Mann-Whitney U test, "friendships" were higher among the adults with ASD, compared to the control group. Based on "friendships" in the CSW Scale, the adults with ASD believed that having a trusted friend is important and that they felt more confident in themselves by having a friend they could talk to about anything, compared to the control group. In addition, adults with ASD felt that they had trusted friends, compared to the control group.

In related research, Baron-Cohen and Simon (2003) conducted a direct-response questionnaire survey of the friendships among 68 people with ASD (without intellectual disabilities) and typically developing people, with a mean age of 34.3 years. Their results showed that the friendships of adults with ASD were negative than those of typically developing people. The results showed that the friendships of people with ASD were significantly lower than the control group, which is at variance with the results of the present study. Although the present study did not identify a clear reason for this discrepancy, one possible reason is the individual differences in the friendships among the adults with ASD. Their study also indicated that the higher the autism spectrum index, the worse the friendships (Baron-Cohen and Simon, 2003), which is, again, possibly due to the individual differences

in such friendships.

The results of the correlation analysis indicated that there is a minimal relationship between "friendships" in CSW and subjective well-being among adults with ASD. However, the greater "friendships" in CSSW are, the higher subjective well-being is. Kojima (2020) interviewed a sample of people with ASD, whose mean age was 19.8 years, and asked about the source of their subjective well-being. Based on the findings, a number of adults with ASD indicated that the source of their subjective well-being was friends. Specifically, responses such as "I feel happy when I am talking to my friends" were found, supporting the results of this study.

Conversely, some adults with ASD reported a minimal relationship between friends and subjective well-being. In this regard, Mazurek (2014) investigated the relationship between the number and quality of friends and subjective well-being among adults with ASD aged 18 to 62 years (mean age: 32.4 years), and found that there was a minimal relationship between the number and quality of friends and subjective well-being.

Possible reasons for this contradictory result can be discussed in terms of the age in life and the influence of the scale. First, regarding the age in life, the ages of the 19 adults with ASD in this study ranged from 20 to 57 years, with a mean age of 27.2 years ($SD$ = 8.2). In Mazurek's (2014) study, the adults with ASD ranged in age from 18 to 62 years, with a mean age of 32.4 years ($SD$ = 12.5). Since this was not significantly different from our study's sample, age was not a factor.

As for the influence of the scale used in Mazurek's (2014) study, i.e., the Unidimensional Relationship Closeness Scale (Dibble et al., 2011), it measures the degree of intimacy between the self and a specific attribute such as "friends" or "families." In this regard, Mazurek (2014) placed "friends" for the question item in the scale (Dibble et al., 2011) to measure the quality of friends and the degree of intimacy between friends and the self. There are several questions about how they perceive friends in various situations in the Unidimensional Relationship Closeness Scale. Conversely, the "friendships" questions in this study were relatively simple and did not specifically ask how one perceives friends in various situations/settings. Thus, it is possible that the difference in the content of the question items regarding friends was one of the reasons for the inconsistent result.

The PEERS® (Program for Education and Enrichment of Relational Skills) is a program that can be used as a reference for individuals with ASD in enhancing "friendships" in CSSW. PEERS®, developed at the University of California in Los Angeles, is a program for making friends tailored to the characteristics of ASD (Tanaka & Yamada, 2020). The PEERS® has already been implemented in more than 125 countries (Itani et al., 2022), and there have been significant improvements in communication (Yamada et al., 2020) and increased self-esteem (Schiltz et al., 2018). In other words, PEERS® may be effective in increasing self-esteem by enhancing the "friendships" of individuals with ASD in CSSW, and consequently, in increasing their subjective well-being.

#### 4.2.4 Prosocial behavior

According to the results of the correlation analysis, there was no significant difference between "prosocial behavior" and subjective well-being in CSW among the adults with ASD, nor was there a significant difference between "prosocial behavior" and subjective well-being in CSSW. Feng and Zhang (2021) examined 1,106 adults aged 30 to 60 years, with a mean age of 37.06 years. They found that "prosocial behavior" had a positive effect on subjective well-being, supporting the results of the control group in the present study. Hence, it can be concluded that the higher "prosocial behavior," the higher subjective well-being of the control group.

Regarding the correlation coefficient between "prosocial behavior" and subjective well-being in terms of effect size, the coefficient of CSSW was .40 for the control group, while the coefficient was

.34 for the adults with ASD. Therefore, there was no major difference in effect size, and that the relationship between "prosocial behavior" in CSSW and subjective well-being of both the adults with ASD and the control group were generally comparable.

#### 4.2.5 Appearance

The results of the correlational analysis showed that there was a minimal relationship between "appearance" in CSW and CSSW and subjective well-being, for adults with ASD. These aspects were similar to those of the control group. Diener et al. (1995) examined the relationship between subjective physical attractiveness and subjective well-being among 221 college students and found a significant weak correlation of .29. In the present study, the correlation coefficient between "appearance" and subjective well-being in CSSW for the adults with ASD was not significant, but remained weak at .36. This suggests that this relationship was generally comparable to that of the control group.

## 5. Limitation and future research recommendations

One limitation of this study is that the adults with ASD were those whose parents/guardians belonged to parent associations for children and youth with developmental disabilities. It is assumed that such parents are more motivated to obtain information on childrearing. Therefore, it is possible that many of the adults with ASD were more likely to receive the necessary social support, thus having fewer challenges in everyday life.

### Note

[*1] Although Ito et al. (2011). used the term "contentment of sources of self-esteem," we used the term "contentment of sources of self-worth" to correspond with the term "contingencies of self-worth," which is commonly used as an academic term in Japan and abroad. Additionally, the term "self-worth" is used synonymously with the definition of "self-esteem" (Endo, 2013).

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