The Impact of Sports and Physical Activities on Assertiveness in University Students

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Objective: Enhancing communication skills is important for university students in Japan. However, a practical evidence-based approach cannot be employed for analyzing assertiveness among university students due to lack of evidence. This study examines the relationship between the experience of sports and physical activity (PA) at different developmental stages and the level of assertiveness among university students.

Methods: 756 university students (235 males and 521 females) in Japan participated in this study. Experience of sports and PA levels were evaluated based on the items of sports carrier profile and the International Physical Activity Questionnaire short form. Assertiveness was assessed using the Rathus Assertiveness Schedule.

Results: In the logistic regression, participation in sports at middle or high competitive levels in the elementary school stage was associated with assertiveness in university students (inexperience versus middle competitive levels: adjusted odds ratio 1.70, 95% confidence interval 1.02-2.81, inexperience versus high competitive levels: AOR 2.29, 95% confidence interval 1.11-4.71). Moderate or vigorous PA was associated with assertiveness in university students (inactive versus moderate PA with over 720 min/wk: AOR 1.97, 95% confidence interval 1.05-3.72, inactive versus vigorous PA within 360.0-739.9 min/wk: AOR 2.19, 95% confidence interval 1.31-3.68).

Conclusions: Promotion of participation in youth sports and ensuring sufficient PA levels in campus life can enhance assertiveness in university students.

Key words: assertiveness, physical activity, communication skills, university students.

Introduction

Enhancement of communication skills is important for university students in Japan. This is because communication skills are required for building healthy interpersonal relationships during campus life, participating in teamwork during social and extra-curricular activities, and to be better evaluated by companies at the time of recruitment. According to the Japan Business Federation, many Japanese companies expected university students to enhance their communication skills before entering the company1). Furthermore, the Ministry of Education, Culture, Sports, Science and Technology has prioritized training for enhancing communication skills in university education in Japan2).

Although communication skills include various factors, “assertiveness” is academically considered as a core and ideal skill. Assertiveness implies having the ability to appropriately express ideas, feelings, and boundaries, while respecting others’ rights, maintaining a positive impact on the receiver, and considering the potential consequences of the expression used3,4). To identify effective approaches to enhance assertiveness,
conventional studies have examined the factors and outcomes of the skill. Focusing on the individual aspect in adolescents, for instance, Sarkova et al. (2013) established the relationship between high self-esteem, which is a component of motivation, and high assertiveness. In the environmental aspect, Seyrdowleh et al. (2014) examined the association between parenting styles and assertiveness in children. Mohebi et al. (2012) stated that a positive impact of training students to be assertive is the reduction of academic anxiety.

Researchers have attempted to explain the construction of assertiveness based on the experience of sports and physical education. Sucań et al. (2016) confirmed that the learning styles associated with physical education are associated with assertiveness in school students. Yiğiter (2013) reported that an improvement in assertiveness was observed in nursing students who participated in recreational physical activities. Sari et al. (2014) also predicted the levels of assertiveness based on the perceived leadership behavior among individual sports athletes. Additionally, Nishida et al. (2016) emphasized that participating in physical education enhances the ability of university students to adjust to university life. Many universities in Japan have incorporated the elements of recreational sports and physical exercise in the first-year of education to enhance communication with new friends and career education by encouraging assertive communication.

According to these conventional studies, the experience of sports and physical education could be regarded as a remarkable factor that supports the development of assertiveness. However, we do not have enough evidence to conduct a practical evidence-based analysis of enhancing assertiveness in university students. To address the gap, this study examines the relationship between the experience of sports and physical activity (PA) at different developmental stages and the level of assertiveness observed in university students.

Methods

1) Participants

An online questionnaire based survey was conducted in August 2020. The participants were university students in Japan and a questionnaire URL or QR code was shared with the participants. A total of 756 (235 male and 521 female) valid responses were collected (recovery rate = 40.1%, response rate = 100%). The mean age of the participants was 19.8 years (SD = ±1.31). Based on the G*Power version 3.1.9.7 software, for calculating sample size, the appropriate sample size for this study was 785 ($\chi^2$ test, effect size =0.1, $a=0.05$, $1-\beta=0.80$, df=1).

2) Variables

(1) Exposures

This study takes into consideration the exposure to sports and physical activity (PA) at different developmental stages. To evaluate the experience of sports, the participants were asked if they were a part of a sports club community during elementary school, junior high school, high school, or university. The responses included the following: (1) No (reference) or (2) Yes. Furthermore, the participants were asked to specify the competitive level at each developmental stage based on the following categories: (1) inexperience (reference), (2) low-level with participation in city-wide competitions, (3) mid-level with participation in prefecture-wide competitions, and (4) high-level with participation in nationwide competitions.

To evaluate the experience of PA, this study measured the total metabolic equivalents (METs) using the Japanese version of the International Physical Activity Questionnaire (IPAQ) short version. This included the total days per week and total minutes per day for walking, moderate, and vigorous PA. Total METs were calculated using the following equation: Total METs = 3.3 × walking PA min/wk + 4.0 × moderate PA min/wk + 8.0 × vigorous PA, based on the guidelines. The categorical variable of the total METs (MET-min/wk) was defined by the quartile range: (1) < 1,030.5 min/wk (reference), (2) 1,030.51–2,826.0 min/wk, (3) 2,826.1–6,186.0 min/wk, and (4) ≥ 6,186.1 min/wk. The categorical variable of time spent on walking PA min/wk, moderate PA min/wk, and vigorous PA min/wk, was categorized in terms of time as following: (1) < 10 min/wk (reference), (2) 10.1–359.9 min/wk, (3) 360.0–719.9 min/wk, and (4) ≥ 720 min/wk. To measure total METs, while minimizing the effects of restrictions imposed on outings due to the declaration of a state of emergency four months before the study was conducted,
the participants were required to remember what their PA levels were four months before the same were evaluated.

(2) Outcomes
To measure the outcome or the level of assertiveness as a positive aspect of communication skills, this study used the Japanese version of the Rathus Assertiveness Schedule (RAS)\(^\text{15, 16}\). The RAS has been widely used internationally\(^\text{17-19}\). This scale has a total of 30 items rated on a 6-point Likert scale. The response categories are (1) very characteristic of me, (2) rather characteristic of me, (3) somewhat characteristic of me, (4) somewhat uncharacteristic of me, (5) rather uncharacteristic of me, and (6) very uncharacteristic of me. Scores for these categories ranged from +3 to −3 points.

Accordingly, the score range of total items ranged from −90 to +90 points\(^\text{20, 21}\). The categorical variable of assertiveness was defined by the 75 percentile: (1) control group (−90–60) and (2) assertive group (60–90).

(3) Socio-demographics
This study considered age, gender, and affiliated university, as potential confounding factors. These socio-demographic variables were considered during the statistical analysis.

3) Statistical analysis
A binomial logistic regression analysis was conducted to examine the strength of relationship between exposure and outcome variables using the IBM SPSS statistics version 26.0. The strength of relationships was evaluated by crude odds ratio (OR) and adjusted odds ratio (AOR) with 95% confidence interval (CI). The independent variables were the experience of sports and PA at different developmental stages. The dependent variable was assertiveness. The effects of affiliated university, gender, and age, were considered during the analysis. Furthermore, in the examination of the association between time spent on PA and assertiveness, walking, moderate, and vigorous PA were considered.

4) Ethical considerations
This study was approved by the Ethics Committee of Juntendo University Graduate School of Health and Sport Science (Application Number: 2020–48) and Kanda University of International Studies (Application Number: 2020–4).

Results
The results of the logistic regression analysis are shown in Table 1 and 2. According to the value of AOR and 95% CI, a dose–response relationship was confirmed between the competitive levels in the elementary school stage and assertiveness. Compared to the inexperienced group, those who were categorized as mid–level (AOR 1.70, 95% CI 1.02–2.81) and high–level (AOR 2.29, 95% CI 1.11–4.71), in the primary school stage, indicated higher assertiveness scores. Experience of PA was also related to assertiveness. Although the 95% CI crossed 1.0, the dose–response relationship between total METs and assertiveness was almost the same at significant levels. Furthermore, compared with the inactive category, time spent on moderate PA with over 720 min/wk (AOR 1.97, 95% CI 1.05–3.72), and vigorous PA within 360–719.0 min/wk (AOR 2.19, 95% CI 1.31–3.68), were associated with higher assertiveness scores.

Discussion

1) Association between experience of sports activity and assertiveness among university students
This study establishes that middle or higher competitive levels of sports activity in school–aged children are associated with higher assertiveness at the university stage. As the experience of sports in junior high school and high school stage is not associated with assertiveness, this study specifically emphasizes on the importance of sports experiences at the elementary school stage.

According to conventional studies, participation in youth sports has the potential to increase assertiveness. For instance, Blaser et al. (2019) described that interactive team sports like football, require youth athletes to share their thoughts, ideas, and develop a common understanding concerning potential future actions, and this gives them the opportunity to learn to coordinate with others. This may be an advantage as it encourages the use of direct communication\(^\text{22}\). They also reported that these communication skills are enhanced due to
The relationship with youth sports coaches can also be regarded as a potential factor that can enhance assertiveness. Lisinskiene (2018) confirmed that educational programs for coaches improve communication and strengthen the interpersonal relationship between athletes and coaches in individual youth sports. Additionally, the relationship with parents can be another factor that increases assertiveness in children. As Dorsch et al. (2015) reported, participation in youth sports gave parents an opportunity to teach their children life lessons. The parents assimilated what was expected of them in the organized youth sports setting. Furthermore, Mossman and Cronin (2019) indicated that parental behaviors such as praise and understanding, directive behavior, and pressure, affect the development of children’s life skills, including interpersonal communication. Moreover, in the field of educational science, it is well known that parenting styles such as permissive, authoritative, and authoritarian, have a strong influence on the level of assertiveness in children. As these conventional studies indicate, participation in youth sports at the school age involves many aspects that enhance assertiveness. In addition to these findings, this study provides evidence that participating in youth sports activities has an impact on the level of assertiveness in young adults.

Table 1  Categorical variables used for logistic regression

| Attribution                          | Categories | n | %   | Attribution          | Categories | n | %   |
|--------------------------------------|------------|---|-----|----------------------|------------|---|-----|
| Age                                  | 18         | 130 | 17.2| High school          | Inexperience | 237 | 31.3 |
|                                      | 19         | 214 | 28.3| Low level (not levels) | 94 | 12.4 |
|                                      | 20         | 183 | 24.2| Middle level (not levels) | 280 | 37.0 |
|                                      | ≥21        | 229 | 30.3| High level (not levels) | 145 | 19.2 |
| Sex                                  | Female     | 521 | 68.9| University           | Inexperience | 550 | 72.8 |
|                                      | Male       | 235 | 31.1| Low level (not levels) | 26 | 3.4 |
|                                      |            |     |     | Middle level (not levels) | 86 | 11.4 |
|                                      |            |     |     | High level (not levels) | 94 | 12.4 |
| Affiliated university                | University A | 251 | 33.2| Physical activity level (not levels) | 1030.51–2826.0 | 123 | 16.3 |
|                                      | University B | 117 | 15.5| 2826.01–6186.0 | 201 | 26.6 |
|                                      | University C | 176 | 23.3| ≥6186.0       | 201 | 26.6 |
|                                      | University D | 129 | 17.1| Time spent on physical activity (m/wk) | <10 | 85 | 11.2 |
|                                      | University E | 83  | 11.0| Walking PA | 10.1–359.9 | 307 | 42.0 |
|                                      | Junior high school | Yes | 643 | 85.1 | 360.0–719.9 | 181 | 23.9 |
|                                      |            | Yes | 554 | 73.3 | ≥720       | 123 | 16.3 |
|                                      |            | Yes | 379 | 50.1 | Moderate PA | <10 | 419 | 55.4 |
|                                      |            | Yes | 377 | 49.9 | 10.1–359.9 | 212 | 28.0 |
| Developmental stage and competitive level (not levels) | Elementary school | Inexperience | 308 | 40.7 | 360.0–719.9 | 72 | 9.5 |
|                                      | Low level (not levels) | 188 | 24.9 | ≥720       | 53 | 7.0 |
|                                      | Middle level (not levels) | 194 | 25.7 | <10        | 313 | 41.4 |
|                                      | High level (not levels) | 66  | 8.7 | 10.1–359.9 | 192 | 25.4 |
|                                      | Junior high school | Inexperience | 151 | 20.0 | 360.0–719.9 | 117 | 15.5 |
|                                      | Low level (not levels) | 203 | 26.9 | ≥720       | 134 | 17.7 |
|                                      | Middle level (not levels) | 309 | 40.9 | 1: Low | ≤9 | 604 | 79.9 |
|                                      | High level (not levels) | 93  | 12.3 | 2: High | ≥10 | 152 | 20.1 |

1) Affiliation of sports club in each stage, Yes or No with school sports club or private sports club at elementary school, junior high school, high school and university. Developmental stage and competitive levels, 2) Inexperience, 3) Low levels (regional and city games), 4) Moderate levels (prefectural and local games), 5) High levels (national and international games), 6) Using the IPAQ International Physical Activity Questionnaire, 7) MET-m/wk=MET-Minutes/Week, 8) Total METs (total amount of PA), 9) m/wk=Minutes/Week, 10) Walking PA (walking-intensity physical activity), 11) Moderate PA (moderate-intensity physical activity), 12) Vigorous PA (high-intensity physical activity)
Table 2  Relationship between sports and physical activities and assertiveness

| Attribution                                      | Categories          | Crude OR | 95% CI   | Adjusted OR | 95% CI   |
|--------------------------------------------------|---------------------|----------|----------|-------------|----------|
|                                                   | OR(1)               | AOR(3)   |          |             |          |
| Developmental stage and competitive sports participation |                     |          |          |             |          |
| Elementary school                                | No                  | 1.00     | 1.00     |             |          |
|                                                   | Yes                 | 0.89     | 0.54     | 1.47        | 0.83     | 0.49     | 1.39     |
| Junior high school                               | No                  | 1.00     | 1.00     |             |          |
|                                                   | Yes                 | 1.09     | 0.62     | 1.94        | 1.09     | 0.60     | 1.97     |
| High school                                      | No                  | 1.00     | 1.00     |             |          |
|                                                   | Yes                 | 1.37     | 0.86     | 2.19        | 1.16     | 0.69     | 1.94     |
| University                                       | No                  | 1.00     | 1.00     |             |          |
|                                                   | Yes                 | 1.06     | 0.74     | 1.52        | 1.08     | 0.72     | 1.62     |
| Developmental stage and competitive level (not levels) |                     |          |          |             |          |
| Elementary school                                | Inexperience        | 1.00     | 1.00     |             |          |
|                                                   | Low level           | 0.92     | 0.56     | 1.50        | 0.90     | 0.54     | 1.48     |
|                                                   | Middle level        | 1.86     | 1.15     | 3.02        | 1.70     | 1.02     | 2.81     |
|                                                   | High level          | 2.66     | 1.33     | 5.31        | 2.29     | 1.11     | 4.71     |
| Junior high school                               | Inexperience        | 1.00     | 1.00     |             |          |
|                                                   | Low level           | 0.77     | 0.43     | 1.36        | 0.78     | 0.44     | 1.41     |
|                                                   | Middle level        | 0.95     | 0.54     | 1.69        | 0.97     | 0.54     | 1.75     |
|                                                   | High level          | 0.85     | 0.40     | 1.82        | 0.87     | 0.40     | 1.88     |
| High school                                      | Inexperience        | 1.00     | 1.00     |             |          |
|                                                   | Low level           | 0.81     | 0.42     | 1.57        | 0.79     | 0.40     | 1.55     |
|                                                   | Middle level        | 1.13     | 0.69     | 1.85        | 1.03     | 0.60     | 1.76     |
|                                                   | High level          | 0.82     | 0.44     | 1.53        | 0.92     | 0.47     | 1.80     |
| University                                       | Inexperience        | 1.00     | 1.00     |             |          |
|                                                   | Low level           | 1.37     | 0.54     | 3.46        | 1.21     | 0.47     | 3.11     |
|                                                   | Middle level        | 1.10     | 0.65     | 1.88        | 1.03     | 0.58     | 1.82     |
|                                                   | High level          | 0.95     | 0.53     | 1.70        | 0.93     | 0.49     | 1.80     |
| Physical activity level (not levels) (MET-m/wk)(8) |                     |          |          |             |          |
| Total METs(9)                                     | <1030.5             | 1.00     | 1.00     |             |          |
|                                                   | 1030.51–2826.0      | 1.37     | 0.84     | 2.22        | 1.55     | 0.94     | 2.55     |
|                                                   | 2826.01–6186.0      | 1.72     | 1.07     | 2.76        | 1.64     | 0.99     | 2.70     |
|                                                   | ≧6186.01            | 1.79     | 1.10     | 2.92        | 1.74     | 0.98     | 2.07     |
| Time spent on physical activity (m/wk)(10)       |                      |          |          |             |          |
| Walking PA(17)                                    | <10                 | 1.00     | 1.00     |             |          |
|                                                   | 10.1–359.9          | 0.69     | 0.41     | 1.17        | 0.77     | 0.45     | 1.32     |
|                                                   | 360.0–719.9         | 0.89     | 0.51     | 1.56        | 0.95     | 0.64     | 2.07     |
|                                                   | ≧720                | 0.83     | 0.45     | 1.53        | 0.95     | 0.51     | 1.78     |
| Moderate PA(12)                                   | <10                 | 1.00     | 1.00     |             |          |
|                                                   | 10.1–359.9          | 1.29     | 0.89     | 1.88        | 1.35     | 0.92     | 1.99     |
|                                                   | 360.0–719.9         | 1.09     | 0.61     | 1.95        | 1.02     | 0.56     | 1.87     |
|                                                   | ≧720                | 1.99     | 1.09     | 3.62        | 1.97     | 1.05     | 3.72     |
| Vigorous PA(13)                                   | <10                 | 1.00     | 1.00     |             |          |
|                                                   | 10.1–359.9          | 1.40     | 0.91     | 2.14        | 1.42     | 0.92     | 2.20     |
|                                                   | 360.0–719.9         | 2.39     | 1.50     | 3.81        | 2.19     | 1.31     | 3.68     |
|                                                   | ≧720                | 1.63     | 1.02     | 2.59        | 1.53     | 0.88     | 2.67     |

Notes: Age, sex and affiliated university were adjusted in the logistic regression analysis. Additionally, in the analysis of time spent on physical activity, walking PA, moderate PA and vigorous PA were adjusted with each other.

Bold:Parameter estimate shown in bold have 95% confidence intervals that do not include 1.

1) OR: Crude odds ratio. 2) 95% CI: Confidence interval. 3) AOR: Adjusted odds ratio. 4) Inexperience. 5) Low levels (regional and city games). 6) Middle levels (prefectural and local games). 7) High levels (national and international games). 8) MET-m/wk=MET-Minutes/Week. 9) Total METs (total amount of PA). 10) m/wk=Minutes/Week. 11) Walking PA (walking-intensity physical activity). 12) Moderate PA (moderate-intensity physical activity). 13) Vigorous PA (high-intensity physical activity)
2) Association between experience of physical activity and assertiveness among university students

This study contributed to the evidence that the experience of PA with moderate and/or vigorous intensity exercise in daily life is related to higher assertiveness among university students. On the basis of the data collated, this study established that university students indulging in moderate PA with over 720 min/wk (AOR 1.97, 95% CI 1.05–3.72) and/or vigorous PA within 360–719.0 min/wk (AOR 2.19, 95% CI 1.31–3.68) display higher levels of assertiveness. In terms of health benefits, the World Health Organization (WHO) has recommended moderate PA within 150–300 min/wk, vigorous PA within 75–150 min/wk, or combined moderate PA and vigorous PA for all adults. This study indicates that slightly higher levels of PA, as compared to the levels recommended by WHO, can enhance assertiveness in university students.

This study discusses the association between PA levels and assertiveness from two perspectives based on conventional studies. The first is that moderate and high PA levels increase the degree of assertiveness among university students. According to Guddal et al. (2019), physically active adolescents in team sports have higher self-esteem. Sarkova et al. (2013) confirmed that higher self-esteem is associated with higher assertiveness in adolescents. It can be assumed that a high level of PA, including sports, increases assertiveness by enhancing self-esteem. Additionally, studies regarding the effectiveness of structured PA programs to improve communication skills for adolescents with autism spectrum disorder (ASD) support the findings of this study (Huang et al., 2020, Zhao & Chen, 2018). Huang et al.’s (2020) meta-analysis concluded that PA has a significant positive impact on communication skills of adolescents with ASD. These conventional studies and the evidence from this study indicate that an increase in PA levels improves assertiveness among university students.

The second is that higher assertiveness increased the levels of PA among university students. To participate in new communities and activities during campus life, university students have to be assertive to some extent. Consequently, there is a possibility that those who have higher assertiveness also have higher PA levels. Conventional studies also imply that assertive people tend to have an active daily life. For instance, Small et al. (2013) reported that college-aged children who communicate well with parents tend to have a higher level of PA. Furthermore, low assertiveness and communication skills can be regarded as factors of physical inactivity (Lisinskiene and Jukskiene, 2019). These findings and the evidence from this study emphasize that intervention to increase PA levels is important for university students with low assertiveness.

Conclusion

Experience of middle and/or higher competitive levels sports activity in elementary school is associated with assertiveness in university students. Moderate PA with over 720 min/wk and vigorous PA within 360–719.0 min/wk is related to assertiveness among university students. This implies that promotion of participation in youth sports and ensuring enough PA in campus life can enhance assertiveness in university students.

Limitations and future research

Although this study confirmed the existence of a significant association between experience of sports and PA and assertiveness, the evidence and suggestions of this study are based on a cross-sectional study design. Future studies should utilize a longitudinal study design including a prospective cohort study and a before–after study to clarify the mechanism and causation of the effects of experience of sports and PA on assertiveness. Furthermore, as this study measured the PA levels prior to the restrictions imposed because of COVID-19, recall bias should be controlled in future research.

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Disclosure statement

The authors declare that there is no conflict of interest.

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