

Effect of oral communication through physical activity on a non-native
language proficiency

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Abstract

Effect of oral communication through physical activity on a non-native language proficiency

The purpose of the present study is to investigate the effect of oral communication through physical activity on non-native language proficiency and its difference depending on the type of activity. The results as shown below were observed by a questionnaire survey on non-native language proficiency and/or oral communication in the present study. In the non-native English speakers, student-athletes improved their English proficiency during their engagement in physical activity at the American university, while student non-athletes did not ($p < 0.05$) (Experiment 1). 86% of the international students who took a sport class answered that a sport class is effective for their proficiency in Japanese (Experiment 2). Japanese students who took a sport class were communicating more in a sport class than a conventional class ($p < 0.05$), especially in a team sport class and an individual sport class (Experiment 3). The present study suggested that communication through physical activity such as club activity and sport class can be an effective measure to learn a non-native language.

身体活動を通じた口頭でのコミュニケーションが非母国語習熟度に及ぼす影響

本研究の目的は身体活動を通じた口頭でのコミュニケーションが非母国語習熟度に及ぼす影響と、身体活動の種類によるその違いを明らかにすることである。非母国語習熟度・口頭コミュニケーションに関するアンケート調査から、以下のような結果が得られた。英語を母国語としないアメリカの大学に在籍する部活生は英語能力を向上させたが、非部活生には向上が見られなかった ($p < 0.05$) (実験 1)。体育の講義を履修した留学生の 86% が「体育の講義は日本語の習熟に有効である」と考えていることが分かった(実験 2)。体育の講義を履修した日本人学生が、座学の講義に比べ体育の講義、特にチームスポーツおよび個人スポーツで多くコミュニケーションをとっていることが分かった ($p < 0.05$) (実験 3)。結果から、本研究は部活動や体育の授業等の身体活動を通じたコミュニケーションは非母国語の学習において有効な手段になりえることを示唆した。

Efecto de la comunicación oral en el dominio de un idioma no nativo a través de la actividad física

El propósito del presente estudio es investigar el efecto de la comunicación oral en el dominio de un idioma no nativo a través de la actividad física y su diferencia dependiendo del tipo de la actividad. Los resultados que se muestran a continuación fueron obtenidos mediante una encuesta tipo cuestionario sobre el dominio del idioma no nativo y/o la comunicación oral. En los hablantes no nativos de inglés, los estudiantes atletas mejoraron su dominio del inglés durante su participación en actividades físicas en la universidad estadounidense, mientras que los estudiantes no atletas no lo hicieron ($p < 0.05$) (Experimento 1). El 86% de los estudiantes internacionales que tomaron una clase de deportes respondieron que la misma fue efectiva para su dominio del idioma japonés (Experimento 2). Los estudiantes japoneses que tomaron una clase de deportes se comunicaban más en una clase deportiva que en una clase convencional ($p < 0.05$), especialmente en las clases deportivas de equipo y en las individuales. (Experimento 3). Los resultados del presente estudio sugieren que la comunicación oral a través de la actividad física, como las actividades de los clubes y las clases deportivas, pueden ser una medida efectiva para aprender un idioma no nativo.

This graduation thesis includes the conference abstract as shown below:

MIYAMOTO, H., WATANABE, K. (2019). Effect of Participation in Sports Team During Overseas Study Program on Non-native Language Proficiency. “24th Annual Congress of the European College of Sport Science”, Prague, Czech Republic, July 3-6, 2019.

Introduction

The number of people from overseas in Japan has been increasing in recent years (Ministry of Justice, 2018). Amendment of Immigration Control and Refugee Recognition Act in 1990 is considered to be one reason for that (Ministry of Education, Culture, Sports, Science and Technology-Japan, 2010), and in June 2018, their number has increased to the largest one: 2,637,251 (Ministry of Justice, 2018) (Fig. 1). The increase in their number has made Japanese government work on language training for those who do not speak Japanese, and the number of children/students who need any language training has been increasing; according to Ministry of Education, Culture, Sports, Science and Technology-Japan (2018), 34,335 children/students from overseas needs any language training (Ministry of Education, Culture, Sports, Science and Technology-Japan, 2018) (Fig. 2). However, many children and students who need the language training have not been able to take any training class; while the number of those who need any language training is 43,947, those who actually take it among them is only about 75% (Ministry of Education, Culture, Sports, Science and Technology-Japan, 2017). The lack of teachers who can teach Japanese and/or teaching materials contributes to the number of those who can actually take any language training. For example, 1,434 schools in Japan cannot teach Japanese to children from overseas because they do not know the method of teaching Japanese and/or they do not have any teaching materials for them (Ministry of Education, Culture, Sports, Science and Technology-Japan, 2018). In addition to that, Ministry of Education, Culture, Sports, Science and Technology-Japan (2006) reports that certain number of children from overseas do not attend school because they cannot understand Japanese, they cannot get used to Japanese culture, they cannot make any friends there, or they can be bullied at school (Ministry of Education, Culture, Sports,

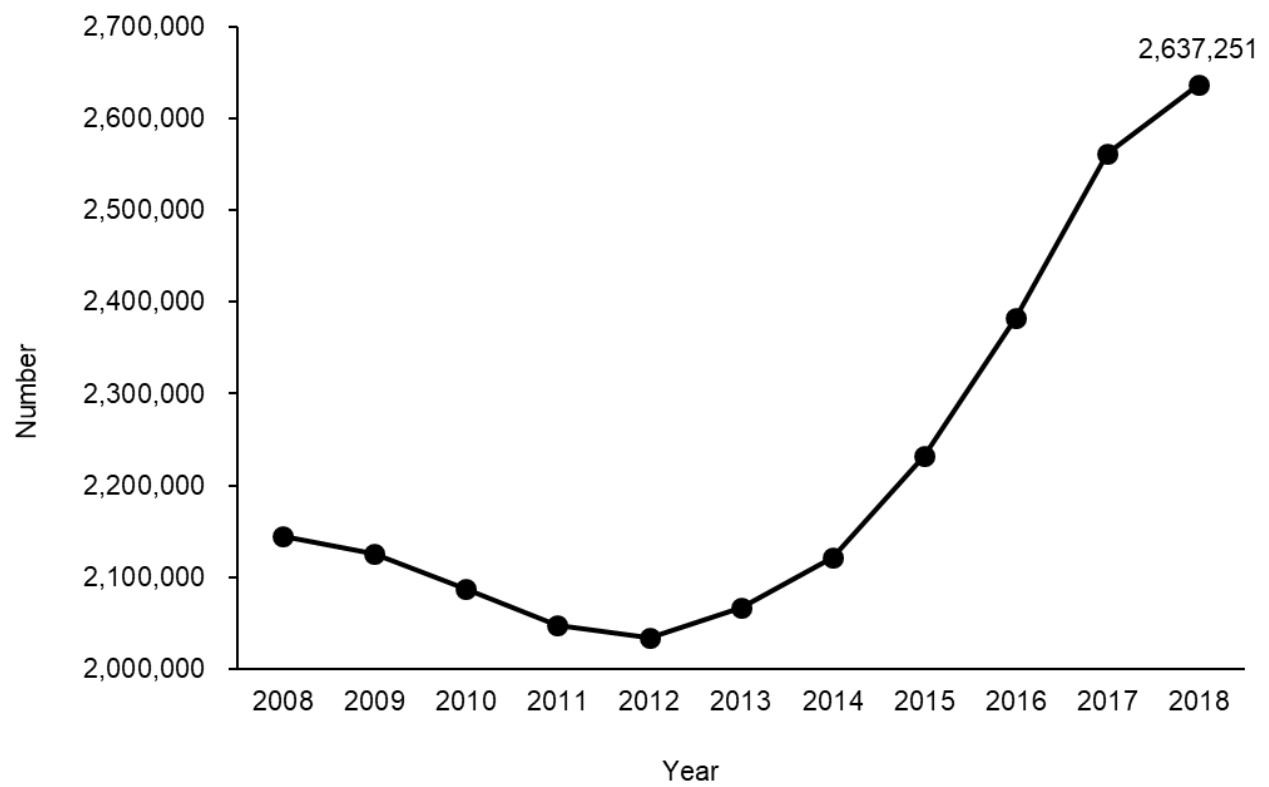


Fig. 1 The number of people from overseas in Japan

This was drawn by author based on a report from Ministry of Justice (2018).

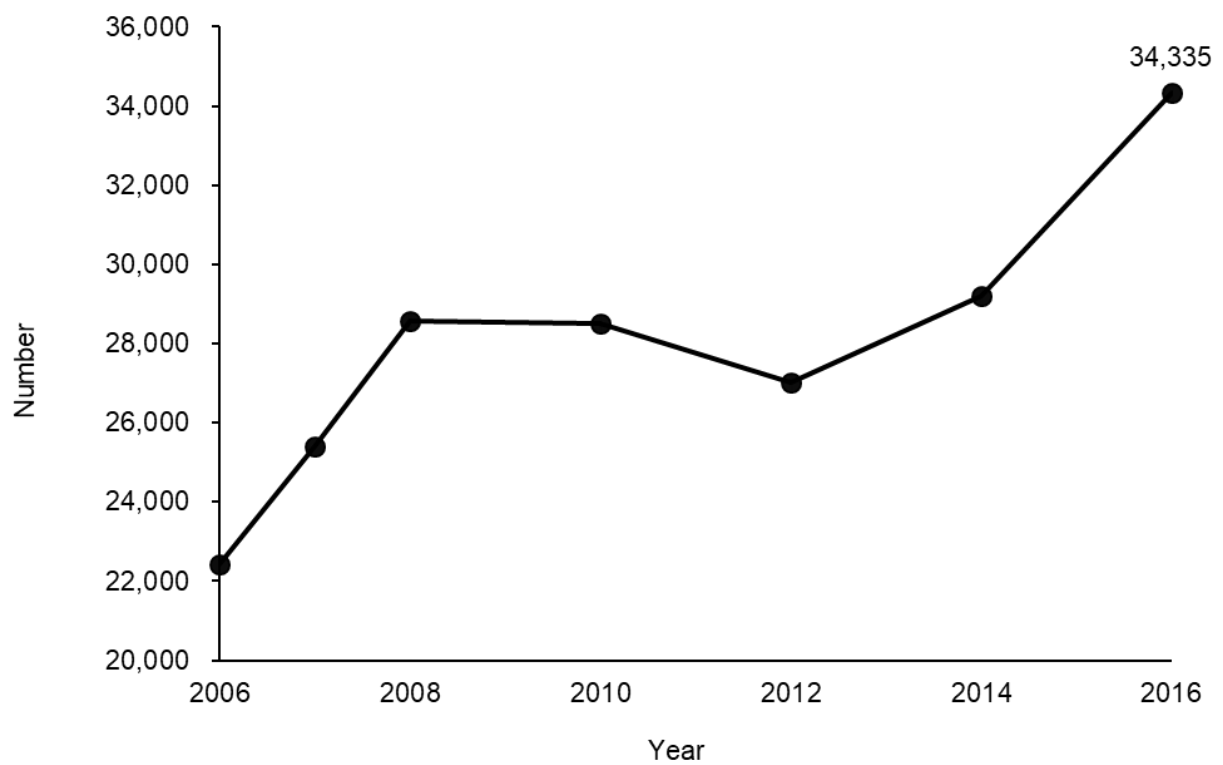


Fig. 2 The number of children/students from overseas who need to learn Japanese

This was drawn by author based on a report from Ministry of Education, Culture, Sports, Science and Technology-Japan (2018).

Science and Technology-Japan, 2006). As mentioned, sociocultural factors such as language, culture, and habit can be the obstacles for those children and students to attend school in Japan.

As previously mentioned, language is one of the crucial factors to attend school in Japan because all the class at school in Japan is offered in Japanese. To attend school and get used to it, acquiring Japanese is necessary for them; everyone includes those who have come from overseas is required to communicate in Japanese. Referring to the method of learning a non-native language, Hernández (2010) argues the importance of oral communication for the proficiency in a non-native language as follows.

It is often assumed that study abroad is superior to instruction at home because the study-abroad experience offers students greater access to NSs (native speakers) and more varied opportunities to use the target language as a tool for exchanging information and participating in social and interpersonal functions (Hernández, 2010).

Indeed, his study to investigate how English speakers' proficiency in Spanish was affected by their motivation and interaction in Spanish has revealed that a student contact with the Spanish language has a significant effect on their speaking improvement (Hernández, 2010).

While many studies have been trying to find an effective way to learn a non-native language, some studies have revealed that physical activity can have a positive effect on learning. Recent animal studies showed that physical activity can have a positive impact on brain; according to Okamoto and co-workers (2012), mild exercise activates hippocampal neurons through the glutamatergic pathway, and also promotes adult hippocampal neurogenesis (Okamoto et al., 2012). Van der Borght and co-workers (2007) have revealed that 14 days of wheel

running promotes memory acquisition, memory retention, and reversal learning (Van der Borgh et al., 2007). In human studies, one study has showed the impact of physical activity on learning a non-native language; Liu and colleagues (2017) have revealed that learning a foreign vocabulary while performing a concurrent physical activity yields better performance than learning the same vocabulary while being in a static situation (Liu et al., 2017). Their study showed that the participants in the experimental group, who were pedaling while learning non-native language vocabularies, responded faster in the word-picture verification task and had higher accuracy in the sentence semantic judgement task than the control group (Liu et al., 2017). As these studies have revealed, physical activity and learning have a positive correlation that makes learning more effective.

Although the two positive correlations, which refer to the relationship between physical activity and language learning and one between language learning and oral communication, have revealed by studies as mentioned above, studies of the relationship between physical activity and oral communication are sparse; most studies that referred to physical activity and learning have concentrated only on memory such as memorizing vocabulary. In addition to that, those studies have used personal activity for their experiments, which participants did not have to communicate with other participants and/or testers while conducting an experiment. While the relationship between physical activity and oral communication has not revealed yet, physical activity should go hand in hand with communication; study by Ishak (2017) argues that not only does interpersonal communication promote team success, but sports also offer a setting to improve communication efficacy (Ishak, 2017). If personal physical activity can have any positive impact on learning a non-native language, does interpersonal physical activity have more positive impact on it as well?

The purpose of the present study is to investigate the effect of oral communication through physical activity on non-native language proficiency and its difference depending on the type of physical activity such as personal activity and interpersonal one. In the United States, many universities regard collegiate sport as a crucial factor to decide their quality; NCAA, National Collegiate Athletic Association, governs collegiate sport in the United States. Therefore, many students from overseas enroll in a university in the United States, seeking a better environment for training and competing. According to NCAA, there are over 20,000 international student-athletes enrolled and competing at NCAA schools (National Collegiate Athletic Association). They are required to use English, a non-native language for them, to take classes and to engage in sport activity there. In Japan, a sport class is a compulsory subject in some universities; according to Japanese Association of University Physical Education and Sports (2017), in 2016, 27.5 percent of universities registered to the association have set a sport class as a compulsory subject for all students enrolled (Japanese Association of University Physical Education and Sports, 2017). Every student includes international students are required to take a sport class and thus they have an opportunity to communicate through physical activity. In addition to that, international students, whose first language is not Japanese, have also an opportunity to communicate in Japanese through physical activity. Based on the facts as mentioned above, three research questions were set to achieve the purpose of the present study.

- i. Is there any difference between those who engage in sport activity and those who do not in their proficiency in a non-native language and in how they improve it?
- ii. How do international exchange students think about a sport class's effectiveness for their proficiency in a non-native language?

- iii. Is there any difference between a sport class and a conventional one in the amount of communication? Is there any difference in it depending on the type of sport class as well?

The hypotheses for each research questions were set as follows.

- i. Those who engage in sport activity significantly improve their proficiency in a non-native language in comparison with those who do not engage in sport activity.
- ii. International exchange students feel that a sport class is more effective for their proficiency in a non-native language than a conventional class is.
- iii. Students communicate more in a sport class than they do in a conventional one, and they communicate more in interpersonal sport class than in personal sport class.

To verify the three hypotheses mentioned above, three experiments were conducted in this study.

Materials and Methods

Experiment 1

Participants

Twenty-five undergraduate international students including thirteen non-athletes (NATH) and twelve athletes (ATH) who attend a university in the United States participated. The participants were given the written informed consent for the study after receiving a detailed explanation of the purposes, potential benefits, and risks associated with participation in the study.

Experimental design

The participants were given an online survey. They were asked questions to ascertain their basic information such as nationality and first language, and then they were asked their English proficiency, which was divided into four categories: Reading, Listening, Speaking, and Writing. The participants retraced their English proficiency of before enrolling in the American university and then answered their proficiency at the time they answered the survey, which was during enrolling. “During enrolling” is referred to “Now” in the survey. ATH group was also asked questions to make sure what kind of sport team they join in the university and how long they have been in the team. The questions that participants were asked are shown in Fig. 3 for NATH group and Fig. 4 for ATH group.

Statistics

A part of data is provided as mean and SD. Before the analysis, the normal distribution of the data was confirmed using Shapiro-Wilk test and the non-parametric analysis was used in Experiment 1 as a result. The understanding level of English for Reading, Speaking, Listening, and Writing were compared between before and during enrolling in the university in the United States by Wilcoxon test for NATH and ATH. The understanding level of English for Reading, Speaking, Listening, and Writing were compared between NATH and ATH by Man-Whitney test at before and during enrolling in the university in the United States. The level of statistical significance was set at $p < 0.05$. Statistical analyses were performed using SPSS software (version 21.0; SPSS, Tokyo, Japan).

Experiment 2

Participants

1. Are you a(n) undergraduate or graduare?

☐ Undergraduate☐ Graduate

2. How long have you been in university in the U.S.?

3. What is your nationality?

4. What is your first language?

5. What language do you use in university?

6. How long do you study IN ENGLISH in a day? (dropdown)

7. Understanding level of English IN CLASS (BEFORE enrolling into university in the U.S.)
(R=reading L=listening S=speaking W=writing)

	More than 80%	About 60%	About 40%	Less than 20%
R: I can understand...of the textbooks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
L: I can understand...of what people say	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
S: I can speak...of what I want to say	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
W: I can write...of what I want to express	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Understanding level of English IN CLASS (NOW)
(R=reading L=listening S=speaking W=writing)

	More than 80%	About 60%	About 40%	Less than 20%
R: I can understand...of the textbooks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
L: I can understand...of what people say	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
S: I can speak...of what I want to say	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
W: I can write...of what I want to express	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Fig. 3 Questionnaire survey used in Experiment 1 (for NATH)

1. Are you a(n) undergraduate or graduate?

☐ Undergraduate

☐ Graduate

2. How long have you been in university in the U.S.?

3. What is your nationality?

4. What is your first language?

5. What sports do you engage in university?

6. How long have you been joining the sports in university?

7. What language do you use in university?

8. How long do you study IN ENGLISH in a day?

9. Understanding level of English IN CLASS (BEFORE enrolling into university in the U.S.)

(R=reading L=listening S=speaking W=writing)

	More than 80%	About 60%	About 40%	Less than 20%
R: I can understand...of the textbooks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
L: I can understand...of what people say	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
S: I can speak...of what I want to say	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
W: I can write...of what I want to express	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Understanding level of English IN CLASS (NOW)

(R=reading L=listening S=speaking W=writing)

	More than 80%	About 60%	About 40%	Less than 20%
R: I can understand...of the textbooks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
L: I can understand...of what people say	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
S: I can speak...of what I want to say	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
W: I can write...of what I want to express	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Fig. 4 Questionnaire survey used in Experiment 1 (for ATH)

Seven international exchange students who engaged in the exchange program at Chukyo University and took any sport class there participated. The participants were given the written informed consent for the study after receiving a detailed explanation of the purposes, potential benefits, and risks associated with participation in the study.

Experimental design

The participants were given an online survey. They were asked questions to ascertain how much they communicated with people in Japanese in a sport class, a conventional one, and outside of the classes. They were also asked what kind of sport class they took (fitness, individual sport, and team sport), and whether they think a sport class and a conventional one was effective for their proficiency in Japanese or not. The questions that participants were asked are shown in Fig. 5.

Statistics

Statistical analyzes could not be performed because the number of the data collected was for seven participants and all the questions were closed-ended questions. Therefore, percentages of answers were used to quantify the results of Experiment 2.

Experiment 3

Participants

Eighty-eight Japanese students who took sport class (two-basketball classes, five-badminton classes, three-fitness classes, one-aerobics class, and one training class) at Chukyo University during fall semester 2019 participated. The participants were given the written informed consent for the study after receiving a detailed

★ Sport Class ★	★ Conventional Class ★
<p>Have you ever taken/do you take any sport class at Chukyo? (If yes, please go on to the next questions.)</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Do you talk with people IN JAPANESE in conventional classes, in general?</p> <p><input type="radio"/> Rarely</p> <p><input type="radio"/> Sometimes</p> <p><input type="radio"/> Often</p>
<p>What kind of sport class have you ever taken/do you take at Chukyo? (It has to be based on the name of the class)</p> <p><input type="radio"/> Individual sport</p> <p><input type="radio"/> Team sport</p> <p><input type="radio"/> Fitness</p>	<p>Do you talk with classmates OUTSIDE OF THE CONVENTIONAL CLASSES IN JAPANESE, in general?</p> <p><input type="radio"/> Rarely</p> <p><input type="radio"/> Sometimes</p> <p><input type="radio"/> Often</p>
<p>Did/do you talk with people IN JAPANESE in the sport class?</p> <p><input type="radio"/> Rarely</p> <p><input type="radio"/> Sometimes</p> <p><input type="radio"/> Often</p>	<p>Do you text with them IN JAPANESE?</p> <p><input type="radio"/> Rarely</p> <p><input type="radio"/> Sometimes</p> <p><input type="radio"/> Often</p>
<p>Did/do you talk with classmates OUTSIDE OF THE SPORT CLASS IN JAPANESE?</p> <p><input type="radio"/> Rarely</p> <p><input type="radio"/> Sometimes</p> <p><input type="radio"/> Often</p>	<p>Do you think a conventional class is effective for your proficiency in Japanese?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>Did/do you text with them IN JAPANESE?</p> <p><input type="radio"/> Rarely</p> <p><input type="radio"/> Sometimes</p> <p><input type="radio"/> Often</p>	
<p>Do you think a sport class is effective for your proficiency in Japanese?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>	

Fig. 5 Questionnaire survey used in Experiment 2

explanation of the purposes, potential benefits, and risks associated with participation in the study.

Experimental design

Experiment 3 was conducted to ascertain the tendency that has been shown in experiment 2. The participants were given either a printed survey or an online one at the last class of fall semester 2019. The participants were asked the questions to ascertain how much they communicated with people in a sport class, a conventional one, and the outside of the classes. They were also asked what kind of sport class they took (fitness, individual sport, and team sport). The questions that participants were asked are shown in Fig. 6 and 7.

Statistics

A part of data is provided as mean and SD. Before the analysis, the normal distribution of the data was confirmed using Shapiro-Wilk test and the non-parametric analysis was used in Experiment 3 as a result. The amount of communication in a sport class was compared among fitness class (FT), individual sport class (IS), team sport class (TS) by Kruskal-Wallis test. The amount of communication was also compared between each groups and conventional class, and between the averaged values of three types of sport classes and that of conventional class by Wilcoxon test. The level of statistical significance was set at $p < 0.05$. Statistical analyses were performed using SPSS software (version 25.0; SPSS, Tokyo, Japan).

Results

Experiment 1

Before the analysis, three of all participants were excluded because their first language was English or

★体育の授業について★

現在履修している体育の授業は次のうちどれに該当しますか。（授業名に基づいて回答して下さい）*

☐ 個人スポーツ
☐ チームスポーツ
☐ フィットネス

1回の授業内で人との会話は平均して何分程度ありましたか。（最大90分とします）回答例：30*

回答を入力

体育の授業内でできた友人と授業外でも会話することはありますか。*

☐ はい
☐ いいえ

体育の授業内でできた友人とLINE等オンラインでのやり取りは一日何回ありますか。（メッセージ送信・返信で1回とします）回答例：1回*

回答を入力

現在履修中の体育の授業には留学生はいますか。*

☐ はい
☐ いいえ

（「はい」と答えた場合）1回の授業内で留学生との日本語での会話は平均して何分程度ありましたか。（最大90分とします）回答例：30

回答を入力

（「はい」と答えた場合）体育の授業内の留学生とLINE等オンラインでの日本語でのやり取りは一日何回ありますか。（メッセージ送信・返信で1回とします）回答例：1回

回答を入力

★座学（体育以外の授業）について★

1回の授業内で人との会話は平均して何分程度ありましたか。（最大90分とします）回答例：30*

回答を入力

座学の授業内でできた友人と、授業外でも会話することはありますか。*

☐ はい
☐ いいえ

座学の授業内でできた友人とLINE等オンラインでのやり取りは一日何回ありますか。（メッセージ送信・返信で1回とします）回答例：1回*

回答を入力

現在履修中の座学の授業に留学生はいますか。*

☐ はい
☐ いいえ

（「はい」と答えた場合）1回の授業内で留学生との日本語での会話は平均して何分程度ありましたか。（最大90分とします）回答例：30

回答を入力

（「はい」と答えた場合）座学の授業内の留学生とLINE等日本語でのオンラインでのやり取りは一日何回ありますか。（メッセージ送信・返信で1回とします）回答例：1回

回答を入力

Fig. 6 Questionnaire survey used in Experiment 3 (online)

①日本人学生用

体育

1 現在履修している体育の授業は以下のうちどれに該当しますか。

- 個人スポーツ
- チームスポーツ
- フィットネス

2 一回の授業内で人との会話は平均して何分程度ありましたか。

約 分

3 体育の授業内で出来た友人と授業外でも会話することはありますか。

- はい
- いいえ

4 体育の授業内で出来た友人とLINE等オンラインでのやり取りは一日何回しますか。

(メッセージ送信一返信で1回とします)

約 回

5 現在履修中の体育の授業には留学生はいますか。

- はい
- いいえ

6 (5で「はい」と答えた場合) 一回の授業内で留学生との「日本語での」会話は平均して何分程度ありましたか。

約 分

7 (5で「はい」と答えた場合) 体育の授業内の留学生とLINE等「日本語での」オンラインでのやり取りは一日何回しますか。

(メッセージ送信一返信で1回とします)

約 回

座学

8 座学の授業：一回の授業内で人との会話は平均して何分程度ありましたか。

約 分

9 座学の授業内で出来た友人と授業外でも会話することはありますか。

- はい
- いいえ

10 座学の授業内で出来た友人とLINE等オンラインでのやり取りは一日何回しますか。

(メッセージ送信一返信で1回とします)

約 回

11 現在履修中の座学の授業には留学生はいますか。

- はい
- いいえ

12 (10で「はい」と答えた場合) 一回の授業内で留学生との「日本語での」会話は平均して何分程度ありましたか。

※複数の授業に留学生がいる場合、全ての授業の平均を回答してください。

約 分

13 (10で「はい」と答えた場合) 座学の授業内の留学生とLINE等「日本語での」オンラインでのやり取りは一日何回しますか。

(メッセージ送信一返信で1回とします)

約 回

Fig. 7 Questionnaire survey used in Experiment 3 (printed)

Translation of Figure. 6 and 7 is as follows:

Sport class

- What kind of sport class do you take this semester? [Individual sport/Team sport/Fitness]
- How much do you talk with people in one class of the sport class, on average? [About minute(s)]
- Do you talk with classmates outside of the sport class? [Yes/No]
- How many times do you text with classmates online in a day [About time(s)]?
- Is there any international student in the sport class? [Yes/No]
- If "Yes" in question 5, how much do you talk with them in Japanese in one class of the sport class, on average? [About minute(s)]
- If "Yes" in question 5, how many times do you text with them in Japanese online in a day? [About time(s)]

Conventional class

- How much do you talk with people in one class of a conventional class, on average? [About minute(s)]
- Do you talk with classmates outside of the conventional classes? [Yes/No]
- How many times do you text with classmates online in a day? [About time(s)]
- Is there any international student in the conventional class? [Yes/No]
- If "Yes" in question 11, how much do you talk with them in Japanese in one class of the conventional class, on average? [About minute(s)]
- *If there is an international student in several classes, please calculate its average.
- If "Yes" in question 11, how many times do you text with them in Japanese online in a day? [About time(s)]

they were not categorized into international student. The participants were from Colombia, Kenya, Japan, China, France, Finland, Italy, Brazil, Spain, Austria, and Czech Republic (Table 1 and 3). Significant increase was found in the understanding level of English for Reading, Speaking, Listening, and Writing from before to during enrolling in the university in the United States for ATH ($p < 0.05$), while not for NATH ($p > 0.05$) (Table 6). There were significant differences in the understanding level of English in three of four skills: Reading, Listening, and Speaking between NATH group and ATH group at before enrolling in the university in the United States ($p < 0.05$) (Table 7). However, there was no significant differences in the understanding level of English in all four skills between NATH group and ATH group at during enrolling ($p > 0.05$) (Table 7).

Experiment 2

One participant took team sport class and five participants took individual sport class, and one correspondent took fitness class (Table 8). Regarding communication in sport class, one out of all participants answered “Rarely” (14%), and three of them answered “Sometimes” (43%) and “Often” (43%) (Table 8). For a question asking the effectiveness of a sport class for Japanese proficiency, six out of all participants answered “Yes” (86%), which means “I think a sport class is effective for my proficiency in Japanese.” (Table 8). Regarding communication in conventional class, one out of all participants answered “Rarely” (14%), four of them answered “Sometimes” (57%), and two of them answered “Often” (29%) (Table 9). For a question asking the effectiveness of a conventional class, all of the participants answered “Yes” (100%), which means “I think a conventional class is effective for my proficiency in Japanese.” (Table 9).

Experiment 3

Table. 1 The result of the questionnaire survey in Experiment 1 (NATH, n=11) (First half)

1. Are you a(n) undergraduate or graduate?

Undergraduate	11
Graduate	0

2. How long have you been in university in the U.S.?

Less than one month	3
1~3 month(s)	3
4~6 months	1
7~11 months	1
More than one year	3

3. What is your nationality?

Colombia	1
Kenya	1
Japan	5
China	2
France	1
Finland	1

4. What is your first language?

Spanish	1
Kiswahili	1
Japanese	5
Chinese	2
French	1
Finnish	1

5. What language do you use in university?

I always use English	6
I use both English and my first language	5
I always use my first language	0

Table. 2 The result of the questionnaire survey in Experiment 1 (NATH, n=11) (Latter half)

6. How long do you study in English in a day?

Less than one hour	0
1~3 hour(s)	2
4~6 hours	8
7~9 hours	1
More than 10 hours	0

7. Understanding level of English in class (before enrolling in university in the U.S.)

Reading

More than 80%	8
About 60%	3
About 40%	0
Less than 20%	0

Listening

More than 80%	9
About 60%	2
About 40%	0
Less than 20%	0

Speaking

More than 80%	6
About 60%	4
About 40%	1
Less than 20%	0

Writing

More than 80%	5
About 60%	6
About 40%	0
Less than 20%	0

8. Understanding level of English in class (now)

Reading

More than 80%	8
About 60%	3
About 40%	0
Less than 20%	0

Listening

More than 80%	10
About 60%	1
About 40%	0
Less than 20%	0

Speaking

More than 80%	8
About 60%	2
About 40%	1
Less than 20%	0

Writing

More than 80%	6
About 60%	5
About 40%	0
Less than 20%	0

Table. 3 The result of the questionnaire survey in Experiment 1 (ATH, n=11) (First part)

1. Are you a(n) undergraduate or graduate?

Undergraduate	11
Graduate	0

2. How long have you been in university in the U.S.?

Less than one month	0
1~3 month(s)	2
4~6 months	3
7~11 months	2
More than one year	4

3. What is your nationality?

Italy	2
Brazil	3
Spain	2
Austria	1
Czech Republic	1
Japan/United States	1
Germany	1

4. What is your first language?

Italian	2
Spanish	1
Catalan	1
Portuguese	3
Japanese	1
Czech	1
German	2

Table. 4 The result of the questionnaire survey in Experiment 1 (ATH, n=11) (Second part)

5. What sports do you engage in university?

Soccer	5
Track & Field	3
Basketball	1
Tennis	2

6. How long have you been joining the sports in university?

Less than one month	0
1~3 month(s)	3
4~6 months	2
7~11 months	2
More than one year	4

7. What language do you use in university?

I always use English	5
I use both English and my first language	6
I always use my first language	0

8. How long do you study in English in a day?

Less than one hour	1
1~3 hour(s)	7
4~6 hours	3
7~9 hours	0
More than 10 hours	0

Table. 5 The result of the questionnaire survey in Experiment 1 (ATH, n=11) (Last part)

9. Understanding level of English in class (before enrolling in university in the U.S.)

Reading

More than 80%	3
About 60%	4
About 40%	3
Less than 20%	1

Listening

More than 80%	2
About 60%	4
About 40%	2
Less than 20%	3

Speaking

More than 80%	3
About 60%	1
About 40%	5
Less than 20%	2

Writing

More than 80%	4
About 60%	3
About 40%	2
Less than 20%	2

10. Understanding level of English in class (now)

Reading

More than 80%	10
About 60%	0
About 40%	1
Less than 20%	0

Listening

More than 80%	8
About 60%	3
About 40%	0
Less than 20%	0

Speaking

More than 80%	5
About 60%	5
About 40%	1
Less than 20%	0

Writing

More than 80%	8
About 60%	3
About 40%	0
Less than 20%	0

Table. 6 The understanding level of English (Before enrolling vs. During enrolling)

		NATH		ATH	
Reading (%)	Before enrolling	74.5 ± 9.3		56.4 ± 19.6	
	During enrolling	74.5 ± 9.3	$p=1.000$	76.4 ± 12.1	$*p=0.009$
Listening (%)	Before enrolling	76.4 ± 8.1		49.1 ± 22.6	
	During enrolling	78.2 ± 6.0	$p=0.317$	74.5 ± 9.3	$*p=0.010$
Speaking (%)	Before enrolling	69.1 ± 13.8		49.1 ± 22.6	
	During enrolling	72.7 ± 13.5	$p=0.157$	67.3 ± 13.5	$*p=0.014$
Writing (%)	Before enrolling	69.1 ± 10.4		56.4 ± 23.4	
	During enrolling	70.9 ± 10.4	$p=0.317$	74.5 ± 9.3	$*p=0.026$

$*p < 0.05$ Before enrolling vs. During enrolling (Wilcoxon test)

Table. 7 The understanding level of English (NATH vs. ATH)

		Before enrolling		During enrolling	
Reading	NATH	74.5 ± 9.3		74.5 ± 9.3	
	ATH	56.4 ± 19.6	* $p=0.017$	76.4 ± 12.1	$p=0.353$
Listening	NATH	76.4 ± 8.1		78.2 ± 6.0	
	ATH	49.1 ± 22.6	* $p=0.002$	74.5 ± 9.3	$p=0.280$
Speaking	NATH	69.1 ± 13.8		72.7 ± 13.5	
	ATH	49.1 ± 22.6	* $p=0.032$	67.3 ± 13.5	$p=0.259$
Writing	NATH	69.1 ± 10.4		70.9 ± 10.4	
	ATH	56.4 ± 23.4	$p=0.216$	74.5 ± 9.3	$p=0.386$

* $p < 0.05$ NATH vs. ATH (Man-Whitney test)

Table. 8 The result of the questionnaire survey in Experiment 2 (n=7) (First half)

1. Have you ever taken/do you take any sport class at Chukyo University?

Yes	7 (100%)
No	0 (0%)

2. If yes in question 1, what kind of class?

Team sport	1 (14%)
Individual sport	5 (71%)
Fitness	1 (14%)

3. Did/do you talk with people in Japanese in the sport class?

Rarely	1 (14%)
Sometimes	3 (43%)
Often	3 (43%)

4. Did/do you talk with classmates outside of the sport class in Japanese?

Rarely	3 (43%)
Sometimes	2 (29%)
Often	2 (29%)

5. Did/do you text with them in Japanese?

Rarely	4 (57%)
Sometimes	2 (29%)
Often	1 (14%)

6. Do you think a sport class is effective for your proficiency in Japanese?

Yes	6 (86%)
No	1 (14%)

Table. 9 The result of the questionnaire survey in Experiment 2 (n=7) (Latter half)

7. Do you talk with people in conventional classes, in general?

Rarely	1 (14%)
Sometimes	4 (57%)
Often	2 (29%)

8. Do you talk with classmates outside of the conventional class in Japanese?

Rarely	1 (14%)
Sometimes	5 (71%)
Often	1 (14%)

9. Do you text with them in Japanese?

Rarely	0 (0%)
Sometimes	7 (100%)
Often	0 (0%)

10. Do you think a conventional class is effective for your proficiency in Japanese?

Yes	7 (100%)
No	0 (0%)

Twenty-two, thirty-six, and thirty students took TS, IS, and FT classes (Table 10 and 11). There was no significant effect of class in the amount of communication ($p > 0.05$). There were significant differences in the amount of communication between sport class and conventional class when compared in each group; the amount of communication was significantly lesser in conventional class when compared to TS, IS ($p < 0.05$) (Table 12). Furthermore, the amount of communication was significantly lesser in conventional class when compared to the averaged values of three groups ($p < 0.05$) (Table 13).

Discussion

Experiment 1

While ATH group significantly improved their English proficiency from before enrolling to during enrolling ($p < 0.05$), NATH group did not improve their English proficiency ($p > 0.05$) (Table 6); although ATH group was not proficient in English than NATH group before enrolling in a university in the United States, there was no significant difference between NATH group and ATH group at during enrolling in the American university ($p > 0.05$) (Table 7). Thus, engaging in physical activity have a potential to have any positive impact on learning a non-native language. Therefore, the hypothesis (i), “Those who engage in sport activity significantly improve their proficiency in a non-native language in comparison with those who do not engage in sport activity.”, was supported by the results. However, this experiment should be more explored because the understanding level of English of the participants at before enrolling were varied; it should be the same in both NATH group and ATH group.

Table. 10 The result of the questionnaire survey in Experiment 3 (First half)

1. What kind of sport class do you take this semester?

Individual sport	36
Team sport	22
Fitness	30

2. How much do you talk with people in the sport class, on average?

	IS (n=36)	TS (n=22)	FT (n=30)	Averaged
(minutes)	45.7 ± 24.1	53.2 ± 29.2	30.8 ± 22.9	42.5 ± 26.3

3. Do you talk with classmates outside of the sport class?

	IS (n=36)	TS (n=22)	FT (n=30)
Yes	27	19	21
No	9	3	9

4. How many times do you text with classmates online in a day?

	IS (n=36)	TS (n=22)	FT (n=30)	Averaged
(times)	1.7 ± 3.9	0.4 ± 0.6	0.4 ± 0.7	0.9 ± 2.6

5. Is there any international student in the sport class?

	IS (n=36)	TS (n=22)	FT (n=30)
Yes	14	1	6
No	22	21	24

6. If “Yes” in question 5, how much do you talk with them in Japanese in one class of the sport class, on average?

	IS (n=14)	TS (n=1)	FT (n=6)	Averaged
(minutes)	11.4 ± 20.8	0.0 ± 0.0	0.5 ± 1.2	7.8 ± 17.6

7. If “Yes” in question 5, how many times do you text with them in Japanese online in a day?

	IS (n=14)	TS (n=1)	FT (n=6)	Averaged
(minutes)	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0

Table. 11 The result of the questionnaire survey in Experiment 3 (Latter half)

8. How much do you talk with people in one class of a conventional class, on average?

	IS (n=36)	TS (n=22)	FT (n=30)	Averaged
(minutes)	22.7 ± 16.8	15.5 ± 16.7	22.0 ± 20.2	20.7 ± 18.1

9. Do you talk with classmates outside of the conventional classes?

	IS (n=36)	TS (n=22)	FT (n=30)
Yes	30	17	28
No	6	4	2
N/A	0	1	0

10. How many times do you text with classmates online in a day?

	IS (n=36)	TS (n=22)	FT (n=30)	Averaged
(times)	4.0 ± 6.2	2.0 ± 2.6	2.2 ± 2.5	2.9 ± 4.5

11. Is there any international student in the conventional class?

	IS (n=36)	TS (n=22)	FT (n=30)
Yes	14	5	7
No	22	17	23

12. If “Yes” in question 11, how much do you talk with them in Japanese in one class of the conventional class, on average?

*If there is an international student in several classes, please calculate its average.

	IS (n=14)	TS (n=1)	FT (n=6)	Averaged
(minutes)	1.4 ± 3.6	0.3 ± 0.5	4.3 ± 11.3	2.0 ± 6.4

13. If “Yes” in question 11, how many times do you text with them in Japanese online in a day?

	IS (n=14)	TS (n=1)	FT (n=6)	Averaged
(times)	0.2 ± 0.4	0.0 ± 0.0	0.0 ± 0.0	0.1 ± 0.3

Table. 12 The amount of communication (each Sport class vs. Conventional class) (First half)

	TS		IS		FT	
Sport class (minutes)	53.2 ± 29.2		45.7 ± 24.1		30.8 ± 22.9	
Conventional class (minutes)	15.5 ± 16.7	<i>*p</i> <0.001	22.7 ± 16.8	<i>*p</i> <0.001	22.0 ± 20.2	<i>p</i> =0.081

**p* < 0.05 Sport class vs. Conventional class (Wilcoxon test)

Table. 13 The amount of communication (Sport class vs. Conventional class) (Latter half)

	Averaged Value
Sport class (minutes)	42.5 ± 26.2
Conventional class (minutes)	20.7 ± 18.1 * $p < 0.001$

* $p < 0.05$ Sport class vs. Conventional class (Wilcoxon test)

Experiment 2

86% of the participants were communicating in Japanese both in a sport class and in a conventional class (Table 8 and 9); that could be the reason why almost all of them answered “Yes” for question “Do you think a sport class/a conventional class is effective for your proficiency in Japanese?” (Table 8 and 9). On the other hand, contrary to the hypothesis (ii), more participants answered “Sometimes” or “Often” in questions regarding communication with classmates of a conventional class in comparison with a sport class (Table 9). This could be because they are required to communicate with classmates of a conventional class, unlike they just have an opportunity to communicate with them; for example, they might have to communicate with classmates of a conventional class to work on a group project. For the results mentioned and the reasons presumed above, the hypothesis (ii), “International exchange students feel that a sport class is more effective for their proficiency in a non-native language than a conventional class is.”, could not be supported by the results. In Experiment 2, the number of data collected was for seven participants; this experiment needs a further research by collecting a greater number of data.

Experiment 3

The participants of all groups were communicating more in a sport class than in a conventional class ($p < 0.05$) (Table 13). However, there was no significant difference in the amount of communication between a sport class and a conventional class in FT group ($p > 0.05$) (Table 12). That could be because of a characteristic of a fitness class: it mainly concentrates on physical activities that can be performed without communicating with others such as running on a treadmill, pedaling an aero bike, and resistance training using a machine. On the other hand,

there were significant differences in the amount of communication between a sport class and a conventional class in both TS group and IS group ($p < 0.05$) (Table 12); that could be because a team sport class and an individual sport class involve communication with others by forming a team to practice/compete and by making a pair to throw a ball to each other. Indeed, communication is crucial for those who engage in interpersonal physical activity; according to the article from Arkansas State University (2018), players who know how to effectively interact with each other will work together better, forming a stronger overall team (Arkansas State University, 2018). In addition to that, communication is one of the important factors to acquire a non-native language; Gass and Mackey (2015) argues that interaction, which means conversations that learners participate in, is important because it is in this context that learners receive information about correctness and incorrectness of their utterances (Gass & Mackey, 2015). For the result mentioned and reasons presumed above, the hypothesis (iii), “Students communicate more in a sport class than they do in a conventional one, and they communicate more in interpersonal sport class than in personal sport class.”, was supported by the results.

Conclusion

We explored how oral communication through physical activity can affect the proficiency in a non-native language using questionnaire surveys that referred to language proficiency and/or communication, dividing the study into three experiments. The results of the study are as follows.

- i. While proficiency in English was improved during enrolling in a university in the United States in international student-athletes ($p < 0.05$), there was no significant improvement in it in international student non-athletes ($p > 0.05$) (Table 6).

- ii. 86% of international students at Chukyo University who participated in the study think that a sport class is effective for their proficiency in Japanese (Table 8).
- iii. Students communicate more in a sport class than in a conventional class ($p < 0.05$) (Table 13), especially in a team sport class and in an individual sport class ($p < 0.05$) (Table 12).

The results showed that engagement in physical activity enabled participants to communicate more. Based on the results above and the fact that oral communication is important for the proficiency in a non-native language (Hernández, 2010), we concluded that communication through club activity contributed to the improvement in the proficiency in English in international student-athletes. This study suggests that communication through physical activity such as club activity and sport class can be an effective measure to learn a non-native language. This finding would be one of the crucial factors to develop a more effective program to learn/acquire a non-native language, which will contribute to people from overseas including children and students who need to learn Japanese. In addition to that, this finding would also contribute to Japanese children/students as well; 9,612 children/students whose nationality is Japan also need to learn Japanese in 2016 (Ministry of Education, Culture, Sports, Science and Technology-Japan, 2018). The program to learn a non-native language would also be applied to other countries which have been working on language training for those who have come there as immigrants.

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