

A study of the unity of sports teams: development of a scale and examination of related factors

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Abstract:

This study focused on sports teams' unity with the aim of regrouping and developing sports group research, particularly group cohesiveness research, in Japan. We evaluated the unity of sports teams (Study I) and examined factors related to unity (Study II), through the following 2 studies.

In Study I, we developed a Unity Scale for Sports Teams (USST) that was completed by 1,001 student athletes from 13 different types of sports. In the results, USST had a two-factor (i.e., "Integration for the group" and "Commitment") and consisted of eight items, based on Forsyth's (2006, 2010) model. Additionally, it was confirmed this scale's reliability and validity, the scale was shown to have high versatility.

In Study II, we examined the unity of sports teams on the basis of athletes' (participants') attributes, as well as examining the relationship with group size. In the results, the USST scores of high school athletes were higher than university athletes, and the regular and semi-regular athletes were higher than non-regular athletes. Also, there was negative correlation between USST scores and group size. Therefore, these results indicated that the perception of unity of a sports team differs depending on schools and roles within the team, and that it is negatively correlated with group size.

Key words: unity, group cohesiveness, sport team, group dynamics, development of a scale

Introduction

Group cohesiveness is the most critical social psychological construct for sport teams (e.g., Carron et al., 2005). Group cohesiveness is defined as "a dynamic process that is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs" (Carron et al., 1998).

In particular, the relationship between group cohesiveness and team sports performance is one of the most interesting topics within sports psychology research (Cotterill, 2012). As an example, Carron et al. (2002) found the two concepts have consistent positive relationships and reciprocity.

Nevertheless, the number of surveying Japanese research on group cohesiveness of sport teams is small. So far, few studies were particularly conducted using scales with sufficient reliability and validity. Uchida et al. (2011) emphasized that the development of a scale that can appropriately evaluate group cohesiveness of sports teams will increasingly become indispensable in Japan. Therefore, the development of a scale to measure group cohesiveness specializing in Japanese sports teams is an urgent task.

However, despite a concept of group cohesiveness is understood as a multidimensional structure based on Carron et al. (1985), there has barely been any research conducted in Japan that could serve as its foundation. Therefore, it would be difficult to comprehensively perceive and evaluate the concept of group cohesiveness. In keeping with the above, it is effective to attain new findings that can serve as the foundations of group cohesiveness research by launching studies focused on the subordinate concept of group cohesiveness.

Concerning the subordinate concept, Forsyth's (2006, 2010) new group cohesiveness model provides a thought-provoking suggestion. Forsyth (2006, 2010) conducted a meta-analysis of the major research defining group cohesiveness, based on several findings from group dynamics research studies. He then proposed that group cohesiveness is a concept that unites the three collective characteristics of teamwork, unity, and attraction (Fig.1).

On the basis of Forsyth's (2006, 2010) model, no research has focused on unity. Furthermore, Arai et al. (2013) indicated the necessity of quantitatively evaluating unity in teams. Thus, it is of vital importance to create a scale that can evaluate the unity of a sports team.

Therefore, this study will develop a scale that evaluates the unity of a sports team, and clarify the related factors of unity. Preceding this, this paper will first define the concept of unity pertaining to sports settings, since it is not possible to render a uniform definition of unity from a sports science perspective. Forsyth (2006, 2010) defined unity as "groups are cohesive social arrangements of individuals that perceivers, in some cases, consider to be unified wholes". According to Honma (2011), unity is "a state of group being united and its awareness". These two definitions exhibit commonalities such as "the properties of the target are group, and its unity or cohesiveness serve as subjects" when summarized. Therefore, this study will consider the sports setting perspective and ultimately define unity as "to feel that a team is united as one".

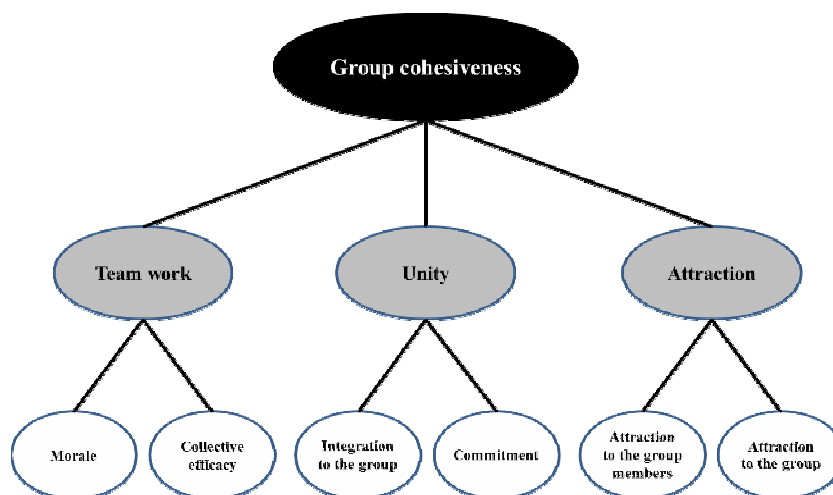


Fig.1. Cohesiveness model (Forsyth, 2006, 2010)

Concerning the development of the scale, Ohlert (2012) stated that it is necessary to include athletes and teams specializing in co-active sports and not just interactive sports. Kawazu et al. (2012) argued that an evaluation scale with high versatility covering a wide range of athletic events is required. Therefore, it is necessary to develop a scale that can be applicable to a variety of athletic events, as well as athletes of various age groups, from both co-active and interactive sports. Furthermore, reducing the burden on participants is a particularly important issue (Namikawa et al., 2012). This burden can be minimized by reducing the number of questionnaire items on the scale, ensuring that the participants' response times will be shorter. Furthermore, in order to develop a scale substantiated scientifically and theoretically, collective efficacy will be used as an external criterion of a concurrent validity of the scale. Since it is predicted to have a close relationship to unity, being a subordinate concept of teamwork that conceptually juxtapose to unity in Forsyth's (2006, 2010) model.

Last, concerning the examination of the related factors of unity, group cohesiveness is positioned as a superordinate concept of unity (Forsyth, 2006, 2010), is strongly influenced by member characteristics (personal factor) and the group's environment (environmental factor) (Carron et al., 2005). Thus, there is a possibility that unity has some sort of relationship with personal and environmental factors. Therefore, team unity and improvement in teamwork are often focused upon in coaching and team-building activities that have sports teams as their subjects (Tsuchiya, 2005). Thus, it is also important to examine the findings that will contribute to the improvement in sports teams' unity by aspiring to elucidate the properties and other related factors of unity through the examination of the relationship between unity and other factors.

Building upon the above points, this study will comprehensively examine the unity of sports teams by developing scales that can evaluate the unity of a sports team (Study I) and clarify the related factors of unity (Study II).

Study I

In Study I, a scale that measures the unity of sports teams will be developed. In addition, the scale's reliability and validity will be examined.

Method

Research topics period

Researchers administered a questionnaire survey to student athletes who belonged to high school and university sports clubs (n = 47). The analysis included 1,001 participants (gender: 590 males, 411 females;

school: 557 high school students, 444 university students), with their average age of 17.88 years (SD = 2.04). There were a total of 13 athletic sports that participants participated in. Researchers conducted a test-retest of the reliability (stability) examination after an interval of approximately two weeks (15 days) with 58 high school and university students (gender: 29 males, 29 females; school: 33 high school students, 25 university students). The research period was between August and December 2012.

Procedures

The purpose of the study was explained to the managers and supervisors of the participants' sports clubs. After obtaining their approval, a questionnaire survey was conducted in the classroom of each participant's school. Prior to administering the questionnaires, information about the purpose of the research, the data processing methods, the confidentiality of response data, and the voluntariness of research participation was outlined on the questionnaire coversheet. The survey was conducted after the participants gave their informed consent. Furthermore, to ensure confidentiality, the filled questionnaire sheets were enclosed and sealed into an envelope that was distributed along with the questionnaire sheet.

Questionnaire sheet

(a) Participants' attributes

The participants were asked their age, gender, and which sporting events they participate in.

(b) Unity Scale for Sports Teams: USST

First, 299 questionnaire items were prepared, taken from several scales that corresponded or were related to the definition of unity being "I feel that the team is united as one". The scales included those that measured group cohesiveness such as GEQ (Carron et al., 1985), as well as related psychological concepts. The questionnaire items were prepared by a graduate student conducting research specializing in sports psychology and coaching science, in addition to serving as a coach for competitive field sports. Next, to extract only items that matched the concept of unity from the 299 items, meetings on item selection were held by the student and three university teaching staff members specializing in sports psychology. In the first meeting, after one of the aforementioned teaching staff members who were well-acquainted with English translated the English items into Japanese, each of the 4 members selected the items that fit the definition of unity in this research. As a result, 77 items were extracted. In the second meeting, a consultation was held on whether the extracted 77 items accurately satisfied the criteria. Ultimately, 37 items for which an overall consensus was attained were extracted. Finally, in the third meeting, pronouns in the instruction sentences of all questionnaire items were changed to "our team members" or "I". Thereafter, a detailed examination was conducted by holding another consultation on the following points to organize the format of the questionnaire items: "Can research participants understand the question?", "Is it easy for the research participants to respond?", "Are there any expressions that can be perceived as different meanings?", and "Are the expressions used in the questions unified?".

The instructions for the USST were as follows: "These questions ask how you feel about your own team. For each question, please select the number that best describes your feeling out of the numbers 1 to 5". For the response method, a 5-point Likert scale was used, where the respondents selected from 1 (strongly disagree) to 5 (strongly agree).

(c) Psychological Performance Collective Efficacy Scale: PPCES

The Psychological Performance Collective Efficacy Scale (PPCES), an evaluation scale developed by Arai (2011) to measure the collective efficacy of an athlete's psychological performance, was used in this study. The scale comprised 10 questionnaire items. The participants responded using an 11-point Likert scale, where they were asked to respond from 0 (which I believe is absolutely impossible) to 100 (which I believe is absolutely possible) in increments of 10 for each question.

Analysis

(a) Categorization of participating sports

On the basis of Murray (2006), the 13 sports were divided into co-active or interactive. In this paper, co-active sports are track and field, swimming, tennis, gymnastics, badminton, judo, and weightlifting, and interactive sports are volleyball, basketball, handball, soccer, baseball, and softball.

(b) Statistical analysis

We analyzed the factor structure of the USST by conducting an exploratory factor analysis using a principal factor method with no rotation. After calculating the number of factors that comprise the scale, an exploratory factor analysis using a principal factor analysis with promax rotation was conducted with the factor number set based on the result. Following this, in order to examine the reliability of the scale, Cronbach's α coefficient was calculated to examine internal consistency. Additionally, construct validity was examined by conducting a confirmatory factor analysis. Furthermore, in order to examine the concurrent validity of the scale, the Pearson product-moment correlation coefficient between the scores of USST and PPCES was calculated.

Afterward, stability was examined by calculating the Pearson product–moment correlation coefficient between examination and re-examination.

Results

Participants' attributes and the average USST score

Table 1 shows the participants' average scores for each item. The scores on the 37 items ranged from 3.30 to 4.17 ($SD = .80-1.06$).

Table 1 Scores of mean and standard deviation of each question item

No	Items	Mean	SD
1.	Our team members are united in trying to reach team's goal for performance.	3.76	.90
2.	Our team members have aspirations for the team's performance.	3.86	.88
3.	Our team members feel united.	3.45	1.06
4.	Our team members have a strong camaraderie.	3.65	1.05
5.	Even if our team members are losing a game, we are closely united.	2.77	.95
6.	Even after our team members have lost a game, we are closely united.	3.07	.96
7.	Our team members attempt to unite for winning a game.	3.91	.83
8.	Our team members work together more closely than those on other teams.	3.50	.99
9.	Our team members are closely united.	3.44	.95
10.	Our team members understand each other.	3.43	.94
11.	Our team members trust each other.	3.45	1.01
12.	Our team members feel strong ties with the team.	3.54	1.01
13.	Our team members work together very well.	2.94	.93
14.	Our team members build successful relationships within the team.	3.42	.93
15.	Our team members build successful relationships between seniors and juniors within the team.	3.65	.86
16.	Our team members feel strong bonds with each other.	3.38	1.00
17.	Our team members share thoughts with one another.	3.42	1.05
18.	I am very happy to be working with this team.	4.17	.98
19.	I feel as if the team's problems are my own.	3.76	.93
20.	I identify with this team.	3.72	.97
21.	I feel like a member of this team.	4.17	.80
22.	Our team members feel a strong sense of belonging to this team.	4.02	.82
23.	I do my best for the team.	3.89	.97
24.	I have a strong feeling for this team.	3.81	1.05
25.	I dedicate myself to this team.	3.53	1.04
26.	I contribute to this team.	3.28	1.00
27.	Our team members have heart-to-heart communication with each other.	3.31	1.05
28.	Our team members all feel responsibility for any loss or poor performance in our games.	3.57	.91
29.	Our team members realize their own roles within the team.	3.95	.82
30.	Our team members understand each other's tasks.	3.79	.83
31.	Our team members value teamwork.	3.84	.94
32.	Our team members share the team's goal.	4.07	.99
33.	Our team members think about the team while participating in practices or games.	3.66	1.06
34.	Our team members always share information while they practice and compete.	3.56	.93
35.	Our team members are willing to complete the each other's roles.	3.79	.89
36.	Our team members have a clear understanding of each other's needs.	3.31	.93
37.	Our team members attempt to follow team's roles.	3.91	.89

Factor structure of USST

To examine the factor structure of the USST, the first step was to correct for ceiling effects (the score exceeding the average score + 1SD = 5). Ceiling effects were seen in two items (No.18 and No.32) out of the total of 37 items; hence, 35 items excluding these two were used for the analysis. Next, to calculate the number of factors that construct this scale, an exploratory factor analysis using a principal factor method with no rotation with the factor number set as “1” was conducted. The eigenvalues decreased to 18.99, and then to 1.94, 1.26, 1.18, and so on. Therefore, if an eigenvalue of 1 or more was used as the criteria, we predicted that viewing the scale as a maximum 4-factor structure was valid. However, Forsyth’s (2006, 2010) group cohesiveness model (Fig.1) shows that unity is constructed from the two subordinate concepts. Furthermore, when the scree plot of the eigenvalues was verified during the analysis process, a relatively large bias toward Factor 2 was observed. It was determined that the two-factor structure was optimum for this scale. Next, since there were no items with a factor loading of lower than .40 in the above analysis, an exploratory factor analysis using principal factor analysis with two factors and with promax rotation was conducted for all 35 items. The results showed that the communality exceeded .20, with 33 items (excluding No.28 and No.34) with a factor loading of .40 or more in one of their factors being confirmed. Additionally, under the premise of “creating a scale with sufficient reliability and validity while maintaining a low number of questionnaire items”, 4 items were extracted from each factor from the order of the highest factor loading so that the total items of the scale were 8 at most (Table 2). Since the representative scales that measure sports team group cohesiveness (e.g., GEQ: Carron et al., 1985; SCI: Yukelson et al., 1984) shows that the least number of questionnaire items that construct the subordinate factors is 4. Concerning item selection, in order to create a psychological evaluation scale with the objective of heightening consistency and usability of the scale, the number of items in each factor was unified.

The 4 items in Factor I included “our team members feel united”. Since they are items related to the unity of members and the strength of the bond, this factor was named “Integration for the group”, on the basis of Forsyth’s (2006, 2010) model. The 4 items in Factor II included “I feel like a member of this team”. Since this was a factor related to the sense of belonging to a team and the strength of commitment, it was named “Commitment” in the same way.

Table 2 Scores of contribution, factor loadings and alpha coefficients of the USST

No	item	Communality	I	II
Factor I: Integration for the group (IG)				
3 (IG 1)	Our team members feel united.	.68	.90	-.11
9 (IG 2)	Our team members are closely united.	.69	.89	-.08
4 (IG 3)	Our team members have a strong camaraderie.	.66	.84	-.03
13 (IG 4)	Our team members work together very well.	.61	.83	.02
Factor II: Commitment (C)				
25 (C 1)	I dedicate myself to this team.	.64	-.11	.88
23 (C 2)	I do my best for the team.	.53	-.16	.84
24 (C 3)	I have a strong feeling for this team.	.61	-.07	.83
21 (C 4)	I feel like a member of this team.	.55	-.05	.78
			Contribution	55.73
			Cumulative contribution	10.96
			α coefficient	66.69
			α coefficient of the overall scale	.90
			Factor correlation	.86
				.91
				.77

Internal consistency of USST

We calculated α coefficients of the item groups included in each factor of USST and the total scale (8 items in total) (Table 2). The α coefficients were .90 for Factor I, .86 for Factor II, and .91 for the overall scale. Therefore, the internal consistency of the scale was confirmed.

Construct validity of USST

To examine the construct validity of the USST, we conducted a confirmatory factor analysis (Table 2 and Fig.2). The goodness of fit for USST was GFI = .98, AGFI = .96, CFI = .99, RMSEA = .06. The goodness of fit index satisfied the evaluation criterion proposed by Oshio (2008) ($\leq .90$ for GFI, AGFI and CFI, with RMSEA < .10). Therefore, the construct validity of the scale was confirmed.

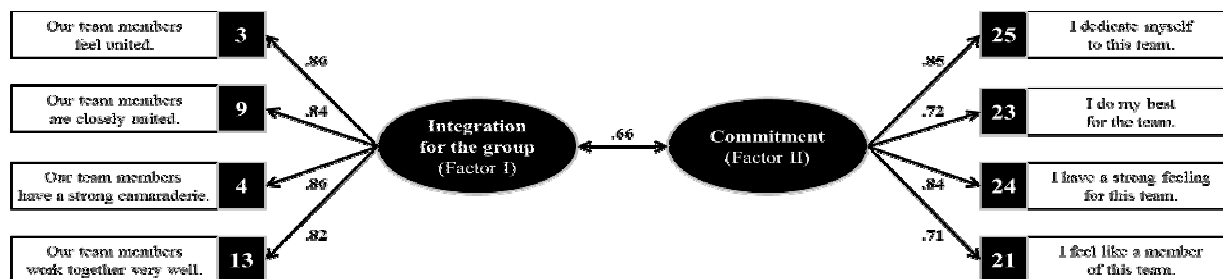
Concurrent validity of USST

To examine the concurrent validity of the USST, the scores for two subordinate factors, the total scores for the scale (the total scores for 8 items), and the correlation coefficient with psychological performance CE

score in PPCEs were calculated. The results were $r = .47$ ($p < .001$) for Factor I, $r = .50$ ($p < .001$) for Factor II, and $r = .55$ ($p < .001$) for the total USST score. Thus, the concurrent validity of the scale was confirmed.

Stability of USST

To examine the relationship between examination and re-examination, the correlation coefficient between the averaged values of the two was calculated. The results were $r = .51$ ($p < .001$) for Factor I, $r = .64$ ($p < .001$) for Factor II, and $r = .70$ ($p < .001$) for the total scale scores, thus the stability of the scale was confirmed.



$$\chi^2(19) = 82.53, n.s.; GFI = .98, AGFI = .96, CFI = .99, TLI = .98, RMSEA = .06$$

Fig.2. Unity model for sports teams based on confirmatory factor analysis

Study II

In Study II, the USST developed in Study I will be used to examine the unity of sports teams from the 4 perspectives of gender, school, participating sports, and the role within a team, depending on athletes' attributes (personal factor). Furthermore, Study II will focus on the group size (the number of team members) by Carron (1982). He mentioned that an environmental factor impacts group cohesiveness, so we examine its relationship with the unity of sports teams.

Methods

Participants and procedure

We administered a questionnaire survey to athletes belonging to high school and university sports clubs ($n = 47$). The analysis included 595 participants (gender: 291 male, 304 female; school: 239 high school students, 356 university students), with their average age of 18.47 years ($SD = 2.08$). There were a total of 13 athletic sports that they participated in. The research period was between December 2012 and February 2013.

The research procedure was the same as in Study I.

Questionnaire sheet

(a) Participants' attributes

The participants were asked their school, age, gender, sports they participate in, their role within the team (from the three choices of regular, semi-regular, and non-regular), and the number of members in the club (including the manager).

(b) Unity Scale for Sports Teams: USST

The evaluation scale developed in Study I comprising 2 factors and 8 items was used.

Analysis

(a) Categorization of participating sports

The participating sports were categorized using the same procedure as in Study I. Track and field, swimming, tennis, gymnastics, badminton, and kendo were categorized as co-active sports, while volleyball, basketball, handball, soccer, baseball, American football, and rugby were categorized as interactive sports.

(b) Statistical analysis

We examined the unity of sports teams by using an independent-sample t-test, setting school, gender, and participating sports as independent variables and the unity of the sports team as a dependent variable. When role within the team was a dependent variable, we used a one-way analysis of variance (ANOVA) to examine the unity of the sports team. Tukey's HSD test was used for post-hoc multiple comparisons when a significant F-value was found during an ANOVA. The relationship between the unity of the sports team and group size was examined using the Pearson product-moment correlation coefficient.

Results

Participants' attributes and the average USST score

Table 3 presents the population distribution by participants' attributes. The score ranges of 8 items in the USST for all participants were between 3.24 and 4.13 ($SD = .79-1.00$). The average scores for each

subordinate factor were 1.45 ($SD = 3.36$) for “Integration for the group” and 15.59 ($SD = 3.01$) for “Commitment”, with “Unity” (the total of the 8 items) being 30.04 ($SD = 5.62$).

Unity of sports teams according to participants’ attributes

The results from the USST scoring calculations by participants’ attributes (Table 3) show that the scores for “Commitment” and “Unity” for high school athletes were significantly higher in comparison to those for university students ($p < .05-.01$). When genders were compared, no significant differences were found between male athletes and female athletes ($p \geq .05$). Comparing participating sports demonstrated that no significant differences between co-active sports athletes and interactive sports athletes were seen ($p \geq .05$). When roles within the team compared, for both “Commitment” and “Unity” scores, regular and semi-regular athletes had significantly higher scores than non-regular athletes ($p < .05-.001$).

Relationship between the unity of sports team and group size

The average group size was 38.94 ($SD = 26.88$). The correlation coefficients between the USST scores and group size (the number of members in a club) are shown in Table 4. The results confirmed that there was a significant negative correlation between all the items in the USST and group size (all $p < .001$).

Table 3 Relationship between unity and demographic data

School		Gender				Participating sports						Roles within the team						Tukey's HSD					
University		High school		Male		Female		Co-active sports			Interactive sports			Regular (1)		Semi-regular			Non-regular				
<i>n</i> =356		<i>n</i> =239		<i>n</i> =291		<i>n</i> =304		<i>n</i> =282			<i>n</i> =313			<i>n</i> =207		<i>n</i> =198			<i>n</i> =190				
<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>		<i>Mean</i>	<i>SD</i>			
USST																							
Integration for the group																							
IG 1	3.68	1.00	3.80	1.02	1.42	3.67	1.04	3.78	.98	1.28	3.77	.08	3.69	1.03	1.04	3.86	.99	3.75	1.04	3.56	.97	4.29*	3<1
IG 2	3.65	.92	3.69	.97	.51	3.66	.94	3.67	.94	.15	3.66	.95	3.66	.92	.06	3.71	.97	3.68	.98	3.59	.85	.93	
IG 3	3.81	.96	3.83	1.00	.22	3.82	.97	3.82	.98	.07	3.82	.94	3.82	1.01	.02	3.85	.97	3.83	1.00	3.79	.96	.17	
IG 4	3.16	.93	3.37	.94	2.70**	3.21	.95	3.27	.93	.74	3.28	.93	3.20	.95	1.03	3.25	.97	3.29	.96	3.18	.89	.65	
Total	14.30	3.28	14.69	3.48	1.38	14.37	3.40	14.54	3.33	.61	15.54	3.34	14.38	3.39	.59	14.66	3.44	14.55	3.50	14.13	3.14	1.38	
Commitment																							
C 1	4.08	.82	4.21	.74	2.08*	4.07	.84	4.19	.74	1.99*	4.11	.75	4.15	.83	.72	4.20	.75	4.19	.76	3.99	.85	4.51*	3<1, 2
C 2	3.79	.99	4.02	.87	2.91**	3.82	.98	3.94	.92	1.53	3.86	.92	3.90	.98	.51	3.92	.94	4.03	.90	3.68	.99	6.90***	3<1, 2
C 3	3.86	.90	4.02	.81	2.22*	3.87	.90	3.97	.83	1.33	3.93	.82	3.91	.90	.22	4.04	.82	3.96	.87	3.75	.88	5.82**	3<1, 2
C 4	3.58	1.03	3.78	.86	2.60**	3.60	1.01	3.71	.92	1.29	3.67	.91	3.64	1.02	.40	3.80	.92	3.72	.94	3.43	1.01	8.12***	3<1, 2
Total	15.29	3.10	16.03	2.82	2.92**	15.36	3.10	15.81	2.91	1.81	15.57	2.75	15.61	3.23	.16	15.97	2.86	15.90	2.89	14.85	3.17	8.58***	3<1, 2
Unity	29.59	5.61	30.71	5.58	2.39*	29.73	5.74	30.34	5.50	1.33	30.11	5.28	29.98	5.92	.27	30.63	5.58	30.45	5.76	28.98	5.40	5.11**	3<1, 2

*: $p < .05$, **: $p < .01$, ***: $p < .001$

Table 4 Correlation coefficient between unity and group size

	Group size
Integration for the group	
IG 1	-.16***
IG 2	-.13***
IG 3	-.13***
IG 4	-.09***
Total score for IG	-.15***
USST	
Commitment	
C 1	-.18***
C 2	-.11***
C 3	-.14***
C 4	-.09***
Total score for C	-.15***
Unity (Total score of 8-item)	-.17***
<i>n</i> = 595	All ***: $p < .001$

General discussion & Conclusions

This study focused on sports teams' unity with the aim of regrouping and developing sports group research, particularly group cohesiveness research, in Japan. This study evaluated the unity of sports teams and examined factors related to this through the 2 studies mentioned below.

In study I, we developed the USST for evaluating the unity of a sports team. By comprehensively examining this scale's reliability and validity, the scale showed high versatility. The USST comprises a 2-factor, 8-item structure, on the basis of Forsyth's (2006, 2010) group cohesiveness model. In addition, since the positive correlation found with collective efficacy, this scale was considered to have theoretical validity as well. We further strove during the development of the scale to make the scale capable of being used on a team with a relatively wide age range, by having a combination of high school student athletes and university student athletes as subjects. At the same time, since athletes specializing in co-active sports accounted for 42% of the total subjects, in addition to the scale not being restricted to specific sports and the item number being limited to 10, the scale can be easily used at coaching and team-building settings. Therefore, it can be concluded that the developed scale has high versatility.

In study II, we examined the unity of sports teams on the basis of athletes' (participants') attributes, as well as examining the relationship with group size. The results clarified that the perception of unity of a sports team differs depending on school and the role within the team, and that it is negatively correlated with group size. First, comparing between schools, high school student athletes had higher "Commitment" and "Unity" scores than university student athletes. This could be attributed to the fact that high school student athletes have a relatively short period of sports participation compared with university student athletes, and in most cases, their individual skills and performances are still undeveloped. Therefore, for a team to succeed or make accomplishments, the team needs to improve its degree of unity. When the roles within a team were compared, the "Commitment" and "Unity" scores in regular and semi-regular athletes were higher than those in non-regular athletes. Brawley et al. (1993) clarified that the roles of a member affect group cohesiveness, which is a superordinate concept of unity. Thus, this result suggests that team unity varied according to the roles that a team member fills.

Next, we clarified that there was a negative significant correlation between the unity of a sports team and the size of the team. The results suggested that the fewer the number of members, the stronger the perceived unity. It was also suggested that as the number of members in the team increases, the unity of the team weakens. Widmeyer et al. (1990) examined the group cohesiveness including basketball teams as the subject. The results showed that as the group's size increased, group cohesiveness declined, indicating that group size is a significant factor in predicting group cohesiveness. This study showed results similar to a preceding study in terms of the relationship between unity, which is positioned as a subordinate concept of group cohesiveness, and group size.

Unity is positioned as a major construct of group cohesiveness (Forsyth, 2006, 2010), which impacts the win/loss records and performances of sports teams. Therefore, researchers have pointed out the importance of improving the unity of teams during team-building activities (Arai et al., 2013). On the basis of this, there is a possibility that by improving and heightening the unity of teams, sports teams will perform better and have better interaction among each other. Therefore, it would be beneficial for future research to examine the relationship between unity and specific behaviors, such as performance, without being limited to other psychological factors.

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