Asian Journal of Sport and Exercise Psychology 3 (2023) 130–136

Contents lists available at ScienceDirect

Asian Journal of Sport and Exercise Psychology

journal homepage: www.elsevier.com/locate/ajsep

Psychometric properties of the controlling coach behaviors scale for Japanese athletes

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ARTICLE INFO

Keywords:
Self-determination theory
Coaches' interpersonal style
Scale development
Validity
Reliability

ABSTRACT

Two studies examined the validity and reliability of the Japanese version of the Controlling Coach Behaviors Scale (CCBS). The CCBS is a multidimensional self-report measure designed to evaluate sports coaches' controlling interpersonal style from the perspective of self-determination theory (SDT). It comprises 15 items measuring the controlling use of rewards, negative conditional regard, intimidation, and excessive personal control on a seven-point Likert scale. The study 1 sample comprised 526 university student-athletes (M_{age} = 19.59 years, SD = ±0.94, 364 females) who completed the Japanese CCBS, which was developed through back-translation. Confirmatory factor analyses provided support for the tenability of the hypothesized factor structure of the Japanese CCBS (CFI=.927; NNFI=.909; RMSEA=.079). Moreover, the results supported the invariance of the scale across sex, sport types, and competitive levels. The subscale internal consistency and discriminant validity scores were all acceptable. Test-retest reliability evidence was obtained in Study 2 (N=108), suggesting a positive and significant intraclass correlation between the pre-test and the post-test CCBS (ICC range: .65–.87). These findings support the Japanese CCBS as a valid and reliable measure for use in research which will enhance our understanding of coaches' controlling interpersonal styles in sports.

Coaches can significantly impact athlete motivation and the quality of their psychological experiences in sports (Mageau & Vallerand, 2003). However, despite numerous research emphasizing the positive effect of coaching in sports (e.g., Côté & Gilbert, 2009), inappropriate coaching behavior, such as verbal abuse, is still present in Japanese sports society. The Japan Sports Association surveyed registered coaches with their organization and found that 59.8% of coaches had seen and heard verbal abuse during sports coaching within the past five years (Nakazawa et al., 2021). Such findings indicate the need for more studies examining negative coaching behaviors and interpersonal styles in Japan.

According to the self-determination theory (SDT; Deci & Ryan, 2002; Ryan & Deci, 2017), a popular theory of motivation widely applied in sports, a coach's behavior can be classified into two interpersonal styles: an autonomy-supportive style and a controlling style. When adopting an autonomy-supportive style, coaches support self-initiated strivings and create conditions for athletes to experience a sense of psychological freedom and volition (Reynders et al., 2020). Research on coaches' autonomy-supportive behaviors in sport contexts has grown globally over the past decade, including in Japan. It has been found to predict important psychological (e.g., well-being), motivational (e.g., autonomous motivation), and behavioral (e.g., commitment) outcomes (for a review, see Mossman et al., 2022).

Conversely, controlling coaches act in a coercive authoritarian way to restrict behavior and thinking (Bartholomew et al., 2011). Previous research supports the negative effects of a controlling coaching style. For example, athletes' perceptions of controlling coaching behavior have been positively associated with poor motivation (Haerens et al., 2018) and maladaptive outcomes such as disordered eating, burnout, depression, fear of failure, and anxiety (Bartholomew et al., 2011; Hu et al., 2023; Ramis et al., 2017). To the best of our knowledge, in Japan, only one study has explored controlling coaching behaviors based on SDT (Toyama et al., 2020). The authors showed that athletes' perceptions of their coaches' controlling behaviors positively related to need frustration and, in turn, increased levels of amotivation among Japanese female athletes. Given the limited research in this context, there is a need

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https://doi.org/10.1016/j.ajsep.2023.07.001
Received 17 November 2022; Received in revised form 24 May 2023; Accepted 6 July 2023
Available online 21 July 2023

for further empirical work on coaches' use of controlling behaviors toward their athletes in Japan, particularly given their hypothesized negative impact on psychological, motivational, and behavioral outcomes.

Bartholomew et al. (2010) developed a measurement tool entitled the Controlling Coach Behaviors Scale (CCBS) based on SDT. The CCBS assesses four conceptually different types of controlling coaching behaviors based on athletes' perceptions in sport settings: the controlling use of rewards, negative conditional regard, intimidation, and excessive personal control. The controlled use of rewards is the most conspicuous controlling approach (Bartholomew et al., 2010). The controlling use of rewards refers to the use of tangible and verbal enticements as an incentive for interacting with and completing a task or meeting specific performance requirements. Negative conditional regard refers to people in positions of power withholding love, attention, and affection when desired qualities or behaviors are not demonstrated by their subordinates (Castillo et al., 2014). The use of tactics to regulate actions to humiliate and demean someone, through verbal abuse, yelling, or threats of physical punishment, is referred to as intimidation (Bartholomew et al., 2009). Finally, excessive personal control refers to invasive activities that seek to interfere with parts of the athletes' lives that are not immediately related to their engagement in sports (Bartholomew et al., 2010).

The original version of the CCBS (Bartholomew et al., 2010) is in English, and it has been shown to have internal reliability and structural validity demonstrated, as well as invariance according to sex and sport type. Psychometric properties of the CCBS have been tested in Persian and Spanish, and the scale showed adequate internal reliability and good structural validity (Arbab et al., 2020; Castillo et al., 2014). Nevertheless, to date, no studies have investigated the psychometric properties of the CCBS with Japanese athletes. Hence, developing the Japanese version of the CCBS will contribute to a deeper understanding of coaches' controlling behaviors in the sport context and help investigate cultural differences in coaching behaviors.

This study's purpose was twofold: (1) to evaluate the structural validity, measurement invariance, internal consistency, and discriminant validity of the Japanese version of the CCBS; and (2) to examine the test-retest reliability of the Japanese version of the CCBS. Thus, we conducted two studies to develop the Japanese version of the CCBS.

Study 1

Study 1 generated items for the Japanese version of the CCBS and evaluated the structural validity of the revised scale. We hypothesized that the Japanese version of the CCBS would comprise four factors based on the items and structure of the original CCBS (Bartholomew et al., 2010), and demonstrate measurement invariance across the groups tested. We expected to see internal consistency, evidenced by acceptable Cronbach's alpha coefficients and Raykov's composite reliability (CR) coefficients, for each subscale. Previous studies indicated that controlling behaviors are weakly or non-significantly related to autonomy-supportive behaviors (Bartholomew et al., 2010; Castillo et al., 2014). Therefore, we hypothesized that the CCBS subscales would be weakly or non-significantly correlated with autonomy-supportive behaviors, supporting the discriminant validity of the new scale. Moreover, the average variance extracted of the CCBS subscales would be higher than their shared variance, which provides evidence for the Japanese CCBS's additional discriminant validity.

Methods of study 1

Participants and procedure

A total of 526 Japanese university student-athletes (161 males, 364 females, and one participant did not indicate their sex; M_{age} = 19.59 years, SD_{age} = 0.94) from three universities in Japan (two universities in the Kansai area and one university in the Kanto area) participated in the study. The majority practiced athletics (n = 70, 13.3%), baseball (n = 70, 13.3%), football (n = 49, 9.3%), basketball (n = 37, 7.0%), tennis (n = 30, 5.7%), softball (n = 29, 5.5%), handball (n = 29, 5.5%), swimming (n = 25, 4.8%), and volleyball (n = 23, 4.4%). The remaining athletes (n = 164, 31.2%) were from various sport backgrounds including badminton, touch football, lacrosse, futsal, canoe, gymnastics, American football, artistic gymnastics, and kendo. The average number of years of sport experience was 11.05 years ($SD_{experience}$ = 3.74) and most participants (58.4%) reported training six times per week. The athletes competed at the local (n = 87), provincial (n = 123), national (n = 305), and international (n = 11) levels.

Participants completed an anonymous online questionnaire which included the translated CCBS items and several other validated scales after their lectures. The questionnaire took approximately 15 minutes to complete and participants were asked to complete it using their smartphones. A paper-based questionnaire was submitted when participants could not answer online. In total, 13.9% (n = 76) of participants submitted the paper-based questionnaire. Standardized instructions were used to minimize between-subject effects related to the method of questionnaire administration. All participants provided informed consent and were allowed to ask questions during the survey. The data were collected from 2017 to 2018. Ethical approval for this study was granted by the ethics committee of the principal researcher's university (No. 17–09).

Instruments

Controlling coaching behaviors. The Controlling Coach Behaviors Scale (CCBS) is a 15-item, self-report instrument developed by Bartholomew et al. (2010) to assess athletes' perceptions of their coaches' controlling behaviors, in line with SDT (Ryan & Deci, 2017). The CCBS comprises four subscales including (a) controlling use of rewards (four items, e.g., "My coach only uses rewards/praise so that I complete all the tasks he/she sets during training"), (b) negative conditional regard (four items, e.g., "My coach pays me less attention if I have displeased him/her"), (c) intimidation (four items, e.g., "My coach embarrasses me in front of others if I do not do the things he/she wants me to do"), and (d) excessive personal control (three items, e.g., "My coach tries to control what I do during my free time"). Participants were asked to rate each CCBS item using a seven-point Likert scale, ranging from 1 = "strongly disagree" to 7 = "strongly agree."

The English version of the CCBS was translated into Japanese using a back-translation technique according to Sperber (2004). First, two professional translators specializing in psychology from an English translation agency translated it from English into Japanese. After the translation, a team of three experts—two specialists with experience developing psychological measurements and a bilingual coach with experience of coaching in the National Collegiate Athletic Association Division I—modified the translation and examined the content validity of the scale. This version of the scale was translated from Japanese into English by two different professional translators. After the back-translation, the research team, including the first author of the original CCBS, compared the original items with the back-translated versions. After some minor changes to item wording, meaning, and content (e.g., adding some examples in the items after getting permission from the first author of the original CCBS), the preliminary Japanese version of the scale was deemed ready for use.

Autonomy-supportive coaching behaviors. The four-item subscale, taken from the competency of *Kokoyakyu* (Japanese high-school baseball) manager scale (Takamatsu & Yamaguchi, 2015), was used in the present study. A sample item for this measure is as follows: "My coach leaves some areas for the athletes to explore on their own." Participants were asked to rate each item using a five-point Likert scale, ranging from 1 = "not at all true" to 5 = "very true." Takamatsu and Yamaguchi (2015) provided evidence for the internal consistency and structural validity of

the scale. In the present study, the internal consistency (Cronbach's alpha) of the scale was .86; Data from 386 participants from two universities were provided on this scale.

Data analysis

Data analysis was carried out in the following stages using SPSS 21.0 and AMOS 21.0. First, data were screened for missing values, multivariate outliers, and normality. Second, the structural validity of the translated CCBS items was assessed using confirmatory factor analysis (CFA). Factor loading above .30 or .40 is minimally acceptable (Hair et al., 2019). The maximum likelihood method was adopted to estimate the hypothesized four-factor structure. To evaluate the model fit, the chi-square (χ^2), comparative fit index (CFI), non-normed fit index (NNFI), root mean square error of approximation (RMSEA), and respective confidence interval (RMSEA 90% CI) were used. The value of .90 was used as the minimal indication of a good fit for the CFI and NNFI indices per Bentler's (1990) instructions. A value less than or equal to .08 suggests an acceptable model fit for the RMSEA (Hu & Bentler, 1999). Third, multi-group analysis using CFA was performed to explore whether the CCBS displayed invariance by sex, sport type (team or individuals), and competitive level (local and provincial or above). Cid et al. (2018) recommended that multi-group analysis be performed by restricting the model parameters. The following types of invariance are to be considered: the free parameters model (configural invariance), the fixed factorial measurement model (measurement invariance), and the fixed factorial and covariance measurement model (scale invariance) following the same method used in previous research (Bartholomew et al., 2010). The difference in the CFI values between the free and fixed parameters models should be less than or equal to .01 (Cheung & Rensvold, 2002). Fourth, estimates of the internal consistency of the CCBS were tested. Internal consistency was calculated using α coefficients (Cronbach, 1951) and composite reliability (CR) coefficients (Raykov, 1997). Values above .70 and .60 were considered acceptable for Cronbach's α (Tenenbaum, Eklund, & Kamata, 2012) and Raykov's CR (Bagozzi & Yi, 1988), respectively. Fifth, correlations (Pearson's r) were used to test bivariate associations between athletes' perceptions of their coach's controlling and autonomy-supportive coaching behaviors to provide support for the discriminant validity of the new scale. And finally, the average variance extracted (AVE) for each factor and the shared variance between the factors were estimated.

Results of study 1

Preliminary analyses

Data analysis indicated that 0.4% ($N_{missing} = 2$) of participants ($N = 545$) chose not to respond to all items; thus, they were removed from subsequent analyses. Further inspection of the remaining participants using Mahalanobis distance revealed 17 multivariate outliers ($p < .01$). List-wise deletion of cases with multivariate outliers resulted in an effective sample size of 526. According to Ntoumanis and Myers's (2016), values of kurtosis and skewness between −2 and +2 indicate the normal distribution of a data set. Therefore, all items were distributed normally (see Table 1).

Confirmatory factor analysis

The results revealed that the hypothesized four-factor model demonstrated an adequate fit to the data (χ^2 (84) = 361.27, $p < .01$; CFI= .927, NNFI = .909, RMSEA = .079, 90% CI = .071–.088). Standardized factor loadings were all significant (Table 1), ranging from moderate to strong ($M = .71$; range .40–.88; p's $< .01$). The range of inter-factor correlations was between .57 and .87 (p's $< .01$).

Measurement invariance testing

The statistics showed that the model was invariant across sex (Table 2), sport type (Table 3), and competitive level (Table 4). Results of the measurement invariance model and scale invariance model

Table 1
Means, standard deviations, factor loadings, skewness, and kurtosis values for the CCBS items.

	CCBS Subscale and Items	Mean	SD	Loading	Skewness	Kurtosis
Controlling use of rewards (報酬の統制的使用)						
3	My coach only uses rewards/praise so that I stay focused on tasks during training. コーチ (指導者) は,褒美 (練習時間の短縮など) や称賛 (ほめ言葉など) をひたすら使って,トレーニング中に課題へ集中させようとする	3.02	1.67	.40	0.47	−0.69
7	My coach tries to motivate me by promising to reward me if I do well. コーチ (指導者) は,良く出来たときの褒美 (たとえば,練習時間の短縮) を約束することで,私にやる気を起こさせようとする	2.58	1.66	.57	0.72	−0.53
11	My coach only uses rewards/praise so that I complete all the tasks he/she sets during training. コーチ (指導者) は,褒美 (練習時間の短縮など) や称賛 (ほめ言葉など) をひたすら使って,コーチが決めた課題をトレーニングですべてやらせようとする	2.44	1.57	.85	0.89	−0.04
14	My coach only uses rewards/praise to make me train harder. コーチ (指導者) は,褒美 (練習時間の短縮など) や称賛 (ほめ言葉など) をひたすら使って,私により厳しいトレーニングをさせようとする	2.18	1.44	.83	1.08	0.35
Negative conditional regard (負の条件的関心)						
1	My coach is less friendly with me if I don't make the effort to see things his/her way. コーチ (指導者) は,私がコーチの望むような努力をしなかったら,そっけない態度になる	3.80	1.79	.65	−0.02	−0.86
4	My coach is less supportive of me when I am not training and competing well. コーチ (指導者) は,私が順調にトレーニングへ取り組めず,競技も上手くできないと,あまりサポートしてくれなくなる	3.14	1.70	.75	0.45	−0.63
8	My coach pays me less attention if I have displeased him/her. コーチ (指導者) は,私がコーチを喜ばすことが出来ていないと,	2.91	1.78	.86	0.55	−0.77

(continued on next page)

Table 1 (*continued*)

	CCBS Subscale and Items	Mean	SD	Loading	Skewness	Kurtosis
	私にあまり関心を示さなくなる					
12	My coach is less accepting of me if I have disappointed him/her. コーチ (指導者) は,私がコーチをがっかりさせると,私をあまり受け入れてくれなくなる	2.86	1.80	.88	0.62	−0.70
Intimidation (威嚇)						
2	My coach shouts at me in front of others to make me do certain things. コーチ (指導者) は,私を他の人たちの前で怒鳴りつけて正しい方向へ向かわせようとする	3.24	1.93	.59	0.33	−1.12
6	My coach threatens to punish me to keep me in line during training. コーチ (指導者) は,私がトレーニングに集中するよう,罰 (練習時間の延長など) を与えると言って脅す	2.42	1.76	.72	1.02	−0.16
9	My coach intimidates me into doing the things that he/she wants me to do. コーチ (指導者) は,私を脅してコーチの望んでいることをさせる	2.21	1.52	.84	1.12	0.38
13	My coach embarrasses me in front of others if I do not do the things he/she wants me to do. コーチ (指導者) は,私がコーチの望んでいることをしないと,他の人たちの前で恥ずかしい思いをさせる	2.05	1.46	.81	1.35	1.03
Excessive personal control (過度の個人統制)						
5	My coach tries to control what I do during my free time. コーチ (指導者) は,私が自由時間にすることをコントロールしようとする	2.69	1.69	.68	0.69	−0.55
10	My coach tries to interfere in aspects of my life outside of my sport. コーチ (指導者) は,私のスポーツ以外の人生にも干渉しようとする	2.55	1.69	.63	0.81	−0.37
15	My coach expects my whole life to center on my sport participation. コーチ (指導者) は,私の生活がスポーツ中心になることを期待している	3.33	1.97	.59	0.32	−0.09

Note. All factor loadings are statistically significant (p<.01). Correlation between factors: Controlling use of rewards-Negative conditional regard = .57; Controlling use of rewards-Intimidation = .70; Controlling use of rewards-Excessive personal control = .71; Negative conditional regard- Intimidation = .82; Negative conditional regard-Excessive personal control = .73; Intimidation-Excessive personal control = .87.

demonstrated an acceptable fit for all invariances. The increase in CFI did not exceed the criterion value of .01 compared to the baseline configural invariance model.

Internal consistency and discriminant validity analyses

Table 5 displays the means and standard deviations, α coefficients, CR, AVE, and range of shared variance regarding the CCBS subscales. The internal consistency of all subscales was generally acceptable (α coefficient range: .65–.86; CR coefficient range: .65–.87). In relation to discriminant validity, the correlation between controlling and autonomy-supportive coaching behaviors indicated small negative correlations ($p < .01$) for two of the CCBS subscales (negative conditional regard $r = -.18$, intimidation $r = -.18$), and nonsignificant correlations for the other two subscales (controlling use of rewards $r = -.02$, excessive personal control $r = -.04$). The AVEs of the CCBS variables (range: .39–.62) were higher than their shared variance (range: .13–.49), except for the excessive personal control subscale.

Summary of study 1

The Japanese version of the CCBS has been found to exhibit acceptable psychometric properties in terms of its factor structure, measurement invariance, internal consistency, and discriminant validity.

Study 2

Study 2 examined the test-retest reliability of the Japanese version of the CCBS over a two-week period of time. We hypothesized that each subscale of the CCBS would show a moderate to a good level of intraclass correlation coefficient (ICC).

Methods of study 2

Participants and procedure

A total of 108 Japanese university student-athletes (38 males, 70 females; M_{age} = 19.61 years, SD_{age} = 0.59) from two universities in Japan (one university in the Kansai area and another university in the Kanto area) participated in the study. The majority practiced baseball (n = 34, 31.5%), athletics (n = 9, 8.3%), football (n = 8, 7.4%), basketball (n = 8, 7.4%), volleyball (n = 7, 6.5%), swimming (n = 5, 4.8%), and tennis (n = 5, 4.8%). The remaining athletes (n = 32, 29.6%) were from various sport backgrounds, including badminton, touch football, lacrosse, futsal, canoe, gymnastics, artistic gymnastics, and kendo. Participants were asked to complete the CCBS of Study 1 before and two weeks later for the CCBS of Study 2. The same procedures and ethical approval as in Study 1 were applied to Study 2.

Data analysis

Intraclass correlation coefficient (ICC) was used to assess the test-retest reliability of the Japanese version of the CCBS. ICC values and their 95% confident intervals were computed using SPSS 21.0 based on a mean-rating (k = 3 or 4), absolute-agreement, and two-way mixed-effects model. ICC values were interpreted as follows: < .50 as poor, .50–.75 as moderate, .75–.90 as good, and > .90 as excellent reliability, respectively (Koo & Li, 2016).

Results of study 2

8.5% (N = 10) of participants (N = 118) did not complete the second assessment; thus, they were removed from subsequent analysis. The results revealed that The ICC values for all of the subscales were .65 to .87, indicating moderate to good reliability (Controlling use of rewards, ICC = .65 [95%CI=.47–.76]; Negative conditional regard, ICC = .87 [95%CI=.81–.91]; Intimidation, ICC = .71 [95%CI=.57–.80]; Excessive personal control, ICC = .80 [95%CI=.70–.86]).

Table 2
Good-of-fit indices for the invariance of the CCBS across sex groups.

Model description	χ^2	*df*	χ^2/df	$\triangle\chi^2$	$\triangle df$	*p*	CFI	$\triangle$CFI
Configural invariance (the free parameters model)	467.17	168	2.78	–	–	–	.922	–
Measurement invariance (the fixed factorial measurement model)	480.47	179	2.68	13.30	11	.000	.921	.001
Scale invariance (the fixed factorial and covariance measurement model)	510.17	189	2.70	43.00	21	.000	.916	.006

Note. χ^2 = chi-squared; *df* = degrees of freedom; χ^2/df = normative chi-square; $\triangle\chi^2$ = differences in the value of chi-squared; $\triangle df$ =differences in the degrees of freedom; CFI = comparative fit index; $\triangle$CFI = differences in the value of the comparative fit index.

Table 3
Good-of-fit indices for the invariance of the CCBS across sport type groups.

Model description	χ^2	*df*	χ^2/df	$\triangle\chi^2$	$\triangle df$	*p*	CFI	$\triangle$CFI
Configural invariance (the free parameters model)	460.35	168	2.74	–	–	–	.924	–
Measurement invariance (the fixed factorial measurement model)	475.19	179	2.66	14.84	11	.000	.923	.001
Scale invariance (the fixed factorial and covariance measurement model)	491.99	189	2.60	31.64	21	.000	.921	.003

Note. χ^2 = chi-squared; *df* = degrees of freedom; χ^2/df = normative chi-square; $\triangle\chi^2$ = differences in the value of chi-squared; $\triangle df$ =differences in the degrees of freedom; CFI = comparative fit index; $\triangle$CFI = differences in the value of the comparative fit index.

Table 4
Good-of-fit indices for the invariance of the CCBS across competitive level groups.

Model description	χ^2	*df*	χ^2/df	$\triangle\chi^2$	$\triangle df$	*p*	CFI	$\triangle$CFI
Configural invariance (the free parameters model)	475.05	168	2.83	–	–	–	.920	–
Measurement invariance (the fixed factorial measurement model)	487.04	179	2.72	11.99	11	.000	.920	.000
Scale invariance (the fixed factorial and covariance measurement model)	502.25	189	2.66	27.20	21	.000	.918	.002

Note. χ^2 = chi-squared; *df* = degrees of freedom; χ^2/df = normative chi-square; $\triangle\chi^2$ = differences in the value of chi-squared; $\triangle df$ =differences in the degrees of freedom; CFI = comparative fit index; $\triangle$CFI = differences in the value of the comparative fit index.

Table 5
Means, standard deviations, internal consistency and validity indices for the CCBS subscales.

Subscale	*Mean*	*SD*	*α*	*CR*	*AVE*	*Range of Shared Variance*
Controlling use of rewards	2.55	1.22	.77	.77	.47	.13–.23
Negative conditional regard	3.18	1.49	.86	.87	.62	.13–.49
Intimidation	2.48	1.37	.81	.83	.55	.23–.49
Excessive personal control	2.88	0.94	.65	.65	.39	.19–.42

Note. *α* = Cronbach's alpha coefficient; *CR* = Composite reliability coefficient; *AVE* = Average variance extracted.

Summary of study 2

The findings from Study 2 supported the test-retest reliability of the Japanese version of the CCBS across a two-week period.

Discussion

The purpose of this study was to explore the psychometric properties of the Japanese version of the CCBS. Two studies were conducted to examine factor structure, measurement invariance, internal consistency, discriminant validity, and test-retest reliability. The findings supported the structural validity of the scale. Adequate fit indices were identified for the four-factor model tested. The Japanese version of CCBS includes 15 items that measure four types of coaches' controlling behavior, that is, the controlling use of rewards, negative conditional regard, intimidation, and excessive personal control. Additionally, the Japanese version of the CCBS demonstrated equivalence of the scale across sex, sport types, and competitive levels. Multi-group invariance analyses evaluate whether measurement properties are generalizable across multiple groups. It is crucial to assess differences between various groups (e.g., male and female) in sport/exercise research (Ntoumanis & Myers, 2016). Previous research has tested the invariance of the factor pattern and factor weights for the four subscales on the original CCBS across sex and sport types (Bartholomew et al., 2010). The Spanish version of CCBS was conducted with an equivalence test across competitive levels (Castillo et al., 2014). The findings imply that the Japanese version of the CCBS can also be used to investigate sex, sport type, and competitive level differences within the sport context.

Internal consistency of the Japanese version of CCBS was generally acceptable regarding *α* and CR coefficient values. Although only one subscale (excessive personal control) indicated a slightly lower *α* coefficient value ($\alpha = .65$). Cortina (1993) pointed out that *α* coefficient is affected by the number of items. Value above .60 are still considered acceptable with respect to subscales with small numbers of items, such as excessive personal control which only includes three items. The correlation analysis between athletes' perceptions of their coach's controlling and autonomy-supportive coaching behaviors supported the discriminant validity for the Japanese version of the CCBS. Bartholomew et al. (2010) have suggested that controlling behaviors are not the exact opposite of autonomy-supportive behaviors. Therefore, we hypothesized that CCBS constructs would be weakly or non-significantly correlated with autonomy-supportive behaviors. The result showed that negative conditional regard and intimidation were weakly

correlated with autonomy-supportive coaching behavior. Conversely, controlling use of rewards and excessive personal control revealed nonsignificant correlations with autonomy-supportive coaching behaviors. These results align with those of previous studies (Bartholomew et al., 2010; Castillo et al., 2014) that negative conditional regard and intimidation are more negatively related to autonomy-supportive coaching behavior than controlling use of rewards and excessive personal control. The AVE of excessive personal control was slightly lower than its shared variance. Comparing the AVE and the shared variance between the factors is a more rigorous test for discriminant validity (Hair et al., 2019). The discriminant validity of the CCBS using AVE and shared variance needs to be further tested. The findings of Study 2 suggested that the Japanese version of CCBS has generally good test-retest reliability.

The Japanese version of CCBS developed in this study may facilitate future research on coaching behavior in the Japanese sports context. As a result, researchers who use the Japanese CCBS would obtain more accurate and comprehensive data on coaching behaviors in Japan. Furthermore, the initial validation of the Japanese CCBS will support cross-cultural research on coaching behaviors, as it provides a standardized measure that can be used to compare coaching behaviors across different cultures and contexts. In turn, this may help to identify similarities and differences in coaching behaviors across different cultures and inform the development of more effective cross-cultural coaching strategies.

Although the findings from this study add to the existing literature on the interpersonal style of sport coaches in Japan, some limitations should be acknowledged. First, while we have made efforts to evaluate the validity and reliability of the Japanese version of CCBS, several aspect of the new scale's validity still need to be tested (e.g., criterion validity and ecological validity). Examining the relationship between scores on the CCBS scale and observations of actual coaching behavior would provide strong support for concurrent validity. Furthermore, the concurrent and predictive validity of the CCBS should be explored in future research. It is hypothesized the scores on the Japanese version of the CCBS will positively predict athletes' need frustration (Ryan & Deci, 2017). Second, our data were collected on young athletes, and only university students were included. Further research is needed to generalize the current findings to different age groups of Japanese athletes. In addition, this study did not evaluate the cross-cultural invariance of the CCBS. Further testing of cross-cultural invariance with a multicultural sample using the English version of the CCBS would offer a better understanding of coaches' controlling behaviors.

Collectively, the evidence obtained in this study provides important support for the translated CCBS. The Japanese version of the measure demonstrated good structural validity, invariance across sex, sport type, and competitive level, internal consistency, discriminant validity, as well as test-retest reliability. In sum, the Japanese version of the CCBS was shown to be a valid and reliable measure of athletes' perceptions of their sports coaches' controlling interpersonal behaviors. We hope that the scale will facilitate research into the "darker" side of sports participation and cross-cultural explorations into this important but underresearched area, allowing us to understand the motivational strategies used by sports coaches.

Auth note

Portions of these data were presented at the 8th International Congress of Asian-South Pacific Association of Sport Psychology, Daegu, Korea. The authors thank Yoshifumi Tanaka, Nana Toyama (Mukogawa Women's University), and Yufu Tanaka (Kindai University) for their help with data collection.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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