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Sport-specific relationship problems: Turkish adaptation of an evaluation method



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Abstract

Background The aim of this study is to adapt the Student Athlete Relationship Instrument (SARI) scales (Family, Coaches, Teammates, Peers) that evaluate student-athletes' relationships with their environment in a standardized manner into Turkish, ensuring their validity and reliability.

Methods The study included athletes aged 14 and older who are proficient in reading and writing Turkish and actively engaged in regular sports activities. Following the necessary approvals, the scales were translated into Turkish by independent experts, ensuring content validity. A total of 403 athletes participated in validity and reliability analyses. The suitability of the scales for factor analysis was assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. Exploratory factor analysis using the principal components method was conducted to examine construct validity. Reliability was assessed through internal consistency analysis, utilizing Cronbach's alpha coefficient.

Results The study examined the psychometric properties of the family, coach, teammate, and peer subscales, with a focus on reliability and validity. The scales demonstrated strong internal consistency and suitability for factor analysis, as evidenced by supportive measures of sampling adequacy and factor structure. These findings indicate that the subscales are robust tools for assessing the intended constructs in their respective domains.

Conclusions The SARI has been adapted into Turkish, confirming its validity and reliability for Turkish-speaking athletes. These scales provide a resource for health professionals to identify relational dynamics impacting athletic performance.

Keywords Interpersonal relations, Questionnaire, Sport psychology

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Background

Student-athletes are individuals who simultaneously manage both academic and athletic responsibilities. Their relationships with social groups such as family, coaches, teammates, and peers significantly influence their biopsy-chosocial well-being and athletic performance. Particularly, factors such as the coach-athlete relationship, team dynamics, and family support can play a critical role in determining an athlete's performance [1, 2].

Social support is recognized as a factor that strengthens psychological resilience and coping mechanisms against stress. Supporting the psychological health of athletes can positively contribute to their athletic performance.



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The effects of this support structure emerge through the relationships individuals establish with their social environment [3, 4]. The quality of social interactions plays a role in fostering emotions and behaviors such as trust, support, motivation, respect, and cooperation, or conversely, negative traits like lack of motivation, insecurity, and indifference [5]. Evaluating athletes'relationships with their environment constitutes the first step in identifying problems and developing solutions [6].

In this context, the Student Athlete Relationship Instrument (SARI) was developed to determine the extent and manner in which relationship factors affect athletic performance [7]. SARI, with its four subscales (family, coaches, teammates, and peers), provides a standardized method to evaluate individuals'relationships with their social environment.

As far as the literature review indicates, no standardized Turkish instrument specifically addresses the manifestation and scope of sports-specific issues within the relationships between athletes and their coaches, teammates, family, or peers. The absence of such a measurement tool in Türkiye creates a gap in understanding the problems in athletes'social relationships. This study aims to adapt the SARI [7], which evaluates the relationships of student-athletes with their social environment through a standardized method, into Turkish and ensure its validity and reliability. This research focuses on adapting the instrument in accordance with scientific standards and aims to contribute to studies on Turkish athletes and their social support systems.

Methods

Participants and sample selection

The study population consists of athletes who are currently students in the provinces where the research was conducted. Participants were recruited via convenience sampling from sports clubs and local teams. Scales were administered face-to-face by trained researchers to ensure comprehension. The inclusion criteria for athletes were being at least 14 years old, having proficiency in reading and writing in Turkish, and regularly participating in any sports discipline. Athletes diagnosed with psychiatric disorders (major depression) and currently using medication (n = 3) were excluded from the study.

The SARI evaluates athletes'relational problems across four subscales: Family (16 items), Coaches (19 items), Teammates (18 items), and Peers (10 items). Each item is scored on a 7-point Likert scale (1 = Strongly Disagree, 7= Strongly Agree). The original scale demonstrated high reliability (Cronbach's α : 0.87–0.96) [7]. The scales were gradually adapted in accordance with the COS-MIN international consensus [8]. To ensure the validity and reliability of the scales in Turkish, permission was obtained via email on September 25, 2023, from Prof. Dr. Brad Donohue, one of the developers of tools that assess relationships with the environment using standardized methods.

Ethics approval and consent to participate

The study was deemed ethically appropriate by the Health Sciences Ethics Committee on November 7, 2023, under decision number 69/6. Volunteer participants over the age of 18 signed a written informed consent form. Parents provided written informed consent on behalf of their children under 18 years of age to participate in the study. The research was taken in accordance with the Declaration of Helsinki.

Translation-back translation phase

After obtaining the necessary permissions, independent four experts (EŞ, GB, NB, HK) translated the scales, resulting in the Turkish version of the scales. The backtranslation of the scales was carried out by a bilingual professional translator (AÖ).

Sample Size

The scientific literature suggests 5–20 individuals for the content validity phase and minimum 5 observations for each item on the scale for other validity and reliability evaluations [9]. The sample size (n = 403) was determined based on the guideline of 5–20 participants per item [10]. With 10–19 items per subscale, our sample exceeded the minimum requirement of 100 participants for stable factor analysis [11]. To ensure content validity, an Understandability Evaluation Form with options ranging from'4-Completely Understood'to'1-Not Understood at All'was used to gather feedback from 10 athletes. Based on the feedback and analyses, it was determined that content validity was achieved. Subsequently, the Turkish version of the scales was administered to 403 athletes simultaneously for validity and reliability analyses [10].

Statistical analysis

The content validity of the scales was assessed using the Item-Content Validity Index (I-CVI) and Scale-Content Validity Index (S-CVI) values, calculated using the formulas: I-CVI = agreed items/number of experts and S-CVI = sum of I-CVI scores/number of items [12]. I-CVI values ≥ 0.78 and S-CVI ≥ 0.80 were considered acceptable [13]. Cronbach's $\alpha > 0.70$ indicated adequate internal consistency [14].

To test the suitability of the scales for factor analysis, the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity were conducted. Based on these tests, Exploratory Factor Analysis (EFA) using the principal components method was performed to examine construct validity. For the reliability assessment of the scales, internal consistency was evaluated using Cronbach's alpha coefficient, item analysis, and difference testing between upper and lower groups [9].

The validity and reliability analyses of the scales were conducted using SPSS v.23 (IBM Corp., Armonk, New York, USA). Categorical data were presented as frequency (n) and percentage (%), while quantitative data were presented as mean \pm standard deviation.

Results

Content and face validity

The content validity stage involved 10 athletes (70% (n = 7) female, 30% (n = 3) male/20% (n = 2) high school, 80% (n = 8) university) with an average age of 19.80 ± 3.22 years. Of these athletes, 80% (n = 8) participated in team sports (n = 5 volleyball, n = 1 basketball, n = 1 soccer, n = 1 futsal), and 20% (n = 2) participated in individual sports (n = 1 fitness, n = 1 table tennis). The athletes had been training for 5.40 ± 4.50 years, with an average training duration of 8.90 ± 8.63 h per week. 10% (n = 1) of the athletes had a known chronic illness (asthma) but did not use medication.

In the content validity analysis according to the Davis technique [12], the I-CVI values were calculated in the range of 0.80 to 1.00 (Table 1), and the S-CVI values were found to be 0.95 for the Family scale, 0.97 for the Coach scale, 0.98 for the Teammates scale, and 1.00 for the Peers scale. Davis recognized 0.80 as an acceptable level for CVI [12]. Based on this reference value, it was determined that the Turkish version of the scales matched the acceptable criteria for content validity.

Descriptive characteristics of the research's sample

The study involved 403 athletes (44.7% (n = 180) female, 55.3% (n = 223) male/16.1% (n = 65) high school, 83.9% (n = 338) university) with an average age of 20.15 ± 2.17 years. Of these athletes, 74.4% participated in team sports, and 25.6% participated in individual sports, with an average training duration of 7.72 ± 3.11 years and 5.57 ± 3.49 h per week. 4% (n = 16) of the athletes had a known chronic illness, and 1.5% (n = 6) used medication.

When querying the level of contribution of individuals in athletes'relationships to sports performance (with a minimum score of 1 and a maximum score of 7), the scores given were 5.97 ± 1.36 for coaches, 5.94 ± 1.33 for teammates, 5.73 ± 1.41 for peers, and 5.71 ± 1.68 for family members.

Reliability analysis and exploratory factor analysis

In the internal consistency examination of the scales, Cronbach's alpha coefficients were found to be at a high reliability [9, 14] level (> 0.90). The average and standard

2	1 00	1.00	1 00	1 00
2	1.00	1.00	1.00	1.00
3	0.90	1.00	1.00	1.00
4	1.00	1.00	0.90	1.00
5	0.80	0.90	0.90	1.00
6	1.00	1.00	1.00	1.00
7	0.90	1.00	1.00	1.00
8	0.90	0.90	1.00	1.00
9	1.00	1.00	1.00	1.00
10	0.90	1.00	1.00	1.00
11	1.00	1.00	1.00	-
12	1.00	1.00	1.00	-
13	1.00	0.90	1.00	-
14	1.00	1.00	1.00	-
15	1.00	1.00	1.00	-
16	1.00	1.00	1.00	-
17	-	0.90	1.00	-

1.00

1.00

SARI-Coaches

1.00

SARI-

1.00

1.00

Teammates

Table 1 I-CVI scores of SARI's Items

SARI-Families

I-CVI

0.80

Item no

1

18

19

SARI Student Athlete Relationship Instrument

deviation values of the items were similar (Tables 2, 3, 4 and 5). The item discrimination index was positive, and the *p*-value from the independent groups t-test conducted between the upper and lower 27% groups was calculated as < 0.001. There was no floor or ceiling effect [9, 15] in the total scale scores and subscale scores.

SARI-Family scale

In the internal consistency examination of the SARI-Family scale, items that decreased the Cronbach alpha coefficient (originally item 1 and item 14) were identified and removed from the scale. As a result, the Cronbach alpha coefficient for the SARI-Family scale was determined to be 0.93.

The KMO value (0.92), Bartlett's test of sphericity Chi-Square result (3669.41), *p*-value (< 0.001), and'antiimage'correlation values (*0.50; lowest: 0.85, highest: 0.96) indicated the suitability of the scale for factor analysis. Consequently, the scale was examined using the principal components method with direct oblimin rotation.

In the scale, a three-factor structure with eigenvalues greater than 1 was identified, with shifts in item distribution compared to the original scale. For the SARI-Family subscale, the first factor (items 6, 11, 12, 13, 15, 16; Cronbach's alpha coefficient: 0.89) had an eigenvalue of 7.35 and explained 52.52% of the

SARI-Peers

1.00

Original item no	New item no	Mean	Standard Deviation	Corrected Item-Total Correlation Coefficient	Item Discrimination Strength Index	Rotated Factor Load
2	1	3.52	2.02	0.59	16.93	0.87
3	2	3.39	1.99	0.57	15.74	0.88
4	3	3.71	2.06	0.69	20.35	0.80
5	4	4.03	2.04	0.73	25.31	0.72
6	5	4.07	2.22	0.66	20.70	0.42
7	6	3.84	2.07	0.59	16.64	0.91
8	7	3.71	1.97	0.68	22.72	0.60
9	8	3.82	1.95	0.70	21.73	0.77
10	9	3.91	2.04	0.67	19.30	0.43
11	10	4.16	2.11	0.78	28.17	0.48
12	11	4.53	2.06	0.64	17.32	0.65
13	12	4.78	2.15	0.69	21.07	0.69
15	13	4.47	2.25	0.65	22.97	0.94
16	14	4.54	2.22	0.70	25.00	0.91

Table 2 Results of SARI-Family scales

SARI Student Athlete Relationship Instrument

Table 3 Results of SARI-Coaches scales

ltem no	Mean	Standard Deviation	Corrected Item-Total Correlation Coefficient	Item Discrimination Strength Index	Rotated Factor Load
1	4.01	2.24	0.71	24.11	0.75
2	4.35	2.22	0.76	28.17	0.76
3	3.75	2.01	0.63	17.69	0.78
4	4.10	1.94	0.66	18.68	0.55
5	4.22	2.02	0.75	23.22	0.68
6	3.64	2.10	0.65	19.13	0.62
7	3.89	2.05	0.74	23.34	0.73
8	3.33	1.94	0.54	14.06	0.61
9	4.21	2.22	0.76	30.91	0.66
10	4.75	2.09	0.66	18.58	0.59
11	4.45	2.04	0.71	23.40	0.63
12	4.27	2.18	0.48	10.54	0.72
13	4.18	2.08	0.74	21.96	0.68
14	4.10	2.01	0.74	23.19	0.50
15	4.23	2.04	0.80	30.85	0.60
16	4.15	2.06	0.71	22.07	0.55
17	4.09	1.95	0.66	17.37	0.75
18	4.44	2.03	0.69	21.29	0.64
19	4.01	2.03	0.58	13.66	0.83

SARI Student Athlete Relationship Instrument

variance. The second factor (items 2, 3, 4, 5, 10; Cronbach's alpha coefficient: 0.87) had an eigenvalue of 1.55 and explained 11.13% of the variance. The final factor (items 7, 8, 9; Cronbach's alpha coefficient: 0.82) had an eigenvalue of 1.01 and explained 7.21% of the variance.

Original item no	New Item no	Mean	Standard Deviation	Corrected Item-Total Correlation Coefficient	Item Discrimination Strength Index	Factor Load
1	1	3.70	2.22	0.76	30.81	0.65
2	2	3.60	2.12	0.76	26.29	0.64
3	3	3.93	2.18	0.75	26.48	0.63
4	4	3.14	1.98	0.62	15.81	0.45
5	5	3.73	2.12	0.74	25.51	0.61
6	6	3.73	2.05	0.64	16.71	0.48
8	7	3.73	1.93	0.63	16.22	0.45
9	8	3.95	2.09	0.77	29.77	0.66
11	9	3.87	2.01	0.68	20.88	0.52
12	10	4.15	2.11	0.58	16.29	0.40
13	11	3.74	2.07	0.71	22.69	0.56
14	12	3.61	2.10	0.74	26.48	0.61
15	13	4.10	2.14	0.73	25.05	0.60
16	14	4.16	2.11	0.75	29.05	0.63
18	15	4.69	2.09	0.61	15.83	0.44

Table 4 Results of SARI-Teammates scales

SARI Student Athlete Relationship Instrument

Table 5 Results of SARI-Peers scales

Original item no	New Item no	Mean	Standard Deviation	Corrected Item-Total Correlation Coefficient	Item Discrimination Strength Index	Rotated Factor Load
1	1	3.71	2.32	0.74	31.72	0.88
2	2	3.62	2.22	0.71	27.33	0.92
3	3	3.54	2.12	0.67	23.07	0.84
4	4	3.86	2.17	0.76	30.94	0.87
5	5	3.96	2.12	0.78	34.13	0.83
6	6	4.17	2.11	0.80	36.11	0.71
8	7	4.66	2.29	0.56	16.05	0.88
9	8	5.25	2.17	0.56	16.09	0.87
10	9	4.57	2.28	0.55	17.98	0.86

SARI Student Athlete Relationship Instrument

SARI-Coaches scale

No items were found to decrease the scale's reliability, and the Cronbach's alpha coefficient was determined to be 0.95.

The KMO value was 0.94, Bartlett's test of sphericity Chi-Square result was 5305.65, the *p*-value was < 0.001, and the 'anti-image' correlation values were all above 0.50 (lowest: 0.90, highest: 0.97), indicating the scale's suitability for factor analysis. The analysis was conducted using the principal components method with varimax rotation.

In the scale, a three-factor structure with eigenvalues greater than 1 was identified. In the original scale, items from Factors 2 and 3 merged into a single factor. For the SARI-Coaches subscale, the first factor (items 1, 2, 3, 4, 5, 6, 7, 8, 9; Cronbach's alpha coefficient: 0.92) had an eigenvalue of 10.06 and explained 52.99% of the variance. The second factor (items 10, 11, 12, 13, 14, 15, 16; Cronbach's alpha coefficient: 0.89) had an eigenvalue of 1.43 and explained 7.54% of the variance. The third factor (items 17, 18, 19; Cronbach's alpha coefficient: 0.85) had an eigenvalue of 1.02 and explained 5.37% of the variance.

SARI-Teammates scale

In the internal consistency analysis of the scale, items that reduced the Cronbach's alpha coefficient (original items 7, 10, and 17) were identified. These items, which diminished the reliability of the scale, were removed following the analysis. Consequently, the SARI-Teammates subscale's Cronbach's alpha coefficient was determined to be 0.94.

The KMO value was 0.94, Bartlett's test of sphericity Chi-Square result was 3953.84, the *p*-value was < 0.001, and the 'anti-image' correlation values were all above 0.50 (lowest: 0.91, highest: 0.96), indicating the scale's suitability for factor analysis. The analysis was conducted using the principal components method.

A single-factor structure with an eigenvalue greater than 1 was observed. The eigenvalue of this factor was 8.40, explaining 56.00% of the variance.

SARI-Peers scale

No items were identified as reducing the scale's reliability. However, item 7, which exhibited redundancy, was decided to be removed from the scale. Consequently, the Cronbach alpha coefficient for the Peers scale was found to be 0.90.

The KMO value was 0.89, Bartlett's test of sphericity Chi-Square result was 2586.64, the *p*-value was <0.001, and the 'anti-image' correlation values were all above 0.50 (lowest: 0.82, highest: 0.95), indicating the scale's suitability for factor analysis. Exploratory factor analysis was performed using the principal components method with direct oblimin rotation.

A two-factor structure with eigenvalues greater than 1 was observed. After removing the redundant item (item 7), the distribution of items across factors was similar to the original scale.

For the SARI-Peers subscale, the first factor (items 1, 2, 3, 4, 5, 6; Cronbach's alpha coefficient: 0.93) had an eigenvalue of 5.25 and explained 58.40% of the variance. The second factor (items 8, 9, 10; Cronbach's alpha coefficient: 0.85) had an eigenvalue of 1.58 and explained 17.64% of the variance.

Confirmatory factor analysis

Due to the removal of items from the scales and the observed shift of remaining items to different sub-factors compared to the original scales in the exploratory factor analysis, confirmatory factor analysis was not conducted [16, 17]. The version of the original scale (Appendix 1) adapted to Turkish culture and language is presented in Appendix 2. The newly formed sub-factors were created by considering the content of the questions and drawing inspiration from the original scale names to ensure they align with Turkish cultural context.

Discussion

The findings of this study indicate that the SARI scales have been successfully adapted into Turkish and their validity and reliability have been ensured.

In the validity assessments, the first step involved examining comprehensibility through content validity [8, 18]. In this study, the I-CVI values were calculated to range between 0.8 and 1.0 [12], while the S-CVI values were found to be 0.95 for the SARI-Family, 0.97 for the SARI-Coaches, 0.98 for the SARI-Teammates, and 1.00 for the SARI-Peers. Given that the minimum acceptable values are 0.78 for I-CVI and 0.80 for S-CVI [13], it was observed that the instruments adequately covered and were comprehensible regarding the concepts they intended to measure.

In reliability studies for surveys, a Cronbach's alpha coefficient above 0.70 is considered acceptable [14, 19]. In this study, Cronbach's alpha values for all scales were found to be high, indicating strong reliability: 0.93 for family, 0.95 for coaches, 0.94 for teammates, and 0.90 for peers. In the original study by Donohue et al., the Cronbach's alpha values were reported as 0.92 for family, 0.96 for coaches, 0.93 for teammates, and 0.87 for peers [7].

Construct validity assesses how well the survey items measure the intended qualities [9, 15]. Factor analysis techniques are commonly used for this purpose [19, 20]. For scale development and adaptation studies, it is essential that the KMO value exceeds 0.60, the Bartlett's Test of Sphericity has a *p*-value less than 0.05, and the "antiimage" correlation values are above 0.50 to proceed with factor analysis [9, 21]. The KMO value ranges are categorized as"average"(0.50-0.70),"good"(0.70-0.80),"very good"(0.80–0.90), and "excellent" (above 0.90), with higher values indicating better sampling adequacy [9, 11, 19]. In this study, KMO values were calculated as 0.92 for family, 0.94 for coaches, 0.94 for teammates, and 0.89 for peers, with *p*-values from Bartlett's Test of Sphericity being <0.001 for all scales and "anti-image" correlation values exceeding 0.50. These results confirmed the adequacy to proceed with exploratory factor analysis.

For a construct to be accepted as a factor, its eigenvalue must exceed 1 and its explained variance ratio must surpass 5%[9, 15, 17, 20]. In this study, the SARI-Family scale revealed a three-factor structure, with some shifts observed in item distributions compared to the original scale. The eigenvalues and explained variance ratios were 7.35, 52.52%; 1.55, 11.13%; and 1.01, 7.21%, respectively. The SARI-Coaches scale also revealed a three-factor structure; items in Factors 2 and 3 of the original scale merged into a single factor. The SARI-Coaches subscale merged into one factor, reflecting local coaching styles. The eigenvalues and explained variance ratios were 10.06, 52.99%; 1.43, 7.54%; and 1.02, 5.37%, respectively. The

SARI-Teammates scale exhibited a single-factor structure, with an eigenvalue of 8.40 and an explained variance ratio of 56.00%. While the original SARI-Teammates scale had five factors, the Turkish version showed a single-factor structure, possibly due to cultural emphasis on collective harmony in Turkish sports teams. The SARI-Peers scale showed a two-factor structure; after excluding item 7 due to overlapping characteristics, the item distribution was found to resemble the original scale. The first factor's eigenvalue and explained variance ratio were 5.25, 58.40% while the second factor's values were 1.58, 17.64%.

Studies aiming to adapt measurement tools developed in different languages and cultures recommend conducting confirmatory factor analysis [9, 15, 20]. However, in validity and reliability studies, factors and the items they encompass may vary depending on the population's cultural context [20]. Measurement tools translated into different languages may be influenced by the target country's language and culture, requiring the removal of some items [9, 15, 22]. In this study, confirmatory factor analysis was not conducted because some items were excluded [20], and the items retained in the scales showed shifts to different sub-factors compared to the original scales after exploratory factor analysis. The new sub-factors were named inspired by the original scales, considering the content of the items and adapting them to Turkish culture.

Limitations

Confirmatory Factor Analysis was not performed due to significant item removal and factor structure changes during EFA, which rendered the original theoretical model incompatible. Future studies should validate the revised factor structure using Confirmatory Factor Analysis in independent samples. Limitations include the predominance of university-level athletes and reliance on self-report data, which may not capture all relational dynamics. Future studies should include observational methods.

Conclusions

As a result, the SARI was successfully adapted into Turkish in compliance with scientific standards, ensuring its validity and reliability, and made available for use by Turkish-speaking athletes. Health professionals working with athletes can use these scales to identify relational dynamics that may negatively affect athletic performance. After identifying problematic relationships, the data obtained can assist in treatment planning, and the scales can also be used to assess progress following interventions [7]. For example, health professionals can use this scale to identify athletes struggling with coach conflicts or peer isolation, tailoring interventions like team-building workshops. Researchers may apply it to assess intervention efficacy or cross-cultural comparisons.

The current items were developed as a self-report method to evaluate the scope of sports-specific relational issues, particularly among student-athletes [7], and have been adapted for the same target group. Future studies may explore the applicability of the scales among different athlete groups.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13102-025-01170-x.

Supplementary Material 1.

Supplementary Material 2.

Acknowledgements

We would like to thank the volunteers who participated in our research.

Clinical trial number

Not applicable.

Authors' contributions

SE, EŞ, AÖ conception; SE, EŞ, EŞ, AÖ, GB, NB, HK design of the work; SE analysis; All author interpretation of data; SE, EA have drafted the work; All author have approved the submitted version.

Funding

There was no funding for the research.

Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study was deemed ethically appropriate by the Health Sciences Ethics Committee on November 7, 2023, under decision number 69/6. Volunteer participants over the age of 18 signed a written informed consent form. Parents provided written informed consent on behalf of their children under 18 years of age to participate in the study. The research was taken in accordance with the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 27 January 2025 Accepted: 30 April 2025 Published online: 16 May 2025

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