

# Motivation in combat sports: a cross-cultural study on judokas from Brazil, India, and Poland

## BACKGROUND

This study aimed to (1) validate the Sport Motivation Scale (SMS) for Indian athletes and (2) compare sports motivation among judokas from India, Poland, and Brazil to explore cultural differences in motivational patterns.

## PARTICIPANTS AND PROCEDURE

Study 1 involved 305 Indian athletes across various sports. Confirmatory factor analysis (CFA), reliability testing, and measurement invariance were conducted using the Indian-adapted SMS, Anxiety-Depression-Stress Scale, and Achievement Motivation Scale. Study 2 included 104 judokas (India: 37, Poland: 32, Brazil: 35). Culturally validated versions of SMS were used to assess intrinsic, extrinsic motivation, and amotivation. Statistical analysis included the Tukey test, correlation analysis, and trend analysis.

## RESULTS

The Indian SMS showed good model fit (CFI = .95, TLI = .94, RMSEA = .05), high internal consistency ( $\alpha = .81-.96$ ), and strong convergent/discriminant validity. Cross-cultural comparisons showed no significant differences in intrinsic motivation, introjected regulation, or identified regulation among judokas, reflecting the standardized philosophy of

judo. Differences were mainly observed in externally regulated motivation and amotivation, highlighting the role of sociocultural and structural factors. Career-related factors revealed distinct motivational patterns: career length was associated with identified motivation in Indian judokas and with intrinsic motivation to experience stimulation in Polish judokas, whereas career quality showed associations with both intrinsic and extrinsic motivation across all groups. These findings highlight the importance of autonomy-supportive and culturally sensitive sport environments in sustaining long-term athletic engagement.

## CONCLUSIONS

This study validates the SMS for Indian athletes and reveals that, while core motivational components in judo are largely consistent across cultures, differences in external regulation and amotivation reflect sociocultural and structural influences. These findings highlight the need for culturally sensitive and autonomy-supportive environments to sustain long-term motivation in judo.

## KEY WORDS

sport motivation scale; judo; cross-cultural comparisons; psychometry

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## BACKGROUND

Motivation is an important aspect in combat sports because it inspires participants to push their physical and mental boundaries, overcome obstacles, and strive for perfection. It requires a great level of dedication, discipline, and resilience, as competitors must overcome physical and mental difficulties to attain their goals. Research on motivation for sports involvement is essential for comprehending the various mechanisms influencing individuals' decision to participate in sports (Balaguer et al., 2011; Perlman et al., 2012).

The most reliable and comprehensive theory supporting the data on motivation in various athletic contexts is Deci and Ryan's (1985) self-determination theory (SDT), which conceptualizes motivation as a continuum reflecting varying degrees of self-determination, ranging from non-regulated to fully autonomous forms of motivation (Deci & Ryan, 2000; Ryan & Deci, 2007, 2017). At one extreme of this continuum lies amotivation, which denotes a lack of intention or willingness to engage in an activity. Moving toward more self-determined forms, extrinsic motivation encompasses different types of regulation depending on the extent to which behavior is internalized. External regulation represents the least autonomous form of extrinsic motivation and refers to engagement driven by external rewards or the avoidance of punishment. Introjected regulation reflects partial internalization, where behavior is influenced by internal pressures such as guilt, obligation, or ego enhancement. A more autonomous form, identified regulation, occurs when individuals consciously value an activity and recognize its personal importance.

At the most self-determined end of the continuum lies intrinsic motivation, which refers to engaging in an activity for inherent satisfaction and interest. Within SDT, intrinsic motivation is further differentiated into three dimensions: intrinsic motivation to know, which involves engagement driven by curiosity and learning; intrinsic motivation to accomplish, which reflects satisfaction derived from mastery and achievement; and intrinsic motivation to experience stimulation, characterized by enjoyment, excitement, and sensory pleasure associated with the activity (Hagger & Chatzisarantis, 2007, 2008). These motivational regulations are not fixed categories but rather form a dynamic system through which individuals may shift depending on personal experiences and contextual influences (Harwood et al., 2015; Hastie et al., 2013; Pereira et al., 2024; Ryan & Deci, 2017).

SDT seeks to explain how differing levels of autonomous versus controlled motivation influence behavior across various domains, including participation and persistence in physical activity and sport (Mayorga-Vega & Viciano, 2014; Tang et al., 2021). While intrinsic motivation is associated with engagement driven by pleasure, interest, and satisfaction,

controlled forms of extrinsic motivation are associated with external demands or internal pressures, resulting in less volitional behavior. In contrast, autonomous extrinsic motivation, particularly identified regulation, is associated with greater self-endorsement and sustained involvement. Furthermore, SDT posits that the satisfaction of the basic psychological needs for autonomy, competence, and relatedness is essential for fostering intrinsic motivation and facilitating the internalization of extrinsic motivation, and these needs are considered universal across individuals and cultures (Deci & Ryan, 2008; Vallerand & Grouzet, 2001).

The Sport Motivation Scale (SMS) has been widely used across various countries, enabling comparisons of the motivational determinants of sports participation and facilitating the exploration of similarities and differences influenced by socio-cultural contexts. The literature on motivation, which has largely developed within Western contexts, raises concerns about the applicability of these theories to non-Western, collectivist cultures (Erez, 2008; Frontera, 2007; Iguisi, 2009; Iyenger & Lepper, 1999; Ly, 2020; Mdhlalose, 2024; Robbins et al., 2009). In collectivist societies, individuals often perceive their achievements as the result of collective efforts with peers, parents, and teachers, valuing group feedback and cooperation. In contrast, people in more individualistic societies attribute their success to personal effort and individual improvement, placing greater emphasis on self-reliance (Miller, 2013).

Cross-cultural studies have yielded mixed results regarding motivation's role in learning outcomes and well-being (Iyenger & Lepper, 1999; Markus & Kitayama, 2003). Chirkov (2009) found that, regardless of cultural orientation, autonomy support from teachers and parents positively influenced students' autonomous motivation and academic success in both Western (e.g., Belgium, the U.S.) and Eastern (e.g., South Korea, Brazil) contexts. Similarly, Taylor and Lonsdale (2010) observed that an autonomy-supportive environment enhanced motivation and positive experiences in physical education classes across British and Hong Kong students. These findings suggest a certain degree of cross-cultural generalizability for motivation-related constructs, such as autonomy support and achievement goals.

However, other studies, such as those by Markus and Kitayama (2003) and Iyengar and Lepper (1999), indicate that not all motivational factors hold equal importance across cultures. For example, autonomy – a key motivator in individualistic cultures such as the United States – plays a lesser role in collectivist cultures, where group autonomy and interdependence are prioritized. In Eastern societies, students are often more motivated when decisions are made by authority figures, such as parents or teachers, rather than by themselves. Such differences highlight the

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complexities of motivation across cultural boundaries, suggesting that while some aspects of motivation may be universal, others are culturally specific, and the role of culture in shaping motivation remains inconclusive.

In the present study, we examined sports motivation in three cultures: Polish, Indian, and Brazilian. Our study was divided into two parts, since the SMS is validated for Polish and Brazilian cultures but not in an Indian context. Therefore, study 1 validated the Indian version of the SMS. Then, study 2 compared sports motivation across the three cultures.

## STUDY 1: VALIDATION OF SMS IN INDIAN POPULATION

### PARTICIPANTS AND PROCEDURE

This study included a sample of 305 athletes: 152 females and 153 males, with a mean age of 22.92 years ( $SD = 3.59$ ). Convenience sampling was used: the authors contacted sports clubs and coaches to invite the players to participate in the data collection.

The study included participants from football, volleyball, field hockey, cricket, basketball, badminton, boxing, field athletics, judo, fencing, and gymnastics. The research involved two groups of participants: 117 classified as recreational and 188 as high-performance athletes. High-performance athletes were classified as individuals who had competed in officially sanctioned national or international events within the previous six months. Recreational athletes were defined as individuals actively participating in organized sport at any level who had no history of representing their sport at regional, national, or international levels, including during junior competition (Lamont-Mills & Christensen, 2006).

The study was conducted in accordance with the Declaration of Helsinki and received ethical approval from the relevant institutional ethics committee (approval no. 4/17.10.2022; approved on 29 November 2022). The subjects were given an informed consent form to sign, and they agreed to participate voluntarily in the study.

### MEASURES

*Demographics.* Participants responded to demographic questions (e.g., gender, age, domicile, sport types, years of training, frequency of training, and level of sports participation). In addition to the Indian version of the SMS, the study employed the following instruments to assess convergent, divergent, and discriminant validity.

*Sport Motivation Scale (SMS; Pelletier et al., 1995):* The SMS consists of 28 items across seven subscales,

measuring three types of intrinsic motivation, three types of extrinsic motivation, and amotivation. Each subscale has four items. Participants rate their reasons for engaging in sports on a 7-point Likert scale, with higher scores indicating stronger motivation in that category.

To ensure cultural and linguistic relevance, the SMS was adapted for use with Indian athletes. A panel of three subject-matter experts reviewed and culturally adapted the original English version of the questionnaire to ensure linguistic clarity and cultural relevance for the Indian context. In parallel, a Hindi version was developed to improve accessibility for Hindi-speaking athletes, particularly from North India. The Hindi translation underwent author review and evaluation by a sports psychologist, followed by back-translation by two independent bilingual psychologists fluent in English.

Despite these efforts, the number of completed Hindi-language questionnaires was insufficient for reliable psychometric analysis. Consequently, the Hindi version was excluded from the final analyses. All results presented in this study are therefore based on the culturally adapted English version of the questionnaire, which was selected due to adequate sample size and data quality. Minor wording adjustments were introduced to improve cultural clarity while preserving the original conceptual meaning of each item. The revised items were reviewed for clarity and comprehensibility by a small group of athletes prior to data collection. Then, to assess the psychometric adequacy of the adapted scale, a confirmatory factor analysis (CFA) was conducted, followed by the main data collection using the revised instrument.

*Anxiety, Depression, and Stress Scale (ADSS-BSPSA; Bhatnagar et al., 2011):* ADSS-BSPSA is a 48-item self-report measure of anxiety, depression, and stress that can be used on ages ranging from 14 to 70 years old. The scale is divided into 3 subscales: the anxiety subscale, which consists of 19 items; the depression subscale, which consists of 15 items; and the stress subscale, which consists of 14 items. Each item is scored 1 if the answer is “yes” and 0 if the answer is “no.” The range of scores for the anxiety subscale is 0-19, for the depression subscale is 0-15, and for the stress subscale is 0-14. Higher scores indicate greater levels of anxiety, stress, and depression. The scale demonstrated good internal consistency reliability for subscales, Anxiety ( $\alpha = .86$ ), Depression ( $\alpha = .85$ ), and Stress ( $\alpha = .82$ ).

*Achievement Motivation Scale (AMSn-DM; Deo & Mohan, 2008):* AMSn-DM is a 50-item self-report measure of achievement motivation that has 15 factors (academic motivation, need for achievement, academic challenge, achievement anxiety, importance of grade/marks, meaningfulness of task, relevance of school/college to future, attitude towards education, work methods, attitude towards teachers, interper-

sonal relations, individual concern, general interests, dramatics, and sports). There are 37 positive items and 13 negative items. This questionnaire is of the self-rating type and can be administered in a group, with 5 points to rate the categories *always, frequently, sometimes, rarely, and never*. It has no time limit. The scoring device was a simple, stencil type, with positive items weighted from 4 to 0 and negative items scored in reverse. The scores theoretically range from 0 to 200. This obtained score represents the raw score, which can be interpreted using z-score norms. The z-scores categorize achievement motivation into seven levels, ranging from highly motivated to lowest motivated. The scale demonstrated good internal consistency reliability (Cronbach's  $\alpha = .89$ ).

### STATISTICAL ANALYSIS

As per the objective of the study, the statistical techniques used in this study were descriptive statistics, confirmatory factor analysis, measurement invariance, and Spearman rho correlation. These analyses were done using RStudio and IBM SPSS Statistics version 29.0.1.0 (171). The evaluation of the tested models was based on several model fit indices. Although the chi-squared statistic was calculated, it is known to be highly sensitive to sample size. Therefore, additional fit indices were primarily used to assess model adequacy, including the comparative fit index (CFI), Tucker-Lewis index (TLI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA). The models were estimated using the maximum likelihood (ML) estimation procedure. The tested model aligned with

theoretical expectations and the structure of the original scale. Consistent with the seven subscales of the SMS, the model proposed seven latent factors, each represented by four corresponding items from its respective subscale.

The scale invariance was investigated for gender and sports participation level (high performance and recreational players). Item reliability was estimated through factor loadings and their squared values, which ultimately led to the analysis of convergent validity. If the composite reliability (CR) value is above 0.6 (or 0.7) and the average variance extracted (AVE) value above 0.5, then it is considered that the construct satisfies the convergent validity requirement. However, according to Fornell and Larcker (1981), if AVE is less than 0.5, but composite reliability is higher than 0.6, then it confirms the adequacy of convergent validity of the construct.

Later, Cronbach's  $\alpha$  coefficient was assessed in order to determine the reliability of the scale. For correlation, the Spearman rho correlation method was used to assess the relationship between the SMS and the other two scales (ADSS-BSPSA; AMSn-DM).

## RESULTS

### PRELIMINARY ANALYSIS

The descriptive statistics results are shown in Table 1. The overall fit test results of the CFA model are presented in Table 2. They showed a satisfactory fit to the data (i.e., CFI, and TLI > 0.90, RMSEA, and SRMR < 0.08) for the 7-factor model. Additionally, the 7-factor model showed satisfactory fit to the data

**Table 1**

*Descriptive statistics for the Indian version of the Sport Motivation Scale*

Sex Level of participation	N	Intrinsic motivation			Extrinsic motivation			Amotivation M (SD)
		To know M (SD)	To accomplish M (SD)	To experience stimulation M (SD)	Identification M (SD)	Introjection M (SD)	External regulation M (SD)	
Total	305	22.06 (5.71)	21.50 (4.99)	21.19 (5.39)	21.11 (4.42)	20.14 (5.31)	18.18 (4.80)	15.07 (6.24)
Female	152	24.82 (3.83)	23.19 (4.75)	23.31 (4.45)	23.08 (4.55)	21.68 (4.79)	19.65 (4.98)	15.75 (6.58)
Male	153	19.35 (5.92)	19.81 (5.62)	19.09 (5.43)	19.76 (4.59)	18.60 (5.37)	16.73 (4.13)	14.40 (5.83)
Recreation	117	19.89 (6.54)	19.71 (6.41)	19.70 (5.74)	20.36 (5.72)	18.57 (5.37)	16.99 (4.71)	14.88 (5.80)
High performance	188	23.44 (4.60)	22.60 (4.45)	22.12 (4.96)	22.07 (4.11)	21.11 (5.04)	18.94 (4.70)	15.20 (6.51)

**Table 2***CFA models for Indian version of the Sport Motivation Scale*

Models	<i>N</i>	$\chi^2$ ( <i>df</i> )	<i>p</i>	CFI	TLI	RMSEA [90% CI]	SRMR
7-factor	305	663.94 (329)	< .001	0.95	0.94	0.05 [0.05, 0.06]	0.05
M	153	524.26 (329)	< .001	0.94	0.93	0.06 [0.05, 0.07]	0.06
F	152	540.70 (329)	< .001	0.93	0.92	0.06 [0.05, 0.07]	0.06
HP	188	562.05 (329)	< .001	0.93	0.92	0.06 [0.05, 0.07]	0.05
R	117	472.82 (329)	< .001	0.95	0.95	0.06 [0.04, 0.07]	0.07

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*Note.* M – male; F – female; HP – high-performance athletes; R – recreational athletes; CFI – comparative fit index; TLI – Tucker-Lewis fit index; RMSEA – root mean square error of approximation; SRMR – standardized root mean square residual – robust values based on Satorra-Bentler correction.

in terms of gender and level of sports participation groups (Table 2).

Internal consistency for each subscale was evaluated across all subsamples, with Cronbach's  $\alpha$  coefficients ranging from .81 to .96. Table 3 displays the factor loadings, reliability metrics, squared multiple correlations, composite reliability (CR), average variance extracted (AVE), and maximum shared variance (MSV). All factor loadings were statistically significant ( $p < .001$ ), falling between 0.55 and 0.94.

#### INVARIANCE OF THE SMS MODEL

Table 4 summarizes the results of the invariance analysis of the SMS within the Indian context. The proposed models showed acceptable fit across both gender and sport participation level groups. These findings indicate that the SMS is a valid and reliable tool for use across different genders and levels of athletic involvement in the Indian population. Additionally, changes in fit indices remained within acceptable thresholds, with no CFI reduction greater than 0.01 or RMSEA increase exceeding 0.015, further confirming the model's stability.

#### CORRELATION

Spearman correlation analysis revealed statistically significant, moderate negative relationships between all dimensions of sports motivation (SMS) and the ADSS-BSPSA, with the exception of amotivation, across the entire athlete sample. Additionally, moderate positive correlations were observed between all SMS factors and the AMSn-DM (Table 5).

#### DISCUSSION

The SMS has been widely used in research on sport and physical recreation (Walczak & Tomczak, 2019). This study provided an in-depth analysis of Indian

athletes' functioning within their sports environment, focusing on psychological development through the fulfilment of autonomy, competence, and relatedness needs. The findings enabled comparisons of the psychometric properties of the SMS within the Indian context to those of other versions of the scale. Our results provided evidence of CFA, and invariance at the configural, metric, scalar and strict levels for the SMS within the Indian context. The results showed that a 7-factor model provided a good fit to the data:  $\chi^2(329) = 663.94$ ,  $p < .001$ , CFI = .95, TLI = .94, RMSEA = .05 with 90% CI = .05-.06, SRMR = .05. These results meet or exceed commonly accepted thresholds for good fit (CFI and TLI  $\geq .90$ , RMSEA  $\leq .06$ , SRMR  $\leq .08$ ), suggesting that the model is well supported by the data.

Compared to previous studies, the fit indices in this study are similar (Komarc et al., 2020) or notably stronger; for example, Walczak and Tomczak (2019) reported a suboptimal fit, with CFI = .884 and TLI = .867. Martens and Webber (2002) presented lower values (CFI = .84, TLI = .82, RMSEA = .07). While Pelletier et al. (1995) and Li and Harmer (1996) reported better results (CFI around .91 and TLI around .90), the current study shows even higher values for both CFI and TLI. Additionally, the RMSEA in this study (.05) is lower than in most prior studies, indicating improved model parsimony and precision. Hence, the fit indices obtained in the present research suggest a more robust representation of the SMS model compared to several previous validations, supporting its structural validity within this sample.

The SMS factorial model also exhibited invariance across gender and level of sports participation. These results are consistent with previous studies (Komarc et al., 2020). Factor loading values of all items in this Indian adaptation were fairly high ( $\geq 0.50$ ), which shows that all the items were acceptable (Hair et al., 2019). The smallest and largest factor loading values were 0.55 and 0.94, respectively (see Table 3). Discriminant validity was largely confirmed, as the AVE for each subscale surpassed the MSV. Convergent

**Table 3***Reliability analysis*

Dimensions	Items	$\lambda$	$\lambda^2$	CR	AVE	MSV	$\alpha$
IM to know	I2	0.93	0.86	0.96	0.86	0.36	.96
	I4	0.93	0.86				
	I23	0.91	0.83				
	I27	0.94	0.88				
IM to accomplish	I8	0.8	0.64	0.88	0.66	0.42	.88
	I12	0.84	0.71				
	I15	0.87	0.76				
	I20	0.74	0.55				
IM to experience stimulation	I11	0.85	0.72	0.86	0.61	0.40	.85
	I13	0.87	0.76				
	I18	0.83	0.69				
	I25	0.55	0.30				
EM identification	I7	0.81	0.66	0.83	0.55	0.40	.81
	I11	0.82	0.67				
	I17	0.74	0.55				
	I24	0.59	0.35				
EM introjection	I9	0.65	0.42	0.84	0.58	0.40	.85
	I14	0.83	0.69				
	I21	0.73	0.53				
	I26	0.83	0.69				
EM external regulation	I6	0.82	0.67	0.91	0.72	0.26	.91
	I10	0.91	0.83				
	I16	0.82	0.67				
	I22	0.86	0.74				
Amotivation	I3	0.9	0.81	0.95	0.82	0.06	.95
	I5	0.92	0.85				
	I19	0.91	0.83				
	I28	0.91	0.83				

*Note.*  $\lambda$  – factor loading;  $\lambda^2$  – the squares of the factor loading; CR – construct reliability; AVE – average variance extracted; MSV – maximum shared variance; IM – intrinsic motivation; EM – extrinsic motivation.

validity is satisfactory, as the subscales of the SMS within the Indian context showed high composite reliability values, 0.83 to 0.96. According to Hair et al. (2019), a CR value of  $\geq 0.7$  is good reliability. Considering this claim, we can say that the seven subscales of the SMS questionnaire have satisfactory internal consistency reliability. In addition, AVE for every subscale was higher than MSV, allowing us to assume the discriminant validity of the tested constructs. The results showed that this final measurement model presented good reliability ( $\alpha = .81$  to  $.96$ ), better

than previous studies (Bara et al., 2011; Burtscher et al., 2011; Doganis, 2000; Granero-Gallegos et al., 2014; Martens & Webber, 2002; Núñez et al., 2006; Pelletier et al., 1995; Walczak & Tomczak, 2019).

In the analysis of correlations between motivation subscales and other psychological variables, higher levels of sports motivation were generally associated with lower levels of anxiety, stress, and depression among athletes, suggesting a protective role of motivation in mental well-being (Castro-Sánchez et al., 2019; Jewett et al., 2014). This pattern was

**Table 4***Measurement invariance of the Sport Motivation Scale by gender and level of participation*

	CFI	RMSEA	SRMR	$\Delta$ CFI	$\Delta$ RMSEA	$\Delta$ SRMR
Gender (male vs. female)						
Configural	0.936	0.064	0.063	–	–	–
Metric	0.936	0.063	0.065	0	–0.001	0.002
Scalar	0.930	0.064	0.064	–0.006	0.002	–0.001
Level of participation in sports (high-performance vs. recreational)						
Configural	0.947	0.061	0.062	–	–	–
Metric	0.946	0.061	0.072	–0.001	0	0.009
Scalar	0.940	0.063	0.074	–0.006	0.002	0.003

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Note. CFI – comparative fit index; TLI – Tucker-Lewis fit index; RMSEA – root mean square error of approximation; SRMR – standardized root mean square residual – robust values based on Satorra-Bentler correction.

**Table 5***Correlations between Sport Motivation Scale, Achievement Motivation Scale, and Anxiety, Depression and Stress Scale*

Sport Motivation Scale ( <i>N</i> = 256)	Anxiety, Depression, and Stress Scale			Achievement Motivation Scale
	Anxiety	Depression	Stress	
IM to know	–0.38***	–0.34***	–0.39***	0.58***
IM to accomplish	–0.41***	–0.30***	–0.38***	0.66***
IM to experience stimulation	–0.44***	–0.38***	–0.34***	0.65***
EM identification	–0.37***	–0.40***	–0.36***	0.70***
EM introjection	–0.39***	–0.35***	–0.33***	0.61***
EM external regulation	–0.29***	–0.34***	–0.29***	0.54***
Amotivation	0.09	0.04	–0.01	0.41***

Note. IM – intrinsic motivation; EM – extrinsic motivation; \*\*\**p* < .001.

consistent across all motivation dimensions except for amotivation, which showed no significant relationship. This may indicate that amotivation lacks the protective benefits associated with other forms of motivation (Harbichová et al., 2025). Conversely, the positive correlations between sports motivation and achievement motivation suggest that athletes who are more motivated in sports also tend to possess stronger achievement drives, reinforcing the connection between sport-specific motivation and broader performance-related motivation. Interestingly, amotivation in sport also showed a positive association with achievement motivation, a finding that appears counterintuitive at first glance. This relationship likely reflects the multidimensional and domain-general nature of the achievement motivation measure, suggesting that athletes who feel disengaged from sport may still maintain strong achievement-oriented drives in other life domains,

such as academic work or future career goals. This pattern aligns with research showing that multidimensional or domain-general achievement motivation measures may relate to motivational constructs outside a specific domain (e.g., academic vs. sport achievement motivation), suggesting that individuals can hold strong achievement goals in non-sport areas even when experiencing low sport-specific motivation (Michel et al., 2022).

In conclusion, the findings of the present study provided support for the latent structure, factor validity and reliability of the SMS when applied to Indian athletes. From a practical perspective, Indian researchers, sports psychologists, and coaches can be more confident in using the SMS to assess and better understand the complex, multidimensional motivational processes involved in the exercise and sport domain. We used this validated version of the SMS for collecting the data from Indian athletes.

## STUDY 2: COMPARISON OF SPORTS MOTIVATION ACROSS THREE CULTURES

### PARTICIPANTS AND PROCEDURE

The study sample included 37 judokas from India, 32 judokas from Poland, and 35 judokas from Brazil, with mean ages of  $23.0 \pm 4.2$ ,  $26.0 \pm 6.3$ , and  $24.4 \pm 6.8$  years, respectively. Convenience sampling was used; the authors contacted sports clubs and coaches to invite the players to participate in the data collection. The quality of judokas' sport careers was categorized on a 1-4-point scale: 1 – *recreation*, 2 – *amateur*, 3 – *national*, 4 – *international* (Malchrowicz-Moško et al., 2020; McKay et al., 2022).

The study was conducted in accordance with the Declaration of Helsinki and received ethical approval from the relevant institutional ethics committee (approval no. 4/17.10.2022; approved on 29 November 2022). The subjects were given an informed consent form to sign, and they agreed to participate voluntarily in the study.

### MEASURES

*Sport Motivation Scale* (SMS; Pelletier et al., 1995): The SMS comprises seven subscales designed to measure three types of intrinsic motivation (motivation to know, to experience stimulation, and to accomplish), three types of extrinsic motivation (external regulation, introjection, and identification), and amotivation. Each subscale includes four items, making 28 items in the overall scale. Participants were asked to indicate their reasons for engaging in sports, with their responses being quantified using a 7-point Likert scale, ranging from 1 (*does not correspond at all*) to 7 (*corresponds exactly*). Higher scores on the scale indicate greater levels of a specific type of motivation.

For Polish judokas, the Polish adaptation of the SMS developed by Walczak and Tomczak (2019) was used. Cronbach's  $\alpha$  coefficients for the Polish sample were as follows: IM-to know ( $\alpha = .80$ ), IM-to accomplish ( $\alpha = .80$ ), IM-stimulation ( $\alpha = .83$ ), External regulation ( $\alpha = .75$ ), Introjected regulation ( $\alpha = .73$ ), Identifi-

ed regulation ( $\alpha = .73$ ), Amotivation ( $\alpha = .77$ ). For Brazilian judokas, the Brazilian version of SMS adapted by Bara et al. (2011) was applied. Cronbach's  $\alpha$  coefficients for the Brazilian sample were as follows: IM-to know ( $\alpha = .68$ ), IM-to accomplish ( $\alpha = .82$ ), IM-stimulation ( $\alpha = .75$ ), External regulation ( $\alpha = .73$ ), Introjected regulation ( $\alpha = .71$ ), Identified regulation ( $\alpha = .82$ ), Amotivation ( $\alpha = .84$ ). In the case of Indian judokas, the SMS was culturally adapted and validated for Indian athletes in Study 1 of this research and subsequently used for data collection. Also, participants responded to the demographic questions, e.g., age, career duration, and quality of career.

### DATA ANALYSIS

For the statistical analysis, the TIBCO Statistica 13.4 program was used. The collected material was evaluated using statistical methods: normality of distribution was assessed using the Shapiro-Wilk method, and average values were calculated for the total value of motivation and its components for each group of players.

Graphs were plotted with trend lines and the coefficient of determination ( $R^2$ ), while nominal data were analyzed using Spearman's rank correlation coefficient ( $R_s$ ).

The significance of differences between the average test results for all three tested groups of players was determined using the Tukey test, with  $< 0.05$  considered significant.

## RESULTS

The results of the study revealed several notable differences in the motivation levels and career characteristics of judokas from India, Poland, and Brazil. Table 6 provides an overview of the demographic details of the athletes, including age, length of their sports careers, and the quality of their careers. Indian judokas had an average age of ( $23 \pm 4.2$ ), and the quality of their career, measured on a scale from 1 to 4, averaged 2.6, indicating participation mostly at the amateur level. In contrast, Polish judokas were old-

**Table 6**

*Mean values of metrical age, length of sports career and quality of sports career in the studied groups of judokas*

Group	Metrical age (years)	Range (years)	Length of sport career (years)	Range (years)	Quality of sport career (points 1-4)	Mode/Dominant
India ( $n = 37$ )	$23.0 \pm 4.2$	17-35	$7.3 \pm 3.3^{a,b}$	3-15	$2.6 \pm 1.1$	M-2/D-2
Poland ( $n = 32$ )	$26.0 \pm 6.3$	19-44	$15.4 \pm 6.3^a$	3-31	$3.1 \pm 0.9$	M-3/D-3
Brazil ( $n = 35$ )	$24.4 \pm 6.8$	16-48	$15.4 \pm 8.4^b$	1-30	$2.6 \pm 0.9$	M-3/D-3

Note. <sup>a,b</sup> – statistically significant differences at  $p < .05$  – comparison within the same columns.

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er, and had significantly longer careers. Their career quality was also higher, with a score of 3.1, indicating national-level participation. Brazilian judokas showed similar demographic trends to the Polish group, with a mean age of  $24.4 \pm 6.8$ , and had significantly longer careers, but their career quality averaged 2.6, aligning more closely with the amateur level observed in the Indian group. Due to the small sample size, we calculated Cohen's *d* for the three country groups. The observed effect sizes suggest that the results are significant and interpretable (Table 7).

Motivation scores, intrinsic, extrinsic and amotivation, are detailed in Tables 8 and 9. When examining the specific components of intrinsic motivation, Brazilian judokas scored the highest in motivation to know ( $23.5 \pm 4.8$ ), motivation to accomplish ( $24.1 \pm 4.1$ ), and motivation to experience stimulation ( $25.8 \pm 2.2$ ), indicating a strong drive for knowledge, achievement, and enjoyment. Indian judokas also showed strong intrinsic motivation across these components, while Polish judokas had slightly lower scores in these categories. However, there were no statistically significant differences between all the components of intrinsic motivation of judokas from India, Poland, and Brazil.

In terms of extrinsic motivation, Indian judokas scored the highest in identified regulation ( $22.8 \pm 4.8$ ), which reflects their motivation driven by the perceived importance of judo. Polish judokas had the highest introjected regulation score ( $22.9 \pm 3.3$ ), suggesting that internal pressures such as guilt or anxiety motivated their participation. In contrast, Brazilian judokas had the lowest scores across all extrinsic motivation categories, with the exception of introjected regulation, where they were comparable to the other groups. Notably, Indian judokas had the highest score for amotivation ( $13.9 \pm 7.0$ ), indicating some level of disengagement or lack of motivation, although not more than the intrinsic or extrinsic motivation, whereas Brazilian and Polish judokas had lower amotivation scores,  $8.6 \pm 5.0$  and  $9.1 \pm 6.4$ , respectively. Significant differences were observed only in extrinsic motivation-external regulation and amotivation of judokas from India, Poland, and Brazil.

The relationships between the variables in Figure 1 indicate a significant relationship between the length and sports career quality in all the studied groups. Trend lines had Spearman correlation coefficients of  $R_s = 0.66$ ,  $R_s = 0.66$ ,  $R_s = 0.57$ .

**Table 7**

*Cohen's d calculated for each motivation component – for all pairs of groups of judo athletes*

Cohen's <i>d</i> indicator	Extrinsic motivation identified	Intrinsic motivation to know	Extrinsic motivation introjected	Intrinsic motivation to accomplish	Extrinsic motivation external regulation	Intrinsic motivation to experience stimulation	Amotivation
India 37/ Poland 32	<b>0.20</b>	0.15	<b>0.20</b>	<b>0.20</b>	<b>0.61</b>	0.15	<b>0.71</b>
Poland 32/ Brazil 35	<b>0.30</b>	0.11	<b>0.33</b>	<b>0.38</b>	0.03	<b>0.54</b>	0.08
Brazil 35/ India 37	<b>0.39</b>	0.12	0.15	<b>0.24</b>	<b>0.59</b>	<b>0.73</b>	<b>0.87</b>

*Note.* Small effect ( $d = 0.2$ ), medium/moderate effect ( $d = 0.5$ ), large effect ( $d \geq 0.8$ ).

**Table 8**

*Average values of: intrinsic motivation to know, intrinsic motivation to accomplish, intrinsic motivation to experience stimulation*

Group	Range	Intrinsic motivation to know	Range	Intrinsic motivation to accomplish	Range	Intrinsic motivation to experience stimulation	Range
India	96-188	$23.0 \pm 3.0$	16-28	$23.1 \pm 4.4$	13-28	$23.5 \pm 3.9$	14-28
Poland	110-156	$21.9 \pm 4.3$	14-28	$22.5 \pm 4.8$	12-28	$24.1 \pm 3.9$	16-28
Brazil	95-192	$23.5 \pm 4.8$	9-28	$24.1 \pm 4.1$	13-28	$25.8 \pm 2.2$	22-28

*Note.* Statistically significant differences at  $p < .05$ .

**Table 9**

Average values of: extrinsic motivation–identified, extrinsic motivation–introjected, extrinsic motivation–external regulation, and amotivation

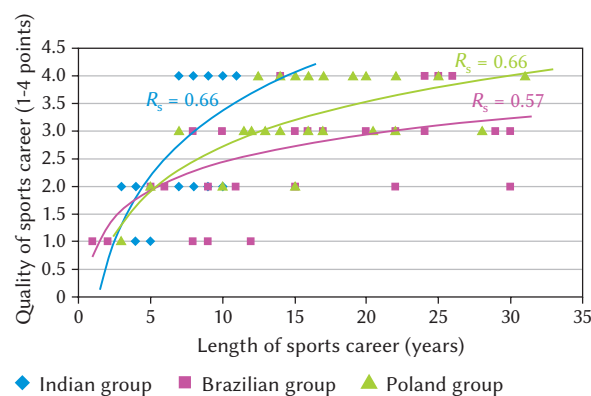
Group	Extrinsic motivation identified	Range	Extrinsic motivation introjected	Range	Extrinsic motivation external regulation	Range	Amotivation	Range
India	22.8 ± 4.8	11-28	22.1 ± 4.5	12-28	19.1 ± 4.9 <sup>*a,b</sup>	8-28	13.9 ± 7.0 <sup>*a,b</sup>	4-28
Poland	22.1 ± 3.2	15-28	22.9 ± 3.3	17-28	15.7 ± 6.2 <sup>*a</sup>	4-28	9.1 ± 6.4 <sup>*a</sup>	4-25
Brazil	21.0 ± 4.7	11-28	21.3 ± 6.1	7-28	15.9 ± 5.9 <sup>*b</sup>	4-28	8.6 ± 5.0 <sup>*b</sup>	4-28

Note. <sup>\*</sup>Values differ significantly from all other values within the same row (Tukey test); the other values are not significantly different;  $p < .05$ . <sup>a,b</sup>Values differ significantly from all other values within the same column (Tukey test); the other values are not significantly different;  $p < .05$ .

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**Figure 1**

Relationship between length of sports career and sports career quality



These results suggest that the players train systematically, with no outliers. All judoka groups are therefore suitable for direct comparison.

Figure 2 shows a similar pattern of motivation components for all groups of judokas. A small but significant decrease was observed for the last two values of motivation: extrinsic motivation–external regulation and for amotivation. This indicates that intrinsic motivation and identified regulation are typically dominant in sustained sport participation, while external regulation and amotivation are lower among active athletes (Deci & Ryan, 2000; Malchrowicz-Moško et al., 2020).

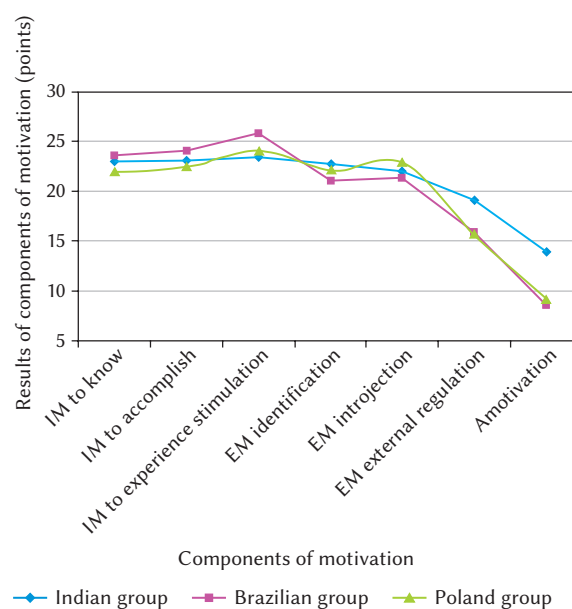
The relationship between the length and sports career quality as a function of all the components of motivation is presented in Figures 3 and 4.

In the group of Indian judokas, only values of intrinsic motivation to experience stimulation correlate with the length of sports training. The correlation coefficient  $R^2 = .41$  for the presented trend lines was at a statistically significant level.

In the group of Polish judokas, only values of extrinsic identified motivation correlated with the length of sports training. The correlation coefficient

**Figure 2**

Lines representing components of motivation for all examined groups of judokas



Note. IM – intrinsic motivation, EM – extrinsic motivation.

for the presented trend lines was  $R^2 = .30$ , representing a statistically significant low level.

In the case of Brazilian judokas, no component of motivation correlated with the length of a sports career.

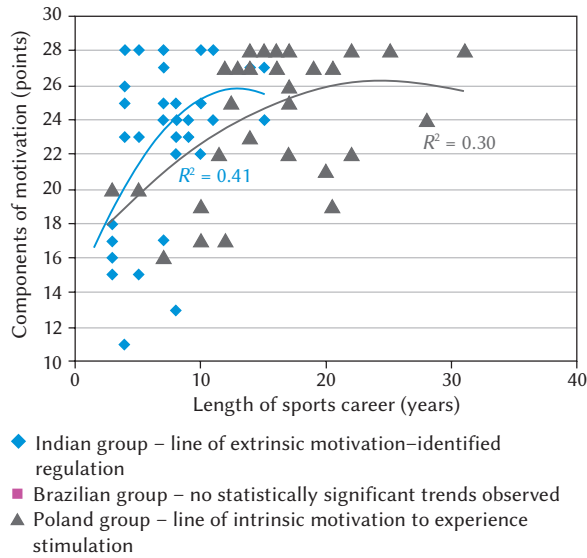
The other components of motivation did not correlate with the length of a sports career in any of the studied groups of judokas.

In the group of Indian judokas, only values of extrinsic motivation–introjected regulation correlated with the quality of sports training. The Spearman correlation coefficient for the presented trend lines was  $R_s = 0.39$ , which was statistically significant.

In the group of Brazilian judokas, only values of intrinsic motivation to accomplish correlated with

**Figure 3**

*Relationship between length of sports career and components of motivation in the studied groups of judokas*



the quality of sports training. The Spearman correlation coefficient for the presented trend lines was  $R_s = 0.40$ , which was statistically significant.

In the group of Polish judokas, only values of intrinsic motivation to experience simulation correlated with the quality of sports training. The Spearman correlation coefficient for the presented trend lines was  $R_s = 0.44$ , which was statistically significant.

The other components of motivation did not correlate with sports career quality in any of the studied groups of judokas.

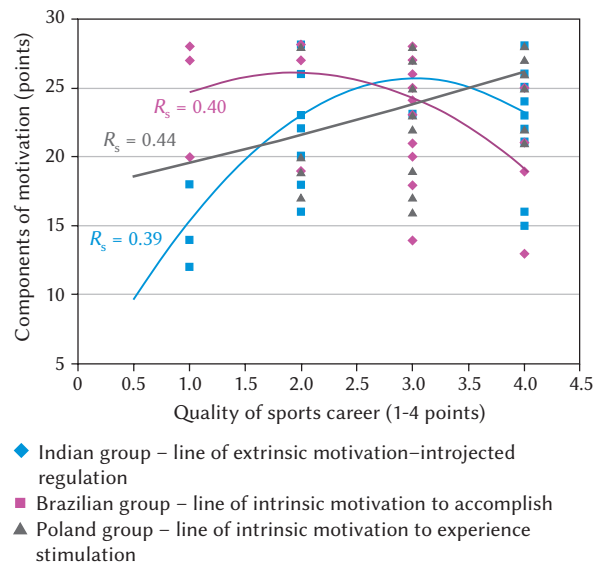
## DISCUSSION

This cross-cultural study highlights that motivation in sports is shaped not only by personal factors but also by broader cultural and structural influences (Chirkov et al., 2003). By comparing judokas from India, Poland, and Brazil, the study offers insights into how athletes' motivations and career trajectories develop within different social contexts.

The study found an absence of cross-cultural differences in intrinsic motivation, identified regulation, and introjected regulation; however, significant differences were observed in external regulation and amotivation. This phenomenon can be explained by the unique and standardized nature of judo as both a sport and a philosophical system. Judo was originally conceived as a *dō* (way of life), emphasizing universal values such as respect, self-discipline, mutual welfare, and personal development, which are transmitted consistently across training systems worldwide (Jänicke, 2024; Messner, 2023). This

**Figure 4**

*Relationship between sports career quality and components of motivation in the studied groups of judokas*



Motivation  
in combat sports

shared philosophical foundation, reinforced through ritualized practices such as bowing and codified ethical principles promoted by the International Judo Federation, supports the internalization of common values across national contexts. Together with the global standardization of judo training and competition structures, these features likely foster comparable levels of intrinsic motivation among practitioners, resulting in no differences between intrinsic motivation across countries.

Similarly, no significant differences were observed in extrinsic motivation–introjected regulation between athletes from different countries due to the strong standardization of judo's core values, the uniform nature of the sport's pedagogy, and the high level of professionalism required to compete. This global "sportification" means that, regardless of culture, athletes are exposed to the same behavioral expectations and hierarchical structures in judo (Sato, 2013). Research suggests that while initial, casual participation may differ by culture; once an athlete is committed, their motivation to train and compete often focuses on similar goals (e.g., passing belt tests, winning competitions), leading to similar levels of internal pressure or obligation (introjected regulation) (Sterkowicz-Przybycień et al., 2017).

Furthermore, the lack of differences in identified regulation may be attributed to the central role of friendship, belonging, and mutual respect within judo's value system. Identified regulation is closely associated with personally endorsed values, a sense of personal importance, and meaningful social relationships within sport participation (Deci & Ryan, 2000; Ryan & Deci, 2007). These elements align directly

with judo's core values, including friendship, respect, and mutual welfare, which are emphasized universally in judo education and practice (Freitas, 2020). As such, athletes from different cultural backgrounds may similarly internalize judo as an important and meaningful activity, regardless of national context.

In contrast, external regulation and amotivation appear more sensitive to contextual and structural factors embedded within specific sociocultural environments. External regulation is influenced by national sport policies, funding systems, coaching expectations, and societal attitudes toward athletic success, all of which vary considerably between countries (Mageau & Vallerand, 2003; Sakalidis et al., 2023; Teixeira et al., 2012). Likewise, differences in amotivation may reflect disparities in career support structures, such as opportunities for dual career development, educational integration, and long-term athletic pathways (Sakalidis et al., 2023). In contexts where institutional support or clarity regarding future prospects is limited, athletes may experience greater uncertainty about their sporting trajectory, contributing to higher levels of amotivation (Jewett et al., 2014; Vallerand & Grouzet, 2001).

A key observation is that intrinsic motivation – engaging in judo for enjoyment, personal growth, or the satisfaction of learning – was evident across all three groups, but varied in its expression. Brazilian judokas scored highest in this domain, especially in the area of experiencing stimulation. This suggests that their participation is strongly driven by enjoyment and emotional engagement with the sport. This contrasts with the findings of Dos Santos et al. (2017), where outcome-oriented motivations were dominant. The Brazilian group in the current study appears to emphasize the process of participation rather than achievement, which may explain why their motivation remains high despite their generally amateur-level career status.

Indian judokas also demonstrated strong intrinsic motivation, paired with high levels of identified regulation – an extrinsic form of motivation that reflects the personal value placed on the sport. This indicates that judo holds meaningful personal or career-related significance for them, aligning with the previous findings of Singh and Saini (2012). This pattern may be explained by the shorter sport experience and younger age of the Indian sample. Athletes at earlier stages of their sporting careers are often more novelty-driven and intrinsically motivated (Rottensteiner et al., 2015), as they still have opportunities to explore, learn, and develop within their sport.

In contrast, Polish judokas exhibited slightly lower levels of intrinsic motivation than other groups but demonstrated elevated levels of introjected regulation, suggesting that their motivation is often driven by internal pressures such as guilt, obligation, or the desire to meet perceived expectations. This

motivational pattern reflects a performance-oriented culture in which both external demands and self-imposed standards play a significant role. While such a framework may enhance short-term commitment and athletic performance, as evidenced by higher career quality scores, it may simultaneously contribute to emotional strain and reduced long-term satisfaction with the sport.

This interpretation is consistent with the findings of Sterkowicz-Przybycień et al. (2017), who reported that intrinsic success, defined as engagement in sport for enjoyment and personal mastery, was rated lower than extrinsic success among both male and female judokas. Although the study did not explicitly measure introjected regulation, it associated elevated scores in extrinsic motives such as power, excellence, and aggression with internalized social pressure, aligning with the framework of SDT. According to SDT, introjected regulation involves behavior driven by internal pressures such as the desire to gain approval or avoid feelings of guilt and disapproval, whereas identified regulation reflects engagement based on personally endorsed values, perceived importance of the activity, and a sense of meaning and belonging within the sport context. Furthermore, the study highlighted the influence of social context, including expectations from coaches, competition-related stressors, and the fear of penalties, as key factors shaping athletes' motivational profiles. This tendency toward extrinsic and performance-focused motivation is further supported by Walczak and Tomczak (2019), who found that elite athletes in individual sports often exhibit higher ego-orientation and lower levels of intrinsic motivation compared to recreational athletes. Within this context, the motivational structure observed among Polish judokas may be a response to the sustained pressure to perform at the national level, which, while effective in maintaining effort and achievement, may not support long-term personal fulfillment or enjoyment of the sport.

With regard to career length, Indian judokas demonstrated a positive association between years of participation and identified extrinsic motivation. This suggests that as athletes remain longer in the sport, external goals (e.g., career development, social recognition, personal importance of judo) become increasingly internalized and aligned with personal values (Sakalidis et al., 2023). Such a pattern may reflect a sport system in which continued participation reinforces goal-oriented commitment rather than diminishing motivation. In contrast, Polish athletes showed a positive relationship between career length and intrinsic motivation to experience stimulation, indicating that prolonged engagement in judo may enhance enjoyment, excitement, and interest derived from the sport itself. This supports the assumption that long-term involvement can foster more self-determined forms of motivation when athletes

continue to find the activity inherently rewarding (Malchrowicz-Moško et al., 2020).

Notably, no significant relationships between career length and motivational components were observed in the Brazilian group. It may suggest that factors other than duration of participation, such as training environment, social support, or competitive structure, play a more decisive role in shaping motivation in this cultural context (Bara et al., 2011).

Analysis of career quality revealed clearer and more consistent associations with motivation across all groups. In the Polish group, higher career quality was positively related to intrinsic motivation to experience stimulation, suggesting that sporting success reinforces enjoyment and engagement rather than shifting motivation toward external regulation (Malchrowicz-Moško et al., 2020). This finding aligns with SDT, which posits that competence satisfaction strengthens intrinsic motivation.

In the Indian and Brazilian groups, however, the relationship between career quality and motivation followed a curvilinear pattern. Indian athletes displayed increasing introjected extrinsic motivation with improved career quality, peaking at higher performance levels and then slightly declining. This may indicate that internal pressures such as obligation, pride, or fear of failure become more salient as competitive demands increase (Rottensteiner et al., 2015). Similarly, Brazilian judokas exhibited an inverted U-shaped relationship between career quality and intrinsic motivation to accomplish, with motivation peaking at moderate levels of success and declining at the highest level. This pattern may reflect increased performance pressure or reduced perceived autonomy among elite athletes (Holding et al., 2020).

Overall, the findings suggest that career quality is a stronger determinant of motivation than career length, particularly in shaping intrinsic motivational processes. Furthermore, the observed cultural differences highlight that similar career trajectories may foster distinct motivational profiles depending on the socio-cultural and organizational context of sport (Sheehan et al., 2018). These results underline the importance of considering both structural and cultural factors when developing athlete support programs aimed at sustaining long-term, self-determined motivation. The study also reinforces the importance of intrinsic motivation for long-term engagement, while showing that external pressure or lack of clarity can lead to amotivation and dropout.

#### LIMITATIONS AND FUTURE DIRECTIONS

This study is limited by its relatively small sample size and lack of additional contextual variables such as socio-economic background, family support, financial incentives, or coaching quality. These factors likely

play a significant role in shaping motivation and merit further investigation. Future studies should adopt a more holistic approach, integrating both psychological and environmental factors to better understand what sustains athlete engagement across cultures.

#### CONCLUSIONS

This study validated the SMS for Indian athletes and compared the motivation of judokas from India, Poland, and Brazil. This study demonstrated that while core motivational components in judo, particularly intrinsic motivation, introjected regulation, and identified regulation in extrinsic motivation, are largely consistent across cultures, differences emerge in externally regulated motivation and amotivation, reflecting broader sociocultural and structural influences. The standardized philosophy and pedagogy of judo appear to foster shared intrinsic values among athletes regardless of national context, whereas external pressures, support systems, and career structures shape less self-determined forms of motivation. Importantly, career-related factors revealed distinct motivational patterns: career length was associated with identified motivation in Indian judokas and with intrinsic motivation (to experience stimulation) in Polish judokas, whereas career quality showed associations with both intrinsic and extrinsic motivation across all groups. Overall, the findings emphasize the need for culturally sensitive athlete support systems that promote autonomy, enjoyment, and long-term motivation in judo.

#### DISCLOSURES

This research received no external funding. The study was approved by the Ethics Committee of Kazimierz Wielki University (Approval No. 4/17.10.2022). The authors declare no conflict of interest.

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