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Adaptation, psychometric properties and factor structure of the Lithuanian interpersonal behaviours questionnaire (IBQ) in sport

Stanislav Sabaliauskas^{1*}, Nelė Žilinskienė², Ričardas Gerasimovičius¹, Donatas Gražulis² and Darius Radžiūkynas²

Abstract: Research on interpersonal behaviour is becoming increasingly important in a variety of social contexts and cultures. In educational practice, its importance is based on interactions as the educational context, in which learning, value formation and meaningful activities take place. The aim of this was to adapt the Interpersonal Behaviours Questionnaire (IBQ) in Sport into Lithuanian and to analyse its reliability and validity. 241 physically active men (mean age 27.01 ± 7.67) participated in this study. The adapted questionnaire showed good reliability (Cronbach α 0.927), content, criterion and structural validity (CFI 0.928, TLI 0.917, RMSEA 0.070, χ^2/df 2.21) of Lithuanian version of IBQ in sport. The structural validity of the scale showed that supportive behaviours are strongly related to autonomy, competence and



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PUBLIC INTEREST STATEMENT

Recent changes in social life have highlighted the impact of physical activity and interpersonal behaviour on people's physical and mental health. Human health and education are key principles of sustainable development, and physical activity makes a significant contribution to people's physical and personal well-being. Research on interpersonal behaviour is valuable from a culture-building perspective, as interpersonal relationships become the educational context in which learning and the formation of personal values take place. The paper presents an adaptation of the IBQ in sport, highlighting the thwarting inherent in interpersonal relationships and also the importance of the need for support. The results of the study showed that support is also important for adults in sport. However, supportive and thwarting behaviours are not diametrically opposed. This makes the IBQ in sport valuable for both researchers and practitioners seeking to better understand the effects of interpersonal behaviour on motivation, autonomy, competence and relational needs.

relatedness needs (r s ranged from .843 to .877), while supportive and thwarting behaviours have a moderate inverse relationship. However, supportive and thwarting behaviours are not diametrically opposed ($r = -.597$). Thus, the study shows that the IBQ in sport is valuable for analysing interpersonal relationships explaining the links between supportive and thwarting behaviour. The IBQ in sport can be a valuable tool for advancing research, enriching and improving educational practice in this field.

Subjects: Sports Coaching; Sport Education; Research Methods

Keywords: Interpersonal behaviour; Physical education; Support; Thwarting; Autonomy; Competence; Relatedness

1. Introduction

The COVID-19 crisis that began in late 2019 posed massive consequences on individuals' lives across the globe (IEA, 2020). Pandemic has affected day to day life and affected the quality of life of people worldwide (Haleem et al., 2020; Geng et al., 2022; Yu et al., 2022). The impact of the pandemic on the social world (Tang et al., 2022), including education (Acheampong & Agyemang, 2021; Rahmat et al., 2022), has been particularly high. The pandemic and social isolation have disrupted people's normal patterns of movement and physical activity (Bailey & Scheuer, 2022; Diniz et al., 2020), which has had a profound impact on people's physical and mental health.

During the pandemic, countries focused on ensuring the smooth functioning of health and education systems. It should be noted that the concept of sustainable development identifies health and education as key principles of sustainable development (Salvo et al., 2021). Sport and physical activity are important tools for sustainable development (Baena-Morales & González-Villora, 2022; Baena-Morales et al., 2021), good health, personal and societal well-being (Snedden et al., 2019; Yelamos et al., 2019).

Recent research highlights the socio-cultural impact of sustainability (Aman et al., 2022), and the sustainable development goals has become a focal point worldwide due to its positive influence on environmental sustainability, economic progress, quality of life, and health (Ahmed et al., 2017). Many studies highlight that sustainability, community and societal well-being are linked to interpersonal behaviour (Acheampong & Agyemang, 2021; Geng et al., 2022; NeJhaddadgar et al., 2022; Rahmat et al., 2022).

Interpersonal behaviour is important for successful prevention—for building resilience and well-being and for improving community health. Furthermore, research during the pandemic has shown that social isolation and a reduction in interpersonal relationships affect people's mental health (Abbas et al., 2021; Jusienė et al., 2022), and that excessive sedentary work, use of computers and social media leads to learners becoming physically unbalanced, leading to boredom and irritable behaviour (Abbas et al., 2019). Therefore, promoting their physical activity is more important than ever and health teachers and physical activity coaches have a responsible role to play.

1.1. Interpersonal behaviour and motivation

Interpersonal behaviour in sport is determined by many factors related to the personal characteristics and behavioural motives, abilities and competencies of the participants in the interaction, the educational environment, and the group culture formed by coaches, sports teachers, or instructors. Although research suggests that coach leadership determines team motivational climate (Olympiou et al., 2008), the interaction still depends on the quality of the coach-athlete interpersonal behaviour. A good interpersonal behaviour between a coach and an athlete creates the preconditions for the formation of a favourable motivational climate and can in one way or another affect the motivation of athletes.

Although personal motivation is generally considered to be an important precondition for successful performance, modern research shows a reciprocal link between motivation and involvement in the process. Motivation has a positive effect not only on achievement, but also on the learning process itself and on a person's involvement in learning, i.e., learning itself can influence motivation to learn (Siqueira & Wechsler, 2006). Therefore, the focus of the social sciences keeps increasing on educational interaction and interpersonal teacher-learner behaviour as a space where the learner's personal growth, change and development take place.

Deci and Ryan's self-determination theory (SDT; Deci & Ryan, 1985; R. M. Ryan & Deci, 2000), which focuses on personal development, meeting the needs of human autonomy, has gained recognition in many areas of science and social life and gained the macro-theory status of human motivation and social relations. Self-determination theory is based on the premise that people are active, strive and want to constantly improve, tend to organize and purposefully direct their activities, seek knowledge and improve their abilities. SDT describes how motivation develops and how it influences human behaviour. Studies confirm (Ntoumanis, 2001; D. Teixeira et al., 2018) that SDT is a very widely used motivational construct to understand the influence of motivation on human behaviour in the context of sporting activities. SDT is based on meeting a person's innate basic psychological needs. The authors (Deci & Ryan, 1985; R. M. Ryan & Deci, 2000) distinguish three innate human needs: competencies, relationships with other people and autonomy, which determine the level of motivation. Although many individuals have positive and stable traits, a person's self-determination may change as a result of, for example, external factors or an absence of a personal progress. According to the authors of the SDT, meeting the needs of personal autonomy, competencies and relatedness ensures the continuity of motivation development. SDT is like a continuation of actions that identifies six possible types of individual motivation that are qualitatively different in the way different external influences act (Edvalda et al., 2013).

Both the person's own actions and external motivation can be motivating or, conversely, reduce the person's motivation. Therefore, an important task is to scientifically investigate the conditions that contribute to or, conversely, affect a person's opportunities for disclosure. Physical education teachers and sport coaches can influence a person's motivation and involvement in physical activity, which is crucial in the context of increasing competition between different forms of leisure activity. As a result, research in this area has recently received increasing attention from researchers.

1.2. Psychological needs and well-being

Meeting a person's psychological needs is essential to a person's prosperity and well-being. Although a person's needs vary, the list of basic psychological needs is limited to three: autonomy, competence, and relatedness. The Basic Psychological Need Theory (BPNT), which is one of the six mini-theories within the Self-Determination Theory, examines the satisfaction or dissatisfaction of these needs. BPNT explains that dissatisfaction with these needs leads to frustration, which implies a deeper and more threatening impact on a person's involvement and experience than inaction (Vansteenkiste et al., 2020).

The need for relationships is associated with a person's belonging to a particular social group and the ability to interact with different people. In terms of the relationship between interpersonal behaviour and athletic performance, it is noted that the athletes who feel that their coaches are pursuing high-level support strategies are more committed to the sport. Therefore, the coach's dedication is examined by researchers from the perspective of involvement in activities (Lonsdale et al., 2007). If athletes realize that their coaches are dedicated, sincerely appreciate the athletes' efforts and hard work and accept them unconditionally, the athletes' potential and willingness to devote more time and energy to achieving important goals is reinforced. Perceived interpersonal behaviour was found to correlate with athlete involvement (Jowett et al., 2016).

The need for autonomy is defined as 'the degree of freedom and choice of the individual' and is related to the individual's perception that he or she can control his or her behaviour. Autonomy refers to the experience of volition and willingness (R. Ryan & Deci, 2017). The environment that supports autonomy satisfies a person's need for independence, giving him or her choices through personal communication. Meanwhile, a controlling environment occurs when those in power (coaches, instructors) use pressure to communicate and do not provide a meaningful explanation and force them to accept their views (Deci et al., 1994). Therefore, research on interpersonal behaviour in sport is taking on a significant role in ensuring the prevention of abuse of coaching power.

A satisfied person feels a sense of fullness, his thoughts and feelings are authentic (R. Ryan & Deci, 2017). When disappointed, one experiences a feeling of pressure together with the feeling of being pushed in an unwanted direction. Relatedness involves experiencing warmth, communication, care, and personal satisfaction by connecting to and feeling meaningful to others, while frustration leads to feeling of social alienation, exclusion, and loneliness.

The need for competence is associated with a person's desire to unleash their potential and realize themselves in a particular social environment. The need for competence is based on a perception of personal effectiveness, mastery and progress. The need for competence is satisfactory when a person engages in activities and experiences opportunities to exploit and expand own skills and competencies. Meanwhile, a person who does not meet this need and is frustrated, experiences a feeling of inefficiency, failure, and helplessness.

The main dimensions of SDT were discovered through inductive analysis of empirical research data confirming that experience of competence and autonomy is essential for developing and maintaining intrinsic motivation. To illustrate this, it has been found that positive feedback stimulates greater interest and pleasure in engaging in activities that determine individuals' need for competence (De Mynck et al., 2017).

By extending inductive access to substantiate needs for autonomy, competence and communication as key psychological ones, R. Ryan and Deci (2017) argue that the importance of these needs is reinforced by a deductive perspective as well. Scientists construct their theory based on the needs of the living organism, assuming that humans naturally evolve towards the pursuit and enhancement of adaptation. These integration trends are supported and characterized by experiences of autonomy, competence and interrelationships. Based on this organic perspective of personal development, these needs become an integral part of the concept of a holistic personality.

1.3. Supportive and thwarting interpersonal behaviour

Although the impact of interpersonal behaviour on the motivation and athletic achievement of athletes is well explored, most of the research nonetheless focuses on the autonomy of athletes (Rocchi et al., 2017a, 2017b)). Nevertheless, self-determination theory includes other dimensions as well. Emphasizing the relevance of research on interpersonal behaviour in sports activities, a questionnaire has been developed to assess how an interpersonal behaviour is perceived by an athlete and a coach in the context of self-determination theory (Rocchi et al. 2017a). According to the self-determination theory, there are six different types of interpersonal behaviour that influence the satisfaction or non-satisfaction of basic needs: Autonomy—supportive (AS), Competence—supportive (CS), Relatedness—supportive (RS), Autonomy—thwarting (AT, also called controlling), Competence—thwarting (CT) and Relatedness—thwarting (RT; e.g., Williams et al., 2013).

In terms of needs-supporting behaviours, AS includes the ability to give athletes freedom of choice by recognizing their perspective on vision (Mageau et al., 2015). CS focuses on the recognition of athletes' development and belief that they can achieve their goals and success, and RS manifests itself in providing feedback to athletes (Sheldon & Filak, 2008). RS behaviour includes

warm communication with athletes, interest in their activities, support and caring for athletes (Jones et al., 2004).

AT behaviour includes the use of intimidating language, the submission of claims by athletes in line with rewards (Bartholomew et al., 2009). CT behaviour means that athletes are not encouraged to perform difficult tasks, they are given information that they are incompetent about, their ability to improve is questioned and their failures are emphasized. RT behaviour includes adherence to distance relationships with athletes, disregard for their opinions, and the inaccessibility of a coach without giving athletes the opportunity to participate in activities together (Sheldon & Filak, 2008).

Although significant research has been conducted to understand the role of interpersonal behaviour in athlete performance, unanswered questions remain. First, SDT provides that self-motivation is influenced by the satisfaction of all needs. However, to date, most research has focused exclusively on autonomy (Bartholomew et al., 2009) and is rarely focused on athletes' perceptions of the interpersonal behaviour of coaches' AS, CS, and RS (Amorose & Anderson-Butcher, 2007). This has led researchers to develop a questionnaire that encompasses all dimensions together and broadens attitudes and understanding of coach functions. IBQ in sport is a fairly new research tool developed and adapted in sports practice, therefore its application in practice is extremely relevant in integrating the latest scientific knowledge in sports practice.

1.4. Problematic issues

In Lithuania, the relevance of the research is based on the dissemination of new forms of physical activity that are attractive to society, as well as considering steady increase in society's physical activity. Recently, the provision of personal training services, including personal training for children and the elderly, and private kinesiology services have become more widespread. New forms of physical activity such as skateboarding, snowboarding, parkour, street dancing, line dancing, etc. are becoming popular. This, in turn, encourages the provision of coaching and sports consulting services and in parallel encourages the response to emerging societal needs and the search for scientifically sound ways to research the interpersonal behaviour of coaches and athletes. This is also supported by new research which shows that education-based health belief models effectively promote disease-preventive behaviours (Azadi et al., 2021).

The interaction between a coach and athletes in the Lithuanian context is still rarely analysed and no suitable research tools to study interpersonal behaviour in sport exist. Such research in the context of physical education is of great importance, especially as physical activity cultures change. Therefore, an IBQ was chosen for our work, which was prepared basing on self-determination theory. According to SDT, human behaviour is autonomous and decisive in a person's self-determination to act. However, for effective activities, it is important for a person to assess the relevance of the activity. Perception of motivation helps to set real tasks, create a favourable atmosphere of work and leisure, and feel satisfaction with the activity. Therefore, we also take the view that adapting the new scale in practice can not only provide valuable information to researchers, but can also encourage trainees to self-reflect and rethink their training experiences.

This publication provides only part of a study that focused on the relationship between motivation, interpersonal behaviour and coach leadership. Based on current scientific practice (Rocchi et al., 2017; Rodrigues et al., 2018), research on interpersonal behaviour is becoming increasingly important in a variety of social contexts and cultures. The IBQ in sport selected for our study was developed and validated in sports practice. Therefore, the aim of the study was to adapt the IBQ in sport into Lithuanian and to analyse its reliability and validity.

The following hypotheses for testing the IBQ structure and psychometric indicators are raised during the work:

H1: The Lithuanian version of the Interpersonal behaviours questionnaire in sport has good psychometric properties.

H2: There is a significant relationship between autonomy, competence and relatedness support behaviours.

H3: There is a significant inverse relationship between supportive and thwarting behaviours.

2. Methods

2.1. Instrument of research

The research questionnaire consisted of three structural parts: a guide for study participants, socio-demographic variables, and interpersonal behavioural variables (Interpersonal behaviours questionnaire (IBQ) in sport, (Rocchi et al., 2017). Socio-demographic variables included information on the age, gender, and experience of independent leisure activities.

The IBQ in sport consists of twenty-four statements divided into six subscales of four. Sub-scales characterize strategies that support or inhibit autonomy, competencies, and relatedness development: autonomy support (AS, e.g., 'Gives me the freedom to make my own choices', 'Supports the choices that I make for myself'), autonomy thwarting (AT, e.g., 'Pressures me to do things their way', 'Pressures me to adopt certain behaviours'), competence support (CS, e.g., 'Encourages me to improve my skills', 'Provides valuable feedback'), competence thwarting (CT, e.g., 'Points out that I will likely fail', 'Doubts my capacity to improve'), relatedness support (RS, e.g., 'Is interested in what I do', 'Takes the time to get to know me'), relatedness thwarting (RT, e.g., 'Is distant when we spend time together' 'Does not care about me'). To answer each statement on the scale, subjects had to choose between five 'strongly disagree' (1) and 'strongly agree' (5) scales on a five-point scale.

2.2. Adaptation of a scale

The process of linguistic adaptation of the IBQ in sport was carried out following the Standards for Educational and Psychological Testing (*American Educational Research Association, 2014*), validation process of the scale involved several steps (Gjersing et al., 2010; Ryan et al., 2012; *International Test Commission, 2017*).

Translation of the original scale. In the first stage, the English version of the scale was translated into Lithuanian. The translation was performed by three researchers with PhDs in sport education and coaching experience and one researcher with PhD in sport education with experience in research methodology, all of them native speakers of Lithuanian. Each researcher produced a different version of the scale translation. The three versions were compared with each other, the differences were discussed and a study protocol was written. After evaluating three anonymous versions of the translation and reconciling the linguistic differences in the translation, the initial version of the Lithuanian IBQ in sport scale was prepared.

Synthesis of the translated versions. In the second stage, the initial version of the scale was revised by a Lithuanian language specialist, who submitted suggestions for improving the scale. The adaptation of the scale was aimed at selecting the most appropriate Lithuanian equivalents of the concepts without changing the meaning of the statements in the original version of the scale.

Cognitive interview. The translation process itself, although performed by a group of professionals, may mask different semantic meanings of the concepts, resulting in cognitive interviewing. Classical cognitive interviews are conducted face-to-face with small purposive or quota samples of between 5 and 30 respondents (Willis, 2005).

In the third stage, a survey of physically active students was conducted in order to ensure the clarity and comprehensibility of the scale questions in linguistic and cultural aspects. A face validity analysis of the questionnaires was carried out. Physically active (but not professional athletes) Physical Education and Sport study programme students ($n = 12$) were invited to participate in a cognitive interview. Participants were given the prepared questionnaires, they were asked to read and complete the questions and to tick any areas that were unclear or ambiguous for them. The main purpose of this survey was to identify concepts or statements that could cause confusion for study participants and, if necessary, to clarify or reformulate them. A cognitive interview was then conducted with each respondent, based on *thinking aloud* and *probing* techniques. Respondents were encouraged to verbalise their thoughts on the uncertainties that arose. The aim was to find an answer to the question: 'Do all the statements describe the phenomenon in question? Are all the statements well formulated and understandable?'

During the retrospective probing, additional questions were asked to understand respondents' perceptions of the phenomenon. Cognitive interviewing provides insights into respondents' understanding of the phenomenon and their responses to the survey questions; these insights help to detect possible solutions to the uncertainties raised (Lenzner et al., 2022).

The researchers compared the results of the cognitive interview with the translation and scale adaptation protocol notes. The comparison showed that the observations made by the respondents did not provide critical insights. Students did not make any substantive comments on the terms used. This showed that the adaptation of the scale does not require special cultural validation. After discussions with the students, slight linguistic corrections (e.g., adjusting sentence structure) were made to improve comprehension.

Back-translations. In the fourth stage, the scale back-translation technique into English was applied by an independent translator. The obtained translation version was compared with the original scale, without any significant differences and the Lithuanian version of the scale was applied to the research.

2.3. Participants

Methodological publications indicate that the appropriate sample size should be selected for socio-cultural and linguistic adaptation of the scales. The sample size must be proportional to the number of scale variables used for factor analysis (i.e., scale statements). The research methodologies recommended for one scale variable (item) should correspond to 5–10 subjects (Bentler & Chou, 1987; Nunnally & Bernstein, 1994). The IBQ in sports consists of 24 items. Based on the criterion of 1:10 participants per item, we estimated the sample size to be 240.

Our study involved 241 randomly selected respondents, so the number of study participants meets the above methodological recommendation. Thus, the sample size of this study is sufficient to rule out any uncertainty about the sample size.

Coaches and athletes were involved in the study through convenience purposive and randomized sampling. The study was carried out in one region of the country and the participants were physically active men from Vilnius city. The athletes in the study attended physical activity classes led by a coach. The study sample consisted of working, physically active men who participated in athletic training exercises under the guidance of a coach at least once a week. The mean age of participants was 27.01 years ($SD = 7.67$). The youngest participant was 18 years old and the oldest was 54 years old.

2.4. Research procedures and ethics

Coaches were informed about the aims and purpose of the study, and their consents to conduct the study were obtained. After obtaining the coaches' consent to perform the study, the participants were informed about the purpose of the study and the rights to participate in the study.

Study participants were able to decide whether they wanted to participate in the study. The survey took place before the physical training exercise without the participation of the coaches. The questionnaire was given sufficient time to allow respondents to submit their answers without haste. Respondents were informed that participation in the study is based on the principles of anonymity and confidentiality, participation in the study is voluntary, and the results obtained will be analysed only in summary form.

Respondents were encouraged to read each statement of the questionnaire carefully and to respond openly and honestly. It was emphasized that there were neither correct nor incorrect answers to the questions in the questionnaire. In answering the questions describing the choice of sports activities, the participants of the study expressed their personal opinion, marking the answers that corresponded most to the personal attitudes.

All procedures used during the study were performed by involving study participants and analysing study data in accordance with the University and The European Code of Conduct for Research Integrity (2017) and research requirements (Baines et al., 2013; Vanclay et al., 2013).

2.5. Statistical data analysis

Data analysis was performed using *Jamovi* software. Prior to the analysis of the data, it was checked whether the respondents' answers did not contain the missing estimates, and the conformity of the survey data to the normal distribution was assessed. Statistical calculations showed that the indicators were not distributed according to the normal distribution, therefore non-parametric criteria were used in the data analysis.

The structural model of IBQ was evaluated by exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Cronbach's α coefficients (acceptable cut-off value > 0.7) were calculated to assess the internal consistency of the IBQ in sport and its subscales. The structural validity of the model was assessed by the correlation of the statements with the subscale coefficient ITC (Item-total Correlation) and the Cronbach's α coefficient after eliminating the statement.

The suitability of the data for factor analysis was determined by evaluating the Kaiser-Meyer-Olkin (KMO) (acceptable cut-off value > 0.7) and the Bartlett's test of sphericity (p-value < 0.05). An exploratory factor analysis was performed to assess the structural validity of the IBQ. The Maximum likelihood extraction method was used in combination with a "promax" rotation. To assess the overall model fit, we used different fit indicators: RMSEA (Root Mean Square Error of Approximation, acceptable cut-off value < 0.80); CFI (Comparative Fit Index, acceptable cut-off value > 0.90); TLI (Tucker-Lewis Index, acceptable cut-off value > 0.90) and χ^2/df (Satorra-Bentler criteria, acceptable cut-off value < 3.0; Moosburger & Kelava, 2012). Finally, in all tests, a p-value of less than 0.05 was considered statistically significant.

3. Results

3.1. Descriptives and internal compatibility of IBQ

Before the data analysis, a normality test was performed and the skewness and kurtosis values were reviewed. The results showed that the distribution is mesokurtic. IBQ internal consistency analysis confirmed the high consistency of the scale statements with respect to the measured phenomenon (Cronbach α —0.927). The difference in variance of the responses to the individual statements was estimated by the Spearman-Brown coefficient of increased confidence. The value of the Spearman-Brown coefficient determined (equal to 0.925) is very close to the value of the Cronbach's alpha coefficient. This shows that the variances of the answers to the individual questions are similar.

Analysing the correlations between the responses to the individual IBQ scale questions and the sum of the questionnaire values, it was found that the correlation between only one statement

(Item 9) was less than 0.3. However, removing this statement from the scale would not significantly increase the internal consistency of the scale and was therefore retained. It was also considered that when the questionnaire was first adapted, all statements on the original scale were significant.

3.2. Explorative factor analysis (EFA)

The suitability of the data for factor analysis was determined by evaluating the Kaiser-Meyer-Olkin (KMO—0.899) measure and performing the Bartlett sphericity test ($p = 0.000 < 0.05$). The “Maximum likelihood” extraction method was used in combination with a “promax” rotation to determine the common factors. For EFA, the number of factors was determined based on actual factor eigenvalues greater than one. A 6-factor model corresponding to the original scale English model was singled out (Table 1). EFA showed that the isolated model explains 65.3 percent of variance. The factor weight matrix shows that the extracted factors and variables are significantly related (> 0.6). Standardized factor loadings were significant and in the range of .49 and 1.03 and subscales related to each other in expected ways (Table 1).

3.3. Structure of scale, CFA

The six-factor structure of the questionnaire was verified using confirmatory factor analysis. The structure of the IBQ was tested through a CFA using the Lavaan estimator. Assessing the statistical parameters of the respondents’ answers (analysing the values of asymmetry and excess), it was found that the obtained CFA model did not meet the criterion of normality (Table 2). When the data do not meet the normality condition, an alternative solution is used to calculate the Satorra-Bentler criterion (Muthén and Muthén (1998-2015)). It should be noted that the study of internal consistency of subscales confirmed the high coherence between the statements of individual subscales (Cronbach α [.790—.958], Table 1).

The six-factor model isolated by the CFA confirmed the model of the original questionnaire describing interpersonal behaviour in sport, with suitability parameters and values as follows: CFI = 0.928, TLI = 0.917, and RMSEA = 0.070 (95% CI [.062, .078]), Satorra-Bentler (χ^2/df) = 2.21.

Factor correlations (see, Table 3) between autonomy—supportive, competence—supportive, and relatedness—supportive climate are interrelated (r_s ranged from .614 to .640). The dimensions of autonomy-thwarting, competence-thwarting, and relatedness-thwarting are also interrelated (r_s ranged from .328 to .453).

4. Discussion

Satisfying basic psychological needs is important for a person’s continuous growth and improvement. According to self-determination theory, the satisfaction of these needs is influenced by the social environment and the interpersonal behaviour of the individuals surrounding the athlete (R. Ryan & Deci, 2017). The task of a sports coach is to encourage the athlete’s behaviour, which would be conditioned by personal self-determination. Therefore, the sports coach’s behaviour, leadership style, and the motivational climate created play an important role in meeting the basic psychological needs of athletes.

This paper presents the results of the first study conducted in Lithuania, which aimed to adapt the IBQ in sport into Lithuanian language and to analyse its reliability and validity. The hypotheses about the multidimensional structure of the questionnaire and the interrelationships between the dimensions of interpersonal behaviours were tested. The results of our study confirmed a six-factor structure, which is consistent with the structure of the original scale. Notably, our data are very close to the factorisation rates of the original version (Rocchi et al, 2017b), when the studies were conducted separately on samples of men ($n = 105$) and women ($n = 131$) (men: CFI = .90; TLI = .90; RMSEA = .07; [90% CI {.06, .08}], SRMR = .06), whereas latent factors were stable in the female sample (females: CFI = .92; TLI = .91; RMSEA = .07; [90% CI {.06, .08}], SRMR = .06).

Table 1. Data of explorative factor analysis

Items	ITC	A score of factor loadings					
		AS	AT	CT	CT	RS	RT
1. Gives me the freedom to make my own choices	0.74	0.92					
2. Supports my decisions	0.77	1.03					
3. Supports the choices that I make for myself	0.77	1.00					
4. Encourages me to make my own decisions	0.73	0.76					
5. Pressures me to do things their way	0.55		0.78				
6. Imposes their opinions on me	0.44		0.63				
7. Pressures me to adopt certain behaviors	0.56		0.74				
8. Limits my choices	0.62		0.77				
9. Encourages me to improve my skills	0.28			0.50			
10. Provides valuable feedback	0.69			0.48			
11. Acknowledges my ability to achieve my goals	0.79			0.41			
12. Tells me that I can accomplish things	0.54			0.73			

(Continued)

Table 1. (Continued)

13. Points out that I will likely fail	0.30					0.67			
14. Sends me the message that I am incompetent	0.47					0.50			
15. Doubts my capacity to improve	0.39					0.93			
16. Questions my ability to overcome challenges	0.41					0.88			
17. Is interested in what I do	0.68						0.63		
18. Takes the time to get to know me	0.66						0.81		
19. Honestly enjoy spending time with me	0.72						0.95		
20. Relates to me	0.58						0.91		
21. Does not comfort me when I am feeling low	0.39								0.50
22. Is distant when we spend time together	0.52								0.68
23. Does not connect with me	0.49								0.86
24. Does not care about me	0.48								0.84
Cronbach's α	0.958	0.814	0.803	0.827	0.896	0.827	0.896	0.790	0.759
% of variance explained in each factor loading	15.81	13.02	10.28	9.59	8.97	9.59	8.97	7.59	7.59

Note. ITC—Item-Total Correlation
 “Maximum likelihood” extraction method was used in combination with a “promax” rotation. All the factor loadings are above .40 and acceptable

Table 2. Data of confirmatory factor analysis

Factor	Indicator	Estimate	SE	95% Confidence Interval		Z	P	Stand. Estimate
				Lower	Upper			
AS	Item 1	0.91	0.049	0.82	1.01	18.52	<.001	0.914
	Item 2	0.88	0.043	0.80	0.96	20.71	<.001	0.972
	Item 3	0.87	0.043	0.79	0.96	20.18	<.001	0.958
	Item 4	0.80	0.049	0.70	0.89	16.37	<.001	0.848
AT	Item 5	0.74	0.055	0.63	0.85	13.45	<.001	0.780
	Item 6	0.46	0.055	0.35	0.57	8.38	<.001	0.538
	Item 7	0.77	0.057	0.66	0.88	13.52	<.001	0.782
	Item 8	0.73	0.053	0.62	0.83	13.61	<.001	0.789
CS	Item 9	0.35	0.055	0.24	0.46	6.37	<.001	0.413
	Item 10	0.71	0.051	0.61	0.81	14.03	<.001	0.785
	Item 11	0.79	0.044	0.70	0.88	17.83	<.001	0.917
	Item 12	0.65	0.057	0.54	0.76	11.32	<.001	0.669
CT	Item 13	0.53	0.048	0.43	0.62	11.08	<.001	0.654
	Item 14	0.42	0.050	0.32	0.52	8.27	<.001	0.515
	Item 15	0.65	0.037	0.58	0.73	17.65	<.001	0.912
	Item 16	0.64	0.036	0.57	0.71	17.81	<.001	0.917
RS	Item 17	0.70	0.051	0.60	0.80	13.62	<.001	0.763
	Item 18	0.83	0.052	0.73	0.93	15.99	<.001	0.848
	Item 19	0.91	0.052	0.81	1.01	17.56	<.001	0.899
	Item 20	0.84	0.057	0.73	0.95	14.77	<.001	0.805
RT	Item 21	0.51	0.064	0.38	0.63	7.94	<.001	0.530
	Item 22	0.64	0.056	0.53	0.75	11.52	<.001	0.718
	Item 23	0.66	0.049	0.56	0.75	13.48	<.001	0.799
	Item 24	0.63	0.049	0.53	0.72	12.76	<.001	0.767

Table 3. Descriptives and correlations between variables

Subscales	1	2	3	4	5	6	7	8	Mean	SD	95% Confidence Interval	Skewness	Kurtosis
1. AS	1								3.12	0.89	3.02	-0.368	-0.172
2. AT	-.527*	1							2.92	0.74	2.83	0.367	-0.396
3. CS	.614*	-.357*	1						3.38	0.71	3.29	-0.202	-0.026
4. CT	-.252*	.328*	-.387*	1					2.17	0.62	2.09	0.585	2.398
5. RS	.640*	-.486*	.630*	-.231**	1				2.77	0.86	2.66	0.112	-0.513
6. RT	-.426*	.453*	-.381*	.329*	-.343*	1			2.39	0.69	2.30	0.632	1.404
7. Support general	.877**	-.537**	.843**	-.322**	.879**	-.443**	1		3.10	0.71	3.00	0.011	-0.140
8. Thwarting general	-.541**	.803**	-.492**	.695**	-.473**	.783**	-.579**	1	2.50	0.52	2.42	0.413	0.932

Note. * p < .05, ** p < .001,

The metrics of the scale using Structural Equation Modelling and Confirmatory Factor Analysis demonstrate the content and construct validity of the scale. Thus, our study supported the hypotheses (H1) that the Lithuanian version of the IBQ in sport has good psychometric properties and that the latent variables have a robust and reliable structure. The structure of the IBQ in sport is consistent with a multidimensional model consisting of autonomy supportive, autonomy thwarting, competence-supportive, competence thwarting, relatedness support and relatedness thwarting dimensions.

The analysis of the relationship between supportive and thwarting behaviour showed that the hypothesis (H3) is a significant inverse strong relationship between supportive and thwarting behaviour was not supported. It was found that there is a statically significant but moderate relationship between supportive and thwarting behaviour. This is very interesting, because normally supportive and thwarting behaviour can be understood dichotomously and polarly. The study shows that these characteristics are not diametrically opposed, which calls for a deeper exploration of this phenomenon. The subscale correlation analysis confirmed that the hypothesis (H2) is a statistically significant strong relationship between autonomy, competence and relatedness-supportive behaviour. Thus, the study confirmed the content validity and internal consistency (i), criterion validity (ii) and construct validity (iv) of the IBQ in sport (Terwee et al., 2007):

- (i) Cronbach's alpha(s) is between 0.70–0.95; the factor analysis was carried out with an appropriate sample size (calculated to be at least seven times the number of items AND >100);
- (ii) arguments supporting the gold standard AND correlation when Cronbach's alpha is >0.70;
- (iii) the statistical hypotheses were confirmed (more than 75%).

The Lithuanian version of IBQ in sport covers all six behavioural styles emphasized by self-determination theory. Sincere, positive interpersonal relationships improve a person's engagement and motivation. In such activities, where basic psychological needs are met, higher motivation and long-term, purposeful sports activities can be expected (Teixeira et al., 2012). Athletes who feel supported by their coaches opt for long-term physical activity (Edmunds et al., 2007). The fact, that competence-supporting behaviour of coaches can influence young people's decision to continue sports activities is also confirmed by Wekesser et al. (2021) results. Failure to meet these needs in sports can promote amotivation (Vansteenkiste & Ryan, 2013) and even withdrawal from sports (Bartholomew et al., 2011). D. Teixeira et al. (2018) state that coaches in their practice should choose a style of behaviour which increases the basic psychological needs of athletes, create a psychologically supportive environment to strengthen the emotional response to exercise, to avoid disappointment in physical activity. Studies of coaches' perception of interpersonal behaviour (Rodrigues et. al., 2021) show that athletes will be more motivated, will perform exercises more persistently when the coach ensures a sufficient amount of supportive behaviour. Therefore, interpersonal behaviour and sports coach support ensure long-term and purposeful sports activities.

It should be noted that the analysis of causal behaviour confirmed the interrelationships between the dimensions of the questionnaire. The subscales are interrelated and this confirms the integrity of the construct. Therefore, the phenomenon of interpersonal behaviour can be considered as a multidimensional construct consisting of six subscales. It should be noted that the questionnaire and each subscale have good internal consistency. Research consistently argues that a person's motivation and basic needs for autonomy, competence, and relatedness are relevant to fullness of personality in different contexts. It is highlighted that each need is not only unique but also interactive among people of different ages and cultures, operating in different contexts (Vansteenkiste et al., 2020). For example, in a business context, employee behavior, management functions, and organizational behavior have a significant impact on sustainable business financial results and profitability (Li et al., 2022); the authors (Asad et al., 2017) studied

the effect of high performance work systems (HPWS) on organizational performance and found a significant effect of HPWS that has a positive relationship with servant leadership.

Making evaluation on the obtained research results from the STD point of view, the adaptation of the Lithuanian version of the IBQ in sport is important, because the obtained model includes all three elements—autonomy, competencies and relatedness (Deci & Ryan, 1985; R. M. Ryan & Deci, 2000). IBQ validation opens up new possibilities for self-knowledge, self-assessment and reflection of experience, and provides an opportunity to find constructive solutions for forming a nurturing relationship. The need for autonomy encourages research into the surrounding environment and phenomena, getting to know them, making a responsible decision to change, i.e. to develop and acquire new competences. However, self-growth is not as effective compared to when the learner is led by a sports coach or teacher. Effective education and learning in changing situations require support, therefore, interpersonal behaviour and constructive feedback are essential to objectively identify oneself in the context of existing competence (Forsmann et al., 2016; Rottensteiner et al., 2015). Therefore, coaching and facilitation come to the aid of the learner, which creates a space for the formation of the learner's abilities—confidence, relatedness, character, life skills, positive affect and positive psychological capacities—and climate creation (Vella et al., 2011). In this way, a window opens for the education of athletes in the field of education, where the sports coach ensures the learner's learning and development (Roberts & Potrac, 2014).

5. Theoretical contributions and practical implications

Our research adds to the theoretical knowledge about the perception of interpersonal behaviour when practicing sports. The obtained results extend our understanding of supportive and thwarting interpersonal behaviors in sports. The results of the research can be useful for coaches and athletes during their interaction, also motivating and more effectively organizing the educational process achieving the set goals. Validation and adaptation of the research instrument to the Lithuanian socio-cultural context will allow to expand research and the dissemination of such research data. The adapted research instrument could be used to study interpersonal interactions related to supportive and thwarting interpersonal behaviour when practicing sports. This is important in shaping the research culture/tradition of interpersonal behaviour in sports.

6. Limitations and future research perspectives

The psychometric parameters of the Lithuanian version of the IBQ confirmed the validity and suitability of the tool for data analysis. However, it should be noted that the study has some limitations.

First, although the sample of our study meets the requirement in the scientific literature regarding the sample size of the study, we do believe that the sample size of the study is not large in general, so the results of our study could be considered as preliminary. Therefore it would be appropriate to perform a study with a larger number of participants and ensure cross-validation of a larger scope and diversity of the population.

Second, the results of our study are presented by analysing only physically active males. Although the results of the study (Rocchi et al., 2017b) support men and women athletes were invariant with respect to the factor structure, we believe it would be appropriate to conduct a broader study involving both men and women. Therefore, involving persons of different ages and experience in the research would reveal how the research tool is perceived by the representatives of other social groups.

Thirdly, the study was carried out in only one region of the country, so it makes sense to include representatives from different regions. Specific social aspects can affect people's lives, attitudes, behaviour and perceptions of interpersonal relationships.

Fourth, the study is limited to working adults, so it is worthwhile to carry out studies with young people who participate in different sports. From the perspective of self-determination theory, it is important to take into account the contextuality of physical education and sports and to examine how the phenomenon of interpersonal behaviour manifests itself in individual, game and combat sports.

Thus, additional research would allow to assess the suitability of the questionnaire in different societal contexts and would help to reveal the stability of the research instrument over time and analyse the factors that influence the expression and change of interpersonal behaviour according to researchers' recommendations, at least four different social groups should be surveyed in order to improve the reliability and interpretability of the instrument (Terwee et al., 2007).

Future research should broaden the understanding of the IBQ phenomenon by revealing the peculiarities of interpersonal behaviour between coaches and athletes. In addition, the criteria and perspectives listed here could be sources of inspiration for new hypotheses and ideas related to interpersonal research projects and activities, and would allow the newly proposed instrument to be applied in practice and its practical applicability to be assessed.

Looking to the future, there is a valuable field of research that encompasses the links between IBQ and athletes' personal competencies (Kersh et al., 2011). For example, the relationship between IBQ and sport-specific skills, cognitive skills (self-analysis, decision-making, self-analysis, etc.) and socio-emotional (ability to communicate and collaborate, conflict resolution skills, self-confidence, etc.) can be assessed.

7. Recommendations

The IBQ in sport could also be useful for practitioners to better understand the impact of interpersonal behaviour on motivation, autonomy, competence and relational needs, not only in terms of assessing specific behavioural patterns in physical activity practice, but also in terms of providing an opportunity to improve relationships and educational practice. Research on interpersonal behaviour can help to purposefully develop a culture of relationship formation, to contribute to the formation of traditions of leadership in the education of athletes, to provide certain didactic measures to improve educational practice.

It should be noted that sport and physical activity research typically focuses on athletes' self-support behaviours (Bartholomew et al., 2009). However, little attention is paid to strategies related to the manifestation of coach-controlled behaviours in sports. Therefore, this study is important in that the adapted IBQ in sport includes behaviours that inhibit autonomy, competencies, and relationships. Assessing the use of IBQ in sport will help to reveal various negative effects that can be detrimental to an athlete's well-being.

8. Conclusion

Research on interpersonal behaviours is important in educational practice, because interactions become the educational context in which learning, value formation and meaningful activities take place. Our study confirmed the internal consistency, content, criterion and construct validity of Lithuanian version of IBQ in sport. The adapted questionnaire showed good reliability and validity and can be used to study the interpersonal behaviour of athletes and coaches. The structural validity of the scale showed that supportive behaviours are strongly related to autonomy, competence and relatedness needs (i), while supportive and thwarting behaviours have a moderate inverse relationship (ii). The findings of the study, however, show that supportive and thwarting behaviours are not diametrically opposed. Thus, the study shows that the IBQ in sport is valuable for analysing interpersonal relationships explaining the links between supportive and thwarting behaviour. The IBQ in sport can be a valuable tool for advancing research, enriching and improving educational practice in this field.

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Contributions

Conceptualization and study design, S.S., R.G.; theoretical framework, R.G., S.S., D.R., N.Ž. and D.G., methodology, S.S. and R.G.; data collection, R.G.; formal analysis and data curation, S.S.; writing-original draft preparation, S.S.; writing-review and editing, S.S., D.G., and N.Ž.; visualization, S. S.; D.G. and N.Ž. contributed to the final version. All authors have read and agreed to the published version of the manuscript.

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