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Team cohesion: adaptation of the US research tool "Multidimensional Sport Cohesion Instrument" for the business and sporting context in Brazil

Coesão de equipes: a adaptação do instrumento de pesquisa norte-americano Multidimensional Sport Cohesion Instrument para a realidade empresarial e esportiva no Brasil

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Abstract: This study aimed to adapt a team cohesion tool shown to be valid and reliable in the American sports scenario, to the Brazilian sports and business reality. We piloted the first version of the adapted instrument with 45 participants, obtaining high internal consistency and low variation among the 22 questions of the instrument. The instrument was subsequently submitted to a judge to define the version for the test and re-test. The complete study surveyed 173 members of different teams. After the test and re-test, results were tabulated, and in line with Cronbach's recommendations (2004), we used the alpha coefficient as an index of reliability of the instrument. The alpha coefficient found for the global instrument was α=0.9599 in the test, and α=0.9648 in the re-test. The results indicated a high internal consistency of the 22 items about team cohesion. The studies demonstrated Cronbach's alpha coefficients of the following variables that compound the instrument: attraction to the group, quality of teamwork, unity of purpose and valued roles. The adapted instrument showed acceptable consistency in its four dimensions, and also for the various types of teams studied in the Brazilian business and sports environment.

Keywords: Team cohesion; Research instrument; Interior consistency.

Resumo: *O objetivo do presente estudo foi adaptar um instrumento coesivo de equipe válido e confiável da área do esporte norte-americano para o meio empresarial e esportivo brasileiro. A primeira versão do instrumento adaptado foi aplicada a um teste-piloto com 45 participantes, demonstrando alta consistência interna e baixa variação entre as 22 questões que o compõem. Após o teste-piloto, o instrumento foi submetido a um juiz para definir a versão para teste e reteste. O estudo completo pesquisou 173 membros de diferentes equipes. Após as duas aplicações, de teste e reteste, os resultados foram tabulados e, utilizando-se das orientações de Cronbach (2004), foi calculado o coeficiente α (alfa) de Cronbach, que apresenta uma estimativa de confiabilidade sobre o instrumento. O coeficiente α encontrado para o instrumento global foi de α = 0,9599 no teste, e de α = 0,9648 no reteste. Os resultados apontam a consistência interna dos 22 itens de coesão de equipe como muito alta. Os estudos demonstram os coeficientes α (alfa) de Cronbach das variáveis que compõem o instrumento, nomeadas de atração ao grupo, qualidade de trabalho, unidade de propósito e papéis valorizados. O instrumento adaptado possui consistência aceitável nas quatro dimensões, assim como para os diversos tipos de equipes estudadas no meio empresarial e esportivo brasileiro.*

Palavras-chave: *Coesão de equipe; Instrumento de pesquisa; Consistência interna.*

1 Introduction

As observed by Claver-Cortés et al. (2007), effective solutions are required for a fast-changing collective work environment. As reported by Sacomano & Escrivão (2000) and Bejarano (2006), this need emerges mainly because of the adoption of more flexible structures, such as team-based management in the organizational environment.

Numerous authors enthusiastically share their experiences, assigning teams the responsibility for better productivity. In the business environment, Robbins & Finley (1997), Chang (1999), Katzenbach & Smith (2001), Drucker (2001), Moscovici (2003), Bejarano & Pilatti (2008) and Montanari et al. (2011) show the unquestionable advantages of collective action.

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In the sport universe, the enthusiasm is no different. Michael Jordan (2009, p. 51), regarding the need for teamwork, stated that "Talent wins games, but teamwork and intelligence win championships." Carlos Alberto Parreira (2006), in a similar line of argument, inferred that team spirit is absolutely essential for stars to shine and achievements to happen. Phil Jackson (1997) highlighted the need for the exchange of "I" for "we." Rezende (2006) goes further, pointing out that cohesion is the key element for the existence of a real team.

Coaching teams to better performance in the corporate or sports environment is no simple task, even when the best individual talents are brought together. Team performance is related to a number of factors. Karakowsky et al. (2004) mention perceptions and influences among men and women working in teams. Costa (2003) discusses the importance of confidence in the effectiveness of the team. Jackson (2014, p. 14) pointed out the need for "[...] years of nurturing to get young athletes to step outside their egos and fully engage in a group experience."

Nevertheless, and regardless of the team environment, group performance is closely associated with the relationship of its members, the team cohesion. Authors such as Carron et al. (1985), Robbins (2002), Wagner (2006), and Machado (2006) posit that team cohesion is a key factor in the group's performance. Jackson (2014) mentions the importance of cohesion by describing it as an art, "The art of transforming a group of young, ambitious individuals into an integrated championship team."

Given the current scenario, the need for a more comprehensive understanding of team cohesion, and methods and tools that assist in the development and management of team cohesion, is key to maximizing team performance in any environment. The aim of this study is to adapt an American research instrument, the Multidimensional Sport Cohesion Instrument (MSCI), used to measure team cohesion in sports, for the business and sporting reality in Brazil.

2 Theoretical framework reference

The evolution of studies on cohesion indicates that the first systematic work on the topic was conducted by Festinger et al. (1950), who defined cohesiveness as "[...] the total field of forces which act on members to remain in the group." This encompasses two aspects: attraction among the members and forms of control. Carron et al. (1985, p. 213) include social and task-related components, cohesion thus being

> [...] a dynamic process that reflects the intention of the group to stick together and remain united in pursuit of its instrumental objectives related to the task and/or for the satisfaction of members' affective needs [...]

And Tutko & Richards (1984) defined a cohesive group as the combination of people who think, feel, and act as a unit.

Wolfe & Box (1987) concluded that cohesion acts as a social construct element and has historically been based on a tripod: the similarity between individuals, which is judged more in the social than in the intellectual realm; the morale of the group or level of motivation, perceived through sociometric measures, which provide for mutual peer nomination and least/most preferred co-worker selections; and the group's basis to coordinate and control efforts, which is also based on the needs for authority or dominance. Convergent ideas are found in Robbins (2002), and Wagner (2006) highlights the importance of interaction between team members. Robbins (2002) evidences three aspects that influence cohesion: time spent together; the small size of the team, facilitating interaction; and external threats, creating greater alignment of members.

Rocco (2004) pointed out that initially, the concept of cohesion was a purely descriptive term. Several subsequent studies have found factors that affect group cohesion, including: the degree of compliance with the objectives proposed to the group; the interaction that the members establish in the group; antagonisms and intergroup conflicts; degree of proximity or cultural similarity; and the group's previous success stories. Machado (2006) goes further and mentions cohesion as a complex, dynamic, and variable process over time, which does not emerge suddenly, and is not permanent. Maintenance is required, which can be stimulated by all members and leaders.

The first measuring instrument of cohesion level used was the Sport Cohesiveness Questionnaire, developed by Martens, Lander, and Loy in 1972. This instrument has seven items that measure interpersonal attraction or classify attractiveness to the group. No measures of reliability or validity of construction have been applied to this instrument (Weinberg & Gould, 2001). The instrument features an emphasis on social cohesion, considered as a one-dimensional phenomenon. Dissatisfaction with these one-dimensional definitions led to the construction of new measurement instruments to be applied in the field of sport.

According to Carron et al. (2002a), group cohesion has two components: the first is associated with the development and maintenance of interpersonal relationships generated by the social relationship among group members, and the second is linked to the task processes associated with the group's activity to achieve goals. This view describes group cohesion as having a multidimensional nature. Studies solely based on group attraction are inadequate to explain the multidimensional nature of cohesion in teams. Yukelson et al. (1984) concluded that, to assess group

cohesion, the instruments should reflect not only the factors associated with goals and objectives that the group seeks to achieve, but also those related to the development and maintenance of positive interpersonal relationships, cohesion being a multidimensional factor.

Carron et al. (1985) developed a new instrument, called Group Environment Questionnaire (GEQ), translated into Portuguese as *Questionário de Ambiente Grupal - QAG*, which distinguishes between individual and group and social- and task-related interests. Thus, two distinct types of cohesion or two distinct forces act so that members remain in the group. The first is aimed at performing the tasks, entailing the collective efforts of the group to achieve common goals, whereas the second represents the social side, referring to the aspects of relationships and affinities among participants. This model follows the multidimensional conceptual framework, which tested and established the instrument construction reliability and validity. The cohesion model developed by Carron et al. (2002a) separated social and task dimensions, and assumed individual and group aspects of cohesion:

a) Group integration in relation to social aspects;

b) Group integration in relation to the task;

c) Individual attraction in the group in relation to the social aspects;

d) Individual attraction in the group in relation to the task.

The first category - Group Integration - reflects the individuals' perceptions of the similarities and rapport within the group. The second category - Individual Attraction to Group - reflects the personal motives to remain part of the group. Carron et al. (2002a) interpret cohesion by the division of the two forces separating the social and task dimensions. Whereas the first refers to how comfortable group members feel in each other's company, and the extent to which they enjoy belonging to the group, the second identifies the level of group work, i.e., the extent to which the group members work together to meet goals.

The study conducted by Weinberg & Gould (2001) points out factors that influence group cohesion in sports teams, such as environmental, situational, or personal issues, as well as those referring to leadership and team styles, which represent a hierarchy going from the overall to the specific:

a) **Environmental factors**: considered the most general, they represent the normative forces that hold the group together. Examples include scholarships, age, proximity, or eligibility requirements;

b) **Personal factors:** extremely important variables in the study of cohesion on sport teams, they can affect the development of group cohesion when overlooked. The authors point out that these factors explain why team members participate and how they engage in the activities of the team;

c) **Leadership styles**: refers to the coach's interaction with team members and includes the leadership lifestyle and behaviour that professionals exhibit and their relationship with their group. The leader plays a vital role in group cohesion through consistent and clear communication with the captain and the other members of the team, directing efforts to meet the objective and dividing the roles among team members;

d) **Team Factors:** refers to group task characteristics, such as individual or team sports, norms for group actions, desire for success, and team stability.

Cohesion is related to factors that actively affect team performance. The satisfaction of the individual in the group, the motivation to perform the tasks, the quality of the tasks, and acceptance of the leader's role at the head of the group are factors that show the breadth of the topic and the complexity of measuring team cohesion.

Yukelson et al. (1984) reaffirm cohesion as a multidimensional process and portray the need for a more comprehensive measuring instrument. Following the multidimensional concepts of group cohesion, they developed a tool of 41 questions called Multidimensional Sport Cohesion Instrument (MSCI). The psychometric properties of this instrument were analyzed with the data coming from a sample of American basketball players. The final version of the study presented 22 items, measured on an 11-point Likert scale, to evaluate the subject of this article into four major dimensions: a) quality of teamwork; b) attraction to the group; c) unity of purpose; and d) valued roles. This instrument of 22 items for evaluation of sporting cohesion, which uses the principles of psychometrics, has been validated and approved as to its reliability and construct validity, with an alpha reliability coefficient of 0.93.

The instrument developed by Yukelson et al. (1984) follows the definition of multi-dimensional cohesion factors, with reference to both social and the task. Aiming to measure the two factors, four dimensions were created: the quality of teamwork; attraction to the group; unity of purpose; and valued roles. The line that evaluates social cohesion is represented by the dimension attraction to the group, and the line for the

task is measured by the following aspects: unity of purpose, teamwork quality, and valued roles.

Quality of teamwork measures the relationship of team members in relation to the task. It also aims to identify whether the members work together within their functions; if they are compatible and well-defined; and levels of the following qualities: contribution of individuals, conflict resolution, respect, unity generated in the team, feelings of friendship, and discipline to achieve good performance. The Chart 1 summarizes the concepts associated with the dimensions:

In the dimension "attractiveness to the group", the component variables reflect the individual sense of attraction to and/or satisfaction with the group, evaluated by feelings of acceptance, pride in being a team member, meaning, value assigned to team members, and team members' capacity and desire to continue in the group. The Chart 2 shows the variables present in this dimension:

The unity of purpose dimension evaluates the importance given to the preparation of the team, the degree of commitment acquired with the operating norms, the clear understanding of the goals, and methods to re-evaluate the objectives the team hopes to meet, as shown in Chart 3:

The aspect of valued roles evaluates the sense of identification with the team through the perception of each individual about their role in it, their sense

Chart 1. Teamwork Quality Dimension.

Quality of Teamwork	
Teamwork	Wolfe & Box (1987) posit that high cohesion teams seem to establish their performance models more easily and offer a larger bundle of rewards to its members. For the authors, cohesive groups are more effective because little energy is needed to maintain the group, and the group can direct most of its energy towards achieving the goal rather than to internal conflict and its management and resolution.
Compatibility role	According to Wagner (2006, p. 222), "People who share the same attitudes, values or interests tend to feel mutual attraction." Rubio (2003) posits that it is necessary to generate a climate of trust and complicity in the team, in which members should feel supported and believe that a good result depends more on the relationship between them than on individual performance.
Mutual support and respect	According to Wolfe & Box (1987, p. 250), "The cohesion of a team revolves around factors like personal tastes or mutual admiration, similarities, acceptance of group goals, and satisfaction with leadership style, decision-making process, structure and environment. "
Degree of contribution	Weinberg & Gould (2001) emphasize personal factors as relevant points in a team context that can interfere with group cohesion when not functioning. They represent the reason why each member is participating in the activity, involving attitude, represented by the degree of contribution, commitment to implement what is proposed, and satisfaction in performing.
Conflict resolution	According to Cratty (1984) cohesion is modified when there is tension in the group. With moderate tension, fraternal feelings are evident; high tension can affect the group structure; little or no tension will cause the members to collaborate less toward the total effort. According to Wagner (2006, p. 222) "External threats to the well-being of a group can enhance group cohesiveness by propitiating a common enemy that motivates a unified response. The conflict between groups can promote internal cohesion." However, the author points out that using conflict to generate cohesion is dangerous because it discourages cooperation between groups.
Unity	Studies on multidimensional cohesion point out two categories: the first - Group Integration – reflects individual perceptions of proximity, similarity, and unity within the group as a whole, as well as the unification of the group; the second category refers to the execution of tasks (Carron et al., 2002b).
Well-defined roles	The leader should organize and guide the team through clear and effective communication, discuss failures in implementation, and propose solutions and ways to confront these failures. The leader's main role is to monitor and direct the team throughout the competition (Rubio, 2003). According to Weinberg & Gould (2001), the leader must clarify the role of each member of the group and demonstrate that the team's success results from the sum of the performance of all. Each member must know their role and due importance to the group, feeling supported by colleagues, generating pride in their role in the group.
Team discipline in the tasks	Cartwright & Zander (1975) point out that a group is cohesive when its members come together to work towards a common goal, accepting the imposed norms and seeking to fulfil them to achieve collective results.

Source: Authors.

Chart 2. Group Attraction Dimension.

Member attraction to the group	
Feelings of appreciation	Yukelson et al. (1984) state that a cohesive group can be defined by taking into account the degree of attraction between the group of individuals and their will to stay in the group. Robbins (2002) points out that cohesion is the attraction between members and the motivation to stay as a group.
Feelings of acceptance	The individual attractions to the group (social) present the individual feelings of the team members about self-acceptance and social interactions with the rest of the team. Carron et al. (2002a) argue that individuals who obtain a high cohesion level have a high sense of personal acceptance, maintaining positive relationships with everyone and working well together.
Pride in being part of the team	Shawn and Shawn (1962), cited by Wolfe & Box (1987), infer that a successful working group must meet the needs of the group by performing tasks and social pleasure simultaneously.
Value given to participation in a team	Pisani et al. (1994) highlighted that all societies since the earliest manifest themselves through the formation of different groups, in whose participation humans aim to satisfy social needs. "The recognition granted to a group for effective performance can enhance feelings of pride for belonging to the group and for the group performance" (Wagner, 2006, p. 222).
Continuity in the team	Evans and Jarvis (1980), cited by Yukelson et al. (1984), proposed that the attraction to the group may include an individual sense of involvement in the group, feelings of acceptance, and desire to continue being a member of it.
Significance and value	According to findings of Rioux and Chappuis (1979) cited by Hernandez & Gomes (2002, p. 141), "The team as a cohesive organization does not occur suddenly at the beginning of the formation of the group; it is built by the common will of all. Cohesion does not occur naturally, but through a reflective group effort ".
Satisfaction with friendships	Cratty (1984) states that small groups of friends within the team are used as a measure of cohesion, based on the belief that the more mutual friendships occur within a group, the happier and more cohesive it will be.

Source: Authors.

Chart 3. Unity of Purpose Dimension.

Unity of Purpose	
Team preparation	Wolfe & Box (1987) point out that the motivational factor in the cohesion - productivity equation causes cohesive groups to learn more than less cohesive groups, but only when they want to learn. Leadership styles relate to the interaction between the coach and his athletes. Coaches need to behave like leaders and have a good relationship with the members of the group, maintaining open, clear, and direct communication. The leader's behaviour plays a vital role in team cohesion (Weinberg & Gould, 2001). Some situational determinants directly influence group cohesion, including political, administrative, and personal issues; and training conditions, contracts, and change of coaches. Small groups and those who stay together for a long time tend to have higher levels of cohesion because the physical proximity required in training camps and practices, as well as their presence in the same environment outside the activity times, contribute to form the group's cohesion (Machado, 2006).
Commitment to team operations	Rubio (2003) shows that the cohesion of a team is manifested in the group's tendency to remain united in pursuit of a common goal. Therefore, a team will have cohesiveness when its members develop commitment to accomplish the task on behalf of the group, disregarding individual interests.
Clarity of the team's objective	Rocco (2004) posits that a factor influencing group cohesion is the degree of compliance with the objectives proposed to the group: the objectives have to be accepted so that there is commitment and dedication in their execution. "Shared group goals encourage members to work together. When group members participate in defining their purpose and goals, they get to know and influence one another." (Wagner, 2006, p. 222).
Target assessment method	The goals and objectives that the group is trying to achieve are of particular importance in team sports, as much as the functional interdependencies (Yukelson et al., 1984). Groups need to constantly re-evaluate their goals in order to keep them possible and attractive to the group.

Source: Authors.

of belonging to it, and the degree of acceptance from peers and leadership. The discussion in the following Chart 4 shows this dimension:

Yukelson et al. (1984), authors of the MSCI, concluded that it would be necessary to prove that it works in other sports, given that cohesion may vary according to the type of sport practised, which requires different degrees of coordination and interdependence among the team members. Weinberg & Gould (2001) highlight the versatility of the instrument developed by Yukelson et al. (1984), and analysed its validity in different sports, highlighting a relevant element for the purposes of this study.

3 Methodology

This work focuses on applied quantitative research for solving specific problems. In relation to our final objectives, this research is categorized as exploratory. In order to maximize the quality of the construct and operational measures, the following steps were taken: a) exploration and literature review; b) adaptation of the questions for the first version of the instrument; c) selection and definition of the population; d) pilot test application; e) verification of the internal consistency of the instrument adapted, based on the test pilot's input; f) submission to a judge; g) application of the test and re-test; h) verification of the internal consistency of the instrument.

The literature review included material following the precepts of Quivy & Campenhoudt (1998) for exploration at the rupture stage. The exploration aimed to determine the variables influencing team cohesion to build the theoretical frame of reference and identify instruments that measure the cohesion of teams. Once the instrument was identified and defined (Multidimensional Sport Cohesion Instrument - MSCI), the adaptation of the questions began. Because the instrument is in English, the adaptation of the questions was performed by a bilingual (Portuguese/English) person, who was instructed on the objectives of the work and the format of the response used. The questions were adapted seeking the use of a greater number of terms familiar to the business and academic fields, the objective of the adaptation. Chart 5 shows examples of the changes made:

After the questions were adapted, we applied the instrument in a pilot study to two teams of the sales department of a company providing road transport services in the state of Paraná (ten members total); two academic teams that compete in the Academic Challenge of an educational institution (ten participants total); and 15 athletes who participate in a professional soccer team in Southwestern Paraná state. The pilot test respondents, for reasons of convenience, are geographically located in Southwestern Paraná.

After the administration of the pilot test, the internal consistency of the questionnaire was calculated using Cronbach's alpha coefficient, calculated from the variance of the individual items and the sum of the items of each evaluator using the Equation 1 below, according to Cronbach (2004, p. 7):

Chart 4. Valued role dimension.

Valued Roles	
Sense of belonging to the team	Feldman (1968), cited by Yukelson et al. (1984), notes that the degree of specialization of courteous relations among the group members (for example: the efficiency with which group members perform their functions) and their consensus on the number of relevant group norms seem to be related to unity among members of the group. According to Rubio (2003), the successful outcome of a group depends much more on the effective relationship between the team members than on the isolated performance of one of the individuals.
Function valued by the team members	Libo (1953), cited by Yukelson et al. (1984), was one of the first to investigate cohesion as attraction-to-group, noting that cohesion can increase through features such as the objectives and activities of the group, the prestige or status that the group can offer its members, or the interpersonal attraction between them. Gouran (1982) and Leana (1985), cited by Wolfe & Box (1987), found that highly cohesive groups often have less self-censorship and less objectivity when negotiating with their partners for fear of hurting or destroying the delicate solidarity of the group.
Value of function by coaches	According to Rubio (2003), the coach holds a peculiar form of authority and can actively participate in the process of building the group's norms and values. The coach contributes through communication, discussing the failures of a game and proposing ways to confront them, organizing and guiding. The team members are motivated by the coach's evaluation and recognize it. The coach's role is much more than just training the teams, since it influences the orientation of the individuals towards life. The leadership of a group is critical to its organization and cohesion. The leader, in addition to organizing the team, is seen as a model by team members (Weinberg & Gould, 2001).

Source: Authors.

Chart 5. Adaptations to the questions.

Original text	Adaptation to Portuguese
How much do you feel your role or contribution to the team is valued by your team mates?	How much is your role and contribution to the team valued by the coach or leader?
How well does your coach prepare the team, both mentally and physically, to demonstrate its skills during competitions?	Rate how well the coach or leader adequately prepares the team to demonstrate its skills and perform the proposed activities.
Rate the degree of unselfishness on your team (i.e. teammates are willing to sacrifice their own glory for the benefit of the team)	Rate the degree of unselfishness or contribution of the team members - that is, the degree to which teammates strive to sacrifice their individual achievement for the benefit of the team.

Source: Authors.

$$alpha = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum_{i=1}^{k} S_i^2}{S_t^2}\right) \quad (1)$$

where:

k=number of items in questionnaire;

S_i^2=variance of each item;

S_t^2=variance of total questionnaire.

As the instrument showed a favourable internal consistency in the pilot study, it was subjected to a judge, with a Ph.D. in Psychology, for his opinion on the validation of the content and definition of the version for test and re-test. The opinion, which was favourable, indicated that the instrument had satisfactory validity of content to meet the data collection. The judge's statement regarding the opinion is in possession of the researchers.

The definition of the population taking the test and re-test initially considered the coverage area of the original instrument (Multidimensional Sport Cohesion Instrument - MSCI), sports, and was extended to the business and academic contexts in order to meet the objective of the study. In the corporate scenario, the population included members of teams divided into: 14 sales teams of a medium-sized service company operating in different cities in the state of Paraná (58 participants); in the academic field, 16 teams of students enrolled in a sports business program in a higher education institution located in the city of Ponta Grossa, Paraná (70 participants); and in the sports area, three futsal teams (45 athletes) competing in Paraná's Futsal Silver Key championship. Thus, our research universe consisted of 173 team members in the business, academic, and sporting areas.

The test and re-test were applied at two different times with a difference of 15 days from the first application. The procedure aimed to assess the reliability of the instrument by comparing the results with the same respondents at different times. To determine reliability we used Pearson's correlation coefficient (r), which measures the degree of linear relationship between two quantitative variables, as the Equation 2, Triola (2005, p. 682), shows:

$$r = \frac{\sum\left(x - \bar{x}\right)\left(y - \bar{y}\right)}{\left(n-1\right)s_x s_y} \quad (2)$$

where:

x denotes the mean of x

y denotes the mean of y

sx = standard deviation of x

sy = standard deviation of y

n = number of observations

The values of the equation will always range between plus or minus one. The value 0 (zero) denotes the absence of a linear relationship. A positive correlation coefficient means that as the value of one variable increases, the value of the other variable increases as well; as one decreases the other decreases. A negative correlation coefficient indicates that as one variable increases, the other decreases, and vice-versa. The closer the coefficient is to -1 or +1, the stronger the linear relationship between both variables.

Finally, after applying the test and re-test, the reliability results were computed using Pearson's correlation (r). As a cut-off line, we adopted the guidelines provided by Triola (2005), according to which values greater than r = 0.70 of Pearson's coefficient are considered satisfactory and provide desired consistency, indicating the confirmation of the chosen theoretical framework for the adaptation of the instrument (Appendix A).

4 Results and discussions

The research exploration stage focused on efforts to find instruments for measuring the cohesion of teams in the business and academic contexts, as well as the theoretical precepts, in order to review the existing literature. We found instruments that measure the cohesion of teams only in the sports scenario. The available literature showed the existence of works, such as articles in journals, addressing the subject. These results showed the need to build or

adapt a tool for team cohesion aimed at the business and academic communities of the Brazilian reality. We decided to adapt the American research tool Multidimensional Sport Cohesion Instrument (MSCI) because, among those found, the MSCI presented an alpha reliability coefficient of 0.93, considered high according to the precepts of Hair et al. (1995), Cronbach (1996), and Pasquali (1999), demonstrating reliability and validity for a suitable construction.

The final version of the MSCI instrument, used for adaptation, features 22 items, measured on a Likert scale of 11 points, with lateral guidance of the values 1 and 11 indicating minimum and maximum on the scale. The questions adapted are shown subsequently, separated by dimensions:

a) The first dimension, quality of work, consists of eight questions:

- Evaluate the teamwork of your group.
- How important is it to share the same way of thinking as your fellow team members about how to achieve the goals of the team?
- Rate the degree of unselfishness or contribution of the members of this team: the extent to which the teammates strive to sacrifice their individual achievement for the benefit of the team.
- Do conflicts seem to remain unresolved on this team: do colleagues argue a lot or have difficulties interacting with each other?
- Assess the degree of mutual support and respect among team members.
- Rate the degree that your team has well-defined roles so that each member knows what is expected of him or her.
- Evaluate team discipline regarding compliance with the strategies that have been set by the coach or leader.
- Rate the degree of unity of the team members.

b) The second dimension, group attraction, includes seven questions:

- Do you feel accepted on the team?
- Rate the degree of pride you feel to be part of the team.
- Do you wish to continue participating in the team?
- Do your teammates make you feel significant?
- Compared to other teams in which you have worked, how much do you value your participation in this team?
- Rate how much you appreciate being part of the team.
- How satisfied are you with the friendships you have made within the team?

c) The third dimension, unity of purpose, is represented by four questions:

- Assess how much the coach or leader adequately prepares the team to demonstrate its skills and perform the proposed activities.
- How committed are you to the operating rules established by the coach or leader?
- Assess the degree of knowledge of your team-mates about the objectives the team is seeking to achieve.
- Does your team have methods to re-evaluate the goals set, when needed?

d) The fourth dimension, valued roles, consists of three questions:

- Rate the extent to which you feel you belong to the team.
- How much is your function or contribution valued by your team-mates?
- How much is your role or contribution to the team valued by your coach or leader?

The order of the questions was maintained as in the original instrument. Of the 22 topics presented in the instrument, 21 were formulated in the same direction: the higher the level agreement of the respondent to the wording of the question, the greater the marking on the Likert scale of 11 points, indicating greater cohesion in the team. The question outside this pattern was Question 18 (Do conflicts seem to remain unresolved on this team: do colleagues argue a lot or have difficulties interacting with each other?), where the higher the agreement of the respondent, the lower the team cohesion, and vice-versa.

The adapted instrument was applied by the researchers in a pilot test, test, and re-test, each seeking to keep the identity of the respondents hidden. This procedure aimed to ensure the confidentiality of their opinions, and also to establish a climate of trust and empathy. Before the questionnaire was applied, the following information was provided: the questionnaire is confidential; there is no need for

identification by name (just a mark for evaluation of the test and re-test); team leaders will not have access to individual results; and respondents will be participating in a project that included several teams, in order to validate a research tool. In the first contact of the respondent with the questionnaire the instructions were visualized at the top of the page with detailed information about completing it.

Based on the experience with your team, answer the questions according to the following guidelines:

Instructions: Based on your experience with your team, answer the following questions, noting the guidelines below:

a) Do not sign or write your name on the questionnaire;

b) Read the questions carefully and answer them honestly, marking an X in the number that best reflects your level of agreement as to what is asked. Choose, in the scale below, from 1 to 11, the answer that is closest to the reality of your team;

c) Only one answer should be given for each question;

d) Because it is a survey, there are no right or wrong answers.

After the implementation of the pilot test, Cronbach's alpha coefficient was calculated. The results showed that the instrument shows a Cronbach's alpha of 0.9454, meaning that the internal consistency of the instrument is high, as noted by Hair et al. (1995), Cronbach (1996), and Pasquali (1999). The question that showed distortion was number 18, which refers to the difficulty in resolving conflicts. The exclusion of this matter in the instrument would make Cronbach's alpha rise to 0.9598. Table 1 shows the omission of variables in the pilot Cronbach's alpha. The variables are calculated as if each question had been individually deleted, in which case Cronbach's alpha presents variation. No question causes an increase or decrease great enough to justify the exclusion of such item, as shown by the data in Table 1:

Table 1. Omission of variables.

Omission of variables			
Variable	**Alpha value**	**Variable**	**Alpha value**
Q1	0.9466	Q12	0.9417
Q2	0.9412	Q13	0.9421
Q3	0.9446	Q14	0.9419
Q4	0.9407	Q15	0.9410
Q5	0.9419	Q16	0.9413
Q6	0.9418	Q17	0.9427
Q7	0.9410	Q18	0.9598
Q8	0.9465	Q19	0.9413
Q9	0.9407	Q20	0.9427
Q10	0.9428	Q21	0.9400
Q11	0.9402	Q22	0.9422

Source: Authors.

Thus, the individual alpha coefficient of the questions had a very low variation (Δ) (Δ = 0.9400 to 0.9598 in the pilot), which presupposes instrument reliability. After analysing the pilot test and obtaining the approval of the judge, tests and re-tests were applied in the teams defined as the population of this study. The results were tabulated and, using Cronbach's guidelines (2004), the Cronbach alpha coefficients were calculated, which showed an estimate of internal consistency of the instrument, as shown in Table 2:

The results were separated according to the dimensions of the study instrument, with *attraction to the group* having seven items that measure social cohesion, and the other three dimensions corresponding to task cohesion, represented by *quality of teamwork,* with eight items; *unity of purpose* with four items, and *valued roles* with three items. In the four dimensions the Cronbach alpha coefficients had a low variation (Δ) low (Δ = 0.8590 to 0.8988 in the test and Δ = 0.8609 to 0.9141 on re-testing). The overall result of the instrument showed coefficient α = 0.9599 in the test and α = 0.9648 in the re-test. It is noticed that the Cronbach of the instrument as a whole is greater than the Cronbach of each dimension separately. This means that the application of the instrument as a whole that is more consistent than the application of only one of its dimensions.

The literature on Cronbach's alpha coefficient suggests that each researcher should adopt a cut-off point to assess the consistency of a question. According to Cronbach (1951), coefficients equal to or greater than 0.55 indicate good internal consistency. According to Hair et al. (1995), coefficients above 0.60 are deemed acceptable. And Pasquali (1999) posits that coefficients below 0.70 indicate low to moderate consistency, in contrast to Cronbach (1951) and Hair et al. (1995). The cut-off point adopted in the adaptation of the instrument - α of 0.70-, in accordance with Pasquali

Table 2. Result of the instrument's Cronbach's alpha.

Cronbach's alpha for each dimension of the instrument		
Instrument dimensions	**Test**	**Re-test**
Attraction to the group	0.8870	0.9141
Quality of teamwork	0.8772	0.8844
Unity of purpose	0.8988	0.8810
Valued roles	0.8590	0.8609
Global outcome of the instrument	0.9599	0.9648

Source: Authors.

Table 3. Correlation coefficient for test and re-test.

Pearson's correlation coefficient (r)	
Instrument dimensions	***r***
Attraction to the group	0.717
Quality of teamwork	0.792
Unity of purpose	0.705
Valued roles	0.785

Source: Authors.

(1999) - proved the results to be reliable. Thus, it is observed that the alpha coefficients of the four dimensions and the overall outcome of the instrument in both research stages were superior to the cut-off point determined for the present study.

The third evaluation instrument aims to assess the reliability by a correlation between test and re-test response after a period of 15 days. This technique allows us to assess whether similar results are obtained when the instrument is applied under the same methodological conditions as seen in Table 3:

The determination of reliability through Pearson's correlation for test and re-test showed good results because all dimensions obtained results above r = 0.70, demonstrating high reliability in the correlation of the test and re-test responses. According to Triola (2005), a minimum value sufficient for the reliability of a test should be r = 0.70 for the diagnostic evaluation. The lowest correlation was presented in the *unity of purpose* dimension, which aims to measure the preparation of the team, knowledge objectives, revaluation of goals, and commitment to rules and procedures.

The results of this instrument show reliability above that recommended by the literature in the means of the test and re-test for the four dimensions of the instrument, as shown in Table 3. The overall instrument reliability, showing a significant correlation in the whole sample, is represented by the expression $n = 173 / \alpha = 0.01; > 0.195$, meaning that for a sample of 173 elements with a level of significance of $\alpha = 0.01$, the correlations below 0.195 or greater than +0.195 are considered significant.

5 Conclusions

Teamwork in today's business world has been stimulated to maximize results and the greater commitment of human resources. According to Marras (2009), individuals working together and sharing responsibilities enables commitment and involvement with problem solving. Therefore, to maximize the results of collective work it is necessary to develop tools and implement models that identify group behaviour to better manage it, and also make it more dynamic.

Team cohesion is a type of behaviour to be measured and monitored, bringing many benefits to teams in the sports, business, and academic worlds. Cohesive teams have greater integration to the group's objectives, are united, collaborative, wish to remain in the same formation, and support each other in tasks.

This study aimed to adapt the US-developed research tool Multidimensional Sport Cohesion Instrument (MSCI), used to measure the cohesion of teams in sports, to the business, academic, and sports reality of Brazil. We conclude that the goal was achieved, and the instrument adapted. The adaptation and validation of the instrument are justified in three stages. First, by the results obtained in the omission of variables. Of the 22 items surveyed in the various samples, none of the questions of the instrument was eliminated, so its original version has been kept. Second, it is justified by its internal consistency, since the Cronbach's alpha was favourable, with indices above $\alpha = 0.70$, showing a high consistency. And third, it is justified by the reliability analysis of the test and re-test, which showed a correlation in the four dimensions above r = 0.70, confirming the validity of the sample.

Therefore, it is believed that the results bring important contributions to the study of team cohesion in the business, academic, and sports environments. The requirement for satisfactory performance in teams has generated various studies, focused on motivational, behavioural, and leadership issues. It is therefore essential that managers or coaches assess and monitor the cohesion of teams aiming to increase the understanding of and investments in the factors of its influence.

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References

Bejarano, V. C. (2006). *Elementos Essenciais à Implementação de Equipes: um estudo de caso da indústria de papel* (Dissertação de mestrado). Programa de Pós-graduação em Engenharia de Produção, Universidade Tecnológica Federal do Paraná, Ponta Grossa.

Bejarano, V. C., & Pilatti, L. A. (2008). Elementos externos essenciais à implementação de equipes: um estudo de caso. *Revista de Administração*, 43(1), 17-29.

Carron, A. V., Brawley, L. R., & Widmeyer, N. W. (2002a). *The Group Environment Questionnaire: test manual*. Morgantown: Fitness Information Technology.

Carron, A.V., Bray, S. R., & Eys, M. A. (2002b). Team cohesion and team success in sport. *Journal of Sports Sciences*, 20(2), 119-128.

Carron, A. V., Widmeyer, N. W., & Brawley, L. R. (1985). The development of instrument to assess cohesion in sport teams: the group environment questionaire. *Journal of Sport Psychology*, 7(3), 244-267. http://dx.doi.org/10.1123/jsp.7.3.244.

Cartwright, D., & Zander, A. (1975). *Dinâmica de grupo: pesquisa e teoria*. São Paulo: EPU.

Chang, R. Y. (1999). *Construindo uma equipe de sucesso*. São Paulo: Futura.

Claver-Cortés, E., Zaragoza-Sáez, P., & Pertusa-Ortega, E. (2007). Organizational Structure Features Supporting Knowledge Management Processes. *Journal of Knowledge Management*, 11(4), 45-57. http://dx.doi.org/10.1108/13673270710762701.

Costa, A. C. (2003). Work team trust and effectiveness. *Personnel Review*, 32(5), 605-622. http://dx.doi.org/10.1108/00483480310488360.

Cratty, B. J. (1984). *Psicologia do esporte*. Rio de Janeiro: Prentice-Hall do Brasil.

Cronbach, J. L. (1951). Coefficient Alpha and the internal structure of tests. *Psychometrika*, 13, 297-334.

Cronbach, J. L. (1996). *Fundamentos da testagem psicológica* (5 ed.) Porto Alegre: Artes Médicas.

Cronbach, J. L. (2004). My current thoughts on coefficient Alpha and successor procedures. *Educational and Psychological Measurement*, 64(3), 391-418.

Drucker, P. (2001). *Administrando em Tempos de Grandes Mudanças* (5 ed., Tradução Nivaldo Montingelli Jr.). São Paulo: Pioneira Thomson Learning.

Festinger, L., Schachter, S., & Back, K. (1950). *Social Pressure in Informal Groups: a study of a human factors in housing*. New York: Harper & Bros.

Hair, J. F., Black, B., Anderson, R., & Tathan, R. (1995). *Multivariate data analysis: with readings* (4 ed.). New Jersey: Prentice Hall.

Hernadez, J. A., & Gomes, M. M. (2002). Coesão grupal, ansiedade pré-competitiva e o resultado dos jogos em equipes de futsal. *Revista de Educação Física e Ciências do Esporte*, 24(1), 139-150.

Jackson, P. (1997). *Cestas sagradas: lições espirituais de um guerreiro das quadras*. Rio de Janeiro: Rocco.

Jackson, P. (2014). *Onze anéis: a alma do sucesso*. Rio de Janeiro: Rocco.

Jordan, M. (2009). *Nunca deixe de tentar*. Rio de Janeiro: Sextante.

Karakowsky, L., McBey, K., & Chuang, Y. (2004). Perceptions of Team Performance: the impact of group composition and task-based cues. *Journal of Managerial Psychology*, 19(5), 506-525. http://dx.doi.org/10.1108/02683940410543597.

Katzenbach, J. R., & Smith, D. K. (2001). *Equipes de Alta Performance: conceitos, princípios e técnicas para potencializar o desempenho das equipes*. Rio de Janeiro: Elsevier.

Machado, A. A. (2006). As Ciências do Esporte e os Aspectos psicológicos: por uma busca da estabilização da área. In.: A. A. Machado (Org.), *Psicologia do Esporte: da educação física ao esporte de alto nível* (pp. 269-276). Rio de Janeiro: Guanabara Koogan.

Marras, J. P. (2009). *Administração de Recursos Humanos: o operacional ao estratégico*. São Paulo: Futura.

Montanari, R. L., Pilatti, L. A., de Lima, I. A., & Romano, C. A. (2011). A maturidade e o desempenho das equipes no ambiente produtivo. *Gestão & Produção*, 18(2), 367-378.

Moscovici, F. (2003). *Equipes dão Certo: a multiplicação do talento humano* (8 ed.). Rio de Janeiro: José Olympio.

Parreira, C. A. (2006). *Formando equipes vencedoras: lições de liderança e motivação: do esporte aos negócios* (3 ed.). Rio de Janeiro: Best Seller.

Pasquali, L. (1999). *Instrumentos psicológicos: manual prático de elaboração*. Brasília: IBAPP.

Pisani, E. M., Pereira, S., & Rizzon, L. A. (1994). *Temas de psicologia social*. Petrópolis: Vozes.

Quivy, R., & Campenhoudt, L. V. (1998). *Manual de investigação em ciências sociais*. Lisboa: Gradiva.

Rezende, B. R. (2006). *Transformando suor em ouro*. Rio de Janeiro: Sextante.

Robbins, H., & Finley, M. (1997). *Por que as Equipes não Funcionam?* Rio de Janeiro: Campus.

Robbins, S. P. (2002). *Comportamento Organizacional* (9 ed.). Rio de Janeiro: LTC.

Rocco, J. C. D. (2004). A coesão nos grupos desportivos em contexto de ensino militar – academia militar. *PROELIUM – Revista da Academia Militar*, 10, 143-170.

Rubio, K. (2003). *Psicologia do Esporte: teoria e prática*. São Paulo: Casa do Psicólogo.

Sacomano, M., No., & Escrivão, E., Fo. (2000). Estrutura Organizacional e Equipes de Trabalho: estudo da mudança organizacional em quatro grandes empresas industriais. *Gestão & Produção*, 7(2), 136-145.

Triola, M. F. (2005). *Introdução à estatística*. Rio de Janeiro: LTC.

Tutko, T. A., & Richards, J. W. (1984). *Psicología del entrenamiento desportivo*. Boston: Allyn and Bacon.

Wagner, J. A., III. (2006). *Comportamento organizacional*. São Paulo: Saraiva.

Weinberg, R. S., & Gould, D. (2001). *Fundamentos da psicologia do esporte e do exercício* (2 ed.). Porto Alegre: Artmed.

Wolfe, J., & Box, T. M. (1987). Team chesion effects on business game performance. *Developments in Business Simulation & Experiential Exercises*, 14, 250-255.

Yukelson, D., Weinberg, R., & Jackson, A. (1984). A multidimensional group cohesion instrument for intercollegiate basketball teams. *Journal of Sport Psychology*, 6(1), 103-107. http://dx.doi.org/10.1123/jsp.6.1.103.

Appendix A. Adapted instrument.

Instructions: Based on your experience with your team, answer the following questions, noting the guidelines below:

a) Do not sign or write your name on the questionnaire;

b) Read the questions carefully and answer them honestly, marking an X in the number that best reflects your level of agreement as to what is asked. Choose, in the scale below, from 1 to 11, the answer that is closest to the reality of your team;

c) Only one answer should be given for each question;

d) Because it is a survey, there are no right or wrong answers.

Questions:

1) Compared to other teams in which you have worked, how much do you value your participation in this team?										
little										much
1	2	3	4	5	6	7	8	9	10	11
2) Rate the degree to which your team has well-defined roles, in that each member knows what is expected of them.										
poorly defined										well defined
1	2	3	4	5	6	7	8	9	10	11
3) As for your function or contribution, is it valued by your teammates?										
little valued										much valued
1	2	3	4	5	6	7	8	9	10	11
4) How much is your role or contribution to the team valued by the coach or leader?										
little valued										much valued
1	2	3	4	5	6	7	8	9	10	11
5) Evaluate how much you appreciate being part of the team.										
little										much
1	2	3	4	5	6	7	8	9	10	11
6) Do you feel you are an accepted member of the team?										
little										much
1	2	3	4	5	6	7	8	9	10	11
7) Assess the level of teamwork in your group										
Low										high
1	2	3	4	5	6	7	8	9	10	11
8) Evaluate the degree of pride you feel to be part of the team.										
No pride										A lot of pride
1	2	3	4	5	6	7	8	9	10	11
9) Rate the degree of unselfishness or contribution of the members of this team: how much teammates strive to sacrifice their individual achievement for the benefit of the team.										
small										great
1	2	3	4	5	6	7	8	9	10	11
10) How important is it to share the same way of thinking as your fellow team members about how to achieve the goals of the team?										
little										very
1	2	3	4	5	6	7	8	9	10	11
11) Evaluate the degree of knowledge of your colleagues about the goals that the team is seeking to achieve.										
Low										high
1	2	4	5	6	7	8	9	10		11
12) Are you committed to following procedures your coach or leader sets for the team?										
little										strongly
1	2	4	5	6	7	8	9	10		11

13) Evaluate the degree of support and mutual respect among team members.									
small									great
1	2	4	5	6	7	8	9	10	11
14) Evaluate how well the coach or leader adequately prepares the team to demonstrate its skills and perform the proposed activities.									
prepares little									prepares a lot
1	2	4	5	6	7	8	9	10	11
15) Rate the sense of belonging you have you have towards the team.									
weak									strong
1	2	4	5	6	7	8	9	10	11
16) Do your teammates make you feel significant?									
little									very
1	2	4	5	6	7	8	9	10	11
17) How satisfied are you with the friendships you have made within the team?									
somewhat									very
1	2	4	5	6	7	8	9	10	11
18) Conflicts do not seem to be resolved in this team; colleagues discuss a lot and have difficulties interacting with each other.									
weak resolution									strong resolution
1	2	4	5	6	7	8	9	10	11
19) Does your team have methods to re-evaluate the goals set when needed?									
no									yes
1	2	4	5	6	7	8	9	10	11
20) Evaluate the discipline of the team and the implementation of strategies that have been established by the coach or leader.									
little discipline									much discipline
1	2	4	5	6	7	8	9	10	11
21) Evaluate the degree of unity among the team members.									
little united									very united
1	2	4	5	6	7	8	9	10	11
22) Do you desire to continue being a member of the team?									
little									a lot
1	2	4	5	6	7	8	9	10	11