Development and preliminary validation of the Coach Interpersonal Style Observational System

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Abstract

Objectives: The aim of this study was to design and develop a multidimensional observational coding system (Coach Interpersonal Style Observational System) to assess coaches' interpersonal style adopted during training sessions and matches.

Equipment and methods: Content validity was established by 11 experts (with proven knowledge and experience in sport science, motivational psychology, and coaching) using qualitative (e.g. ease of comprehension, utility, and adequacy of examples) and quantitative (category scores) approaches. Coders were trained to test inter- and intra-rater reliability.

Results: Qualitative analyses revealed global positive assessment. Experts' category scores were very high. After coder training, inter- and intra-rater reliability scores were acceptable. Discriminant validity was tested through the pilot application to eight soccer coaches. Overall, the results support the preliminary reliability and validity of an instrument to analyze interpersonal coach behavior.

Keywords

Coach interpersonal style, need support, need thwarting, observational tool, training tasks

Coaches play a central and influential role in youth sports. Coach–athlete interactions are crucial not only for the quality and outcomes of training, but also for character building.[1] This influence can be exerted through sport training contents, type of coach behavior regarding motivational practices and the subsequent interpersonal climate created, the importance attributed to winning and sport results, among other factors.[2] For young athletes, coaches can be a reference both from the competitive and educative or cultural perspectives. Coaches should therefore promote an environment (verbal and structure) in which not only sport performance is considered, but also where global learning concepts can be transmitted. Thus, young athletes would be trained from a systemic perspective (e.g. sports, sociological, and psychological).[3]

Coaches' interpersonal style is of paramount importance.[4,5] According to the *coach–athlete motivational model*,[6] the degree of autonomy support provided by coaches to their athletes will be determined by the coaches' personal orientation, the sport setting, athlete-perceived coach behavior, and athletes' type of motivation. An interpersonal style conveying a rich involvement, structure, and autonomy support will nurture athletes' basic psychological needs for autonomy, competence, and relatedness, in accordance with the Self-determination Theory.[7,8]

Based on the hierarchical motivational model developed by Vallerand[9] and considering both contextual (e.g. sport) and situational (e.g. training and matches) levels, an environment is created in which the educational and instructional functions converge and are

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represented by the coach. Scientific interest in coaching behavior has been studied continuously and intensively over the past 40 years. Various psychometric instruments have been created from different theoretical perspectives. The *Leadership for Sport Scale*[10] and the *Coaching Behavior Scale for Sport*[11] were based on leadership theories. The *Perceived Motivational Climate in Sport Questionnaire*,[12] the *Controlling Coach Behaviors Scale*,[13] the *Empowering and Disempowering Motivational Climate Questionnaire*,[14] and the *Interpersonal Behaviors Questionnaire in Sport*[15] among others were based on motivational theories (i.e. SDT[7,8] and achievement goal theory (AGT)[16,17]). Despite the relevance of these scales, all of them share a common limitation. Assessments are based on the athletes' perceptions and not on the observed coach behaviors.

Coach behavior observational instruments

Due to the subjective nature of instruments that use athletes' perceptions, a line of parallel research developed, focusing on instruments to analyze coach behavior using an observational methodology.[18] The pioneer *Coaching Behavior Assessment System* (CBAS),[19] developed with coaches from several sports (e.g. baseball, basketball, American football), allows a direct coder observation of coach behavior during training sessions and matches. The CBAS classifies coach behavior into 12 distinct categories. Eleven categories refer to *spontaneous behaviors* (i.e. behaviors initiated by the coach without reference to a preceding athlete behavior): (1) general technical instruction, (2) general encouragement, (3) organization, and (4) general communication; and *reactive behaviors* (exhibited directly in response to either an athlete's desirable performance/effort or to a mistake): (5) reinforcement and (6) nonreinforcement, whereas responses to mistakes are: (7) mistake-contingent encouragement, (8) mistake-contingent technical instruction, (9) punishment, (10) punitive technical instruction, and (11) ignoring mistakes. Finally, the CBAS includes one category representing a *Response to misbehavior*: (12) keeping control.

Similarly, the *Arizona State University Observation Instrument* (ASUOI)[20] was developed to systematically observe coaches' teaching behaviors. Based on the premise that instruction is typically the most frequent strategy, the instrument contains 14 behavioral categories, 10 of which directly reflect different types of instruction. The categories are (1) preinstruction, (2) concurrent instruction, (3) postinstruction, (4) questioning, (5) manual manipulation, (6) positive modeling, (7) negative modeling, (8) use of first name, (9) hustle, (10) praise, (11) scold, (12) management, (13) silence, and (14) other.

Despite being innovative and very useful in capturing rich information not tapped by self-report scales, these tools (CBAS and ASUOI) are not derived from psychological motivational theories (i.e. AGT or SDT, among others) and thus, the coach-created motivational features of training are not adequately tapped. This is a critical limitation because motivational theories like the AGT and the SDT maintain that the most important aspect is not the frequency of particular coach behaviors, but the meaning inferred from how, when, and why such behaviors are delivered. In addition, the ASUOI and CBAS, which were developed decades ago, are also more strongly focused on analyzing the coach's instruction/feedback, without including a relationship with a specific theory that clearly classifies the possible behavior of the coach.

On the other hand, more recently tools have been developed to assess coach behavior from an observational perspective. An important instrument is the *Multidimensional Motivational Climate Observation System* (MMCOS).[21,22] The MMCOS includes *empowering* and *disempowering* dimensions[23] and incorporates environmental features, in line with the AGT and the SDT. It assesses the psychological meaning and potency (i.e. pervasiveness, intensity, and expression) of the coach-created environment in the sport setting through seven motivationally relevant aspects of the social environment: (1) autonomy support, (2) relatedness support, (3) task-involving, (4) controlling, (5) relatedness thwarting, (6) ego-involving, and (7) structure.

Another relevant instrument is the *Assessment of Coaching Tone* (ACT) Observational Coding System[24] which was designed to capture the psychological meaning conveyed to athletes by the coach's behavior, as expressed by the interpersonal tone, rather than through pedagogical content. The ACT is composed of nine categories: (1) organization, (2) instruction/feedback, (3) positive evaluation/encouragement, (4) negative evaluation, (5) mental skills, (6) social/moral behavior, (7) nonsport communication, (8) observation, and (9) not engaged, plus (10) an extra category denominated uncodable. The ACT not only analyzes *what* (the 10 categories), but also *how* (tone), which is classified by the expressed degree of autonomy support. The autonomy tone-modifier dimension comprises three categories: (1) autonomy support, considering athletes as capable decision makers and contributing members; (2) neutral, with absence of autonomy-related tone; and (3) controlling, conveying an autocratic tone, with the coach as the total decision maker.

The aforementioned tools, developed and used in sport settings, have in common the importance given to the coach's interpersonal communication tone/style

(e.g. SDT, AGT, the leadership multidimensional theory,[25] or the transformational leadership model[26]). However, all of them (i.e. ACT, ASUOI, CBAS, or MMCOS) have focused specifically on assessing the frequency of a set of theory-based coaching behaviors and on providing a description of the degree to which a given interpersonal coaching style is provided. Hence, coding is normally done within a limited time interval, so each target variable is assessed only once, regardless of the amount of information that the coach transmits in each fragment.

The Coach Interpersonal Style Observational System (CISOS) allows a continuous register, evaluating the coaches' interpersonal style not only from a qualitative (e.g. supportive versus controlling) but also from a quantitative point of view (e.g. % of oral intervention in each category). In addition, the CISOS analyzes the verbal dimension, like ACT or MMCOS, but the present system also includes a structural dimension that analyzes the characteristics and development of each training task and their potential to either support or thwart athletes' basic psychological needs. Although all these observational systems have provided some very interesting analyses, the current instrument also integrates the positive aspects of both the MMCOS and the ACT instruments, considering the verbal and structural dimensions and the levels of autonomy versus controlling support in an integrative tool to record and assess the coach's multidimensional behavior, considering the exchange of information like the unit of analysis and not the amount of information.

Method

The present study

Taking into account the above-mentioned observational instruments, a new and more integrative observational coding system was designed, developed, and initially validated. The CISOS is intended to be a useful tool to record and analyze coach behaviors from a multidimensional perspective, including the verbal behavior displayed (verbal dimension) and the training tasks assigned (structural dimension), and also including for each dimension the interpersonal tone coding (i.e. controlling, neutral, or need-supportive). With this new multidimensional observational instrument, we expect to evaluate the two dimensions of coaches' behavior toward their athletes (verbal and structural), while also assessing their tone, the *how* in addition to the *what*. The amount of information and who is addressed (individual or team) are also targeted by this observational coding system.

Study design

In accordance with the aim of this research, an adaptation of Brewer and Jones'[27] multi-stage process for sport setting was conducted to design and initially validate the observational system, including: amending an existing observation instrument, establishing the instrument's initial validity, coder training, and determining inter- and intra-rater reliability. Drawing on this, the CISOS was developed and tested progressively in six stages. Stage 1: review of the observational systems used in previous sport coaching research; Stage 2: design and development of the observational system; Stage 3: determination of content validity; Stage 4: coder training; Stage 5: determination of inter- and intra-raters; and Stage 6: determination of discriminant validity.

Stage 1: Review of the existing observation instruments

The development process of the CISOS began with a review of the existing coaching observation instruments in the main databases: PubMed, Scopus, Science Edition (JCR), EMBASE, and Medline/Index Medicus. After analyzing, selecting, and evaluating the related literature (presented above), it was found that these instruments were not fully adapted for the present global project purposes. Hence, while considering the information found in these tools, we decided to develop a new observation system grounded in SDT and AGT motivational frameworks.

Stage 2: System development

Item creation and development. Based on points of potential behavioral codes extracted from the literature review, an expert panel of four researchers viewed five random 15 min video clips of eight different coaches. These 15 min clips were purposefully selected in youth soccer to ensure that the sample varied in behavioral content from the videotaped eight training sessions (20% of the total footage). The four researchers were all educated at postgraduate level or above in the discipline of Sport Psychology, had good knowledge of motivational human theories (i.e. AGT and SDT), and experience of playing and coaching soccer. Each one elaborated an individual report, including suggested changes. These reports were evaluated through internal discussions according to the categories (verbal dimension) and their units of analysis, and the items (structural dimension). This process was repeated until all four experts, after meetings and discussions, reached a unilateral agreement on all the dimensions and levels of evaluation. After reaching this consensus, the video clips were once again viewed in order to

collect real examples of each of the categories and levels. The units of analysis were established considering that the exchange of information according to a recording cannot fall into two categories at the same time (i.e. exclusion criteria) and taking into account that all of them must be in some category (i.e. inclusion criteria).

The CISOS (Appendix I) originally included the following categories (Annex II): (1) *Initial Coach Information*; and (2) *Redirection Process* for training sessions (RP) or *Competition Redirection Process* for matches (CRP). For instance, the way coaches transmit information about the training tasks or their redirection is closely related to autonomy supportive/thwarting of SDT. (3) *Ego-Task Climate*, directly associated with AGT; (4) *Team Instruction*; and (5) *Individual Instruction* (II). The information provided by coaches previously about the action is also closely related to autonomy supportive/thwarting of SDT. (6) *Team Feedback*; and (7) *Individual Feedback*. *Feedback* is strongly associated with competence supportive/thwarting of SDT and ego/task orientation of AGT. (8) *Individual Social Climate*; and (9) *Team Social Climate* (TSC) are very closely related to relatedness supportive/thwarting of SDT. (10) *Others* (O). Ten items were designed to assess the structural dimensions.

All categories (verbal dimension) and items (structural dimension) were scored in three subcategories or response levels from 1 to 3. Level 1 corresponds to controlling verbal behaviors and/or controlling task characteristics. Level 2 refers to coach behaviors and/or task characteristics classified as neutral. Level 3 considers supportive verbal behaviors and/or supportive task characteristics.

Results

Stage 3: Content validity

To determine content validity, the Spanish version of the CISOS was sent to 11 experts with proven knowledge in sport science, motivational psychology, and coaching. Specifically, all of them were also postgraduate researchers with expert knowledge of SDT and they were applied sports psychologists. Three of them also had a UEFA Pro license graduation in coaching soccer. This preliminary version was evaluated attending to the degree to which the tool adequately assesses what it was intended to assess.[28,29] The group of 11 experts evaluated the adequacy of each of the categories and items at a categorical level (Yes or No) and at a descriptive/qualitative level (suggested changes, drafting, etc.). The experts' contributions ranged from small wording modifications to large removal of parts and substantial

changes in the categories and level definitions. Some examples of the experts' contributions were as follows: Categories: (verbal dimension); ''*Lack of the precision in some descriptions*''. *For instance, for (neutral level) saying 'more or less' seems ambiguous in the Initial Information category. Something like the following would be more accurate*: ''*The coach guides the general lines of what to do, without imposing, allowing the players to make some decisions.*'' ''*An observational category cannot pool irrelevant things*''. *It can be defined as 'not directly related'*. Items (structural level); ''*In training task, what allows the player to reflect, training task or reflection on what the coach does about the training task?*'' ''*The time of what, of the training tasks or of the training sessions?*'' ''*The time allows the achievement of the objectives (neither short nor excessive). What do you mean by short?*'' ''*Decision-making does not necessarily have to be related to autonomy. I think it should be revised, it can lead to confusion, this is something that the coach usually confuses, it is necessary to make it clearer*''. All experts' suggestions were considered in the elements of both dimensions and at the different levels. Next, the modified version was individually sent to each expert for a new assessment. The experts' qualitative evaluations expressed their general agreement of the adequacy of the proposed categories and items, except for the *Others* category (Table 1). At the quantitative level (scale range 1–10), the scores ranged between 6.77 (*Others*) and 9.22 (*TSC*). Finally, concerning the degree of definition and ease of understanding, the experts' explanation and examples were examined and modified in each of the categories and items. Considering the qualitative and quantitative evaluations provided by the experts, the *Others* category was deleted.

Stage 4: Coder training

Once the final version of the CISOS was defined, a protocol was created including six successive phases to perform coder training. In the first phase, we explained the objectives of the study and each of the dimensions and levels of the coding system to four potential coders. In the second phase, each coder was given a copy of the instrument and asked to watch some random video clips for two weeks and use the instrument to rate coach behaviors to become familiarized with the task[0]. During this phase, the coders were also trained in the transcription of coach statements. In the third phase, the observers were asked to take notes of the coach's explicit statements in each of the dimensions. The purpose of this third phase was dual, on the one hand, to verify the observation system's categories and item clarity and, on the other hand, to assess coders' decision making in difficult cases of

Table 1. Experts' qualitative valuations in all categories and the global assessment.

Verbal behavior categories	Judges											Global assessment
	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	
Initial Coach Information (ICI)	8	10	8	9	9	9.5	9	8	9	9	10	8.95
Category suitability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Redirection Process (RP/CPR)	10	9	8	10	8	9	9	9	10	9	10	9.18
Category suitability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ego/Task Climate (ETC)	10	8	10	9	9	9	8	9	7	9	10	8.90
Category suitability	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Team Instruction (TI)	8	9	7	7.5	9	10	10	7	10	7	10	8.59
Category suitability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Individual Instruction (II)	8	9	7	7.5	9	10	10	7	10	7	10	8.59
Category suitability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Team Feedback (TF)	8	9	6	9	9	10	10	6	8.5	8	10	8.5
Category suitability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Feedback (IF)	8	9	8	9	10	10	10	6	8.5	8	10	8.77
Category suitability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Team-Social Climate (TSC)	10	9	9	8.5	9	9	10	8	10	9	10	9.22
Category suitability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual-Social Climate (ISC)	10	9	7	9	9	9	10	8	10	7	10	8.90
Category suitability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Others (O)	10	9	0	4	8	9.5	10	7	5	7	5	6.77
Category suitability	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No

coding/interpretation (levels). The discrepant responses served as valuable teaching opportunities.

In the fourth phase, a group discussion was held (experts and coders), in which the coders conveyed their impressions and reasoning about the decisions taken during the preliminary coding process. In the fifth phase, the coders progressed to independent coding assignments. They re-analyzed the same 15 min video clips. The choice of 15 min was because, first, a sufficient number of behaviors (oral and structural) is revealed in this interval and second, to be consistent with the experts' previously used observational methodology. In the sixth and final phase, each individual coding was used to calculate inter- and intra-rater/coder reliability (test and re-test) and to compare with the "gold standard" (experts' conjoint coding) coding. This process was continued until coders reached a minimum reliability standard (stage 5) on two consecutive coding assignments, at which point they were considered fully trained.

Stage 5: Inter- and intra-rater reliability

Both inter- and intra-rater reliability analyses for the final coding system were conducted. Reliability was based on two random methods: intra-class correlation

(ICC), used previously in observational research,[22,30,31] and minimum standard of agreement, set at 75% agreement, in terms of frequency, amount of information selected, dimension and level (1, 2, or 3) of each of the behavioral assessments.[32]

Inter-rater reliability. Inter-rater reliability was assessed through concordance with the minimum coding standard and the resulting ICC obtained by experts' conjoint coding (gold standard). The ICC value is interpreted as poor if it is below .50, moderate if it is between .50 and .75, and adequate if it is above .75.[33] Through the viewing of five 15 min video fragments, four coders (all men), graduates of Physical Activity and Sports Science and unrelated to the design and development of the coding system, were trained during two months according to reliability criteria (range on final coding tests = 79–89% agreement, Kappa range = .63–.69; M ICC = .96). Re-tests of inter-rater reliability were conducted approximately two months after initial completion of coder training, and the minimum 75% agreement standard was maintained (range = 84–94% agreement, Kappa range = .66–.93; M ICC = .97).

Intra-rater reliability. Intra-rater reliability was assessed by requesting all four coders to recode two different

15 min video segments at least two weeks after their initial coding of the same segments. All coders achieved at least the minimum 75% agreement standard on both video segments (range = 78–94% agreement, Kappa range = .68–.92; M ICC = .98).

Stage 6: Discriminant validity

Finally, the full observational system was used to recode a video[34] that showed the behavior of eight youth soccer coaches without any academic or sport degree, aged between 19 and 50 years (M = 32.5, SD = 14.34) during three training sessions and a match. The simple analysis of this recoding provided preliminary support for the discriminant validity of the CISOS because the two dimensions (verbal and structural) and the coach's interpersonal style (levels) were clearly differentiated. Table 2 shows (as an example) the score obtained in a training session and a match by two randomly selected coaches. The new system captured the differences noted in the evaluations of each category and level.

Discussion

The goal of this study was to design and validate a multidimensional observational coding system to assess coaches' interpersonal behaviors from two perspectives: coach behavior (verbal and structural) and tone (control, neutral, and support). Brewer and Jones'[27] procedures were followed, and results regarding content and discriminant validity, and inter- and intra-reliability indicate that the scale is initially validated and reliable and can be used to assess the aforementioned dimensions.

Yoder and Symons[35] identified a number of fundamental processes for developing an observational measurement system: (a) content validity, (b) changing sensibility, (c) treatment utility, (d) related criteria, and (e) construct validity. They also defended the need for flexible instruments depending on the purpose of the study and the instrument's use. Accordingly, the above procedures were extended with different studies from the sport setting[24,36–38] and adapted to take into account further developments.[27,35]

In addition, due to this uncertain criterion applied to the amount of information needed to analyze the interpersonal style adopted by coaches from the different systems developed (e.g. MMCOS or ACT), it would be interesting to determine how much information is needed to provide a homogeneous analysis that represents the coach-created environment during training sessions and matches. Although some research has used a general classification to examine autonomy support in the academic context,[39] considering time

intervals of 5 or 10 min and a general assessment of 50 min as sufficient to obtain satisfactory and interchangeable data, in accordance with our research, we think that this amount of information cannot be considered or evaluated in short time intervals. Each video clip fragment may vary in importance and quantity of information. In addition, more extensive and representative evaluation samples must be collected to obtain complete information of several training sessions and matches.

On the other hand, after performing the experts' recommended quantitative and qualitative changes, the CISOS seems to have a good preliminary validity. However, previously, the category "Others" was subject to amendments. This category was originally designed to record verbal behaviors related to irrelevant aspects (i.e. aspects that would not affect players or the development of the training session or match) but most of the specialists disagreed with this approach, recommending instead that all aspects should be previously defined as relevant. Despite that other observational systems like the ACT considered a dimension as "Other," given the integrated nature of the present instrument, any nonsport verbal interactions may exert some influence on the coach–athlete relationship and should therefore not be considered irrelevant. For example, if the coach argues with another coach or with the referee in the presence of the players, although it may not have a direct impact on the coach–athlete relationship, an indirect impact cannot be precluded. Thus, it must be registered as a potential influential aspect for the social climate generated by the coach.

With respect to inter- and intra-rater reliability, the results show that the instrument is accurate to assess the coach's interpersonal behavior. Previously, instruments designed to assess the verbal behavior of coaches (ACT, MMCOS) and physical education teachers[30,31] had used a comprehensive perspective, focusing on the tone or style used by coaches or teachers in each of their interventions. However, despite using a more systemic approach, none of them included a category related to extra-sport aspects (i.e. "Others"). The CISOS overcomes this limitation, using a multidimensional and gradual structural dimension to analyze coach behavior during training tasks. Of the all reviewed tools, only the MMCOS includes a structural dimension, but, as revealed by content examination, it is still a communicative dimension. This structural dimension of the MMCOS is related to some of the CISOS dimensions, such as the "redirection process," "instruction," the "ego/task climate," or the "initial coach information."

It is important to note that, like other observational instruments (ACT, CASI, CBAS, MMCOS), the CISOS serves to assess coaches' behavior during their interventions in training sessions and matches.

Table 2. Values obtained in two different coaches during a training session and a match.

Coach 1—Training session

	ICI	RP	ETC	TI	II	TF	IF	TSC	ISC	TOTAL
TOTAL ORAL INTERVENTIONS	7	100	3	79	35	18	2	6	5	255
Oral interventions at level 1	0	14	2	13	12	4	1	2	3	51
Oral interventions at level 2	6	82	0	60	22	7	1	0	0	178
Oral interventions at level 3	1	4	1	6	1	7	0	4	2	26
% Oral interventions at level 1	0.00	14.00	66.67	16.46	34.29	22.22	50.00	33.33	60.00	20.00
% Oral interventions at level 2	85.71	82.00	0.00	75.95	62.86	38.89	50.00	0.00	0.00	69.80
% Oral interventions at level 3	14.29	4.00	33.33	7.59	2.86	38.89	0.00	66.67	40.00	10.20
Average score TOTAL	2.14	1.90	1.67	1.91	1.69	2.17	1.50	2.33	1.80	1.90

1. The training task (TT) is *open*, allowing decision making by athletes (game aspects—cognitive implication).	1
2. The athletes participate in the design, organization, and development of the TT (they assume roles).	1
3. The TT involves the athletes reflection on what they do.	1
4. The objectives (TT) are clear and involve significant learning for the athletes.	2
5. The TT is adapted to the athletes' capacity/level.	2
6. The TT time allows the achievement of the objectives (neither scarce nor excessive).	1
7. The TT organization (space, number of athletes, etc.) is well defined and related to the task target.	2
8. The TT requires interaction (athletes' relationship with the same objective and level of importance) and communication.	1
9. The TT requires the athletes' cooperation to achieve the objective.	1
10. The TT allows the participation of all athletes in the same conditions (nondiscrimination).	2

Coach 2—Match

	ICI	CRP	ETC	TI	II	TF	IF	TSC	ISC	TOTAL
TOTAL ORAL INTERVENTIONS	7	7	24	59	46	32	26	16	20	237
Oral interventions at level 1	2	0	10	33	29	3	0	0	1	78
Oral interventions at level 2	5	7	11	22	12	9	7	2	9	84
Oral interventions at level 3	0	0	3	4	5	20	19	14	10	75
% Oral interventions at level 1	28.57	0.00	41.67	55.93	63.04	9.38	0.00	0.00	5.00	32.91
% Oral interventions at level 2	71.43	100.00	45.83	37.29	26.09	28.13	26.92	12.50	45.00	35.44
% Oral interventions at level 3	0.00	0.00	12.50	6.78	10.87	62.50	73.08	87.50	50.00	31.65
Average score TOTAL	1.71	2.00	1.71	1.51	1.48	2.53	2.73	2.88	2.45	1.99

ECT: Ego-task climate; ICI: initial coach information; RP: redirection process; TF-IF: team-individual feedback; TI-II: team-individual instruction; TSC-ISC: team-individual social climate; TT: training task.

However, in the case of matches, the above-mentioned structural dimension cannot be accessed because it is defined by the sport rules (in this context, only the verbal dimension is considered).

Although a comparison including observational recordings and athletes' perceptions to analyze the degree of reliability between the two measures of the interpersonal style adopted by coaches would be a powerful contribution to the related literature, the preliminary validation of the CISOS (i.e. stage 6) showed a good initial discriminant validity. The coders were able to discriminate each of the verbal and structural categories, recording scores of the coaches' interventions in each of the assigned levels.

Another unique feature of the CISOS is that all information transmitted by the coach is registered continuously. Some of the aforementioned tools performed evaluations based on recordings (as in the case of the MMCOS, among others), considering predefined equal time fragments of 5 or 15 min. Conversely, the CISOS design better captures the versatility and variability of coach behavior, considering not only its quality (ACT, CAIS, etc.) but also the amount of information. Indeed, it may be advantageous to record everything included in the coach's intervention (verbal and structural) instead of establishing fixed time intervals for any given assessment.

Limitations and future directions

A possible limitation of this study is that an exhaustive knowledge of the scale (e.g. dimensions and levels) are necessary to carry out a correct analysis, which implies a relevant effort and a fully comprehension of the CISOS, but as with other observational or quantitative instruments. Another possible limitation of this research is that, in spite of having drawn on Brewer and Jones'[27] multi-stage process for the sport setting to design and initially validate the observational system, a comparison between the two ways of analyzing the interpersonal style adopted by coaches (i.e. observations and athletes' perceptions) was not conducted. It would be interesting to compare observational data obtained by the CISOS with a quantitative methodology (using the AGT and/or the SDT), specifically, to determine whether athletes' perceptions of the interpersonal style adopted by the coach are related to the behavior registered by external observers.

In addition, a series of applications are presented to be carried out in future research. First, the CISOS can be administered to club managers to analyze the interpersonal style adopted by their coaches during training sessions and matches. It is also interesting because club managers could determine what direction style their coaches are adopting and could compare this style with other variables or impressions registered in their athletes from a research approach, like: perceived interpersonal style, types of motivation, basic psychological need satisfaction/frustration, and/or positive or negative outcomes such as satisfaction with the coach, intentions of persisting or dropping out, and so on. Second, the CISOS also allows analyzing the interpersonal style adopted by the coach that the club manager or the researcher considers appropriate. Considering that other ways to analyze the interpersonal style provided by coaches using a quantitative methodology are only perceptions, with this kind of observational tools, we can compare the data obtained in both scales and analyze the degree of agreement between the systems. In addition, many quantitative instruments are not a sensitive way to evaluate the real style adopted by a coach.

Conclusion

The CISOS is presented as a reliability and initially valid observational system to assess the coach's behavior during training tasks using a multidimensional (i.e. including verbal and structural dimensions) and gradual process (i.e. considering all the interactions continuously instead of in bouts). In addition, this instrument allows the use of observational data to analyze the style and type of tasks adopted by coaches during their interventions.

This study supports Roberts and Treasure's[40] note about the need to observe the sport setting more accurately. Better assessment of coaches' behaviors could also provide a clearer pathway to understanding the effects of their behavior on other (psychosocial) outcomes in addition to athletes' performance.

Supplemental material

Supplemental material is available for this article online.

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