

## Athlete's retention of a coach's instruction before a judo competition

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### Abstract

The aim of the present study was to analyze the instruction of the Judo coach immediately before the competition, in the process of preparation for the fights, looking to (1) study the coherency between the information which the coach transmits and that which the athlete retains; (2) identify the correlation between the coherency, the extension and the number of ideas conveyed by the coach; (3) determine if the retention varies in relation to variables such as the form and nature of the information, as well as the gender and practice category of the athletes. The participants were 11 coaches and 58 athletes of 3 categories: under-15, under-17 and under-20, of both genders. One hundred and sixteen (116) instructional episodes were observed, which corresponds to four hundred and six (406) information units conveyed by the coaches. The coaches' instructions given before the competition were recorded in an audio and video register. After the coaches' instruction, the athletes were approached by the investigator and an interview was accomplished. To determine if the retention varies in relation to form and nature of the information and gender and practice category of the athletes, the non-parametric statistics, U de Mann-Whitney and Kruskal-Wallis, was used. Correlation of Spearman was applied to verify the degree of association between the coherency, the extension and the number of ideas conveyed by the coach.

The results showed that a substantial part of the information was not retained by the athletes and the information coherency was inversely related to the number of transmitted ideas. The coaches were, mainly, prescriptive and the form of the information was not important for the retention of the information. Gender was a differentiated variable as the girls showed more coherency in the retained ideas in relation to the ideas transmitted by the coach.

**Key words:** Athletes' retention, coach's instruction, judo, competition.

### Introduction

From a historical perspective, the studies of the instructional processes of the teaching effectiveness were at first focused on teacher behavior during the class, namely in Physical Education, during the sixties (Metzler, 2000). In reference to training, the studies into this thematic commenced later, the first study was done in 1976 by Tharp and Gallimore in which the authors studied the behavior of a successful Basketball coach, John Wooden. Other studies followed and showed that the context of the setting has a significant impact upon coaching behavior (Hastie, 1999). Research has demonstrated different coaching behaviors between winning and losing coaches

(Claxton, 1988), between coaches at different age levels (Segrave and Ciancio, 1990), and among the same coaches in pre-season and in-season (Lacy and Goldston, 1990) as well as between practice sessions and game play (Chaumeton and Duda, 1988).

Competition is one context of coaching that has had relatively little empirical research. The precarious investigation done in this context may be justified by the difficulty in approaching the coaches and athletes in the competition period, and their lack of availability at that same period. Out of all the studies done in the competition context, the majority are accomplished during the game, analyzing the coach's instruction during time-out (Botelho et al., 2005; Boutmans and Swillen, 1991; Duke and Corlett, 1992; Kozar et al., 1993). The analysis of the instructional processes during the moments before the competition has not been largely explored; however, athletes and coaches consider these instructional periods to be particularly important (Mesquita et al., 2005).

In the ambit of teaching effectiveness, the active role of the learners has been highlighted in the paradigm of the mediating processes developed by Doyle (1986). This paradigm suggests that the effectiveness of teaching stimuli depends on how the student processes the information provided by the teacher. In the same way, motor learning research show that mediating factors, such as attention, retention and memory capacity, influence student performance (Bandura, 1986). Anderson (1969) underlined that the treatment of the teaching stimulus, done by the students, was a determinant factor in the learning process, constituting the processes of attention, selection and information treatment deriving from the teacher and the surrounding environment. Obviously, the nature and manner in which information is communicated to students can facilitate the development of accurate motor plans (Kwak, 2005; Rink, 1993).

In this way the studies about the retention processes of the substantive information can be decisive in the optimization of the instructional processes, mainly because the analysis of the information retained by the learners will let the teacher or coach understand and refine the instructional process.

In reference to sport context, namely in competition, the instructions given by the coach are optimized if the athletes retain and understand them well, so that it is possible to use them effectively to achieve a better performance in competition. Since the athletes usually experience high levels of anxiety and nervousness, possibly affecting their capacity of processing information, the coach should take extra care when conveying information

during competition. The coaches know, through experience, that there are significant losses of transmitted information by the athletes (Mesquita et al., 2005). In this way, the quantity and the nature of the information transmitted by coach are factors that can affect the level of its retention and comprehension by athletes.

The studies found in the literature about retention of information, in the ambit of the sport activities, have been completed mainly in school. They show that high quantities of information given by the teachers make the retention more difficult for the students (Cloes et al., 1990; 1991; Januário et al., 2006; Swalus et al., 1991). Additionally, the nature of information (e.g. prescriptive, descriptive, etc.) (Januário et al., 2006) and the form that it is conveyed (e.g. visual, auditive, etc.) (Cloes et al., 1990) can affect the level of retention.

To truly understand the dynamics of coaching we should understand the mediating processes between coach instruction and athletes' retention. A more precise comprehension of the theoretical and applied aspects of teaching and learning on the coaching setting can be provided through the study of the mediators athletes' processes, namely in the competition setting.

In this study we focus on the instruction of the Judo coach in the instructional periods immediately before the competition, in the process of preparation for each fight. Specifically, we study the relation between the information that the coach transmits and that which the athlete retains and we analyze if the retention varies in relation to variables such as the structure and nature of the information, as well as the gender and practice category of the athletes.

## Methods

### Subjects

In this study, 11 coaches and 58 athletes of both genders (female 46,5% and male 53,5%) from 3 category participated: under 15 (41,5%), under 17 (27,5%), and under 20 (31%). All coaches were male, aged between 31 and 50 years old and with more than 6 years of professional experience. According to Burden (1990) the stabilizing phase is accomplished after 5 years of professional experience. All coaches in this study are in this phase. One hundred sixteen (116) instructional episodes were observed, which corresponds to 406 information units emitted by the coaches.

### Variables

**Athletes - Gender and Practice Category (under 15, under 17, under 20):** *Coach's Instruction* - 1. Extent of information (number of transmitted words), number of ideas (number of different informations contained in the pre-competition instructional episodes) and density of the information (the ratio between the number of ideas and the number of words used to emit them). 2. *Nature of the instruction*: prescriptive, descriptive, positive evaluation and negative evaluation. 3. *How the information is given*: verbal, visual, kinesthetic and combined (the joining of two of the previous categories).

*Retention of information by the athletes*: Extension of the retained information (number of words used by the athletes), number of retained ideas (number of different informations used by the athletes), density (ratio between the number of retained ideas and the number of words used to express them).

*Coherency*: Ratio between the number of concordant ideas between coach and athlete.

### Instrument of observation

In order to describe and categorize the information transmitted by the coach, we used a system of categories named "Observation system of the pre-competitive coach instruction" (Table 1).

Two strategies were used to develop categories for the instrument, while fulfilling the requirements for content and construct validity. First, a review of the literature with an examination of already existing categories in other observations instruments was conducted. Secondly, validity was also accessed by expert validation, six experts having evaluated whether the categories, considered in each dimension, represented the total possibilities of those instructional periods. Each expert was given a list of dimensions, categories and a sample of judo pre-competitive instructions and was asked about their view of the procedure and asked to match all instructions units in the different dimensions and categories. The percentage of agreement between experts reached 93.3%, meaning a strong consistency.

### Data collection

After the coaches' instruction, the athletes were approached by the investigator and an interview was accomplished by asking the following two questions: *What did your coach say? Do you mind repeating in your own words?*

**Table 1. Observation system of the pre-competitive coach instruction**

NATURE OF THE INFORMATION
• Prescriptive – The coach gives an indication that the athlete should respect in the next combat, imposes a solution, possibly underlining the mistakes to avoid.
• Descriptive – The coach describes the way the athlete accomplished any previous action.
• Positive Evaluation – The coach evaluates the athletes' performance in a positive way or he praises and encourages the athlete.
• Negative Evaluation – The coach evaluates the athlete's performance in a negative way reflecting disapproval.
FORM OF THE INFORMATION
• Verbal – The coach transmits the information in an exclusively verbal way;
• Visual – The coach transmits the information in a non-verbal way, through gestures or facial expressions, which may show approval, disapproval or demonstration/simulation;
• Kinesthetic – The coach transmits the information manipulating the athletes body;
• Combined (Verbal/Visual or Verbal/Kinesthetic) – the information is transmitted in a verbal and gestural way or in a verbal way and with manipulation of the athlete's body, respectively.

We ensured that no athlete was interviewed in a state of emotional instability and that no question was considered particularly intrusive. The coaches' instruction and the athletes' answers were recorded in audio and video register. We then proceeded to transpose all coaches' and athletes' interventions to written protocol, the information having been submitted to Content Analysis. The units of register that were obtained constituted the basis of the analysis of the information and the comparison between the transmitted and the reproduced information.

### Data analysis

A descriptive and inferential analysis was done. Since the requirements of normality and homogeneity of the variations didn't verify, through the Kolmogorov-Smirnov test and the Levene test, respectively, we applied the non-parametric statistics (U de Mann-Whitney and Kruskal-Wallis). We also resorted to the correlation of Spearman to verify the degree of association of the variables. For all the tests done, the level of significance of  $p$  was  $\leq 0.05$ .

### Reliability

The reliability of the observations was assured by the inter-observer and intra-observers' agreement, within a 30-day interval, from Bellack's formula, (1966, as cited by Van der Mars, 1989). Eighteen percent (18%) of the total instruction episodes was analyzed, for each variable, a higher value than the minimum (10%) given in the literature (Tabachnick and Fidell, 1989). The minimum value found was 88.2% for inter-observer agreement. Cohen's Kappa was also calculated, to eliminate the agreement by chance, and the values for the agreement of two independent observers ranged from 0.84 to 0.87. Intra-observer consistency ranged from 0.86 to 0.95. Fleiss (1981) argues that scores greater than 0.75 indicate strong agreement.

### Results

Table 2 presents the Extension and Density of the information and Number of ideas transmitted by the coaches. The information presented an average extension of 37.69 words; the average number of ideas that were transmitted was 3.48 and the density of the information having presented an average value of 11.74%. The results show high amplitude of the variation in the three variables, mainly in the extension of the information.

Coherency presents a moderately negative correlation with the number of transmitted ideas ( $r = -0.384$ ;  $p = 0.003$ ). When referring to the correlation between coherency and the extension of the information, no significant

correlation was found ( $r = 0.073$ ;  $p = 0.585$ ).

Indeed, only 29.3% of the instructional episodes related by the athletes presented a coherency value of 100%. In the other 70.7% of the instructional episodes, there were difficulties in completely reproducing the ideas of the coach, which means a substantial loss of information. On average, the values of coherency were 68.66%, in other words 31.34% of the information was not retained by the athlete.

**Table 2. Information Extension, Density and Number of ideas transmitted.**

Variables	Average	SD	Max	Min
Extension of information	37.7	21.0	116	6
Number of ideas	3.48	1.19	6	1
Density of information	11.74	7.24	36	3

Table 3 presents the retention of the information in relation to the nature of the transmitted information. Only the Prescriptive (84.7%) and the Positive (Pos.) Evaluation (11.3%) are presented because we verified substantially low values for the other categories, with no statistical relevance for analysis (Descriptive, 3% and Negative Evaluation, 1%). The prescriptive information allows the students to reproduce more ideas with fewer words, whereas the values of Density were higher. Contrarily when the information was a positive evaluation the extension of the information retained was superior.

The Visual and Kinesthetic Information did not register any occurrence, and the Verbal Information (VRI) was the one which registered a higher occurrence (71.1%) with a high difference of the Combined Information (CBI) (28.9%). This was composed through auditive-visual (19.6%) and auditive-kinesthetic (9.3%) information. Table 4 shows that the number of ideas retained, the extension of the information retained, the density and the coherency do not differ significantly in relation to the way that the information is transmitted.

Table 5 presents the results of the comparison of the Retained Ideas, Retained Extension, Density and Coherency of Information variables, in relation to the athletes' characteristics. Only gender was a differentiated variable as the boys obtained superior values in the Retained Ideas and Retained Extension variables and the girls in the Coherency variable.

### Discussion

Due to the fact that the information conveyed by the coach is processed immediately before the athletes compete, we understand that the number of conveyed ideas is reduced so that the athletes are focused on what is essential to retain. Different authors (Gusthart et al., 1997;

**Table 3. Comparison of the retained ideas, retained extension, density and coherency in relation to the nature of transmitted Information.**

	Nature of the Information		p
	Prescriptive	Pos. evaluation	
	Category average	Category average	
Retained Ideas	2.30	2.43	.633
Retained Extension	13.86	18.52	.029
Density	19.22	15.19	.009
Coherency	70.41	69.29	.907

**Table 4.** Comparison of the Retained Ideas, Retained Extension, Density and Coherency in relation to the Form of information

	Form of the Information		p
	VRI	CBI	
	Category average	Category average	
Retained Ideas	2.30	2.50	.413
Retained Extension	14.85	18.25	.651
Density	17.63	18.25	.758
Coherency	69.78	70.83	.730

Kwak, 2005; Rink, 1993; 2001; Williams and Hodges, 2005) prove the importance of the information being concise, also indicating the use of key-words (Landin, 1994) so that they can make the retention easier.

In the present study, the average values of coherency were 68.66%, approaching the values registered in other researches. Januário et al. (2006), in a school context and in disciplinary control episodes, obtained coherency values of 68.4%. In view of these results, it is evident that a substantial part of the conveyed information is frequently lost, which raises the question of the adequacy of the instructional strategies used by the teacher or coach. It is not only important to focus attention on the essential, but also to resort to instructional strategies that are not usual (e.g. images, metaphors) which favors memorization (Kwak, 2005; Williams and Hodges, 2005). Different studies (Freedman, 2000; McCullagh et al.; Weiss et al., 1992) indicated that the student's recall of process characteristics of motor skills is dependent on the quality of visual demonstrations, rehearsal strategies and use of appropriate cues among other things.

In our study, coherency increased when the number of transmitted ideas decreased. Similar results were found in the Januário et al. (2006) study. We can then highlight that the coherency of the information is more closely associated with the number of transmitted ideas than with the extension of the information, suggesting that the number of conveyed ideas should not be extensive, otherwise the participants may not be able to retain them. These results demonstrate the importance of the information being concise so that the participant can retain it well, reiterating the conclusions presented by Cloes et al. (1991). The excess information is not useful because the athletes cannot apprehend everything that is transmitted, especially if the information is extensive and if the coach does not repeat the same information multiple times. This assumption was confirmed by Cloes et al. (1990) in the school setting where the authors verified that the students have retained the information which was more repeated.

The instructional episodes were fundamentally of a prescriptive nature (84.7%). This is, essentially, due to the fact that the information is transmitted in the moments immediately before the competition, and therefore, is

orientated to what the athlete should do, so that they can perform better. In the same way, and referring to the phases of motor learning, Wulf et al. (1999) defend that in the initial phases, the coaches should emit more prescriptive feedback, since the athlete needs the correct and precise information about what and how to do it, while later, in a more advanced phase of learning, the descriptive information is more pertinent because it is based on the errors made and helps the athlete to identify them.

The prescriptive information showed that athletes were able to express a larger number of ideas in fewer words (larger density) while the combined information caused athletes to use more words to reproduce what the coach said. These results can be explained by the fact that the prescriptive information resorts exclusively to the verbalization and so it is necessary to condensate the information in few words so that the students retain it, since the coach has a reduced time to inform before the athlete enters the mat to compete. Also in Januário et al. study (2006) the authors noticed that the prescriptive information presented significantly higher values of coherency in relation to the combined.

Concerning the evaluative information provided by the coaches (12.3%) only 1% of that was negative and 11.3% positive. The literature suggests that effective coaches tried to cultivate a more positive environment for their players (Black and Weiss, 1992). Lacy and Darst (1985) and Potrac et al. (2007), reinforce the opinion that the resource of positive instead of negative interactions is crucial for the coaches to be able to create a positive atmosphere for their athletes. Indeed, positive evaluation as an instructional behaviour, has potential to enhance the self-efficacy and confidence levels of players, and is valuable in reinforcing the player behaviour desired by the coaches (Potrac et al., 2002).

The verbal information was by far the more used (71.1%), which we can understand since the instructional episodes being analyzed occur before the competition, and are centered mainly on the emission of the information orientated to the prescription; the visual and kinesthetic forms are usually applied during the motor practice, namely in the presentation of new techniques (Rink, 1994) and in the correction of technical errors (Kwak,

**Table 5.** Comparison of the retained ideas, retained extension, density and coherency in relation to gender and category.

	Gender		p	Category			p
	Male	Female		Under 15	Under 17	Under 20	
	Category average	Category average		Category average	Category average	Category average	
Retained Ideas	2.65	2.00	.009	2.42	2.31	2.28	.818
Retained Extension	18.29	12.41	.021	16.58	14.25	15.33	.610
Density	17.29	18.30	.232	16.71	20.50	16.72	.779
Coherency	57.93	80.52	.030	73.83	71.80	63.28	.533

2005; Magill, 1993).

In the present study, the number of retained ideas, the extension of retained information, the density and its coherency did not differ significantly in relation to the way the information was transmitted. Contrarily, Cloes et al. (1990) verified that the students retained more simple feedbacks, in a verbal way. The fact that the results of the studies were divergent, may have to do with the diversity in contexts where the studies were applied (school/club; competition/session) and, also to do with the moments that were also differentiated (before and during the motor practice). The necessity to attend the particularities of the contexts where we apply the studies has been highlighted by the investigation, in a way that pertinence and nature of instruction depends, in a great way, on the particularities of the contexts (McClaim, 2002; Werts et al., 2003).

When referring to the athletes characteristics, only gender was a differentiated variable, the boys having obtained higher values in the Retained Ideas and the retained Extension variables and the girls in the Coherency variable. These results indicate a possible tendency for girls to be more attentive when the coach is emitting information, and this will, probably, justify a larger coherency between what the coach says and what the athlete retains. However, to confirm this assumption more research is needed. The analysis based exclusively in the athlete's category (under 15, under 17, under 20) only distinguishes the athletes in relation to their age and not in relation to the years of practice (experience) and level of ability. These variables can interfere more in the retention of the information, so they should be considered in future studies.

## Conclusion

The realization that a substantial part of the information is not retained by the athletes is relevant in the professional intervention point of view since it underlines the necessity that coaches have to improve the instructional strategies so that the losses between emission and retention of the information is minimal. On the other hand, the fact that the information coherency shows that it is inversely related to the number of transmitted ideas revalidates the didactic indications that have been highlighting the importance of the information being concise and specific. The coaches, in the instructional periods before the competition, were prescriptive and precise, helping the athletes to retain more ideas with fewer words. The form of the information did not appear important for the retention of the information. Gender was a differentiated variable as the girls showed more coherency in the retained ideas in relation to the ideas transmitted by the coach.

In the point of view of the fragilities of the studied variables in this study, it is important to highlight that the extension, number of ideas and the informative density retained can be insufficient indicators to study the retention of information, a measure necessarily limited in the comprehension of this phenomenon. On the other hand, the simple analysis of the coherency does not necessarily mean that there is a profound comprehension of the transmitted ideas, considering that the coherency may be

apparent. Studies about the comprehension of the information should be developed. It is also important to understand the degree of acceptance of the information by the participants, since it is not enough to only retain and understand it, it must be perceived as valid.

The conclusions to the present research reaffirm the scientific pertinence of the investigation centered on the athlete's retention and comprehension of the information emitted by the coaches, opening a path in the identification of the variables which are mediators in the instructional effectiveness of the coaching process.

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## Key points

- The instructions given by the coach are optimized if the athletes retain and understand them well and should be carefully analyzed by researchers and coaches.
- The ratio between the number of concordant ideas between coach and athlete (coherency) increased when the number of ideas decreased which raises the question of the adequacy of the instructional strategies used by coach.
- The prescriptive information showed that athletes were able to express a larger number of ideas in fewer words (larger density) while the combined information caused athletes to use more words to reproduce what the coach said.
- Gender was a differentiated variable as the girls showed more coherency in the retained ideas in relation to the ideas transmitted by the coach. These results indicate a possible tendency for girls to be more attentive when the coach is emitting information. However, to confirm this assumption more research is needed.

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