10 - EFFECTS OF THE USE OF THE VERBAL INSTRUCTION AND DEMONSTRATION IN THE MOTOR SKILL LEARNING OF THE TECHNIQUE OF DART THROWING.

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INTRODUCTION

The motor skill learning process includes various phases where one of its main pointers is the transfer of information about the task that is intended to be performed. According to MAGILL (2000), the learning of any motor ability may be easier since the model that contains all the information is crucial for the performance of this same ability. Therefore, verbal instruction and the demonstration of the activity that is intended to be performed are two of the most important parameters frequently used as instruments in teaching, when it comes to motor learning.

Verbal instruction includes information about the purpose, the specification and the method of the task (PUBLIO NS. TANI G & MAONEL EJ, 1995). Through the transfer of information, the instructor looks to clarify the movement pattern that the individual must achieve at the end of practicing session (TANI et all, 2004). When a new motor ability is involved, the beginner brings to the situation a collection of all the acquired capacities and knowledge and tends to use them to perform as best as possible the determined action when trying to solve the motor skill problem. Due to this, the verbal instruction serves to help the beginner to find better solutions for the performance of the activity.

The demonstration, in its turn, represents a form of motor skill learning where one movement is demonstrated (model) to the person who is being taught, and must be capable of taking in important information that will help in the organization and the performance of the same activity that was demonstrated, using their own individual motor skill actions. This phase offers a clear idea of information related to the space and time needed for the task intended to be performed (PUBLIO NS, TANI G & MANOEL EJ, 1995).

BANDURA (1977), in his theory of social skill learning, was pioneer to affirm the effect of observation on motor skill learning. The Theory affirms accepting the social skill learning concept of a given learning behavior, does not always occur based on practical experiences or during the performance of responses that are intended to be learned, but also through the observation of responses of other individuals. The Theory suggests that the observation of and appropriate method during the performance of a motor ability may be effective due to the need of a clear idea of what is needed to be achieved (PUBLIO NS, TANI G & MAONEL EJ, 1995).

Based on the BANDURA Theory (1977) a number of existing studies were performed with the intention of discovering the importance of using demonstrations and verbal instructions in the organizing, performing and the assessment of motor skill learning (TONELLO MGM & PELLEGRINI AM, 1998; TANI et al, 2004; PUBLIO NS., TANI G & MANOEL EJ, 1995).

According to NEWEL (1981) the most popular methods for the transfer of information concerning what is to be achieved and the appropriate sequence for action are both considered verbal instruction and demonstrated. For some authors, verbal instruction serves to help the beginner in finding the best solutions. Based on this, TULVING (1985) suggested the existence of three memory systems that aid these individuals; the semantic memory, which represents all conceptual and factual knowledge, episodic memory related to the events according to the time of existence axle of the individual, and finally, the process memory that represents the methods or procedures to be taken when performing a certain action.

To understand these processes of achievement of the motor abilities, ANDERSON (1987) proposed the existence of “Processing”, in which the individual deciphers the stimuli related to the motor skill problem in form of declared knowledge, and therefore, decides which actions should be taken for the solution of the problem. With practice, production systems are prepared, or in other words, a combination of specific instructions is given to perform the specific action. This processed knowledge derives from the declared knowledge, with the advantage of being specific to the task and ready for action in the memory, without involving the subconscious. Based on these facts, verbal instruction must be presented in form to help the beginners, in the transfer of the declared knowledge into the processed knowledge.

Authors, for example SCHMIDT (1993), confirm that the instructor must add verbal instructions to the demonstration of the action (model) and should emphasize to the beginner the important aspects of the action that is being observed. When speaking of the demonstration model TONELLO & PELLEGRINI (1998) verified the way which the model is used in visual situations of teaching and learning, confirming that the demonstration of the activity transmits information concerning what is to be achieved by the action. This study came to a conclusion that the visual information has a preponderant roll in determining the human motor behavior, specifically, the process of teaching-learning of motor abilities.

According to TANI, et al (2004), in a revision of literature about motor skill learning, recent studies focused on a number of aspects, for example, the characteristics of the model (level of ability and/or stages of skill learning), time distribution of the demonstration (relative and absolute frequency, before and/or during the performance), and the relation to other types of information (verbal and self modulation Instruction).

Relating to the characteristics of the model, the results of LEE & WHITE (1990) and MCCULLAGH & CAIRD (1990) that showed that the observation of amateur models produces similar or even greater experience when comparing them to the observation of professional models. On the other hand, existing studies that showed that the observation of professional and well-known models, for example, world known athletes (professional level), lead to a better learning of the skills compared to the observation of amateur level models and individuals that perform by the self modulation (BOSCHKER & BAKKER, 2002; ZETOU, FRAGOULI & TZETZIS, 1999). In relation to the presentation of the model, some studies verified that the controlled presentation by the beginner leads to a higher fixation then that controlled by the study (WRISBERG& PEIN, 2002: WULF, RAUPACH & PFEIFFER, 2003). The observation of the model was also verified before the initial performance and the first attempts (WEEKS & ANDERSON, 2000). Finally, in relating to the use of the demonstration and the verbal instruction, the relation of these two aspects has been more effective for skill learning then each one isolated (ADAMS, 2001; McCULLAGH, WISS & ROSS, 1989; PUBLIO, TANI & MANOEL, 1995).

PUBLIO, TANI & MANOEL (1995) investigated the effects of demonstration and verbal instruction in the achievement of acquiring the motor abilities of gymnasts through two protocols performed in a real situation of skill teaching-learning. The results of GD and GDI showed greater results then the GI group. No difference was observed between the GD and GDI groups. The same results were observed when the same activity was performed with experienced children, but the GDI group presented an increase in performance, when compared to the GD group. These results, based on the Theory of BANDURA (1997), were interpreted as a mental image of the intended performed movement, obtained through the observation of the demonstration, which may be of great importance in younger children when verbal abilities concerning the movements are not yet developed, so that the aspects of space

and time needed would verbally be represented adequately.

Therefore, the practice of a motor ability is influenced by a number of aspects, primarily when verbal instruction and a demonstration is used. For this reason, in agreement with recent studies, the purpose of this study is to examine the real efficiency of the verbal instruction and demonstration in learning dart throwing in individuals of the masculine sex, military aeronautics, who have no experience in this ability.

Methods

7.1 - Sample:

Eighteen adult male subjects, military marines, in between the ages of 22 and 28 years, that have no experience in the ability of dart throwing

7.2 - Instruments:

A dart, diameter of forty centimeters (40cm) with target with three point levels; duck tape to mark the measured distance; a two meter taping measure; a Philco Television of 14"; an individual with experience serving as a model of the same age to demonstrate; and a Sony digital Camera.

7.3 - Outline:

The protocol tested eighteen individuals, with no experience in the ability at hand, divided into three groups of six each: Demonstration Group (GD), Verbal Instruction Group (GI), and the Demonstration and Verbal Instruction Group (GDI);

The protocol was executed in two phases, the Acquisition Phase and the Transfer Phase.

7.4 - Procedure:

This protocol used the following procedure:

Individuals with no experience in the tested ability were selected. After this step, in the Acquisition Phase, the individuals were divided into three groups: GI, GD, and GDI. Each group received instructions according to what task was to be performed. All subjects of groups had 40 attempts in the Acquisition Phase, at a distance of two meters (2m) from the target, and the target was at a height of one meter and seventy two centimeters (1,72m) from the center of the target.

After a pause of three and a half hours, the Transfer Test was performed. Individuals from each group performed 10 attempts at a distance of three meters (3m) from the target.

An Examining Committee was created with two examiners, who were orientated about the procedure so that the same evaluation of results could be used for each individual.

Pointing Distribution:

0 (points) - missed the target
1 (point) - hit the outer part of the target (black area)
2 (points) - hit the intermediate part of the target (yellow area),
3 (points) - hit the middle of the target, (red area)

ACQUISITION PHASE:

Before the first attempt two instructions were given to the respective groups. At every 10 attempts the model performed the exercise once (CP) for each group.

GI: a verbal instruction was given on how to perform the movement before the initial attempt of the individuals. The subject being tested would have both feet parallel one before the other with weight distributed equally between feet, knees slightly bent, hips in position, upper body erect, elbow at the height of the shoulder, both eyes open, holding the dart with the thumb and index finger. Afterwards the subjects extended the elbow. At the moment of elbow extension the dart is released and the dart flies in a parabola to hit the target.

GD: a model with experience of the same age was filmed to demonstrate the technique to be used in the throwing of the dart.

GDI: verbal instruction along with a model (video demonstration) was used before the attempts of the individuals.

TRANFER TESTE:

Each group threw the dart 10 times at a distance of three meters, and then again with the parameter modified.

Statistical Analysis:

For the evaluation of the Acquisition Transference Test the Independent Student *T-test* was used.

Level of significance used was $p<0.05$.

Results:

The graph shows that in the acquisition phase the three groups improved the performance during the training blocks. However, the initial score of the groups GD (1,90) and GDI (1,73) superior was shown to the first block of GI (1,40). THE graph also display that in the blocks 2 and 4, moment in that the performance knowledge was accomplished by the instructor, there was a fall of revenue of the groups GD and GDI.

The table 1 display that in the between groups comparison , Test-t Student showed the existence of significant difference ($p <0,05$) in the comparison among GI x GD and GI x GDI. In the comparison GD x GDI there was not significant difference. In the transfer Test significant differences were not observed ($p>0,05$) among the three groups.

The Table 2 display they measured and deviation-pattern of GI in the transfer phase.
The Table 3 display they measured and deviation-pattern of GD in the transfer phase.
The Table 4 display they measured and deviation-pattern of GDI in the transfer phase.

Graph: Result of the experimental groups in the phase of acquisition and in the transfer test

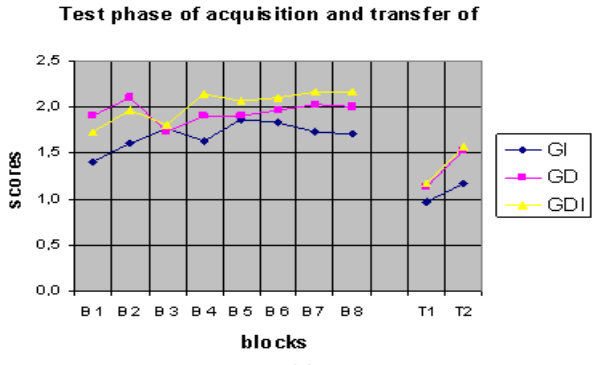


Table 1: Levels of Significance found in the

	ACQUISITION	TRANSFER
Gi x GD	P = 0.0010 P>0.05	P = 0,2260 P>0.05
GI X GDI	P = 0.0005 P<0.5	P = 0.2038 P>0,05
GD X GDI	P = 0,1583 P<0.5	P = 0,04502 p>0.05

Table 2: Phase of Transfer

Subjects	Attempts									
	1	2	3	4	5	6	7	8	9	10
Average of the Attempts	0,8	1,2	1	0,8	1	0,8	1,3	1	1,3	1,3
Average of the Blocks	0,97					1,17				
Standard deviation	0,14									

Table 3: Phase of Transfer Group of Demonstration

Subjects	Attempts									
	1	2	3	4	5	6	7	8	9	10
Average of the Attempts	0,7	1,2	0,8	1,5	1,5	1,2	1,7	1,3	1,7	1,8
Average of the Blocks	1,13					1,53				
Standard deviation	0,28									

Table 4; Phase of Transfer

Subjects	Attempts									
	1	2	3	4	5	6	7	8	9	10
Average of the Attempts	0,7	1,3	1,2	1,3	1,3	1,3	1,7	2	1,3	1,5
Average of the Blocks	1,17					1,57				
Standard deviation	0,28									

DISCUSSION

The literature evidences that the representation imaginary or visual transmits more information concerning a certain task and of the goal to be reached than simply the verbal instruction, contributing more efficiently to the acquisition of a motive ability (BANDURA, 1977; PUBLIO NS, TANI G & MANOEL EJ, 1995; TONELLO MGM. & PELLEGRINI AM., 1998 AND TANI ET ALL, 2004).

The graph shows that three groups increased their performance during the training blocks. However, the initial score of groups GD (1.90) and GDI (1.73) proved to be greater then the GI first block (1.40). The results evidence that in the beginning of the training the demonstration groups and demonstration with verbal instruction superiors were already shown to the of verbal instruction (BANDURA, 1977; PUBLIO NS, SCHMIDT, 1992; TANI G & MANOEL EJ, 1995; TONELLO MGM. & PELLEGRINI AM., 1998 e TANI et all, 2004).

The graph also evidenced that in the blocks 2 and 4, moment in that the performance knowledge was accomplished by the instructor, there was a fall of revenue of the groups GD and GDI. That happened, probably, due to the interruption of the activity, however are scarce the studies that demonstrate that theory.

The comparative analysis among the groups through Test-t Student showed the existence of significant difference (p <0,05) in the comparison among GI x GD and GI x GDI. Those given agree with the results of the work of PUBLIO, TANI & MANOEL (1995) that investigated the effects of the demonstration and verbal instruction in the acquisition of motive abilities of the Olympic gymnastics and it also showed the superiority of the groups GD and GDI in relation to GI.

The absence of significant difference among GD x GDI reinforce the idea that the verbal instruction represents less degree of variability for the motor skill learning (BANDURA, 1977; PUBLIO NS, SCHMIDT, 1992; TANI G & MANOEL EJ, 1995; TONELLO MGM. & PELLEGRINI AM., 1998 AND TANI ET ALL, 2004).

In the transfer Test significant differences were not observed (p>0,05) among the three groups. The explanation for that fact might have been the increase of the distance of 2 meters for 3 meters between the release area and the target, in the transfer test. However, the performance of the groups GD and GDI was superior the one of the group GI. That findings suggest, that even the Test T student showing exist not significant difference, the demonstration groups were superior qualitatively to the verbal instruction. Another possible justification for that fact would be the reduced sample of the study.

The superiority found in the groups of GD and GDI in relation to GI, be in the acquisition phase or in the performance of the Test of Transfer they might have happened because, according to PUBLIO, TANI & MANOEL (1995), the demonstration, based on the Theory of BANDURA (1977), it is retained in the memory it activates in form of representation imaginary or verbal and it is used in the production and evaluation its motor skill actions. In opposition the verbal Instruction is a declarative knowledge that it should be transformed in procedural knowledge to be used in the production and evaluation of the movement, and that involves a process of cognitive elaboration. To summary, according with the Theory the observation of a model is responsible for allowing the apprentice to elaborate references, symbols or representations in the memory concerning the motive ability to be learned. That elaboration involves two sub cases related to the acquisition of the answer - attention and retention - and two sub cases related to the reproduction of the answer - reproduction and motivation (TANI et all, 2004).

The study also emphasized the importance of the demonstration in showing useful particularities for the learning of an ability, reducing the uncertainty on how it should be accomplished as well as the study of TONELLO & PELLEGRINI (1998).

To summarize, in activities that involve a demonstration of the task that is to be performed, in the memory of the beginner, it becomes clear while a verbal instruction should still be processed in the brain and transformed into an action. This affirmative also explains the inexistence of a significant difference between GD and GDI, for the addition of the verbal instruction may not have led to a

better elaboration and performance of the motor skill activity.

CONCLUSION

The study showed significant differences among the groups GI X GD and GI X GDI in the acquisition phase, and it didn't show significant differences among GD x GDI in the acquisition and in the comparison among the three groups in the Test of Transfer. Those results might have been influenced by the use of a dart with target with few subdivisions (three punctuation levels), besides the reduced number of attempts of each group. Another possible justification would be the reduced number of individuals in the sample. Therefore, future studies should be accomplished kindred of observing with more fidedignidade it influences her/it of the use of the verbal instruction and of the demonstration in the acquisition of a motor ability.

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EFFECTS OF THE USE OF THE VERBAL INSTRUCTION AND DEMONSTRATION IN THE MOTOR SKILL LEARNING OF THE TECHNIQUE OF DART THROWING.

ABSTRACT

The Motor Learning Process includes a number of stages and one of its main factors is the transfer of information about the task that is intended to be performed. The verbal instruction and the demonstration of the task at hand are two of the most important parameters frequently used as instruments of the teaching field of motor skill learning. Verbal instruction includes information about the main point, the specification of the task and how it is to be performed. The demonstration, in its turn, represents a form of motor skill learning, in which a movement is demonstrated (model) to the beginner, who should be able to take in important information that will aid in the organization and performance of that shown activity using their own individual motor actions. This study intends to test the influence of these activities in adult men who have no latter experience in the activity, when learning dart throwing. The sample contained 18 male individuals (marines from the military), in between the age group of 22 and 28 years, divided into three groups of 6 individuals each: Demonstration Group (GD), Verbal Instruction Group (GI), and the Demonstration and Verbal Instruction Group (GDI).The test included two phases, the Acquisition Phase and the Transfer Test. The Independent Student T-Test was used for the evaluation of the Acquisition Phase and the Transfer Test. $P<0.05$ was used as the level of significance. The study showed significant differences between the GI, GD and GDI groups in the Acquisition Phase, and no significant differences in the between the GD and GDI in the Acquisition Phase and in the comparison between the three groups in the Transfer Phase.

The study also emphasized the importance of demonstrating the important useful aspects of the action for learning the ability, clearing up doubts about how the action should be performed.

KEY-WORD: Motor learning, verbal instruction and demonstration.

EFFETS DE L'UTILISATION DE L'ORAL DANS L'APPRENTISSAGE ET LA DéMONSTRATION DE éMOTIONNELLE TECHNICAL LANCEMENT DE LA GAGNANTE.

RéSUMé

Le *proccès* d'apprentissage moteur *demande* plusieures étapes et il a comme un de ses points centraux la transmission des informations sur le travail qu'on a intention de réaliser. L'instruction verbale et la démonstration de l'activité qui sera réalisée sont deux *parmis* les plus importants paramètres fréquemment utilisés comme instruments pour l'enseignement dans le champ de

l'apprentissage moteur. L'instruction verbale *réunis* des informations sur *le but* de la tâche, sa spécification et sa manière d'exécution. La démonstration, à son tour, représente une forme d'apprentissage moteur dans laquelle un mouvement est démontré (modèle) au *élève* et celui-là doit être capable d'extraire des informations importantes *pour* l'assister dans l'organisation et l'exécution de la même, en s'utilisant de leurs actions motrices individuelles. Cette étude a l'intention *d'évaluer* l'influence de ces activités *au* apprentissage du lancer du javelot par des adultes du sexe masculin, non-pratiquants de cette habilité. L'échantillon *était* composé par dix-huit personnes du sexe masculin, militaires de l'aéronautique, *agés* de 22 à 28 ans, *organisés en* trois groupes de six: *le* groupe de démonstration (GD), *le* groupe d'instruction verbale (GI) et le groupe de démonstration et d'instruction verbale (GDI). L'essai a été réalisé dans deux étapes: la phase d'acquisition et l'essai de changement. Pour *les* analyser *on* a utilisé l'Essai-t Student indépendant. Le niveau d'importance utilisé a été $p<0.05$. L'étude a montré des différences significatives entre les groupes GI X GD et GI X GDI dans la phase d'acquisition, *mais* n'a montré *aucune* différence significatif entre GD x GDI dans l'acquisition et dans la comparaison entre les trois groupes dans l'Essai de changement.

MOTS CLÉS: apprentissage moteur, instruction verbale et l démonstration.

EFECTOS DE LA UTILIZAçãO DE LA INSTRUCCIóN VERBAL Y DEMOSTRACIóN NA APRENDIZAJE MOTOR DE LA TECNICA DE LANZAMIENTO DE DARDOS.

RESUMEN

El proceso de aprendizaje motor abarca varias etapas y tiene como uno de sus puntos centrales la transmisión de la información sobre la tarea que se pretende realizar. La instrucción verbal y la demostración de la actividad a realizarse son dos de los más importantes parámetros frecuentemente utilizados como instrumentos de enseñanza en el campo del aprendizaje motor. La instrucción verbal abarca informaciones sobre la meta de la tarea, su especificación y su modo de ejecución. La demostración, por su parte, representa una forma de aprendizaje motor en la que un movimiento es demostrado (modelo) para el aprendiz que debe ser capaz de extraer importantes informaciones que le ayudarán en la organización y ejecución de la misma actividad demostrada utilizándose de sus acciones motoras individuales. Este estudio pretende testar la influencia de esas actividades en el aprendizaje de lanzamiento de dardos en personas, no practicantes de la habilidad en cuestión. La muestra fue compuesta de dieciocho sujetos del sexo masculino, militares de la aeronáutica, en la franja de edad de 22 a 28 años, divididos en tres grupos de seis: grupo de demostración (GD), grupo de instrucción verbal (GI) y grupo de demostración e instrucción verbal (GDI).

El test se realizó en dos etapas, la fase de adquisición y el test de transferencia. Para analizar la fase de adquisición y el test de transferencia se utilizó el Test-t Student independiente. El nivel de significancia utilizado fue de $p<0,05$. El estudio presentó diferencias significativas entre los grupos GI X GD y GI X GDI en la fase de adquisición, y no presentó diferencias significativas entre GD x GDI en la adquisición y en la comparación entre los tres grupos en el Test de Transferencia.

PALABRAS CLAVE: Aprendizaje motor, instrucción verbal y demostración.

EFEITOS DA UTILIZAçãO DA INSTRUçãO VERBAL E DEMONSTRAçãO NA APRENDIZAGEM MOTORA DA TECNICA DO LANçAMENTO DO DARDO.

RESUMO

O processo de aprendizagem motora engloba várias etapas e tem como um de seus pontos centrais a transmissão da informação sobre a tarefa que se pretende realizar. A instrução verbal e a demonstração da atividade a ser realizada são dois dos mais importantes parâmetros utilizados freqüentemente como instrumentos de ensino no campo da aprendizagem motora. A instrução verbal engloba informações sobre a meta da tarefa, a especificação da tarefa e o modo de execução da tarefa. A demonstração, por sua vez, representa uma forma de aprendizagem motora em que um movimento é demonstrado (modelo) para o aprendiz e esse deve ser capaz de extrair importantes informações que o auxiliarão na organização e execução da mesma atividade demonstrada utilizando-se de suas ações motoras individuais. Esse estudo pretende testar a influência dessas atividades na aprendizagem do lançamento do dardo em indivíduos não praticantes da habilidade em questão. A amostra foi composta de dezoito sujeitos do sexo masculino, militares da aeronáutica, na faixa etária de 22 a 28 anos, divididos em três grupos de seis. Grupo de demonstração (GD), grupo de instrução verbal (GI) e o grupo de demonstração e instrução verbal (GDI).

O teste foi realizado em duas etapas, a fase de aquisição e o teste de transferência. Para analisar a fase de aquisição e teste de transferência foi utilizado o Teste-t Student independente. O nível de significância utilizado foi de $p<0,05$. O estudo mostrou diferenças significativas entre os grupos GI X GD e GI X GDI na fase de aquisição , e não mostrou diferenças significativas entre GD x GDI na aquisição e na comparação entre os três grupos no Teste de Transferência.

PALAVRAS-CHAVE: Aprendizagem motora, instrução verbal e demonstração.