157 - CREATION, DEVELOPMENT AND ANALYSIS OF REPRODUCTIVENESS OF TEST TO EVALUATE SIMPLE AND CHOICE REACTION TIMES

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Introduction

The reaction time form, in set with other motor capacities, a motor base that allows that corporal the most complex people execute of most elementary to movement. It indicates the speed and the effectiveness of the decision taking and its study it has been, it has much time, a vital aspect in the understanding of the motor behavior of human beings. It is defined as the interval of existing time enters the presentation of the stimulation and the beginning of the movement, supplying, in such a way a clarification regarding the internal processes that are involved with the voluntary corporal movements in diverse situations, of day-by-day, in the sports practical in general, in the learning of complex motor abilities[1,6,9-11].

The reaction time has been very studied in motor behavior, is used as a measure of the time of processing of information and more currently considering different ambient requirements. During this small interval of time they happen a series of mental processes, depending on the characteristics of the subject and the task, being that the performance of movements seems to be intimately related the quality and speed of these processes[12,13]. It can be simple when used only stimulates and only a reply; of choice, when the person will have that to opt for more than one stimulate to give the reply and each stimulate will have a specific reply; and discrimination, where it has more than one stimulate, but only a reply[1].

The reaction time has been identified as an important motor capacity in the performance of movements, in different perspectives. Researchers are relating the time of reaction with questions of synchronization/coordination of movements[13], with inertia moment[14], in tasks with different situations of performance and levels of complexity[15,18]; with different types of stimulations[19]; relating the neurological pathologies[20]; to the intelligence[21,22] and the performance of motor abilities sports complexes[23,25]. It is an important variable in the movement control, since, any problem of time regulation including the reaction time, time of movement and the time necessary to interrupt the action can influence the motor coordination significantly[9].

Owing its peculiarities, to evaluate and to measure the reaction time not and a task of easy. It is necessary instruments that many times are not accessible to all the researchers and professionals of the movement. Some alternatives of measure present it limitations, therefore they finish evaluating beyond the reaction time the reply times.

The evaluations of motor[21] performance serve as a compass of the work of professors and technician, not only to select talents and same to give note, but yes to carry through a more coherent work and that it really brings benefits to the involved people. Tests[22] are instruments for which we get information on the individuals and they must have the capacity of accurately measure what they are considered, to be able to be used by different appraisers in different contexts and also to have coherence of results in followed evaluations.

In such a way, this study it objectified the creation, the development and the analysis of reproductiveness of a test for measure of the simple and choice times reaction, low cost and easy use for researchers of the human movement, professors and trainers.

Development and characterization of software

It's a software developed in the paschal language using the tool Borland Delphi 7. The same it allows to the accomplishment of the tests using only two buttons of mouse. The used measure is the difference of time between the visual stimulation and the beginning of the motor reply, that is, the time difference between a change of color in an object in the screen of the computer and reaction of subject when free the button of mouse. This time is express in milliseconds (ms).

The software it has temporization functions that take in consideration the functioning frequency of the processor of the computer used for that the calculate of time is extremely precision, in this case, reaching 900 ns (nano second) of resolution.

It is important to point out that any special device for the functioning of the same is not necessary, being able to be executed in personal computers (PC' s) in environment Windows or Linux. The only requirement is that the tax of update of the monitor is configured in 60 Hz.

In the future, software must have more options of stimulations, as the sonorous one, and possibilities of interaction with other devices of E/S (entered and exit), as: keyboard, joystick and other devices.

The application of the test

For evaluation of the simple reaction time the subject will use mouse, carrying the task with the domain hand. In the screen it will go to appear a circle that when pressured assumes the red color. The individual to have remain pressuring the button until the circle is green and to free fastest possible at this moment (Figure 1).

The program measures the time enters the appearance of the green color and the withdrawal of the finger of the button mouse. In this test, the subjects repeats this procedure for 15 times being, excluded the five first ones, considering that in these the evaluated one still can be searching security in the accomplishment of the task being carried through a average of the others 10 attempts. The carried through attempts incorrectly are automatically excluded and repeated for proper software.

The evaluated one can first to accustom with the test initiating the attempts when if feel comfortable. For evaluation of choice reaction time the subject will go to pressure the two buttons of mouse, each one with one of the indicating fingers, when pressuring the buttons the circle is red, if the circle to become green the subject one will have to remove the finger of the right hand, if to assume the blue color will have to remove the finger of the right hand.

The sequence of colors is random considering the appearance of the colors green or blue, as well as in relation to the time between the act to pressure the button and the change of color for the withdrawal of the finger, being thus guaranteed, that it does not have conditioning during the test.

The reproductiveness analysis

The reproductiveness analysis was carried through of test and re-test in 21 (twenty one) adult subjects, with interval of one week between the tests, being applied to the test a correlation test interclasse[23]. The test presented coefficients of reproductiveness of 0,805 for evaluation of the simple reaction time, and 0,838 for evaluation of the choice reaction time, indices considered good for election of tests[29].



Figure 1. Screen do *software*

Conclusions

This study it reached objectified it to create a test for evaluation of the times of simple reaction and choice, with visual stimulations, of low cost through a software that can be used in the great majority of the current computers. The same if it showed trustworth and exactness thus being able to be used in scientific works or schools and clubs as a way to evaluate this motor capacity.

In the future, the software will receive a data base so that the same it can store the evaluations with the possibility to classify the evaluated ones in groups. It is intended to still add: statistical reports, graphs and exportation for archives of softwares statisticians. Moreover, this work opens doors for the improvement of the test involving sonorous stimulations, what it can come to add still more to the area of motor behavior.

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CREATION, DEVELOPMENT AND ANALYSIS OF REPRODUCTIVENESS OF TEST TO EVALUATE SIMPLE AND CHOICE REACTION TIMES

Abstract

Considered as one of the most important motor capacities, the reaction time represents the time interval enters the presentation of a stimulation and the beginning of the movement. Your measure it supplies a clarification of the internal processes that occur in the voluntary movement in diverse situations of day-by-day, in the learning of the movements, the sports and the rehabilitation. It can be simple, when, a stimulation will have only one possible reply and of choice when for different stimulations it has also different answers. For its peculiar characteristics the reaction time becomes a motor capacity of difficult evaluation, therefore it needs equipment that many times make it difficult the research as well as the evaluation in the sporting and school scope. Thus this research had for objective to create a test for evaluation of the times of simple reaction and choice of easy applicability and low cost, as well as carrying through analysis of reproductiveness of the same. After research was developed software through the tool Borland Delphi 7 that it uses the paschal programming language object. The software allow the fulfilment of the tests using itself of the two buttons of mouse. Through of visual stimulate generated is calculated the reaction time in accordance with the time that the evaluated one leads to answer. This test presented coefficients of reproductiveness of 0,805 for evaluation of the simple reaction time, and 0,838 for evaluation of choice reaction time, indices considered good for election of tests. The measure of the reaction time in the test is in milliseconds (ms). Thus, we consider that the test can in such a way be used in scientific research as in practical of the same training and in the school contributing for the work of the professionals and the researchers of the human movement.

Key-Words: Reaction Time, Instrumentation, Reproductiveness

LA CRÉATION, LE DÉVELOPPEMENT ET L'ANALYSE DE REPRODUTATIVITÉ D'UN EXAMINÉ POUR ÉVALUER DES PÉRIODES DE LA RÉACTION ET DU CHOIX SIMPLES

Résumé

Considéré en tant qu'une des capacités de moteur les plus importantes, le temps de réaction représente l'intervalle de temps écrit entre la présentation d'un stimulaton et le commencement du mouvement. Son mensuration assure une clarification des processus internes qui se produisent dans le mouvement volontaire dans des situations diverses de jour-par-jour, dans l'étude des mouvements, des sports et du blanchissement. Il peut être simple, quand, un stimulaton aura seulement une réponse possible et de choix lorsque pour différents stimulatons il a également différentes réponses. Pour ses caractéristiques particulières le temps de réaction devient une capacité de moteur d'évaluation difficile, donc il a besoin d'équipement que beaucoup de fois rendent lui difficile la recherche. Ainsi, cette recherche a pour que l'objectif crée un essai pour l'évaluation des temps de la réaction simple et le choix de l'applicabilité facile et du bas coût, aussi bien qu'exécuter l'analyse du reprodutividade de la même chose. Après la recherche a été développée un logiciel par l'outil Borland Delphes 7 qu'elle emploie *l'objet paschal* de langage de programmation. Le logiciel permet l'accomplissement de essais en utilisant seulement des deux boutons de la souris. Par elle que je stimule l'aspect produit est calculé le temps de réaction selon le temps qu'évalué mène à répondre. Cet essai a présenté des coefficients de reprodutividade de 0.805 pour l'évaluation de la période de la réaction simple, et 0.838 pour l'évaluation de la période de la réaction bien choisie, index considérés bons pour l'élection des essais. La mesure de la période de la réaction dans l'essai a lieu en millisecondes (mme.). Ainsi, nous considérons que le bidon d'essai d'une telle manière soit utilisé dans la recherche scientifique comme dans pratique de la même formation et dans l'école contribuant pour le travail des professionnels et des chercheurs du mouvement humain.

Mot-Clef : Période de la réaction, de l'Instrumentation et du Reprodutivité

CREACIÓN, DESAROLLO Y ANÁLISIS DE REPRODUTIVIDAD DE UNA PRUEBA PARA EVALUAR TIEMPOS DE REACCIÓN SIMPLE Y DE OPCIÓN

Resumen

Considerado como una de las más importantes capacidades motoras, el tiempo de reacción representa el intervalo del tiempo entre la presentación de un estímulo y el principio del movimiento. Su medida provee una clarificación de los procesos internos que ocurren en el movimiento voluntario en situaciones diversas del día-por-día, en aprender de los movimientos, de los deportes y de la rehabilitación. Puede ser simple, cuando, un estímulo tendrá solamente una contestación posible y de opción cuando para diversos estímulos tiene también diversas respuestas. Debido sus características peculiares el tiempo de reacción se convierte en una capacidad motora de difícil evaluación, por lo tanto necesita el equipo que muchas veces dificultan la investigación. Así esta investigación tien cómo objetivo crear una prueba para la evaluación de los tiempos de la reacción simple y de opción de fácil aplicabilidad y de bajo costo, así como realizar análisis del reprodutividad de lo mismo. Después de que la investigación fuera desarrollado um *software* a través de la herramienta Borland Delphi 7 que utiliza la lenguaje de programación *object pascal*. El s*oftware* permite el cumplimiento de las pruebas usándose de los dos botones del ratón. A través de lo estímulo visual generado es calculado el tiempo de reacción de acuerdo con el tiempo que lo evaluado demora para contestar. Esta prueba presenta coeficientes de reprodutividad de 0.805 para la evaluación de lo tiempo de reacción simple, y 0.838 para la evaluación de lo tiempo de reacción de opción, índices consideradios buenos para la elección de pruebas. La medida del tiempo de reacción en la prueba es en milisegundos (ms). Así, consideramos que la prueba pôde ser utilizada en la investigación científica, en práctico del entrenamiento y en la escuela, contribuyendo para el trabajo de los profesionales y de los investigadores del movimiento humano.

Palabras-clave: Tiempo de Reacción, Instrumentación, Reprodutividad

CRIAÇÃO, DESENVOLVIMENTO E ANÁLISE DE REPRODUTIVIDADE DE UM TESTE PARA AVALIAR TEMPOS DE REAÇÃO SIMPLES E DE ESCOLHA

Resumo

Considerada como uma das mais importantes capacidades motoras, o tempo de reação representa o intervalo de tempo entre a apresentação de um estímulo e o início do movimento. Embora seja representado por um pequeno intervalo de tempo, nele ocorrem complexos processos neuro-musculares importantes para o controle dos movimentos. Sua mensuração fornece um esclarecimento dos processos internos que ocorrem no movimento voluntário em diversas situações do dia-a-dia, no aprendizado dos movimentos, nos esportes e na reabilitação. Pode ser simples, quando, para um estímulo houver apenas uma possível resposta e de escolha quando para estímulos diferentes há também diferentes respostas. Devido a suas características peculiares o tempo de reação torna-se uma capacidade motora de difícil avaliação, pois necessita de equipamentos que muitas vezes dificultam a pesquisa bem como a avaliação no âmbito esportivo e escolar. Assim esta pesquisa teve por objetivo criar um teste para avaliação dos tempos de reação simples e de escolha de fácil aplicabilidade e baixo custo, bem como realizar análise de reprodutividade do mesmo. Após pesquisa foi desenvolvido um software através da ferramenta *Borland Delphi* 7 que utiliza a linguagem de programação *object pascal*. O *software* permite a realização dos testes utilizando-se somente dos dois botões do *mouse.* Através do estimulo visual gerado é calculado o tempo de reação de acordo com o tempo que o avaliado leva para responder. Este teste apresentou coeficientes de reprodutividade de 0,805 para avaliação do tempo de reação simples, e 0,838 para avaliação do tempo de reação de escolha, índices considerados bons para seleção de testes. A medida do tempo de reação no teste é em milisegundos (ms). Assim, consideramos que o teste pode ser utilizado tanto em pesquisas científicas como na prática do treinamento e mesmo na escola contribuindo para o trabalho dos profissionais e pesquisadores do movimento humano.

Palavras-chave: Tempo de Reação, Instrumentação, Reprodutividade.