

Evaluation of rhythmic ability: Trends and Prospects



Healthcare

Keywords: circadian rhythms, evolutionary rhythms, respiratory rhythms, Peristalsis rhythms, etc.

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Abstract

The pace is an essential component of all biological activities and is represented by a physical manifestation that is repeated regularly along same or different timing intervals. Because of the complexity and many of its components, the concept of rhythm comes interpreted in different ways and diversity of its meanings creates a terminological mess. In fact, rhythmic can be connected to any organized human expression (architectural rhythms, color rhythms, musical rhythms etc.), or with natural biological events (circadian rhythms, evolutionary rhythms respiratory rhythms, Peristalsis rhythms etc.) In general rate is linked to the concept of time, but in musical theory two terms are represented in different meanings. With long term implication is thought to be the Partial symbol (3/4, 4/4, 6/8 etc.) Placed at the beginning of each section, which shows the number and amount of time and the principal grades. Time is a sequence of musical sounds of the same duration and time constitutes the base structure, called by some authors as superior hierarchical structure of rhythm (1). While the pace comes defined as a set of tones of varying length pause; This is the division or the amount of times indicated from time base part (2), and thus is characterized by different ratios of time between grades. The pace is characterized by an alternation of strong and weak accents, composed of sounds with greater intensity or length falling at intervals more or less regular.

Introduction

In the field of motor activities and sports disciplines pace comes defined as specific chronological sequence of motor actions and organizational aspect of muscle activity that can appear again in various movements (3). In this context, the pace and timing can be understood respectively as the frequency of cyclic motors acts done in unit time (high pace, slow pace) and as time interleaving to a certain distance. Only in rhythmic gymnastics both terms refer to concepts of music theory. In fact, in this discipline of reproduction engine of musical accompaniment comes the differences in "execution of time" and "excecution of rhythms depending on whether the movements are performed in accordance with the time basis or in accordance with all values of different rhythmic subdivisions. Rhythmic gymnastics teachers consider execution time, an approximate reproduction engine with musical accompaniment, that consists of the same intensity and duration of the movement (2). Instead, they believe that the pace excecution includes a more accurate discrimination of different musical values and I let place movements with variable intensity, realized through an alteration of muscle contractions and noncontractions, corresponding with values, velocity and accent marks of the musical accompaniment.

The premise Terminology

Rhythmic structure. To define better what is the pace is necessary to analyze the concept of rhythmic structure or form. With rhythmic structure is meant a sequence of sounds that presents specific characteristics and mode of organization, from where the interpretation is conditioned primarily by two factors: human features and characteristics of the structure itself. The first are related to processes of Prudential, with short-term memory, prior learning subjects (4,5,6,7); the latter are associated with numbers, duration, quality, grouping and the emphasis of sounds, musical part time, in relation between time and frequency values of the entire organizational structure (1, 4, 5, 7, 8, 9, 10).

One of the most important characteristics of rhythmic structure is the grouping of sounds that could be organized: for temporary differentiation (through the pauses from a sound to another); for intensive differentiation (by means of accents); for tonal differentiation (based on the height of the sound). (8). If a sequence of sounds these factors are not present which means no accents or different pauses that produce objectively grouping, is not defined as a rhythmic structure and the listener tends to give a subjective interpretation of the part, a kind of personal organization of sounds. In the case of spare parts structured rhythmic music, the group is an objective factor and constitutes as a reference system for the hearer.

It is visible that the subjective and objective grouping constitutes as an essential characteristic for human perception with the condition to be governed by certain laws. In fact, while the rhythmic sequences is adequately understood, the optimal duration of grouping is known to be between 4 and 5s while the maximum number of sounds should be between 5 and 7, in conjunction with the possibility of keeping the memory of the subjects.

Meanwhile the interval between two acoustic stimuli must be included between 0,10s and 1,5s beyond which sounds would not be perceived as a rhythmic group structured, but rather as isolated sounds. Grouping has an essential role in motor activities performed with musical guide. In fact, through discrimination of rhythmic accents is produced a motoric response dovetailed perfectly with stimulating signals: synchronization engine. Not less, until there is compliance, it is necessary to operate a forecasting system that allow him to predict that excecutive moment in which will produce sound. In music, forecasting system is

preferred by the fall of the first periodic emphasis of each rhythmic group create a phonetic reference point precision, rhythm contributes to the regulation of action (8). For more the synchronization engine of the strong rhythmic verse and time of movement organizations, facilitate memorizing and learning the sequence motors.

In conclusion, it is understood as complex rhythmic structure of elements that comprise a system with particular perceptual. In accordance with Psicologia Gestalt theory can be confirmed that the interpretation of a rhythmic structure is influenced not by the amount of specific sections of the pose, but the way in which these are grouped and organized on the basis of proximity, similarity, succession of symmetry (4). In the end precision, discrimination and reproduction of rhythms require activation of mental processing to recognize an established connection between events. Recognition and internalisation of a rhythmic structure are possible only when you can simultaneously memorize a number of intervals and the special characteristics of different structuring elements.

Classification rates. Based on the characteristics of the structure, rhythms are classified in: binary rhythms, regulatory rhythms. Binary rhythms are natural structures composed of alternating strong sound with poor sound, returning the muscular plan in an active phase and in muscular passive phase. These dominate the natural movements characterized by the alternation of contraction and release muscular movements such as the limbs and trunk. A visual presentation can be: O O O O O O.

Regulatory isochronous rhythms are characterized by repeating sounds in regular intervals and the same time. Alternations of sounds are cyclical and groupings are light (two examples are replaced by the rhythm of the heart or of the natural movements of the upper limb during walking). A visual representation of them can be: oooo O. In this case the corresponding movements performed by relying on the alternation of contraction and release. Both rhythms resulting easier if we plan visual interpretation of the graphic and also we plan auditory and allow a better synchronization. Eterocroni rates otherwise, are irregular structures that require accurate analysis of sounds: they can not be perceived without keeping us aware of the plan of all the components. A visual presentation of the candidates could be: OO OO O O oo ooo.

We consider irregularity and complexity structures, difficult in recognition may be determined by the number of sounds presented, various organizations timed used (ie 4/4, 8/12, 7/8, etc.) and the ratio between the phonetic values of time stimuli. (5, 7, 8, 10). In fact, a ratio between the two sounds to 3: 1, in which the first sound has a triple duration compared to the other, resulting as difficult, whether for the re-knowledge, and also for the motoric response (4) and for the localization of Within the hierarchical structures as superior (1). Evaluation of rhythmic ability. Although rhythmic gymnastics sports requires a performance essentially based on the possibility to track the movements of considerable technical complexity in full compliance with rhythmic and melodic structure of musical accompaniment, the problem of rhythmic proficiency assessment is not yet sunk in depth and judgment is believed to the experts of rhythmic gymnastics. If using this method is acceptable during competitions in which the system of judgment is subjective and based exclusively on direct observation, it is not justifiable deficiency of studies and lack of valid measurement procedures for determining the level of development of a so important capacity. Rhythmic ability is defined as the capacity to translate an acoustic precision corresponding to a motoric behaviour (11).

In fact, hearing a piece of music or a rhythmic sequence of tones, generates a corresponding motor activity which determined the rhythmic or induction of motor impulse produced by the pace. Consequently, capacity involves the ability of motor reproductive rhythm (8) and is closely connected with the coordination, speed and agility; it is fundamental in all activities that require movement placed in sequence (12). Also, rhythmic motor activity is considered suitable for all ages, whether as a tool for education and also for preventing and reducing cognitive deterioration of motor functions associated with aging. Rhythmic ability requires an integration between organic muscular qualities, motor ability and ability to identify phonetic components and their order limit. However description of a rhythmic sequence does not necessarily imply the ability to turn into a coordinated motor combination (8) for description and reproduction of rhythmic structures are two independent factors, namely influenced by cognitive processes and motor coordination.

Unfortunately there are not been determined yet as neuro physiological mechanisms by which physical activity affects cognitive functions such as learning, memory and attention, and the effects of rhythmic training sessions increasing the engine capacity. Available data suggest that such mechanisms can fluctuate significantly between social groups and between individuals based on demographic factors, psychosocial and health status (14). Consequently rhythmic ability may be associated with a combination of maturity and experience and tends to decrease with age (15). Although there are currently no data on the influence of musical practice in brain functions, multiple authors have advanced the hypothesis that this practice has a positive effect as the known reproduction of rhythmic sequences, as in learning, and the ability to create a mental representation of the new rhythmic sequences. So far not been clarified that rhythmic ability is an innate quality or obtained, however, coaches believe that can be grown and developed with training. In fact, the trained subjects were able to recognize a great variety of rhythms and adapt to them by changing the type, intensity, duration and highlights the movement of the same moment in which the sounds are produced.

Also, most of the studies conducted to date on rhythmic ability, has been focused only in receptive terms (8). Available procedures are limited to the study related to neural functions that allow the connection time to recognize special phonetic events (18). Despite their importance, the reproductive aspect of rhythm is not treated adequately and her evaluation shows major problems associated with measuring instruments and procedures. Assessment test of rhythmic proficiency. Among the efforts of

measuring the so-called "rhythmic sense", several authors have studied initially the synchronization of motor capacity that isolated stimuli, not repeated over time (19,20). However isolated phonetic stimuli do not constitute a rhythmic structure consequently such studies appear not true when we investigate the rhythmic ability. Other authors (21,22) have seen with the ability of entities to preserve the memory of more repeated rhythmic stimuli, processing complex evidence to investigate individual differences regarding rhythmic capacity. Fraisse (8), one of the greatest scholars of rhythm, has classified and separate pace tests in sixth classes, according to the skills that are required for each: the capacity of discrimination (rhythmic forms recognition site of the same or different); The reproductive capacity of rhythmic forms (immediate reproduction of a rhythmic form after a single hearing); The capacity of producing rhythmic forms (execution of rhythmic sequences without phonetic reference model); The capacity of synchronization of sense engine (synchronization with sounds produced by different sources); The storage capacity of structures (keeping the same pace after finishing the model phonetic sounds); capacity of synchronization (synchronization between sounds and sounds themselves). Following such classification is possible to analyze more easily some of the attempts to appropriate measurement rhythmic ability.

The discrimination rhythmic test forms

One of the most important studies in relation to discrimination of rhythmic forms is that of CE Seashore (23). The investigation based on the administration of a battery of tests measuring the musical talent contains 500 copies of various rhythmic sequences in the first version and 30 copies of reselling version in 1939. Entities are required to discriminate between the two rhythmic forms that include the same number elements; The variable portion is composed of duration of sounds and their ratio limit, a similar test to that of the Seashore, based on the same principle of discrimination between rhythmic forms, is processed by Thackray (24). The change from previous test consists in the discrimination of accents reports instead of time; The required subjects to recognize, between 8 identical sounds to emphasize sounds. As reports Fraisse (8), rhythmic tests forms of discrimination deal only with perceptual aspect of rhythm and self CE Seashore accept the existence of other rhythmic components, unconsidered in his test, such as rhythmic or induction motor impulses produced by the sound; The cognitive capacity is determined by the ability to discriminate rhythmic forms; engine capacity or the accuracy that can be achieved with applause rhythmic structures.

Test reproduction rhythmic forms. Tests rhythmic forms of reproduction is essentially based on the evaluation of loyalty and immediate reproduction, performed after a single hearing. The administration of these tests used different rhythmic forms that vary in relation to the three characteristics: time structure (different time intervals between sounds), intensive structure (different accents), tonal structure (different elevations sounds). Evidence Used follow 3 different models reproduction: Sound, motors, symbolic graphic. Regarding the structure of time, the evidence consists of reproducing the model structure. For this kind of evidence are proposed: uniform structure in which the interval of pause between sounds is always the same, used especially for children; various structures comprising different intervals of pause (11, 25, 26). In the sounds reproduction of timed structures, regarded as a variant of reproduction, motorcycle collisions are replaced by monosyllabi. The structured symbolic graphic reproduction time is realized through transcription of sites located at different intervals.

For the reproduction of tonal structures and intense, is used an instrument equipped with a button named intensive button that is able to detect the pressure exerted by the subject in the model reproduction. It allows to record the intensity of the pressure exerted and the quality of sound that can be cumbersome or acute (27). as it turns out, for the three methods is doubted about their validity. In the reproduction of symbolic graphics participates more the intellectual capacity than those used in the reproduction engine. actually participate factors that coordinate learning. In the sound test answers seem to be less dependent spontaneous than others.

Also OLERON (27) has found that to be educated musically motoric response, taking advantage of an induction type, are faster than symbolic transcripts while Clynes and Walker (28) by taking into consideration a sample of 8 musicians have shown that the motoric reproduction of rates is faster versus of that mental one. These latter authors also discovered that in orchestral direction, where is necessary the reproduction motorcycle musical score, produced an intermediate synchronization between thinking and executing the same musical rhythm. However, the three modalities of reproduction rhythmic require that structures can be accelerated adequately (8).

Having considered the evidence of reproduction yet rhythmic structures, RH Seashore (29) has attempted to establish a link between discrimination and motoric reproduction are framed by comparing evidence realized in different frequencies. The test consists in listening to the reproduction of acoustic signals through tapping. In the presence of systematic errors or delays in reproduction, subjects was given the opportunity to be correct and is seen that in these cases the learning plays an important role in influencing the error correction up to 40%. Although there have been interesting data, administration of the test patterns disrupt motors coefficient meaning correctly. Seashore provides no guidelines for standard reference values of performance, nor correction.

Test production of rhythmic forms. Production tests require that the subject of the rhythmic forms follow the movement or graphically compose rhythmic structure without using phonetic models. Among these as test annovera Stambak (36) is implemented to investigate the structure of time in dislessia of evolution and is divided into three tests: spontaneous rhythmic

production, rhythmic reproduction of structures, meaning and symbolism reproduction II rhythmic structures. The first test consists in producing a rhythmic collision with a pencil on a table, then you invite verbal explanations executed a subject to clash with the same duration. The proof of the second is related to reproduction of motoric rhythmic collisions provided by the experimenter. In the third test subject is asked to reproduce a similar structure with collision with a graphic pattern composed of spatial structure symbolized by item, limited to verbal explanations given and not phonetic model. Because of its ease of the executions, I Stambak test is not valid for adults but finds applicability in children (8).

However, this kind of test, which can be linked with graphic evidence or motors, does not seem suitable for analyzing the changes appeared interindividual and restrictions on motor coordination and spatial differentiation ability of the subjects, and restrictions on the reliability of the procedures that are mainly dependent on the ability of the operator.

Test sense synchronization engine. Fraisee, PICHON the Clairouin (11) have developed a test battery dedicated to rhythmic sensibility evaluation including evidence sense engine synchronization and synchronization engine of the piece, just started coming with the spontaneous rhythmic motor evidence activity of accuracy and rhythmic forms. Evidence metronomo requires commitment and present various difficulties associated with rhythmic structures proposed. The simplest proof is composed of execution of collisions in simultaneity with the sound of scanned from metronomo in which the variety of responses in subjects depends on pauses intervals between sounds. Results indicate that the reduction of the rhythmic light have an interval of 1.03s (11). then were processed other evidence synchronization engine which introduced varieties sense of time relations between sounds (25.30). Data obtained show interesting but has some doubts about the reliability of experimental procedures. In fact, although are using tools like tapping board and metronome, the scale of presentation of results of arbitrary sounds.

However, the tes with the synchronization with musical part overshadows the method of measurement of movements of music. Although the ability of immediate synchronization of the response to the stimulus as sound is a crucial aspect of rhythmic motor activity, there seems to be sufficiently indicative ability of rhythmic because of reports that excludes discrimination between sounds and processing time descendant of the response, therefore sense synchronization engine includes different capacities from those required in the reproduction of rhythmic sequences eterocrone. In fact, the timing of engine response implies a considerable reactivity, and is affiliated with Prudential capacity, excluding the inclusion of short-term memory.

Test Conservation Rhythmic Forms

Among the tests in relation to maintaining rhythmic structures or post-synchronization test these show Smith (21) that, in the attempt to pass slot using the CE test Seashore, made a general analysis of the link between the limit of discrimination of phonetic sequences and sequences corresponding to translation motors. The evidence, which included test C.E. Seashore, are based on discrimination, synchronizing sound reproduction sequences selected among those set by Fraisee (31) as light.

After listening to the first four repeated sounds with the same interval of pause, subjects are invited to practice tapping on a telegraph key in accordance with signs of previous replays 4 (synchronization) and thus continue tapping even after expiry of acoustic signals (post-synchronization) to dismiss the experimenters. So, are estimated errors in re- knowledge the number of sounds and errors in discrimination the different times sounds themselves. The data obtained have confirmed that the CE Seashore and Smith have concluded that there is a link between discrimination time and the corresponding rhythmic presentation of evidence for synchronization as well as for reproduction. The same author also clarified that different rhythmic stimuli had different effects on the presentation and to reduce correctness factor between the rates could be composed of a number of very high impulses to memorize the capacity of the individual involved. In fact it seems that part of a variety of data, in particular for the rhythms are more prolonged, is the function of memory capacity.

Test sincopatura

Qane sincopatura evidence was less used to measure rhythmic ability. In musical terms la sincope is defined by a shift of emphasis in grade seed and is produced when one or more grades found between the two marks or two pauses with small duration . The proof of the simple sincopatura reported by Fraisee, which in musical terms is defined as against time, consists in producing sounds through collisions, intercalate with the sound of a metronome to crush the interval of 0,66s. Accuracy of collisions is measured in relation to the half of the interval between sounds. Beyond musical terminological differences in character, the most important aspect of the test is the difficulty of realization. In fact, the author reports the failure of the test, almost all subjects examined, when the fall of the presentation reached a value of 1 second.

Other tests

Recently, on the basis of tests Seashore, Wing, Stambak the Hiriartborde, Rosato (33) has prepared an evaluation test of rhythmic sense (TVSR) which means three tests: hearing and reproduction of rhythmic structures, adjustment of movements with rhythmic structures elaboration of movements with fast parts and slow music. However after application require very long time, only aspect of faithful reproduction of rhythmic structures was used in 1984 to contest the admission system of SEF Turin.

Management consists in hearing tests 5 registered by rhythmic structures, grouped in four categories, according to the impulse number ranging from 5 to 8, from which follows the subject's request to reproduce the collision. Through a subjective comparison between the proposed rates and the presentation of the subject, the final assessment is determined by a continuous scale of numerical values included between 0 and 10. TVSR limits are determined by: the large number of rhythmic structures that require a higher level subjects. The constant concentration; lack of criteria to stabilize an equivalent degree of difficulty of the rhythmic structures; subjective assessment, often influence operator (33). Clynes and Walker (28) finally have conducted a study to investigate the overall transfer function for the building up the pulses as sound pulses motors, in order to make the predictable response motors. Music test is linked with arbitrary forms of throbbing which are used for only two pulses schemes for ease of analysis. Subjects must respond by crashing sounds with a finger in an instrument called sentografo, by which it can unravel: shapes repeating rhythm proposed; The duration of the first blink; second blink duration; blink interval between the first and second; blink duration of the first relative to the second; frequency of pulses; the degree of elevation of the overall sound. The sound pulse is repeated 70 times and recorded by a computer.

Rhythmic field tests for the evaluation of complex motor responses. Despite all the conclusions obtained with the previous described methodologies are interesting, all the studies they face the problem of motor induction generated by a series of rhythmic sounds analyzed not to respond to complex motors that are typical rhythmic gymnastics and gym. Almost all analyzed tests require a limited response to a musical direction, and is therefore tapped their use results in more restricted as in the field of physical education as well as in Dance (12). This procedure constitutes the first stage of a general analysis on rhythmic skills integrated motors. Unfortunately there is a lack of studies regarding the relationship between tapping and complex rhythmic presentations motors (12.26), as the studies that confirm a connection between evidence on other sense perception and rhythmic discrimination and evidence corresponding to motors. Furthermore, most of the tests used for gymnastics and dance are not finalized in measuring the area of rhythmic skills motors (12) and tests of package rates available to show limits regarding the validity and reliability of the procedures. Among these tests separated as Waglow 'Social Dance Test (34); Tempo Test (35); Ashton l'Rhythm Practical Test (36) who have a duty to measure: the ability of subjects to perform a series of dance steps by a musical time; the ability to repeat a time marked by the metronome; ability to perform rhythmic movements responding to selected musical pieces. Despite their applicability, if the first test whether subjects require an adequate level of musical knowledge and therefore suitable result only in limited population. In the first test subject is required to recognize in advance the pace of the musical part of the proposed but not defined criterion of recognition. For the second test, which is accepted the validity of comfort, it is not clear how we accomplished response sequences metronometrit motors, realized the steps in three different speeds. In the third test, I accepted the validity of commodities which are not clear whose criteria refer to two trials to evaluate the adhesion of movement with music. In the three tests which require the ability to interpret and reproduce a piece of music, the evaluation criteria referred style and executive precision, in the artistic sense and original, are largely influenced by subjective judgment. Finally, as regards the tests that predict the use of recordings of musical parts to be reproduced by rhythmic patterns, some limits are replaced by the complexity of administration. Parts of commercial music generally used may exhibit problems due to lack of variety rhythmic and melodic parts exhibiting organizations and harmonic complex, difficult dealing with discrimination that may depend more cultural experiences previously (37).

Conclusions. In assessing the ability rhythmic main problem seems to be linked to variety of factors to consider, the validity of procedures and standardization of the data, as well as the limited presence of appropriate equipment. It seems so indispensable study of a test that reliables reproducibility characteristics, which is able to discriminate rhythmic ability in relation to the age of the subjects, the difficulty of the sequences, previous experience. Moreover, to compare the rhythmic ability among adult subjects (musicians and sports rhythmic gymnastics athletes) and the sedentary adult that might give interesting results on the effects of rhythmic training sessions motors. It would be ultimately necessary link between the data received from the administration of a rhythmic test with data obtained from tests motors with the same rhythmic structure, federal judges evaluated the sport of rhythmic gymnastics. Thanks to modern equipment available today, studies to clarify better the importance of the progressing activities. The recent development of musical instruments that took allows of a perfect computerized production of standardized rhythmic events (38) and the use of specific musical software is possible detailed analysis of musical productions of studied subjects. In the end, meticulous dinamometriche and automatic systems acquisition can allow a computerized data analysis of bodily movements, and also study their connection with musical rhythm.

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