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Test-retest reliability of the "Beat Competence Analysis-Test"

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Abstract

Rhythmic ability is one of the coordination abilities and its development is related to motor skills improvement, academic achievement, dancing performance and sports. Its significance indicates a valid and reliable assessment tool. Weikart's "Beat Competence Analysis Test" ("BCAT") is a battery that evaluates rhythmic ability and it's been applied in many researches in Greece but its adequacy in Greek population has not been examined yet. The purpose of the present study was the preliminary examination of the test-retest reliability of the "BCAT" battery in Greek population. Eighty one students, 5-8 years old (18 kindergarten pupils, 23 1st grade, 21 2nd grade and 19 3rd grade students) were administered the battery twice. Intraclass and Cronbach's a coefficients were used for the statistical analysis of data. The results revealed that the test-retest reliability was supported but not enough, so.

Keywords: *rhythmic ability, preschool children*

Introduction

Rhythm is the organizing and distinctive feature of any movement (Gabbard, 1992), and it is present in every human activity (Oreb & Kilibarda, 1996). Rhythmic ability or rhythmic fitting is the ability of synchronization of the body movements with the music stimulus, and it is one of the coordination abilities that are considered important for the development, execution and learning of motor skills (Thomas & Moon, 1976). The rhythmic ability is also relative to mathematic and language achievement (Mitchel, 1994; Weikart et al., 1987), dancing performance (Oreb & Kilibarda, 1996), and sports (Huff, 1972). The preschool and school age has been the focus of the studies for the development of rhythmic ability. The practice of the rhythm and the implementation of music and movement programs improves rhythmic ability and develops other sections as motor skills (Mertzanidou et al., 1994), locomotor skills (Derri et al., 2001b) and preschool aged children' s development (Mitchel, 1994; Haines, 2003; Pavlidou, 1998). For the assessment of the rhythmic ability, a reliable and valid instrument for the population on which it is going to be applied, is needed. Weikart (1982) has constructed the "BCAT", a battery that evaluates rhythmic ability. This battery has been applied in many researches in Greece but its adequacy in Greek population has not been examined yet. The purpose of the present study was the preliminary examination of the test-retest reliability of the aforementioned battery as it is demonstrated in "High/Scope Educational Research Foundation" (2005).

Method

Participants

Eighty one students (33 boys, 48 girls), 5-8 years old (M =6.51 years, S.D. =1.085), from public kindergarten and primary schools in Northern Greece participated in the study. Nobody of them had a recognized kinetic or neurological problem. The method of stratified sampling was used to select the participants of the study from a number of randomly selected public schools, using sex and age as the stratification variables, according to the statistical data of the Primary Education Head Office of Macedonia and Thrace, for the school year 2004-2005.

Procedure

The "BCAT" battery (High/Scope Educational Research Foundation, 2005) consists of 4 tests: 1) pat beat, both hands, seated position, 2) pat beat, alternative hands, seated position, 3) march, beat standing in place and 4) touch, step, sequence. The student must perform at two different tempos, A) 132 beats/minute and B) 120 beats/minute.

The examiner demonstrates the exercise, that the student has to perform, without music, before each test, and then examines each student alone. Every piece of music is used from the beginning, for every test of the battery, and is interrupted when the first 32 beats (they start just after the introduction) are completed. The performances of each student are recorded and evaluated by the same or another examiner. A three-point scale (0-2) is used for the evaluation. A score of "2" indicates that the student can accurately match movement to the underlying steady beat for 30 or more beats of 32 total beats. A score of "1" indicates that the student accurately demonstrates the beat for a short time but is not able to keep it throughout (15-29 beats). A score of "0" indicates that the student is not able to accurately feel and demonstrate the beat for fewer than 14 beats.

The duration of the measurement procedure for each student was 6 to 8 minutes. All the measurements took place in special tidied up classrooms in every school where each student was examined alone. The video camera was placed on a non visible from the student point in the classroom, so it could not affect the performance.

The examiner's reliability was examined before the beginning of the measurements. The intra-class correlation coefficient was very high (r = .91).

The criterion that was selected for the preliminary examination of the reliability of the "BCAT" battery is the test – retest reliability. The interval between the two measurements was 4-8 days. The intra-class correlation coefficients (ICC: 2.1) was examined, and the Cronbach's a.

Results

In order to check the test-retest reliability, intra-class correlation coefficient (2.1) was calculated, for each test of the battery for the performance of 81 students. The following table illustrates the values of ICC (single measure) for each test of the battery which ranged between R = .65 that concerned the "march beat, standing in place, 120 beats/min" (A3) and R = .47 that concerned the "pat beat, both hands, seated position, 132 beats/min" (B1) (table 1). ICC has not preceded the high significant reliability limits (R=.75) (Cicchetti, 1994).

Table 1. *Correlation coefficients of 81 students's evaluation performances of 1st and 2ⁿᵈ measurement for each test.*

	Test-retest reliability		
		95% Confidence Interval	
Tests	**Intra-class**	**Lower Bound**	**Upper Bound**
A1: pat beat, both hands, seated position, 120 beats/min tempo	.54	.37	.68
A2: pat beat, alternative hands, seated position, 120 beats/min	.48	.30	.63
A3: "march" beat standing in place, 120 beats/min tempo	.65	.50	.76
A4: "touch, step" sequence, 120 beats/min tempo	.60	.44	.72
B1: pat beat, both hands, seated position, 132 beats/min tempo	.47	.29	.63
B2: pat beat, alternative hands, seated position, 132 beats/min	.59	.43	.72
B3: "march" beat standing in place, 132 beats/min tempo	.56	.39	.69
B4: "touch, step" sequence, 132 beats/min tempo	.54	.37	.68

Cronbach's a correlation coefficient was also calculated. The following table illustrates the values of the coefficient (table 2).

Table 2. *Cronbach's a coefficients of 81 students's evaluation performances of 1ˢᵗ and 2ⁿᵈ measurement for each test.*

Test	Cronbach'
A1: pat beat, both hands, seated position, 120 beats/min	.70
A2: pat beat, alternative hands, seated position, 120	.65
A3: "march" beat standing in place, 120 beats/min	.78
A4: "touch, step" sequence, 120 beats/min tempo	.75
B1: pat beat, both hands, seated position, 132 beats/min	.64
B2: pat beat, alternative hands, seated position, 132	.75
B3: "march" beat standing in place, 132 beats/min tempo	.72
B4: "touch, step" sequence, 132 beats/min tempo	.70

Discussion

The intra-class correlation coefficient for scores of each test in the first and the second measurement ranges from R = .47 to R = .65. The highest indicator (R = .65) refers to the "march beat standing in place, 120 beats/min tempo" test, value that indicates sufficient reliability (Cicchetti, 1994). The lowest indicator (R = .47) refers to the "pat beat, both hands, seated position, 132 beats/min tempo" test and is considered low.

The intra-class correlation coefficient was found sufficient (R= .60- .73) only in two of the eight tests ("march beat standing in place, 120 beats/min tempo" and "touch, step sequence, 120 beats/min tempo"), while moderate (R= .49- .58) in five ("pat beat, both hands, seated position, 120 beats/min tempo", "pat beat, alternative hands, seated position, 120 and 132 beats/min tempo", "march beat standing in place, 132 beats/min tempo and "touch, step sequence, 132 beats/min tempo").

The Cronbach 'a coefficient gave better results (a= .64 - .78) and considered "sufficient" to "highly significant" (Cicchetti, 1994).

According to the repeated measurements check reliability results, reliability is supported but not adequately for the eight sub tests of the battery.

Conclusion

The test-retest reliability of the "BCAT" battery wasn't supported enough, because most of the coefficients were not excellent. A further examination of the battery's reliability for the whole country is necessary.

The present study was limited in checking the criterion of the test-retest reliability. The examination of other criteria of reliability, that would strengthen the suitability of the battery, is proposed.

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