ASSISTING CHILDREN'S READING ACQUISITION BY CONCRETE INNOVATED TOY-MUSICAL-NOTES TECHNOLOGY

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Abstract

Decades of research-studies of three conventional approaches have not reduced the number of children who encounter reading difficulties. Analyzing dozens of reading methods revealed that reading approaches instruct explicitly the specific language details, but implicitly the general bases, too abstract for young children's grasp.

The T.M.N. innovative musical method involves reading and playing concretely the music reading integrating computer program, in order to develop reading readiness and musicality in three research-studies. TMN completes explicitly the general components that implicitly underlie alphabetical languages, and are lacking in conventional approaches.

Three research-studies included experimental groups who studied T.M.N. compared to control groups: a) TMN intervention program in kindergarten children with pre-post tests and follow-up in first grade reading tests, resulted significantly higher in all reading measures compared to control groups; b) Pre-schoolers TMN integrated computer program found significantly higher results than the control group in all readiness to reading-abilities exams. The weaker half of the experiment group advanced significantly more in developing abilities of reading, learning, musical and closing gaps between the halves within eight months; c) A first grade short scope TMN study showed a significant change in improved symbolic perception, indispensable for reading abilities.

These TMN groups built first mental "reading schemata" by explicit learning of general bases, such as accumulating signs, up to achieving meaning and internalizing alphabet principle etc., easing secondary reading skills. The benefits of learning music prior to text reading became evident.

Keywords: Concrete/Abstract Conception, General/Specific Reading Components, Early Childhood Development.

1 INTRODUCTION - READING ACQUISITION SITUATION

Researchers agree that the most difficult task for young children is first time reading acquisition. Any further reading is easier because reading schemata are already implanted in children's minds (e.g. Rayner & Pollatsek, 1984). Many studies on the three conventional approaches to reading instruction and methods have been conducted in recent last decades, showing their indispensability for reading. Each approach suited a very specific population (Wohl, 2000). Nevertheless, the number of children having reading acquisition difficulties has not declined. Reading is the most important basic skill needed for any learning, building of self confidence and image. It is essential to find the root of the problem and ways to reduce first reading difficulties. In a research study (Carmon, 2002) dozens of methods were analyzed, following the conventional approaches: phonetic-analytic; holistic-synthetic; and the eclectic use of both, in order to find what children take from their first reading experience to the second one in order to facilitate it, and also to seek ways to simplify the first time a child reads.

1.1 Exposure of the built-in problem

An insoluble root problem was found to be built-in for early children. Piaget (1967) first determined a fixed order of children's development from concrete to abstract concepts, but did not indicate how to develop the kind of abstract grasp needed for verbal reading. Currently, all conventional reading instruction approaches and affiliated methods deal *explicitly* with the great number of specific components for a language: *letters of phonemes* for consonants and vowels; *spelling* and *syntax*. These unique components need to be relearned at any further learning/reading and cannot be used to facilitate a second reading. There are also reading components that are general and common to all alphabetical languages which once learned can help further reading, but they cannot be grasped by children still in the concrete phase because of their abstractness. Thus teachers circumvent and only

teach them *implicitly*. This happens only because it is difficult to teach general abstract reading rules to young learners. The situation whereby specific components (which have too many details to remember) are taught *explicitly*, while general reading components are taught only *implicitly* leaves many children perplexed. Unfortunately, it is precisely the general components common to alphabetical languages that create children's mental first-reading-schemata (a series of activities that enable reading and comprehension) (Kaniel, 2001). The need to find how to overcome the problem of concrete conception and develop abstraction is exigent.

1.2 The diverseness of current studies

Many reviews of experiments to facilitate first time reading (Carmon, 2002, pp.25-34) were disappointing, such as teaching transparent script before the opaque standard one. Children became fixated on first transparent wrong spelling and needed to relearn the standard ones (Bonds & Dykstra, 1967; 1997). Multiple letters were also a burden to be overcome in first reading acquisition (Pitman method in Bonds & Dykstra, 1997; Perfetti, 1994). The present insight provides an easy *concrete* system for first reading, through musical training, domain that cannot habituate children to wrong spelling. Music is regarded nowadays as beneficial for language processing (Janke et al., 2009) and can help children learn and acquire reading easily (Wong, Kraus, Skoe, Russo & Dees**,** April 2010).

1.3 Innovative solution to the built-in problem via music in contemporary studies

In this spirit of the times, I was not alone in exploring the musical path. But only a musician, an "outsider" to verbal reading problems, who noticed situations similar to conventional music-notation-reading, could dedicate over a decade to developing the easy Toy-Musical-Notes method (TMN), as the author has done. Every year signs were simplified and tried out on hundreds of children in pioneer studies. The final system for musical and verbal solution for developing abstract conception towards reading was crystallized in a Ph.D. study. Music is and alphabetical language in which any sign represents a fixed sound and assists any further reading by using the already internalized comprehension of the general rules. This method creates first mental reading schemata. The TMN experiment group achievements compared to conventional-music group soon revealed significant findings at the end of kindergarten year. But in order to uncover its influence on simplifying first textual reading acquisition, a follow-up of verbal reading in first grade was needed. A description of TMN methods can be found in Carmon (2002), and three studies are reported in Carmon, Wohl & Even-Zohar, (2008); Carmon & Even-Zohar (2010) and Carmon & Elkoshi, (2010). The current enhancement of the domains of technology and neurology domain can show brain activity and what impacts it through MRI (Strait, D. L., Kraus, N., Parbery-Clark, A., Ashley, R., 2010). Kraus's up-to-date articles are based on numerous activities, show how music affects brain.

1.4 The mind behind the TMN method

We present some details of the mind behind the TMN method that help overcome the problem of young learners' inability to think abstractly where needed, through concrete music language. The preparation accelerates the development of abstract concepts towards reading through concrete musical reading, performing cognitive changes in the mind. How? The general reading components rules are detailed in the table below side by side with how music and TMN solve them. The addition of specific strategies to the TMN method is needed to better internalize the general reading and learning components. For instance: the process includes first teaching reading of a very simple few music signs on a concrete tangible keyboard. It activates simultaneously audio-visual-tangible multiple senses. A permanent demand is to repeat any phrase played by singing it. Repeating the played piece in song helps the child internalize the tune-phrase. Singing is as abstract as speaking, both because a child cannot sense the activity in his throat (vocal cords) when singing or speaking, as he can touch and see the keyboard when playing. By repeating the tune in song, while decoding again the signs that were first performed in concrete playing, an abstract phase of the tune is created, similar to abstract spoken words and simultaneously the concrete multi-sense reading is internalized. The change from concrete to abstract is developed and prepares readiness for verbal abstract reading. The child is in an abstract mode of reading (Solfège or words), from his/her inner mental memory. So, by repeating the tune, learned concretely, the abstract mode of reading/singing/learning is developed. This concrete tangible activation and singing, opens the mind to grasp the abstract.

Table 1: TMN. Strategies to develop abstract concept general reading/learning bases

1. **Auditory memory -** sense span expanding and developing fineness observations	**Music**– reduces gaps between auditory and visual reading comprehension (Perfetti, 1994); discernment (pitches, rhythms etc.), and has high a positive correlation (r=.70) with reading phonological awareness (Carmon, 2002; Carmon Wohl & Even-Zohar, 2008). Instructing music is best for expanding and developing auditory memory, and sound component differentiation.
2. **Auditory-visual** senses **integration** is an indispensable reading base (Yishay, 1992)	Music playing adds concrete motor fingers movements. It is achieved better with the few first TMN notation signs than with complicated conventional script (Shafer, 1980 and many others) or verbal reading of multiple components
3. **Accumulating signs** and combining them into meaning at first reading, habituates students to seek meaning in any reading.	This aim can be very difficult to achieve with the multiple signs to decode, while the TMN method uses only eight signs in total. Musical meaning is acquired when a child recognizes tunes, parallel to word recognition in text
4. The **Alphabet principle**, by which any sign has same sound in any context, eases reading, gives regulated meaning to rules, so the learned material is grasped not as arbitrary, and elevates respect for the written script.	This is achieved much easier with the eight T.M.N. signs, than with twenty-six letters. Playing varied directions by eyes and with hands movements on keyboard concretely realizes this abstract notion.
5. Reading **comprehension** is the top target of any reading. As we know, the suitable way with young children is **from easy to more difficult**.	Music reading answers this because its sounds are primary symbols accumulated into a tune with no external decoding, while secondary reading words refers to meaning, outside the sounds.
6. **Accuracy** is the right base for comprehension. Many times children guess without paying attention to accurate script because it is easier to guess than to decode so many components.	TMN does not stimulate this way of reading because it is easy and there is no meaning outside the tune. Besides, it is clearly false when a child is not accurate. TMN as a first reading habituates an **accurate** way to be used in further text reading.
7. **Fluency and velocity** are reading tools that facilitate comprehension.	Musical rhythm and developing musicality habituates fluency and velocity used also in further text reading.
8. **Directivity** and sequence design order enables reading. It is achieved in any first reading text whether musical or verbal.	But only with music the young child feels the various directivities of one way in script and the varied on the keyboard. Because eyes reading is one way and hands motor movement at playing via reading is two-way.
9. **Inclusion** – learning from the familiar to the unfamiliar, encourages independent thinking, an important learning strategy.	This also is achieved sooner and better in the easy way of (first) TMN reading.
10. Developing **Structure analysis** of the **repeated**, **similar** and **varied**, is an important base of a cognitive process to design smart analyzer students (Cash et al, 1997).	This also is achieved in music easier than in text because the text meanings are more complicated, with external meaning of the actual sounds. TMN is clear; hence a child can recognize the structure of tunes with only a few signs. Of course this first reading strategy prepares habituation of seeking structures also in more complicated verbal texts.

Another built-in TMN strategy comprises simple circles or vertical lines for musical pitch signs, organized into symbols in logical combinations: One circle (O) represents Do, two (OO) Re, and three (OOO) Mi, followed by a simple, logical duration signs. The distinct symbol organization order is easy to see and remember with no danger of becoming accustomed to mistaken script. (For TMN details see: Carmon, 2002, pp.48-53). The eight signs reduce the burden of multiple signs in a first reading script. The studies show TMN to be suited to young children's capacities and helpful for developing school readiness through the grasp of the general reading/learning components. When children start reading their mother-tongue after learning TMN, their second reading is easier than the first, as all researchers agree (see above). Children experienced success rather than difficulties in their first reading. Imagine the impact of first success on eager children - no learning difficulties, no learning fears. They use then ten general reading components' schemata already implanted in their minds. This way is as natural as infant sensory development. Hearing, first prenatal sense precedes all others. In auditory media, volume and timbre precede pitch and rhythm, and the consonants and vowels (phonemes) of verbal language are attained last (Inbar, 1990; 1999). Children learn mother tongue aurally and need mature audio-visual integration for reading. This is enhanced easily by concretely played sounds focused first on technique, with no need to cope with the external meaning of words. Once TMN reading is implanted, children get used to seeking words meaning recognition, just as they had recognized the tunes they read. This is greatly beneficial to comprehension. The meaning of a tune is its recognition dependent on sounds only easier, and precedes word recognition, where meaning is external to the word sound, thus needing more knowledge to understand.

The use of music played concretely during TMN reading, and integrating visual, auditory and contiguous multiple senses led to perform studies to find its impact on a) text reading, accuracy reading, velocity and comprehension, (Carmon, Wohl & Even-Zohar,2008); b) the development of cognitive processes and closing gaps in young children for schooling (Carmon & Even-Zohar, 2010); c) TMN impact on symbolic behavior cognitive change in first graders at the beginning of schooling as expressed in children paintings. (Carmon & Elkoshi, 2010).

2 METHODOLOGY AND RESULTS

The present article offers a meta-study of these three different researches to describe the path from concrete to abstract via music using the TMN computer game integrated method: "The House of Sounds", already approved by the Israeli Ministry of Education. The findings are displayed in the order of the three tests tools, each presenting one or more of the ten general components. Results of each study follows it description.

2.1 Tests tools used in the studies

1) *Concept of print* (Tuval, & Zeiler, 1995) shows level of script conceptualization, refers to various general components not specific to any of them: audio-visual integration; accumulating signs and combining them into meaning; alphabetical principle; reading/listening comprehension; accuracy; directivity; inclusion; structure analysis.

2) *Musical Abilities* (Bentley, 1967 in Sharvit version: 1997): auditory memory; audio-visual integration; accumulating signs and combining them into meaning; alphabetical principle; reading/listening comprehension; accuracy; fluency and velocity; directivity; inclusion; structure analysis.

3) *Phonological Awareness* test (Tubul, Lapidot & Wohl, 1995): auditory memory; alphabetical principle; reading/listening comprehension; accuracy; fluency and velocity; directivity; inclusion; structure analysis.

4) Rey test – *Aural Learning Memory Curve* (Vakil, & Blachstein, 1993) derived from vocal word capacity: auditory memory; accuracy; structure analysis - might help to remember, Gestalt and details.

5) *Individual Reading Inventory* (IRI) (Silvaroli & Wheelock, 2001) checking vocal reading accuracy, audio-visual integration; vocal reading timing, and comprehension questions answered on vocally read stories. Tested are: accumulating and combining signs into meaning; alphabetical principle; reading/listening comprehension; accuracy; fluency and velocity; directivity; inclusion; structure analysis.

6) Picture-script test (Elkoshi, 2002), shows musical perception and symbolizing behavior. The test refers to auditory processing by which level of sounds concept is comprehended as shown in the child's invented script. The lowest "out of context upwards to association, pictorial, formal and highest is "Gestalt" level.

2.2 Method and results of the three TMN studies

We report on methods and results of three studies that relate to: A: kindergarten TMN intervention program and first grade follow-up on reading. B: reading readiness and closing gaps towards school, in a one year TMN study. C: cognitive changes of symbol concept behavior analyzed by Elkoshi's Children's Drawing Test in a short term study of four TMN meetings with pre-post drawing tests.

2.2.1. Study A

A two-year study on development of reading acquisition skills at kindergarten in three intervention programs each given to 50 low SES children: TMN; conventional music; non-music of special gymnastics (maturing nerve development) with pet caring (emotional involvement) programs. The program was applied twice a week for half an hour in groups of 6-7 children throughout the school year.

2.2.1.1. Results A

Pre-post intervention tests and follow-up reading tests in first grade resulted in statistically significantly higher TMN group achievements in all IRI reading measures: number of mistakes, vocal reading time, fluency and comprehension, compared to control groups. The TMN group achievements had no connection to the instructional approach applied in first grade (Carmon, 2002; Carmon, Wohl & Even-Zohar, 2008). Here we report on reading acquisition skills, cognitive processes and reading developments of three groups, a correlation between the Phonological Awareness test (Tubul et al, 1995) and the Musical Abilities Test. (Bently, 1966 in Sharvit version, 1992)

Concept of Print in study A involved story telling with the child's comments and answers analyzed to determine their recognition of the printed word and illustrations.

Table 2 (Study A): Means and Standard Deviations of *Concept of Print* test in pre and post intervention for each group.

Time / *Group*	*N*	*Pre-intervention*		***Post-Intervention***	
		M	*(SD)*	**M**	**(SD)**
TMN	54	21.65	(4.89)	28.06	(6.08)
Conventional .music	51	22.74	(4.70)	26.18	(6.83)
Control	44	21.33	(4.09)	25.22	(5.01)
Total	149	21.94		26.57	

A two-way two-tailed analysis of variance with repeated measures was applied and yielded a significant main effect of Time, F (1.148) =128.86, p <.001. Although there was no significant difference across groups, there was significant interaction of Group X Time, F (2,148) = 5.33, p<.01. Seeking the source of the significant interaction effect, we used the repeated ANOVA measures with TMN and conventional music groups combined into one group. The combined group was found to be significantly higher than the control group, F (1,148) =5.11, p<.01.

Phonological awareness: A report from study A of first grade measurement on a shortened version of the *Phonological-Awareness-Test* of various parameters administered at the beginning of first grade. The means and standard deviations of the TMN, conventional music, and control groups were: M=33.8, SD=7.28; M=32.45, SD=6.20; M=30.05, SD=7.29; respectively. A one-way two-tailed ANOVA showed significant main effect of Group, F (2,148) = 3.58, p<.05. A Duncan analysis showed significant differences (p<.05) between the two music groups grouped together (M=33.14) and the control group (M = 30.05), and between the TMN group (M=33.80) and the other two groups combined (M=31.34).

The *Informal Reading Inventory* (IRI) battery (administered after formal reading instruction had begun) was differentially adjusted to the level of learning at each period. Silvaroli and Wheelock (2001) suggested three index levels for the IRI: (a) Independent level – either one or no mistakes in reading and at least 80% correct answers to comprehension questions; (b) Dependent level – two or three mistakes and 70 % correct reading and answers to comprehension questions; (c) Frustrated level – more than three mistakes in reading and 60% or fewer correct answers to comprehension questions. The TMN, conventional music, and control groups received M=74.36, SD=15.56; M=70.14, SD=22.19; M=53.10, SD 31.32; respectively. A one-way two-tailed ANOVA yielded a significant Group main effect, F (2,148) =10.21, p <.001. A Duncan analysis showed the two music groups combined, to be significantly different from the control group (p<.001). The TMN group score was the highest compared to the conventional music group.

The *Vocal Reading test* was administered at the end of first grade, with the results tape-recorded and analyzed for speed (in seconds). The TMN, conventional music, and control groups received M=55.23, SD=32.38; M=60.27, SD=39.94; M=108.84, SD=81.92; respectively. A one-way two-tailed ANOVA showed significant group differences, F (2,149) =14.02, p<.001. The TMN group was fastest, whereas the conventional music group was second and the control group the slowest. By a Scheffe analysis, the combined music groups mean (57.65 seconds) was significantly different from the control group (108.84 seconds); no significant differences were found between the two music groups.

Reading Comprehension Scores (based on the IRI) for the TMN, conventional music, and control groups were: M=70.03, SD=11.67; M=61.41, SD=13.65; M=65.85, SD=13.65) respectively. A one-way two-tailed ANOVA showed significant Group main effect, F (2,149) = 4.70, p<.01. The TMN group achieved the highest mean score and the conventional music group scored the lowest. The control group fell in between. A Scheffe analysis showed that each group differed significantly from the other two. At the end of the first grade, Multivariate Analysis of Variance was carried out on scores from the test of vocal reading times and comprehension. This analysis yielded a significant main effect, F (4,149) =9.52, p<.001. The correlation between the two dependent variables was significant but relatively low, r=.24, p<.05.

Table 3 shows a χ^2 analysis of the comparative frequency with which pupils scored on vocal reading (comprehending or not comprehending), at the end of first grade.

Table 3: Frequency of Reading Comprehension at the End of First Grade

Group	*n*	Comprehending	Non-comprehending
TMN	54	45	9
Conventional music	50	38	11
Control	44	26	18
Total	148	109	38

As can be seen in table, the findings revealed significant group differences χ^2 (2) = 7.88, p<.01. The highest frequency was found in the TMN group, the conventional music was second and the control group was last. The findings for non-comprehension were opposite. The lowest frequency was found in the TMN group, the conventional music was second and the control group last.

To determine the correlation between *Phonological Awareness* (Tubul et al., 1995) and *Musical Ability Test* parameters (Bentley, in Sharvit version, 1992), we administered both tests at the end of the kindergarten year to a random sample of 27 children. The Pearson correlation was .70, p<.001. The *Phonological Awareness Test* could not be administered before the end of the year, as it was too difficult for kindergarten beginners.

The findings confirm our research assumptions by showing that the TMN group achieved the highest scores in reading variables. The conventional music group's results were generally higher than those

of non-music group. Participation in the experiment groups was found to predict the level of reading in first grade, irrespective of reading instruction methods.

2.2.2. Study B

The one-year study: Preschoolers learning to read the innovative computer program integrated musical tool influenced learning and reading readiness and closing gaps towards schooling. The population comprised 108 children using the computer-integrated TMN program in groups of ten children, once a week for 45 minutes throughout the school year, and 25 control groups with drama (enhancing self expression) and pet caring programs (involvement with learning)every other week with groups of 10-12 children. All children were 5-year-olds from very low SES and attended the intervention programs as afternoon clubs.

2.2.2.1. Results B

The preschoolers group of TMN integrated computer program had significantly higher results compared the control groups in all readiness exams for reading/learning abilities. The weaker half of the experiment group advanced significantly more in developing abilities in reading, learning and music tests, and closed gaps between the halves within eight months (Carmon & Even-Zohar (2010). We report on reading acquisition skills, cognitive processes and reading readiness tests of the TMN vs. the control group.

Analysis of the assumptions Post-intervention T-test results show significant differences between the groups in five variables examined.

An analysis T-test process found significant differences between experiment (TMN) and control groups in research variables at the end of kindergarten year after the intervention: in pitch (*p*=.001); melody (*p*=.005); and rhythm (*p*=.001); phonological awareness (*p*=.001) and concept of print (*p*=.001).

Table 4: **Differences between experiment (TMN) and control groups in research variables at the end of kindergarten year – T-Tests**

The group	**measure**	**N**	(SD)	M	t	***p***
Experiment	Pitch	105	(2.55)	6.44	4.277	.001
Control		25	(1.54)	4.16		
Experiment	Melody	105	(1.36)	1.406	2.853	.005
Control		25	(2.24)	.990		
Experiment	Rhythm	105	(1.88)	1.209	3.609	.001
Control		25	(2.90)	1.17		
Experiment	Phonological awareness	105	(5.11)	33.53	3.578	.001
Control		25	(6.27)	29.28		
Experiment	Print conceptualization	105	(4.12)	38.27	4.824	.001
Control		25	(7.48)	32.98		

In order to test the intervention impact on *low and high achievers within the TMN group only*, the subjects were divided into two groups: lower and higher than the median in all pre-intervention measures. Repeated measures analyses were conducted and found interactions between the two groups and the pre-post tests that indicate that low achievers gained more than the high achievers, as shown below.

In *concept of print in Study* B the low group improved from M=26.73 (SD=3.69) to M=38.25 (SD=4.37), a difference of 11.52, while the high group improved from M=35.28 (SD=2.81) to M=39.50 (SD=3.60), a difference of 4.22.

In *pitch*, the low group improved from M=3.00 (SD=1.10) to M=5.41 (SD=2.28) a difference of 2.41, while the high group improved from M=5.52 (SD=1.52) to M=7.00, (SD=2.88) a difference of 1.48.

In *melody*, the low group improved from M=0.70 (SD=.46) to M=2.34 (SD=1.65), a difference of 1.64, while the high group improved from M=2.53 (SD=0.72) to M=1.59 (SD=1.23), a difference of 0.87 at the end of year.

In *rhythm,* the low group improved from M=.72 (SD=.46) to M=2.88 (SD=1.42), a difference of 2.16, while the high group improved from M=2.62 (SD=.82) to M=3.00 (SD=1.36), a difference of .38.

Rey-Aural Learning Curve Test, delivered only at the end of the year, not suitable for kindergarten beginners. A significant difference of memory of heard words was shown between the *experiment* group that improved in M=1.8 words, double the *control* group that improved only in M=.9 words.

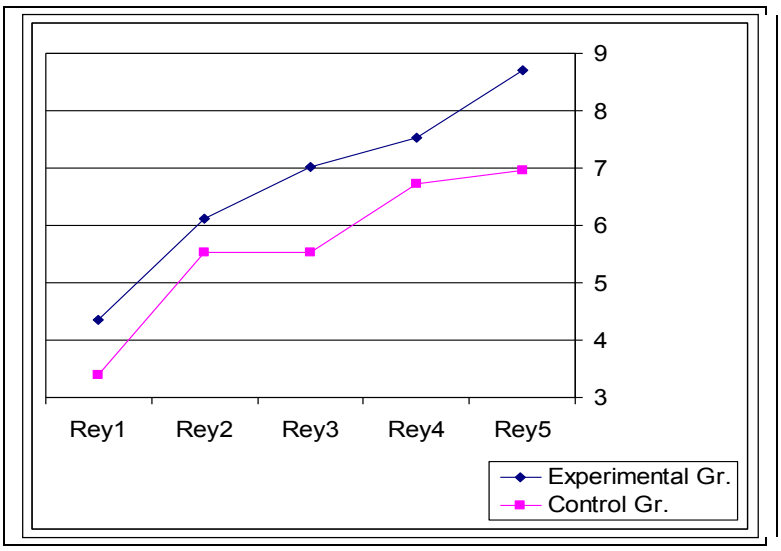

Figure 1: Rey - Aural Learning Curve Test

2.3.1. Study C

Four TMN meeting short study on the effect of learning notation by means of an innovative system on children's musical perception and symbolic behavior. The population comprised of 83 first graders in four single gender classes from religious schools. One class of each gender (19 & 25) composed of the experiment group and received four TMN intervention lessons: two 45-minute lessons with whole classes and two lessons where children were divided into groups of six, each receiving 10 minutes of instruction. The pupils learned to read and write music using the TMN system. The control group (39 children, 19 boys and 20 girls) had no intervention program. All the children underwent Elkoshi painting exams that same week pre and post the intervention program. They received a music lesson and painted to show their symbol concept level of connecting rhythms and visual representations, in five enabling levels: "out of context" through "association", "pictorial" "formal" and up to the highest "Gestalt" level. The children's ability to connect rhythm patterns of five taps with spontaneously invented symbols in painting enables analysis of these levels. The first grade short time scope study showed improved symbolic perception necessary for reading abilities in the TMN group compared to the control group (Carmon & Elkoshi, 2010).

2.3.1.1. Results C

Reported on cognitive perception and symbolic behavior as shown in Elkoshi's drawing test analysis pre and post the short TMN intervention of four meetings. The study was conducted on first grade beginners. Analysis of the drawings shows cognitive perception of heard music rhythm in ascending levels from Out of context, Association, Pictorial, Formal, and Gestalt, respectively. Experimental and control groups pre and post intervention changed levels significantly as shown in fig. 2.

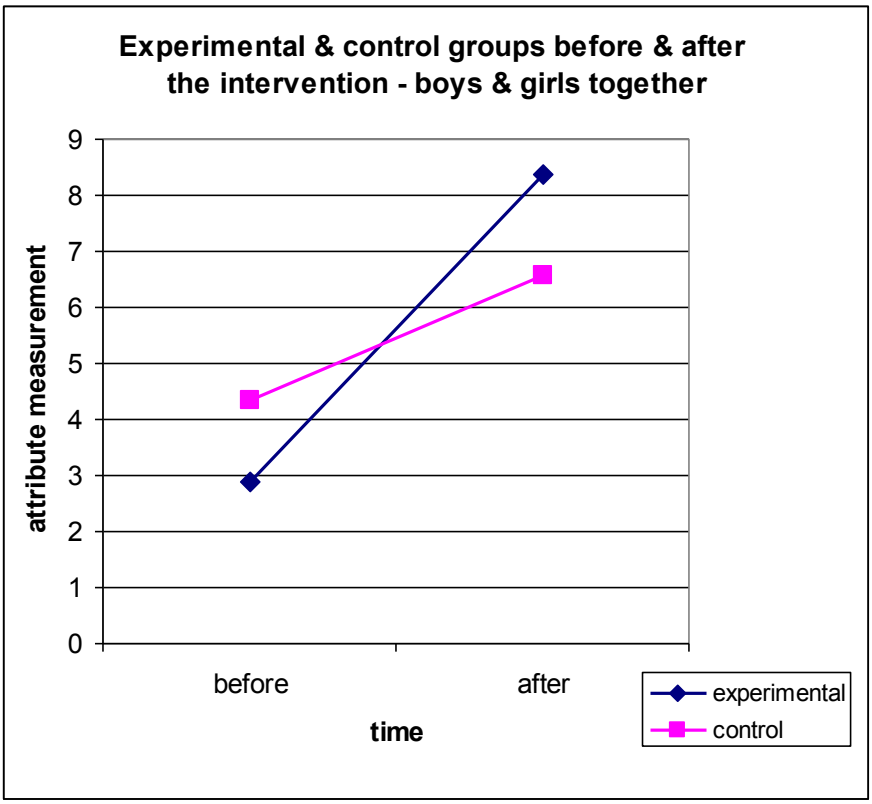

Figure 2: Experimental & Control Groups pre-post Intervention

3 CONCLUSIONS

The results speak for themselves. The TMN intervention program had significant influence overall on the experiment groups compared to the control groups. In all studies, the TMN groups gained the highest and mostly significant achievements in the tests. There are many studies in which, audible music effects were confirmed, but the full potential of music can only be realized with script that enables cognitively analyzing the sounds heard and building a common musical/verbal reading base. The complicated standard notation can be taught only in small portions in early childhood and its impact was shown in studies. The conventional music group in study A affirms this by being second in the achievements. All groups in the studies received the standard Israeli Emergent Literacy program for reading preparation, connecting verbal sounds to letter symbols, and improved in time, but the best TMN achievements upholds the view that active reading, even if not verbal, supports and facilitates reading skills (Hammer et al., 1992). The studies indicate that TMN positively influences cognitive processes from concrete to abstract and helps recursive reading skills. This is the first time that the combination of audible and visual written music was used to show impact on early reading acceleration, accuracy and comprehension, and the TMN group has demonstrated the full impact on cognition processes, enhancing from concrete to abstract grasp with best marks in reading, comprehension and memory of verbal learning (Rey) measures. Using TMN in Kindergartens and first grades improves reading, learning and comprehension meaningfully.

www.readandplay.co.il http://www.youtube.com/watch?v=7etJiy7BA0Q

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