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**Title: The differences and the relations between characteristics of process and product of Handwriting and characteristics of organization in everyday life of children with and without handwriting difficulties.**

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### Abstract

Handwriting is one of the most complicated human activities. It is the highest level of human communication. Writing enables the expression, documentation and transference of messages and ideas. Writing is one of the main occupations of children at school. It involves cognitive, linguistic, perceptual, sensory-motor and ergonomic skills.

Organization skills are the foundation for an efficient and successful performance of tasks in everyday life. They are based on meta-cognitive skills, especially executive functions. Executive functions are the highest-level cognitive processes, which are needed for the execution of complex or unconventional tasks (Godefroy, 2003). They enable the proper implementation of specific skills as well as flexibility in problem solving and unfamiliar situations, in a process which includes selection, planning and an effective performance of a goal-directed action (Lezak, Howieson & Loring, 2004).

While there are many studies which deal with handwriting, only few studies examined the organization skills of children. Additionally, studies which examined the relations between the two realms: handwriting and everyday organization skills, are scarce. According to the clinic experience of occupational therapists, it seems that children who are referred to intervention due to writing disabilities, also have, according to parents and/or teachers reports, organizational difficulties. Thus, the purposes of the present study were to examine the existence of differences between characteristics of process and product of handwriting, and characteristics of everyday organization, as well as the relations between them, among 1<sup>st</sup> and 2<sup>nd</sup> grades boys with and without handwriting difficulties.

### Main research hypothesizes:

- a. There shall be differences in the characteristics of handwriting and organization between the two groups: they shall be expressed in the final grades of the organization questionnaires for the teacher, the parents and the student, as well as in the evaluation of the process and product of writing, as shall be measured by the sentences writing task.
- b. There shall be positive relations between the characteristics of process and product of handwriting and the characteristics of organization in everyday life within each group: a relation shall be found between the grades of process and product of writing the sentences and the final grades in each of the organization questionnaires for the teacher, the parents and the student. In addition, the study examined what are the variables, among the variety of tools used in the present study, which shall predict belonging to the group of students with handwriting difficulties and to the group of students without such difficulties.

**Participants:** The research included 60 1<sup>st</sup> and 2<sup>nd</sup> grades boys, who study in regular education and were selected by convenient sample. They were divided into two groups according to the Teachers Questionnaire for Handwriting Proficiency (TQHP) (Rosenblum, Jessel Adi-Japha, Parush & Weiss, 1997). Children with ADHD, ADD or those who have attention disorders, yet have not been diagnosed as such, as well as those who were diagnosed as having physical or neurological disorders which influence the writing ability, were excluded from the study.

**Study tools:** The children copied letters and sentences according to the Hebrew Handwriting Evaluation (HHE) (Erez & Parush, 1999), on a computerized system including software (ComPET) and digitizing tablet (Rosenblum & Weiss, 2005). Their product was evaluated according to the same HHE. In addition, parents and teachers answered questionnaires regarding the organization skills of the student. (Lifshitz & Yosman, 2006). The children also answered the Child Organization Scale (COS), (Zentall, Harper & Stormont-Spurgin, 1993), which was translated into Hebrew.

**Data Analysis:** the study hypothesizes regarding differences between the two groups were examined using t test and MANOVA. The hypothesizes regarding the relations between handwriting

and organization were examined using a Pearson test. Additionally, a Discriminating Function Analysis was done, in order to identify the variables which predict the division to the two study groups.

**Main results:** The results of the present study point to the existence of differences in the organization skills in every day activities between students who have handwriting difficulties and students without such difficulties. The results support existing knowledge regarding the differences between children with and without handwriting difficulties in the process and product of writing. The results also show a moderate relation between handwriting difficulties and organization in everyday life.

**Conclusions:** The results of the present study have implications for intervention in occupational therapy: gathering information, evaluation and building an intervention program for a new client. Handwriting and organizational difficulties have a great impact on the child's quality of life: on his ability to satisfactorily complete everyday activities, to integrate into society, and as a consequence, on the child's self-esteem and self perception. It is therefore important to identify handwriting difficulties and other related factors, including organization skills, as soon as possible, in order to enable appropriate intervention.