

# HOW HEARING AND HEARING-IMPAIRED CHILDREN DIFFERENTIATE EMERGENT WRITING FROM DRAWING

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## Abstract

This study compared Italian hearing-impaired and hearing preschoolers' conceptions about writing, by examining how they differentiate writing from drawing. The relationship between emergent writing and verbal language within the two groups was also considered. Twenty-three orally educated hearing-impaired children from 2 years and 10 months to 6 years of age, and 23 hearing controls, matched to the hearing-impaired participants for age, took part in this study. Children were asked to write and draw, to classify their products as writing or drawing, and to recognize what they had drawn or written. Results suggest that hearing children have an earlier understanding of the two notational forms (writing and drawing) and are able to differentiate the traits of the two symbolic systems earlier than hearing-impaired children. This understanding and the discrimination between the two different notational forms could be challenging for orally educated hearing-impaired children. However, once they have differentiated writing from drawing, hearing-impaired children can even develop more precise and stable writing representations than their hearing counterparts. Verbal language seems to be a relevant variable in this construction process.

Keywords: emergent writing, hearing-impaired preschoolers, notational knowledge, writing development.

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**Chinese**

[Translation Shek Kam Tse]

這項研究通過區分寫字和畫圖來對比義大利聽力受損和聽力正常的學前兒童對書寫的觀念，同時還考慮了兩組人群中自然書寫和口頭語言的關係。總共有23個聽力受損兒童和23個聽力正常的控制組同齡兒童參加了研究，年齡介於2歲10個月至6歲之間，他們被要求進行書寫或畫圖，分辨他們的作品是書寫還是畫圖，並且識別他們書寫或畫的作品。結果顯示，聽力正常兒童比聽力受損兒童能夠更早地理解這兩種形式的記號，並且更早地分辨兩者的特徵。理解和分辨這兩種記號方式對於接受口語教學的聽力受損兒童是一種挑戰。但是，一旦他們能夠區分書寫和畫圖，聽力受損兒童能夠發展出比正常聽力兒童更加精確的書寫方式，而口語似乎是這個構建過程中的一個相關變數。

**Dutch**

[Translation Tanja Janssen]

TITEL. Hoe horende en slecht horende kinderen onderscheid maken tussen schrijven en tekenen

SAMENVATTING. Dit onderzoek vergelijkt het beeld dat Italiaanse slecht horende en horende peuters hebben van schrijven, door na te gaan hoe zij verschil maken tussen schrijven en tekenen. De relatie tussen beginnend schrijven en verbale vaardigheid binnen de twee groepen wordt eveneens beschouwd. Drieëntwintig dove kinderen tussen de 2 jaar, 10 maanden en 6 jaar oud, en 23 controle kinderen zonder gehoorstoornis van dezelfde leeftijd, namen deel aan het onderzoek. De kinderen werd gevraagd om te schrijven en te tekenen, om hun producten in te delen als schrijf- of tekenproducten en om te herkennen wat zij geschreven of getekend hadden. Resultaten duiden erop dat horende kinderen de twee vormen van notatie (schrijven en tekenen) eerder begrijpen en eerder in staat zijn om verschil te maken tussen de kenmerken van de twee symbolsystemen dan dove kinderen. Dit begrip en het onderscheid maken tussen de twee verschillende notatie vormen zou moeilijk kunnen zijn voor dove kinderen die met mondelinge taal zijn opgevoed. Echter, wanneer zij eenmaal schrijven van tekenen kunnen onderscheiden, kunnen dove kinderen meer precieze en stabiele representaties van schrijven ontwikkelen dan hun horende leeftijdsgenoten. Verbale taal lijkt een relevante variabele te zijn in dit constructieproces.

TREFWOORDEN: ontluikende geletterdheid, dove kleuters, kennis van het schrift, schrijfontwikkeling

**French**

[Translation Laurence Pasa]

TITRE. Comment les enfants entendants et malentendants différencient l'écriture du dessin

RÉSUMÉ. Cette étude compare les conceptions de l'écrit qu'ont des élèves italiens du préscolaire malentendants et entendants, en examinant comment ils différencient l'écriture du dessin. On a également considéré la relation entre l'entrée dans l'écrit et le langage oral dans les deux groupes. Ce travail porte sur vingt-trois enfants malentendants ayant reçu un enseignement de l'oral, âgés de 2 ans et 10 mois à 6 ans, et un groupe contrôle de 23 enfants entendants apparié selon l'âge. On a demandé aux enfants d'écrire et de dessiner, de classer leurs productions comme étant de l'écriture ou du dessin et d'identifier ce qu'ils avaient écrit ou dessiné. Les résultats montrent que les enfants entendants discriminent très tôt les deux formes graphiques (l'écriture et le dessin) et sont capables de différencier les caractéristiques des deux systèmes de représentation symboliques plus tôt que les enfants malentendants. Cette compréhension et la distinction entre les deux formes graphiques pourraient être stimulantes pour des enfants malentendants ayant reçu un enseignement de l'oral. Néanmoins, une fois qu'ils ont différencié l'écriture du dessin, les enfants malentendants peuvent développer des représentations de l'écrit plus précises et plus stables que leurs pairs entendants. Le langage oral semble être une variable pertinente dans ce processus de construction.

MOTS-CLÉS : entrée dans l'écrit, élèves malentendants du préscolaire, connaissance de l'écrit, développement de l'écriture.

**German**

[Translation Ulrike Bohle]

TITEL. Wie hörende und hörbeeinträchtigte Kinder zwischen emergentem Schreiben und Zeichnen differenzieren

ZUSAMMENFASSUNG. Die Studie vergleicht Konzeptionen des Schreibens von hörbeeinträchtigten und hörenden italienischen Vorschulkindern. Untersucht wurde, inwiefern beide Gruppen zwischen

Schreiben und Zeichnen unterscheiden. Die Beziehung zwischen emergentem Schreiben und der Verbal-sprache wurde ebenfalls bei beiden Gruppen untersucht. An der Studie nahmen 23 hörbeeinträchtigte Kinder im Alter zwischen 2.10 und 6 Jahren, die lautsprachlich erzogen wurden, und eine altersentsprechende Kontrollgruppe von 23 hörenden Kindern teil. Die Kinder wurden aufgefordert zu schreiben und zu zeichnen, ihre Produkte als geschrieben oder gezeichnet zu klassifizieren sowie anzugeben, was sie geschrieben bzw. gezeichnet hatten. Die Ergebnisse legen nahe, dass hörende Kinder früher ein Verständnis für die unterschiedlichen Notationsformen (Schreiben und Zeichnen) entwickeln und dass sie früher als hörbeeinträchtigte Kinder dazu in der Lage sind, Merkmale beider Symbolsysteme zu unterscheiden. Das Verständnis für und die Unterscheidung zwischen beiden Notationsformen kann eine Herausforderung für die hörbeeinträchtigten Kinder, die lautsprachlich erzogen werden, darstellen. Sobald sie jedoch Schreiben vom Zeichnen unterscheiden, sind sie in der Lage, sogar präzisere und stabilere Repräsentationen des Schreibens aufzubauen als gleichaltrige Hörende. Die Lautsprache scheint eine relevante Variable in diesem Konstruktionsprozess zu sein.

**SCHLAGWORTER:** emergentes Schreiben, hörbeeinträchtigte Vorschulkinder, Notationswissen, Schreibentwicklung

### Italian

[Translation Manuela Delfino, Francesco Caviglia]

**TITOLO.** Come bambini udenti e bambini non udenti distinguono la scrittura dal disegno

**SOMMARIO.** Questo studio confronta il modo in cui bambini italiani sordi e udenti in età prescolare concepiscono la scrittura, esaminando il modo in cui distinguono la scrittura dal disegno. All'interno dei due gruppi è stata presa in considerazione anche la relazione tra la scrittura emergente e il linguaggio verbale. A questo studio hanno preso parte un gruppo di 23 bambini non udenti educati con il metodo oralista, di età compresa tra i 2 anni e 10 mesi e i 6 anni, e un gruppo di controllo composto da 23 bambini udenti, abbinati ai non udenti per età. Ai bambini è stato chiesto di scrivere e disegnare, di classificare i loro prodotti come scrittura o come disegni, e di riconoscere ciò che aveva disegnato o scritto. I risultati suggeriscono che i bambini udenti capiscono prima le due forme di notazione (scrittura e disegno) e sono in grado di differenziare le caratteristiche dei due sistemi simbolici prima dei bambini non udenti. Questa comprensione e la discriminazione tra le due diverse forme di notazione potrebbe essere difficile per bambini non udenti educati con il metodo oralista. Tuttavia, una volta che hanno differenziato lo scritto dal disegno, i bambini sordi possono anche sviluppare la rappresentazione scritta in maniera più precisa e stabile rispetto ai loro pari udenti. Il linguaggio verbale sembra essere una variabile rilevante in questo processo di costruzione.

**PAROLE CHIAVE:** scrittura emergente, non udenti in età prescolare, competenza nella notazione, sviluppo della scrittura

### Polish

[Translation Elzbieta Awramiuk]

**TITUŁ.** Jak dzieci słyszące i upośledzone słuchowo odróżniają wczesne pisanie od rysowania

**STRESZCZENIE.** Niniejszy artykuł porównuje wyobrażenia na temat pisania włoskich dzieci w wieku przedszkolnym, słyszających i upośledzonych słuchowo, poprzez sprawdzenie, jak odróżniają one pisanie od rysowania. Pod uwagę brano także relację między wczesnym pisanem a językiem mówionym w obu grupach. W badaniach uczestniczyło kształconych ustnie dwadzieścioro troje dzieci z uszkodzeniem słuchu w wieku od 2 lat i 10 miesięcy do 6 lat oraz dwadzieścioro troje dzieci słyszających w grupie kontrolnej, porównywalnej z grupą badaną pod względem wieku. Dzieci zostały poproszone o narysowanie i napisanie, o zaklasyfikowanie własnych produktów jako rysunków albo napisów oraz o rozpoznanie, co napisały lub narysowały. Wyniki sugerują, że dzieci słyszące wcześniej rozumieją dwie formy zapisu (pisanie i rysowanie) i wcześniej niż dzieci upośledzone słuchowo są zdolne odróżniać cechy tych dwóch systemów symbolicznych. To rozumienie i rozróżnianie dwóch odmiennych form notacji może stanowić trudność dla dzieci niedosłyszących kształconych ustnie, kiedy jednak już odróżniają pisanie od rysowania, dzieci z upośledzonym słuchem mogą rozwijać nawet bardziej precyzyjne i trwałe wyobrażenia na temat pisania niż ich słyszący rówieśnicy. Język mówiony wydaje się istotną zmienną w tym procesie.

**SŁOWA-KLUCZE:** wczesne pisanie, dzieci w wieku przedszkolnym z uszkodzeniem słuchu, wiedza o (sposobach) notacji, rozwój umiejętności pisania

### Portuguese

[Translation Sara Leite]

TÍTULO. Distinção entre escrita emergente e desenho por parte de crianças ouvintes e crianças com dificuldades auditivas

RESUMO. Este estudo compara as concepções sobre a escrita de crianças italianas ouvintes e com dificuldades auditivas do nível pré-escolar, analisando o modo como elas distinguem a escrita do desenho. A relação que cada grupo estabelece entre a escrita emergente e a linguagem verbal também foi tida em conta. Os participantes no estudo foram vinte e três crianças com dificuldades auditivas que têm uma educação oral, com idades entre os 2 anos e dez meses e os seis anos, e vinte e três crianças ouvintes, com idades idênticas às das crianças do primeiro grupo, que formaram o grupo de controlo.

Foi-lhes pedido que escrevessem e que desenhassem, que classificassem os seus produtos como escrita ou desenho, e que reconhecessem aquilo que haviam escrito ou desenhado. Os resultados sugerem que as crianças ouvintes têm um conhecimento precoce das duas formas notacionais (escrita e desenho) e são capazes de diferenciar os traços dos dois sistemas simbólicos mais cedo do que as crianças com dificuldades auditivas. Este conhecimento, bem como a discriminação entre as duas formas notacionais, poderá constituir uma dificuldade para as crianças com dificuldades auditivas que sejam educadas oralmente. Contudo, a partir do momento em que conseguem distinguir a escrita do desenho, estas crianças conseguem desenvolver representações escritas mais precisas e estáveis do que as crianças sem dificuldades auditivas. A linguagem verbal parece, assim, ser uma variável relevante neste processo construtivo.

PALAVRAS-CHAVE: Escrita emergente, crianças com dificuldades auditivas, nível pré-escolar, conhecimento notacional, desenvolvimento da escrita.

### Spanish

[Translation Ingrid Marquez]

TÍTULO. Cómo los niños con deficiencia auditiva diferencian la escritura emergente del dibujo

RESUMEN. Este estudio compara los conceptos de la escritura que tienen los niños italianos de nivel preescolar con y sin deficiencias auditivas, al examinar cómo diferencian la escritura del dibujo. Se considera la relación entre la escritura emergente y el lenguaje verbal en estos dos grupos. Los participantes en el estudio eran veintitres niños con deficiencias auditivas, educados oralmente y que variaban de dos años y diez meses a seis años de edad, y veintitres “controles” de edad parecida que oían bien. A los niños se les pidió escribir y dibujar, clasificando sus productos como escritura o dibujo y reconociendo lo que habían dibujado o escrito. Los resultados sugieren que los niños sin deficiencia auditiva entienden en una etapa más temprana estas dos formas de expresión escrita (con palabras y dibujos), logrando diferenciar mejor entre las características de los dos sistemas simbólicos. Esta comprensión y la habilidad de discriminar entre las dos formas podría presentar un mayor reto para los niños con deficiencia auditiva educados oralmente. Sin embargo, una vez que hayan logrado diferenciar entre la escritura y el dibujo, los niños con deficiencia auditiva son capaces de desarrollar representaciones de escritura más precisas y estables que sus contrapartes sin deficiencia auditiva.

PALABRAS CLAVE: la escritura emergente, estudiantes de nivel preescolar con deficiencia auditiva, conocimiento de la escritura, desarrollo de la escritura.

## 1. INTRODUCTION

The discovery of writing has a strong impact on learning and development, influencing our representation of reality and enabling us to transmit knowledge across time and space (Tolchinsky, 2007). In modern literate societies, human intelligence expresses itself through writing (Olson, 1994) and access to cultural products or information is mediated by the efficient use of written language. Discovering written language is thus an important step towards children's participation in their social and cultural worlds.

This discovery is normally easy for children. As Olson points out: “Basic literacy [...] is relatively easily mastered by children so long as the signs of the writing system map on to comprehensible properties of the learner's speech and appropriate learning environments are available” (Olson, 2009). However, even the construction of basic literacy skills may be problematic when the child's access to speech is incomplete or

the learning environment is poor or inadequate, as may be the case for hearing-impaired children.

There has been long-standing concern for hearing-impaired children's access to written language and, in the last two decades, research on this issue has been particularly productive. Hearing-impaired children's reading and writing skills have been investigated extensively in the school-aged population, consistently revealing low levels of proficiency (Alamargot, Lambert, Thebault, & Dansac, 2006; Antia et al., 2005; Arfé, 2003; Arfé & Boscolo, 2006; Arfé & Perondi, 2008; Banks, Gray, & Fyfe, 1990; Dyer, MacSweeney, Szczerbinski, Green, & Campbell, 2003; Fabbretti, Volterra, & Pontecorvo, 1998; Singleton, Morgan, DiGello, Wiles, & Rivers, 2004; Wauters, van Bon, & Tellings, 2006). However, by comparison, fewer studies have focused on hearing-impaired children's emergent literacy skills or on their early exploration and discovery of the writing system (see Williams, 2004).

In this paper we report a study that investigated this process. The study examined how orally educated hearing-impaired (henceforth HI) preschoolers learn to differentiate the notational systems of writing and drawing, to recognize their specific properties and distinguish their products. Two objectives of the study were to a) compare this process to that of normally hearing children, and b) verify whether and how these abilities develop in relation to HI children's verbal language.

Emergent literacy consists of knowledge, constructions, and skills that are important developmental precursors of more formal reading and writing, and are thus essential in tracking both typical and atypical development of literacy knowledge and skills (Whitehurst & Lonigan, 1998). As Williams (2004) posits, the term emergent literacy reflects an important shift in perspective from an instructional literacy approach dominant in the twenties, according to which any reading or writing activity is grounded on a formal teaching process, to a new conception of literacy, as a process rooted in the spontaneous cognitive work of the child. The concept of emergent literacy suggests that knowledge of reading and writing may develop well before formal instruction, through children's informal literacy activities. This approach to literacy suggests an alternative view of the learning subject (the child). Instead of considering the child upon entering the scholastic system as an ignorant subject, not having received any formal instruction, it suggests investigating what the child already knows, as a function of his own cognitive work (Ferreiro, 2007). In this paper, we will assume this perspective.

### *1.1 The construction of writing*

The discovery of written language has been shown to be a spontaneous cognitive process in hearing children (Dockrell & Teubal, 2007; Ferreiro & Teberosky, 1979). Children explore writing because it is a concrete part of their everyday endeavours; it is generated and used by their caregivers, teachers, and by other children (Ferreiro, 2003).

The cognitive exploration of writing leads children to the final understanding that this symbolic system is a secondary system of representation constructed on a primary one: oral language or speech (Vygotsky, 1962). This requires, on the one

hand, the acknowledgment that writing is not iconic, since it does not reproduce concrete objects or events in the world, but a linguistic representation of them, and on the other hand, that two representational systems which are qualitatively and perceptually different (speech and written language) are instead intimately connected and represent each other (Ferreiro, 2003).

### *1.2 Iconic vs not iconic*

The conventions of writing are learned by immersion in the functioning of the system (Tolchinsky, 2007). A first, and critical step in this process is the child's conceptual distinction between different representational graphic systems, such as writing and drawing (Ferreiro & Teberosky, 1979). Writing and drawing are important symbolic tools used in human societies with various cognitive and social functions: to register and represent objects, ideas, and information, and to communicate or express thoughts and feelings. These two activities are similar in many respects in the child's eye: both are comprised of graphic marks on a bi-dimensional surface, produced by the hands, and are "special", since they are physical but also symbolic, with the function of representing objects and realities (Bloom & Markson, 1998; Diesendruck et al., 2003). However, they also differ in a critical way. While drawing represents visible objects in a real or fictional world (Bloom & Markson, 1998; Diesendruck et al., 2003), writing represents something invisible: a linguistic representation of the world (human speech or oral language). The child's understanding of this subtle but even fundamental distinction constitutes the first step for entering literate societies (Ferreiro, 1990).

Research has shown that children of 3 and 4 years of age do not clearly distinguish writing from drawing in a recognition task (Levin & Bus, 2003) and use drawing-like representational devices for writing (e.g. they use more letters for representing bigger referents or select an appropriate colour for representing some perceptual aspects of the referent) (Ferreiro & Teberosky, 1979). They also have difficulty in recognizing the meaning of what they write, and this difficulty persists at the age of five (Levin & Bus, 2003). The recognition that drawing is a notational system, characterized by specific traits, is preliminary to the recognition of writing as a separate notational tool. In general, children of 3 and 4 years of age are more able to recognize their drawings as drawings than their writings as writings, and, when asked to recognize what they have drawn or written, they are better at recognizing the meaning of their drawings than of their writings (Levin & Bus, 2003). The development of these two systems is affected by the development of fine motor and praxic skills, which allow children to express with greater precision their ideas and represent the world on paper, and by an increased cognitive exploration of their own and others' graphic productions with age. A clear idea of writing and a differentiation between the two systems occurs only around the age of 5, when the child's process of construction leads to the discovery that writing is a notational, referential-communicative system, characterized by peculiar constraints (e.g. linearity and limited number of elements), that do not characterize drawings (Levin & Bus, 2003). This discovery is mediated not only by the child's spontaneous cognitive activity,

but access to the symbolic system of writing is considered a conjunction of cognitive, cultural, and linguistic developmental processes (Stobbart & Alant, 2008).

### *1.3 Emergent writing and oral language*

Understanding the connection between speech and writing seems to require some knowledge of the oral language system itself. First, because oral language (e.g. in story-telling and shared book reading) is the main linguistic environment in which children's literacy experiences are based. Second, in order to discover the correspondence between writing and speech, children have to make connections between the structure of speech (linguistic sounds) and the structure of writing (letter sequences). According to Mayer (2007), it is in the transition from emergent to conventional writing, when an explicit connection between speech and writing must be made, that HI children meet their first difficulties. To discover the alphabetic principle, or the phonetization of writing, children have to put together two sets of knowledge: that of their face-to-face language and their knowledge of how writing works. That is, they must have access to the structure of speech (linguistic sounds) and to conventional writing (e.g. letters, written words, texts) (Mayer, 2007). HI children can understand that a referential relation exists between the structure of writing and face-to-face language. However, they are able to establish either a connection between writing and sign language or between writing and inadequate and incomplete representations of oral language.

Minor problems are documented in the earlier phases of emergent writing. Research that has investigated the early literacy development of HI children has generally shown that they, like their hearing peers, are active theory builders and constructors of knowledge (Mayer, 2007). They are interested and engaged in writing like their hearing counterparts (Conway, 1985; Rottenberg & Searfoss, 1992; Williams, 1994), draw similar benefits from literacy activities (Gioia, 2001), make hypotheses about letter-sound correspondence and orthographic correspondence similar to their hearing peers (Bonanni, 1997; Ruiz, 1995), and use sign language to support their early writing endeavours as hearing children do with spoken language (William, 1999). In synthesis, these studies suggest that young HI children's emergent writing is very similar to that of hearing children, at least before the transition to a conventional writing system. However, very few studies have considered orally educated HI children's emergent writing or have examined the influence of verbal language in this process. The present study offers a contribution in this direction.

## 2. METHOD

The study was explorative and aimed to compare normally hearing and orally educated HI preschoolers' emergent writing. We were interested in examining how they differentiated writing from drawing and how emergent writing and verbal language were correlated in these two groups.

Orally-educated HI children today comprise an important part of the Italian HI children population. Hence, the study of the process and the possible problems that

these children may meet in their early construction of the writing system has a high pedagogical relevance. For orally educated HI children, verbal language is a support for early writing endeavours (e.g. for asking questions, formulating hypotheses, and exchanging ideas), such as a primary system of representation, with a secondary system that is writing (Vygotsky, 1962). Verbal knowledge and processes might then be an important component of emergent writing.

### 2.1 Participants

Twenty-three HI preschoolers ranging in age from 2 years and 10 months to 6 years (mean age= 4.3) and 23 normally hearing (NH henceforth) preschoolers, matched with HI participants for age (range 2;10 to 6;0, mean age= 4.1) were involved in the study. All HI participants were reportedly deaf from birth. Apart from one child, who had severe hearing loss, all presented profound hearing loss (> 90 dB). Eighteen children had cochlear implants. HI children were recruited from a special school for hearing-impaired children (Istituto Canossiano of Brescia) and the speech-therapy services of the territory of Brescia. Children in the special school attended an orally oriented kindergarten where HI and NH children were integrated. Children recruited from speech-therapy units attended mainstream preschools with NH peers. Only children who followed an orally oriented training, had normal intelligence, and did not present behavioural or relational problems or additional sensorial problems associated with deafness, were selected for the study. All preschool children attending the special school and those from the speech-therapy units who met criteria for inclusion and accepted to participate were included in the study. Data regarding their cognitive level were drawn both from their clinical files and from interviews with teachers. The NH age-matched participants were twenty-three children randomly recruited from the same preschools attended by HI children.

### 2.2 Procedure

Levin and Bus's (2003) research paradigm was adopted. Children were met separately in a quiet room during school time or during speech therapy and were involved in two tasks: to produce and sort writings and drawings. Children were first asked to produce writings and drawings of four pairs of referents contrasting for colour (cane/mare; dog/sea), size (casa/mela; house/apple), number (palla/tre palle; ball/three balls), and shape (mamma/sole; Mum/sun). Perceptual contrasts were introduced to verify whether the child was guided by some iconic principle in writing. Younger children tend to use these contrasts to represent meaning in their writing (e.g. including more letters to represent the bigger referent) (Ferreiro & Teberosky, 1979).

The stimuli of each pair were dictated in succession. Once the child had produced the writings or drawings, the next pair was dictated. Each child performed the task twice: once writing and once drawing. Examples of drawings and writings are reported in Figures 1 and 2.





Tre palle/Three Balls



Palla/Ball (HI, 2,8)



Mela/Apple



Casa/House (HI, 3,3)



Mamma/Mum



Sole/Sun (HI, 4,6)



Mare/Sea



Cane/Dog (HI, 5,9)

Figure 1: Examples of drawings.

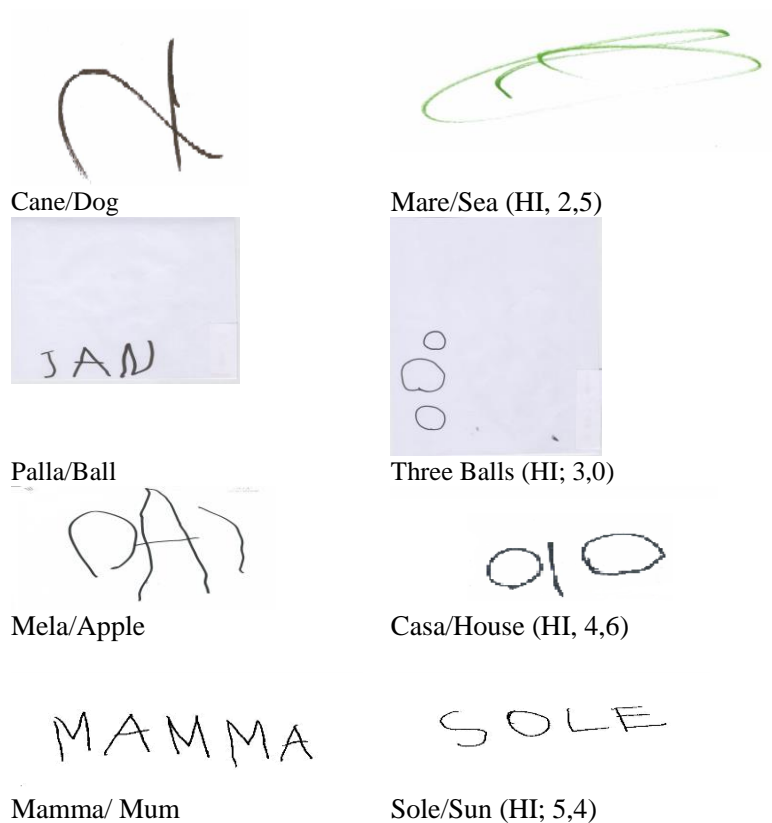


Figure 2- Examples of writings.

After finishing the drawing and writing tasks, children were then asked to recognize and sort their products as writings or drawings. Two large circles, one representing a written word, one a drawing, were put on the table in front of the child. The experimenter took some of the drawings and writings the child had produced and, for each, asked the child if he had written or drawn (“Did you write or draw here?”), then she showed the child how to put the writings in the “writing” circle and the drawings in the “drawing” circle. When two small piles, one of drawings and one of writings, were formed on the table, the child was asked to continue. His writings and drawings were presented in random order, and for each product the child was asked if he had written or drawn (“Did you write or draw here?”), and to put the product (writing or drawing) in the right pile. The products were then presented a second time and children were asked to recognize the referent of their writings and drawings, that is, what they had written or drawn (“Is it *cane* or *mare*?”). Half the participants were

asked first about their drawings and half about their writings. The pairs of stimuli and the tasks were presented in counterbalanced order within the groups. The child's recognition of the notational system used was considered a measure of: a) his domain knowledge about notation (or awareness of the relevant traits of a symbolic system), and b) a greater discriminability between his writing and drawing products. The child's recognition of the referent of the products was a measure of the graphic and symbolic quality of the product itself. The more precise the representation, the less ambiguous is its meaning (or reference).

In the same week, but during a separate session, children were asked to perform the Peabody Picture Vocabulary Test-Revised (PPVT-R, Italian standardization by Stella et al., 2000). The PPVT-R is commonly used in the evaluation of oral receptive vocabulary breadth. The test is administered orally and assesses recognition and comprehension of words pronounced by an examiner. The child is asked to point to one of four pictures that corresponds to the word pronounced. In preschool years, receptive vocabulary is generally considered a good index of linguistic knowledge. We decided to administer the test in its original mode (orally), since all our HI children were exposed to oral language. Children's verbal knowledge was considered particularly relevant in this study, since to discover the notational properties of the writing system, children have to explore the linguistic meaning of scripts and their correspondence to words in verbal language. We assumed that this was also true for HI children, who were orally educated.

### 3. RESULTS

Children's products were scored according to Levin and Bus's (2003) writing scale, as graphic (scribbles or more harmonic forms), writing-like (productions characterized by linearity, segmentation into units, variety, and/or complexity of form), and symbolic writing (use of conventional symbols, such as letters or numbers, cues of phonetic representation, invented spelling or conventional spelling). Scores ranged from 0 to 13. Graphic representations were scored from 0 to 2 according to graphic control and quality of forms (0 for scribbles, 1 for a single large good form, produced not just by scratching, 2 for a small good form). Writing-like representations were scored from 3 to 8, according to the number of writing-like features present in the product (a linear form 3, a linear and segmented form 4, etc.). Symbolic representations ranged from 9 to 13 according to the number of conventional and symbolic features (e.g. inclusion of a conventional letter or number was scored 9, a written form with conventional symbols and some phonetic correspondences between symbols and sounds 10 or 11, etc.). The second and third authors scored each product independently with an inter-rater agreement of 96%.

Children were divided into two age groups according to the kind of exposure to writing they have had (less structured vs. more structured writing activities). The first group comprised children from 2;10 to 4;10 (N=16), who had been exposed to more informal reading and writing activities; the second group comprised children from 5;0 to 6;0 years (N=7), who had been exposed to more conventional and structured reading and writing activities (e.g. name writing and phonological awareness

activities). Hearing and HI children's language scores differed significantly:  $F_{(1,44)}=17.81, p < .001$ .

Two (group) x 2 (age) ANOVAs were used to compare writing scores, correct recognition of drawings and writings, and correct recognition of referents of writings and drawings in the groups. The analysis showed a general effect of age,  $F_{(1,42)}=61.40, p < .000, \eta^2=.59$ , but not of group, for writing scores. Older children produced better examples of writing than younger, but, overall, no differences emerged in this respect between HI and NH children. However, interaction between group and age was close to significance,  $F_{(1,42)}=3.61, p=.06, \eta^2=.08$ . Younger NH children outperformed younger HI children ( $M=4.92$  vs.  $M=3.69$ ), but the opposite was found for older children. Interestingly, HI children showed better writing than NH children, using written symbols more conventionally to represent the phonological structure of words ( $M=11.47$  vs.  $M=9.67$ ) (Table 1).

*Table 1. Mean writing scores of younger and older NH and HI children (SD in parenthesis)*

	NH	HI
Younger	4.92 (2.81)	3.69 (2.67)
Older	9.67 (1.74)	11.47 (1.68)

The ability to recognize drawings as drawings increased with age,  $F_{(1,42)}=22.30, p < .000, \eta^2=.35$ , and the data show that NH children had a greater capacity to recognize their drawing than HI children,  $F_{(1,42)}=10.63, p < .005, \eta^2=.20$ . Interaction between the two factors also emerged,  $F_{(1,42)}=10.63, p < .005, \eta^2=.20$ . Differences between the two groups emerged for younger ( $M=7.19$  vs.  $M=3.56$ ) but not for older children ( $M=8$  and  $M=8$ ). That is, younger NH children recognized their drawings as drawings more than younger HI children, but with age, this difference disappeared. Not surprisingly, older children were also more able to recognize writing as writing,  $F_{(1,42)}=11.26, p < .005, \eta^2=.21$ . NH children outperformed HI children in writing recognition,  $F_{(1,42)}=12.90, p < .005, \eta^2=.23$  (Table 2).

Finally, older children were more able to recognize the referents of their drawings than younger children,  $F_{(1,42)}=10.67, p < .005, \eta^2=.20$ . For this task, no differences between NH and HI children, and no interaction between the two factors (age and group) emerged: the effect of age was similar in the two groups. Older children also recognized the meaning of writings more than their younger counterparts,  $F_{(1,42)}=7.01, p < .01, \eta^2=.14$ , but interestingly, HI children outperformed NH children in the same task,  $F_{(1,42)}=8.50, p < .01, \eta^2=.17$ , at both ages (younger:  $M=4.75$  vs.  $M=3.44$ ; older:  $M=7.14$  vs.  $M=4.57$ ). Correlational analyses showed that PPVT-R scores correlated significantly with writing scores in both groups:  $r=.45, p < .05$  for

NH children and  $r=.46, p<.05$ , for HI children. However, when non-parametric correlations were carried out separately for the two age groups, they revealed some interesting differences: no correlations were found in younger NH children between the PPVT-R scores and writing scores, writing recognition, and referent recognition for writing products. Instead, a significant correlation emerged between PPVT-R scores and writing scores of younger HI children,  $r=.51, p<.05$ . In older NH children, only a significant correlation emerged between PPVT-R scores and writing scores,  $r=.88, p<.05$ . For older HI children, two correlations were close to significance: one between PPVT-R and recognitions of the referents of writing,  $r=.73, p=.06$ , and one between PPVT-R scores and writing scores,  $r=.73, p=.06$ .

*Table 2- Mean number of correct recognitions for drawings and writings in NH and HI children (SD in parenthesis)*

	NH		HI	
	Younger	Older	Younger	Older
Drawings	7.19 (1.38)	8.00 (0.00)	3.56 (2.56)	8.00 (0.00)
Writings	5.88 (2.25)	7.86 (0.38)	3.13 (1.86)	5.71 (3.20)

A final set of paired sample t-tests compared the number of correct writing and drawing recognitions within the two groups and the two age levels. Younger NH children recognized more drawings as drawings than writings as writings:  $t(15)=3.02, p<.01$ . They also recognized more referents for drawings than for writings,  $t(15)=4.75, p<.001$ . Older NH children showed better recognition only of the meaning of drawings compared with writings,  $t(6)=4.08, p<.01$ . On the other hand, the same advantage for drawing recognition did not appear in the case of HI children: younger HI children did not perform differently in the two recognition tasks (drawing and writing recognition and drawing and writing referent recognition) (see, for example, Table 2). Similarly, no differences emerged between drawing and writing recognitions in older HI children, except for a difference in referent recognition, in favour of writing, which was close to significance,  $t(6)=1.99, p=.09$ .

#### 4. DISCUSSION

A literate society is held together by a set of conventions for using language and writing (Olson, 2009). The spontaneous interest of young children for these conventions testifies that the child, not the teacher, is the first agent of his or her own basic literacy.

The emergence of writing requires a process of cognitive construction and linguistic exploration that lasts some years and can be divided in two major phases (Ferreiro & Teberosky, 1979). The first phase is one in which children learn to differentiate writ-

ing and drawing as two different symbolic tools (differently related to the objects they represent). In this phase, children develop increased motor control of their writing and drawing productions (from scribbles to good forms), produce more and more clear forms, and develop some ideas about the characteristics of drawing and writing. For example, they learn that drawing and writing are symbolic, are used to represent other objects, and are interpreted on the basis of their symbolic relation with these referents. They also learn that these two systems have different characteristics and may be distinguished on the basis of their specific features (e.g. writing is linear, segmental and not iconic). This phase corresponds to the graphic and writing-like phases individuated by Levin and Bus (2003).

The second phase is when children learn that writing represents a special entity: oral language. In this phase, children are aware that when writing they are outside of the iconic world (Ferreiro, 1990). They learn how writing, a visible "object", does not reproduce other visible objects but an invisible entity: their linguistic representation in human speech. Researchers report that this phase is more critical for HI children (Bonanni, 1997; Mayer, 2007). It would be reasonable to predict that HI children have greater problems in this second phase because of their difficulties in accessing oral language and representing its phonological structure (Sterne & Goswami, 2000). Consistently, it could also be reasonably argued that HI children's verbal language skills are more related to this second phase of construction than to the first. In light of these considerations, the results of this study seem to be of particular interest.

In general, in line with other authors (Levin & Bus, 2003; Bonanni, 1997), we found that writing and drawing become less ambiguous with age and have more stable correspondences with the referents they represent. This is true for both groups of participants. However, younger NH children were more able than their orally educated HI peers to recognize their writings as writings and their drawings as drawings. Namely, compared with younger HI children, they had a better understanding of the two notational forms and were more able to differentiate the traits of the two symbolic systems. This understanding and the discrimination between the two different forms of notation could be challenging for orally educated HI children. Conversely, our results suggest that the second phase in the process of construction of the writing system is less problematic for these children. Older HI children attained higher writing scores than their NH peers. Moreover, the HI participants in this study were more able than their NH peers to recognize the meaning of their writings. That is, they had probably developed more precise and stable writing representations than their NH peers. These results appear in contrast with those of previous studies (Bonanni, 1997; Mayer, 2007), which have demonstrated how it is exactly in the transition from emergent to more conventional writing that HI children meet their first difficulties. The specific characteristics of the participants in these studies (e.g. the preferential use of signs vs. oral language) may explain these differences. Correlational analyses show that verbal language may play a role in the discovery of written language. Oral receptive vocabulary was in fact related to emergent writing in both groups. However, critically, only in the case of HI children did it play a role from the very first phases of construction of the writing system.

From these results, two different, but compatible, hypotheses can be formulated. One is that oral language may play a rather general, and indirect, role in HI children's early emergent writing, generating the linguistic and interpretive environment for the discovery of the symbolic nature of written objects. Our findings suggest that when oral language is the first and principal communicative means of an HI child, even an imperfect knowledge of oral language may become an important linguistic endeavour and a tool in the child's process of construction. A second hypothesis is that the involvement of verbal language in emergent writing may be more direct and specific. Older HI children attained higher writing scores than their NH peers and were more able to recognize the meaning of their writings. This ability may be related to the construction of more stable and clear connections between writing and oral language, thanks to an increased knowledge of the structure of writing and oral language represented in writing. The specific awareness of phoneme-grapheme correspondence at the basis of more conventional writings is an important focus in speech-therapy interventions, and orally educated HI children may have consolidated phoneme-to-grapheme correspondences because of speech-therapy.

These results suggest seriously considering how oral speech-therapy and children's verbal language experience might affect the HI child's process of constructing the writing system. Traditionally, writing has been introduced in speech-therapy activities as an important device for supporting access to oral language sounds (i.e. sounds discrimination). This experience of the writing system may help HI children to develop early conventional and symbolic representations of writing but not to distinguish conceptually different symbolic systems, such as writing and drawing. Our findings invite educators as well as clinicians to consider this possibility and its educational and developmental implications. On the other hand, our results indicate the importance of oral language development in the very early conceptualization of writing as a symbolic tool. In sum, the findings suggest that the relevance of language in mediating and structuring the child's experience of this cultural object should not be ignored, even when language is not typically developing. These results and these considerations should be limited to the case of orally educated HI children, for which oral language is the first language mode. Different paths of writing construction are probably those of children with Sign Language as L1.

Considering the relevance of oral language in early writing experience does not imply, however, conceiving oral language strictly as a prerequisite or basic skill for emergent writing (see Williams, 2004). Different from the instructional literacy view, where oral language skills were considered to be prerequisites of reading and writing skills, emergent writing models prefer to conceptualize reading, writing, and oral language as objects whose knowledge develops conjointly, thanks to mutual effects of one object upon the other. In an emergent writing theoretical framework, written texts and face-to-face language make sense in terms of each other. This dynamic and interactive perspective seems to be more appropriate in explaining the process through which each child (NH or HI) discovers the relation between different representational systems.

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#### BIOGRAPHICAL NOTES

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