References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

DiNitto, D. M., & Webb, D. K. (2012). Substance use disorders and co-occurring disabilities. In C. A. McNeece & D. M. DiNitto (Eds.), *Chemical dependency: A systems approach* (4th ed., pp. 354–406). Boston: Pearson.

Koch, D. S., Nelipovich, M., & Sneed, Z. (2002). Alcohol and other drug abuse as coexisting disabilities: Considerations for counselors serving individuals who are blind or visually impaired. *RE:view, 33*, 151–159.

Lasser, K., Boyd, J. W., Woolhandler, S., Himmelstein, D. U., McCormick, D., & Bor, D. H. (2000). Smoking and mental illness: A population-based prevalence study. *Journal of the American Medical Association, 284*, 2606–2610.

Lazowski, L. E., Miller, F. G., Boye, M. W., & Miller, G. A. (1998). Efficacy of the Substance Abuse Subtle Screening Inventory-3 (SASSI-3) in identifying substance dependence disorders in clinical settings. *Journal of Personality Assessment, 71*, 114–128.

Nelipovich, M., Wergin, C., & Kossick, R. (1998). The MARCO model: Making substance abuse services accessible to people who are visually impaired. *Journal of Visual Impairment & Blindness, 92*, 567–570.

Substance Abuse and Mental Health Services Administration. (2012). *Results from the 2011 National Survey on Drug Use and Health: Summary of national findings*, NSDUH Series H-44, HHS Publication No. (SMA) 12-4713. Rockville, MD: Author.

Sun, A. P. (2012). Gender, substance use, and substance use disorders. In C. A. McNeece & D. M. DiNitto, *Chemical dependency: A systems approach* (4th ed., pp. 424–439). Boston: Pearson.

Unite for Sight. (n.d.). *Community eye health online course. Module 9: Eye disease and mental health.* New Haven, CT: Author. Retrieved June 6, 2013, from http://www.uniteforsight.org/community-eye-health-course/

World Health Organization & The World Bank. (2011). *World report on disability*. Geneva: World Health Organization. Retrieved from http://whqlibdoc.who.int/publications/2011/9789240685215_eng.pdf

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Teaching the Meaning of Words to Children with Visual Impairments

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In children who are blind (that is, those who have light perception or less vision), syntax, grammar, and lexical development are largely unexplored, and language problems mainly concern semantics and pragmatics (James & Stojanovik, 2007; Pérez-Pereira & Conti-Ramsden, 1999; Tadić, Pring, & Dale, 2010). The same pattern was found in children with visual impairments (that is, those with some visual perception of form and detail) by Tadić et al. (2010) and Wegener-Sleeswijk and Van Ierland (1989a, 1989b), but research in this area is limited due to the range of vision

in children with low vision. Although the breadth of the vocabulary of children who are blind or visually impaired is mostly comparable to that of sighted children, some children show problems with regard to the proper meaning of words. These problems reveal themselves when they are asked to elaborate on a word and not just to label an object or situation. An example comes from Linders (1998), who heard a boy who is blind say, "Oh that tree is large, it must be in a large pot." According to Linders (1998), word knowledge does not seem to be a problem on a lexical level, because words are used correctly in proper sentences, but the full meaning of words is not always comprehended. Linders (1998) also found that although some children who are (legally) blind could describe objects and situations correctly, they were not able to act on this knowledge appropriately, or they had a wrong or incomplete idea of the objects and situations to which their words referred.

Landau (1983) concluded: "Where relevant experience is lacking, concepts cannot develop; and where concepts are lacking, word meanings cannot be learned" (p. 63). A reason semantic and concept development in children with visual impairments is at risk for anomalous development is the restricted number of possibilities for exploring the environment (Warren & Hatton, 2002).

According to Linders (1998), sometimes the mode of acquisition of words by children who are blind or profoundly visually impaired is responsible for the semantic problems. *Mode of acquisition* refers to the way the meaning of words is acquired: by sensory experience, by language and thinking, or by a combination of both. Some children with visual impairments have to rely more on touch and hearing than on vision to acquire the meaning of words. However, vision has several advantages over tactile and auditory perception. Vision enables us to gather much information at the same time, in an instant, and in a coherent way. Vision also integrates and structures information from the other senses and makes learning by imitation and incidental learning easier (Warren, 1994).

Linders (1998) proposed three types of words children who are blind have to learn depending on the mode of acquisition. First, words metaphorically called *far-away words* concern concrete objects, situations, and actions outside a visually impaired child's direct experiences, because they are less accessible due to the vision loss. These words include those that describe objects that are far away (moon, airplanes); objects that are too large to touch in their entirety (buildings, rivers); fragile objects (smoke, mist); tiny objects (fleas, dust); and dangerous or shy objects and animals (lions, fire, hamsters). Learning the meaning of such words is more difficult for children with visual impairments. Although a child who is blind might easily recognize a far-away object upon touching it, there might be problems with describing its function, appearance, or use. Second, *close-by words* are words that children who are blind or visually impaired experience directly through senses other than vision (for instance, fingers, sleep, warm). Last, there are *abstract words* that do not have a concrete referent. The meaning of these words is completely dependent on language itself (for instance, between, because, and lie). The borders between these groups of words are not strict. For a child who is blind, a tree—even a small one—can be perceived by touch but not completely. As such, a tree is on the boundary between close-by and far-away words.

In the report presented here, we describe a pilot intervention study that was intended to teach children with visual impairments the meaning of far-away words, and that used their mothers as mediators. The aim was to teach both labels and *deep word knowledge*, which is the comprehension of the full meaning of words, illustrated through possible semantic relationships and the correct

Table 1
Participants.

Child	Age in months	Gender	Etiology Visual acuity with both eyes	N-CDI* language development scores in months
1	38	Female	Albinism Visual acuity = 1.4/20	21–29
2	25	Female	Retinopathy of prematurity Totally blind	18–24
3	69	Male	Albinism Visual acuity = 1.2/20	Not applicable for this age
4	36	Male	Retinal scarring and detachment Visual acuity = 2/20	23–30
5	43	Female	Congenital nystagmus Visual acuity = 1.4/20	>30
6	28	Female	Unknown, nystagmus present Visual acuity = 1/20	26–30

*Dutch version of the MacArthur CDI (Zink & Lejaegere, 2002).

utilization of the word (Schoonen & Verhallen, 1998).

Methods

Participants

Six children who are blind or visually impaired and their mothers were recruited from the records of an early intervention program. The children were aged 18 months or older, had ocular visual impairment or were blind, and had no additional disabilities or cortical or cerebral visual impairment (see Table 1). All mothers who were approached agreed to participate and gave written and informed consent. This sample consisted of about 20% of the center's population at the time and was deemed workable for this pilot study. In order to rule out language delays, we used the Dutch version of the MacArthur Communicative Development Inventories (N-CDIs) (Zink & Lejaegere, 2002) for all participants. We determined that all children had enough language at their disposal to be able to learn new word meanings.

Materials and setting

At the end of the baseline sessions, the mothers were taught some basic communications skills. They received written instructions (see Box 1) that were explained and demonstrated by the researchers. They were also taught three key elements from the Hanen program (Manolson, 1997): (1) to follow the child's lead to build confidence and encourage the child to communicate; (2) to adjust routines by playing together and to help the child to take turns and keep interactions going; and (3) to add language and information to interactions with the child. During the intervention sessions, techniques for building up word meaning were taught to the mothers: naming (labeling), describing, pretending, explaining, fantasizing, talking about future events, and discussing feelings (Manolson, 1997). Discussing feelings also included explaining how the process felt, literally. Mothers were also instructed to provide names for word categories, since children with visual impairments sometimes show problems with categorizing words (Pérez-Pereira & Conti-Ramsden, 1999).

During the intervention phase, the mothers were provided with verbal and written instructions, demonstrations of how to apply the techniques to enhance word meanings, and exercises and verbal feedback based on video

Basic skills for communication with children with visual impairments

1. Sit at eye level and at near distance
2. Use overaccentuated facial expressions
3. Take care lighting is adequate; when necessary, use additional lighting
4. Let your child explore the immediate environment
5. Take care the child sits or lies in the most optimal position for interaction
6. Imitate sounds, gestures, facial expressions, and your child's words
7. Put into words your child's sounds, gestures, facial expressions, and words
8. Correct your child's language in an inconspicuous way
9. Join in with your child's way of thinking and experiencing things
10. Take into account your child's developmental level
11. Follow your child's interests
12. Show your own and your child's emotions, moods, and feelings in the most explicit way
13. Be consistent; talk for a longer time about one subject
14. Slow down your speed of talking and wait for answers from your child
15. Make use of repetitions
16. When necessary, stop moving or gesturing when you talk
17. Accompany your own activities with relevant language
18. Take turns

Box 1

recordings of the researcher and the home videos, which are described in the Procedure section. Most of the interventions took place in the child's home, but mothers were also encouraged to visit real-life situations to provide substance to the words (for instance, to visit a zoo to learn the word for an animal).

After consensus between the researcher (the second or third author) and the child's early interventionist was reached, an individual list of 10 far-away words was constructed for each child that was composed of words they failed on the N-CDI (see Box 2). If a child could not answer three or more out of five questions in the baseline assessment, the word was included in the intervention.

Procedure

The study consisted of one acquaintance session, two baseline sessions, five intervention sessions, and one follow-up session. The post-test consisted of the sum of the child's scores at the end of each intervention session. Visits lasted from 30 to 60 minutes, during which an interaction session between mother and child was recorded on video. After each intervention visit, the mother received a home assignment composed of two new words. The home assignments took only 10 minutes per week and were filmed by the parents themselves. The recordings from the intervention sessions, filmed by the researcher, and the home videos were used for personalized feedback to the mothers. A typical home assignment consisted of: practicing the word with real materials or toys, applying the Hanen techniques, and making a video recording of it. All children were also visited once or twice per month as part of the regular early intervention program.

At the start of a home visit, the mothers received feedback on the use of techniques to communicate and to teach word meanings. The children were also tested for their knowledge of the two words they had been practicing the previous week. Follow-up one week

Far-away word lists

Child 1	Child 2	Child 3	Child 4	Child 5	Child 6
chimney	washing machine	microscope	washing machine	washing machine	pig
lamppost	chicken	stopwatch	air mattress	airbed	fish
caterpillar	umbrella	compass	airplane	parasol	crocodile
parasol	train	satellite	umbrella	lamppost	samba ball
trailer	butterfly	tram	parasol	chimney	umbrella
helicopter	caterpillar	spaceship	caterpillar	butterfly	caterpillar
sea	airplane	submarine	roller coaster	swan	duck
roller coaster	shark	monorail	lighthouse	lighthouse	seahorse
hedgehog	car	seahorse	kangaroo	tadpole	bear
lighthouse	pig	tadpole	hamster		frog
					sheep

Box 2

after the last training session consisted of testing all 10 words.

Results

Table 2 shows the number of correct answers. The Wilcoxon signed ranks test showed significant differences between pretest and posttest, $z = -2.201$, $p = .028$; pretest and follow-up, $z = -2.201$, $p = .028$; and between the posttest and the follow-up, $z = -2.032$, $p = .042$.

The mean percentage of correct answers to questions 1 to 5 in the posttest were 92, 63, 45, 33, and 100 (see Table 3). Child number 2 had no correct answers to questions 2, 3 and 4. Questions 4 (label category) and 3 (how does it feel, literally?) were the most difficult to answer, followed by question 2 (what is the function?). Questions 1 (description) and 5 (point to) were answered correctly most of the time.

Table 2
Number of correct answers given by the children.*

Child	Pretest	Posttest	Follow-up
1	5	28	43
2	0	16	16
3	1	40	45
4	9	36	37
5	10	42	43
6	13	38	40
Mean	6.3	33.3	37.3

*Possible range: 0–50.

Discussion

After a five-week training program for mothers, the deep word knowledge for 10 words improved in 6 children who are blind or profoundly visually impaired. Home assignments took only 10 minutes per week and the most effort was put into the intervention by the mothers.

Although the improvement in the children's performance was substantial in all children, it was not perfect in the posttest and during follow-up. The questions regarding categories and tactile impressions could still not be answered by several children. Analysis of the mothers' input showed that this might be the result of their not providing this information during the intervention phase. There was also some individual variation, part of which could have resulted from differences in age and visual status.

Given the design of the study, the results are inconclusive as to whether the intervention, a priori differences in word difficulty, maturation, or some other factor caused the improvement in knowledge of words. Also unknown is the effect of the level of visual impairment, since there was only one child who was blind in the study. Future areas of study should focus on the categorizing and verbalizing object properties skills of the

Table 3
Percentage of correct answers to five word meaning questions for 10 words.

	Posttest questions*					Follow-up questions*				
Child	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
1	100	70	10	0	100	100	100	90	40	100
2	60	0	0	0	100	60	0	0	0	100
3	100	90	90	20	100	100	100	90	60	100
4	100	60	50	50	100	90	70	60	50	100
5	100	90	70	60	100	100	90	80	60	100
6	90	70	50	70	100	100	70	40	90	100
mean	92	63	45	33	100	92	72	60	50	100

*Q1. What does a [word] look like? (description)
Q2. What is a [word] for? (explanation of function)
Q3. What is a [word] made of? (how it feels literally or emotionally)
Q4. To what does a [word] belong? (category label)
Q5. Can you point to a [word]? (knowing the label by correct choice between two pictures or objects)

mothers as a way to improve deep word knowledge.

References

James, D. M., & Stojanovik, V. (2007). Communication skills in blind children: A preliminary investigation. *Child: Care Health and Development, 33*, 4–10.

Landau, B. (1983). Blind children's language is not "meaningless." In A. E. Mills (Ed.), *Language acquisition in the blind: Normal and deficient* (pp. 62–67). London: Croom Helm.

Linders, C. M. (1998). *Zweeftaal.* Huizen, Netherlands: Royal Visio.

Manolson, A. (1997). *It takes two to talk.* Toronto: The Hanen program.

Pérez-Pereira, M., & Conti-Ramsden, G. (1999). *Language development and social interaction in blind children*. Hove, UK: Psychology Press.

Schoonen, R., & Verhallen, M. (1998). Knowledge of words: Assessment of deep word knowledge. *Pedagogische Studiën, 75*, 153–168.

Tadić, V., Pring, L., & Dale, N. (2010). Are language and social communication intact in children with congenital visual impairment at school age? *Journal of Child Psychology and Psychiatry, 51*, 696–705.

Warren, D. H. (1994). *Blindness and children. An individual differences approach.* Cambridge, UK: Cambridge University Press.

Warren, D. H., & Hatton, D. D. (2002). Cognitive development in visually impaired children. In I. Rapin and S. Segalowitz (Eds.), *Elsevier's handbook of neuropsychology* (pp. 439–538). New York: Elsevier.

Wegener-Sleeswijk, B., & Van Ierland, M. S. (1989a). Form, content, and pragmatics in the language of blind and visually impaired children, Part 1, Overview. *Logopedie en Foniatrie, 61*, 56–60.

Wegener-Sleeswijk, B., & Van Ierland, M. S. (1989b). Form, content, and pragmatics in the language of blind and visually impaired children, Part 2, Further Analysis. *Logopedie en Foniatrie, 61*, 124–129.

Zink, I., & Lejaegere, M. (2002). *N-CDI lists communicative development, adaptation of and new norms for the MacArthur CDI*. Leuven, Belgium: Acco.

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