CONCEPT FORMATION IN STUDENTS WITH VISUAL IMPAIRMENTS: EVIDENCE FROM A FREE ASSOCIATION STUDY

[1]DANIELA DIMITROVA-RADOJICHIKJ*, [1]EMILIJA OGNENOVA

[1]Saints Cyril and Methodius University of Skopje, Institute for Special Education and Rehabilitation, Faculty of Philosophy, Skopje, North Macedonia

contact: daniela@fzf.ukim.edu.mk

Received: 09.03.2026.
Accepted: 25.05.2026.

ORIGINAL RESEARCH ARTICLE
UDK: 81'23-056.262-057.87
81'23:617.75-057.87
https://doi.org/10.31299/hrri.62.1.8

Abstract: *Concept formation in children with visual impairments develops under conditions of reduced visual access, often resulting in greater reliance on linguistic, auditory, and tactile sources of information. Understanding how these students construct meaning is important for the development of effective inclusive educational practices. The present study examined conceptual understanding and language associations in students with visual impairments, with particular attention to symbolic and sensory-based representations across different semantic domains. The sample included 31 students, aged 9 to 19 years, from North Macedonia. Participants completed a free association task involving 25 concepts grouped into four categories: colours, natural phenomena, living organisms, and physical processes. Responses were analysed using quantitative and qualitative approaches in order to identify dominant association patterns. The results indicate a strong tendency toward symbolic and descriptive associations. Natural phenomena frequently served as central reference points, whereas associations related to animals and direct experiential knowledge were less common. Participants generated an average of 0.99 associations per stimulus concept in the domain of living organisms and 0.89 associations in the domain of physical processes. Overall, the results suggest a predominance of linguistically-mediated conceptualisation, rather than direct experience-based conceptualisation. The study further indicates that students with visual impairments tend to construct conceptual knowledge primarily through language and multisensory experience. Although conceptual organisation abilities appeared more developed in older participants, difficulties remained more noticeable in abstract semantic domains. The results highlight the importance of structured multisensory instruction and enriched experiential learning in supporting concept development among students with visual impairments.*

Keywords: *semantic associations, free association task, conceptual development, multisensory processing, visual impairments*

INTRODUCTION

Language development and concept formation are closely interconnected processes that play a central role in children's cognitive development. In early childhood, children gradually learn to connect words with objects, actions, events, and abstract relations through continuous interaction with their environment. For typically developing children, visual input often provides an important pathway for building these connections. Everyday experiences such as observing objects, following another person's gaze, manipulating materials, and participating in shared attention can create rich opportunities for children to link language with meaning (Owens, 2019). Previous research has shown that visually guided mechanisms, including gaze following, joint attention, and object manipulation, support the alignment between linguistic input and the child's focus of attention, thereby reducing referential ambiguity during word learning (Tomasello, 2003; Brooks & Meltzoff, 2008; Yu & Smith, 2012). More recent evidence also indicates that visual attention and perceptual access contribute significantly to early word-learning processes (Campbell et al., 2024). Thus, vision does not merely provide sensory information, but also helps structure the experiential context in which words become meaningful.

For children with visual impairments (VI), however, language and conceptual development unfold under different experiential conditions. Reduced access to visual information may limit

opportunities for incidental learning, spontaneous exploration, and visually-mediated social interaction. Developmental mechanisms that are typically supported by vision, such as gaze following and visually-based joint attention, may therefore be less accessible or develop in different ways (Perez-Pereira & Conti-Ramsden, 1999; Iverson et al., 2000; Bigelow, 2003). Consequently, children with VI often rely more strongly on auditory and tactile information, direct bodily experience, and verbal explanation when constructing knowledge about the world. At the same time, VI is a highly heterogeneous condition involving considerable variation in visual functioning, cognitive abilities, developmental profiles, and educational needs (Holte et al., 2006). Some children with VI may also have additional disabilities, which can further influence their developmental pathways (Chen, 2001). This complexity is particularly important in educational and diagnostic contexts, where communication differences may sometimes be misinterpreted as signs of intellectual disability or autism spectrum disorder (ASD). Nevertheless, VI itself can shape developmental outcomes in meaningful ways (Eccles et al., 2015), making it essential to recognise its specific role in assessment, educational planning, and intervention (House & Davidson, 2000; James & Stojanovik, 2007).

Although delays in early vocabulary acquisition have been reported in some children with VI (Brambring, 2007; Fraiberg & Fraiberg, 1977), research also suggests that their overall lexical composition may be broadly comparable to that of sighted peers (Landau & Gleitman, 1985; Bigelow, 1986). These findings indicate that vision supports language development, but does not fully determine it. They also point to the flexibility of the language system, as well as to the capacity of children with VI to construct meaning through alternative sensory, linguistic, and social experiences. However, similarity in vocabulary size or lexical composition does not necessarily mean that conceptual knowledge is organised in the same way. Many concepts, particularly those related to colour, shape, space, natural phenomena, and physical processes, are commonly grounded in visual experience. For children with VI, access to these concepts may depend more strongly on tactile exploration, auditory information, verbal mediation, and structured educational support. Warren and Hatton (2002) emphasised that children with VI actively use their remaining sensory modalities to build knowledge about their surroundings, while Landau (1983) highlighted the importance of direct interaction with the environment for the development of conceptual understanding and word meaning. When opportunities for active exploration are reduced, the experiential basis that supports semantic development may also become more limited or differently organised.

This issue is closely related to the concept of "verbalism," originally introduced by Cutsforth (1932). Verbalism refers to the use of words or expressions without direct sensory experience of their referents. In the context of VI, this concept has often been discussed in relation to visually grounded terms, such as colour words, which may be used by individuals who have never directly experienced colour visually. Later work further distinguished different forms of verbalism according to their relationship with sensory experience (Harley, 1963). However, contemporary approaches no longer treat verbalism simply as evidence of deficient or empty language. Instead, recent research suggests that children with VI can develop meaningful semantic representations through linguistic, contextual, and multisensory input (Rosel et al., 2005; Eccles et al., 2015). This shift reflects a broader movement from deficit-oriented interpretations toward constructivist and interactionist perspectives on language development in VI. From this standpoint, language can support the development of abstract, flexible, and socially shared meanings, even when direct visual experience is absent (Millar, 1983; Nelson, 1985). Therefore, the language of children with VI should not be viewed as inherently deficient, but as an aspect that is shaped by different routes of access to experience.

At the same time, existing studies indicate that children with VI may encounter specific difficulties in certain semantic and pragmatic aspects of language (Tadić, Pring, & Dale, 2010). Limited

visual experience may influence how they acquire and organise concepts that are typically supported by visual observation, including concepts related to colour, shape, spatial relations, natural phenomena, and physical processes. In such cases, meanings may rely more heavily on verbal explanation, tactile experience, auditory information, and contextual learning. For example, Linders (1998) described a blind child who conceptualised a tree as being "in a big pot because it is big", illustrating how conceptual interpretations may develop differently when direct visual access is unavailable. Such examples should not be understood merely as incorrect responses. Rather, they show how children with VI may construct meaning through alternative experiential pathways. Although these meanings may be linguistically appropriate, their broader functional, contextual, or sensory grounding may sometimes require further educational support.

Despite the growing body of research on language development in children with VI, much of the existing literature has focused on general developmental trajectories or on specific linguistic domains, such as vocabulary and syntax. Less attention has been devoted to understanding how conceptual knowledge is organised across different semantic categories, particularly through methods that make students' spontaneous associations visible. This represents an important gap, as spontaneous associations can provide insight into how students connect concepts with sensory experience, descriptive knowledge, symbolic meanings, and everyday contexts. Accordingly, the present study is descriptive in nature and examines how students with VI organise conceptual meaning across four semantic domains: colours, natural phenomena, living organisms, and physical processes. The guiding research question was: What types of associations are most prominent across different semantic domains among students with VI? Using a free association task, the study explores dominant response patterns, including descriptive, symbolic, and experience-based associations, as well as differences between semantic categories. By focusing on students in North Macedonia, the study also contributes evidence from a relatively underexplored educational context.

METHODS

Sample

The study included 31 students attending the School for Children with Visual Impairments in Skopje, including 13 girls and 18 boys. Participants ranged in age from 9 to 19 years, with a mean age of 14.26 years (SD = 3.11). Participation was voluntary, and students were included based on availability during the data collection period. To reduce developmental variability within the sample, only students without identified cognitive or motor impairments were included. Participants were classified as blind or as having low vision based on ophthalmological documentation available in school records. In North Macedonia, visual impairment is categorised according to the *Rulebook on the Assessment of Vision and the Degree of Disability in Persons with Mental or Physical Developmental Disabilities* (2016). According to these criteria, low vision is defined as best-corrected visual acuity below 0.4 in the better eye, whereas blindness was defined as best-corrected visual acuity of 0.1 or lower, or visual acuity up to 0.25 combined with a visual field restricted to 20 degrees. However, these criteria are primarily clinically oriented and may not fully reflect functional vision in everyday or educational settings. Several limitations related to participant classification should be acknowledged. A considerable number of school records did not contain precise or standardised visual acuity measurements, and functional vision assessments are not routinely conducted within the national education system. For this reason, the classifications used in the present study should be interpreted cautiously and viewed as operational, rather than strictly clinical categories.

Based on the available documentation, 24 participants were classified as blind and 7 as having low vision. Nineteen participants had congenital visual impairments, whereas 12 had acquired impairments. Although the exclusion of students with additional cognitive or motor impairments reduced variability within the sample, it also limits the generalisability of the findings. Additional developmental conditions are relatively common among students with visual impairments and may

influence conceptual and language development in different ways. Parental consent and institutional approval were obtained prior to data collection, and all procedures were conducted in accordance with ethical standards for research involving minors.

Instrument

A free association test based on the methodology proposed by Jaworska-Biskup (2011) was used in this study. The instrument consisted of 25 stimulus concepts grouped into four semantic categories: colours (black, white, red, yellow, grey, blue, green), natural phenomena (rainbow, cloud, star, sky, sun, wind, leaf, dew, fog, storm), features of living organisms (blood, vein, wrinkles, skin, fur), and physical processes (dust, rust, mould). The selected concepts included visually dominant stimuli (e.g., colours, rainbow), non-visual phenomena (e.g., wind, storm), and concepts that may be experienced through multiple sensory channels (e.g., wrinkles, dust, skin, fur). For the purposes of the present study, the instrument was translated and culturally adapted from Polish into Macedonian. The method enables exploration of semantic organisation and spontaneous conceptual associations among participants.

Procedure

Participants were interviewed individually in a quiet setting, free from major distractions. Prior to data collection, standardised instructions for the free association task were provided. Participants were presented with 25 concepts across four semantic domains and they were asked to report all associations that came to mind for each concept. Responses were recorded in written form during the interviews and later transcribed for analysis. Interviews lasted approximately 15-30 minutes per participant. Clarification was requested when responses were unclear or required additional explanation. All data were anonymised prior to analysis, and no personally identifiable information was collected. The study was conducted with the approval of the school administration, and informed consent was obtained from parents or legal guardians. Participants were additionally informed about the purpose of the study and their right to withdraw at any stage of participation. As there is no formal centralised ethics review process for this type of research within the national context, the study was conducted in accordance with internationally recognised ethical standards for research involving human participants. Both authors participated in the data collection and coding process to ensure consistency in task administration and interpretation of responses.

RESULTS

1. Colour concepts

Colour concepts were first examined through participants' responses to seven colour stimuli. A total of 226 associations were generated for the following concepts - white (39), black (38), red (32), yellow (32), green (31), blue (28), and grey (26). Participants generated an average of 7.29 associations, suggesting that most were able to provide at least one association for each colour stimulus. Table 1 presents the responses in descending order of frequency.

Table 1. *Colour concepts*

Categories	Responses
Nature-related references	*Black*: clouds, night, darkness, earth; *White*: snow, light, sky; *Red*: blood, flowers, strawberries; *Yellow*: sun, leaves, lemons; *Gray*: fog, clouds; *Blue*: sky, sea; *Green*: grass, leaves.
Emotional associations and symbols	*Black*: sadness, poison; *White*: beauty, light; *Red*: love, patriotism.
Animals	*Black*: ants; *White*: cat; *Yellow*: chicks, giraffe.
Everyday objects	*Black*: television, sneakers, phone, marker; *White*: paper, wardrobe, table, wall, bedsheet, air conditioner, wedding dress, coat, medicine; *Gray*: metal, pole, Braille machine; *Blue*: chair; *Yellow*: car, doorknob; *Red*: board; *Green*: bus.

Nature-related references were the most frequent category of associations, accounting for 47.8% of responses (108 associations). Associations linked to everyday objects followed closely, representing 43.4% of responses (98 associations). Emotional and symbolic meanings accounted for 5.3% (12 associations), whereas animal-related

associations represented the smallest proportion of responses (3.5%, 8 associations). Thus, the majority of responses in this domain were concentrated in two categories: nature-related references and everyday objects.

2. Natural phenomena

In the domain of natural phenomena, participants generated a total of 281 associations across eight concepts: rainbow (46), star (39), leaf/leaves (37), cloud (35), storm (35), fog (33), wind (31), and dew (25). Participants produced an average of just over nine associations within this domain (9.06 associations per concept).

Table 2. *Natural phenomena*

Concept	Dominant associations
Rainbow	after rain; sun; colours
Cloud	sky; rain; water
Star	night; clear sky
Wind	cold; storm
Leaves	rustling; autumn
Dew	morning; drops
Fog	gloomy; not visible
Storm	heavy rain; thunder

Responses frequently centred on a relatively small number of shared descriptors. For example, rainbow was commonly associated with "after rain", "sun", and "colours", whereas leaves were often linked to "rustling". Although the original instrument included 10 concepts within this domain, two items (sun and sky) were excluded from further analysis because they elicited highly repetitive or self-referential responses with limited analytical variation. The analysis, therefore, focused on the eight concepts that generated more diverse and informative associations. In this domain, responses were mainly grouped around shared descriptors, temporal references, and sensory-related associations.

3. Living organisms

In the domain of living organisms, participants produced 154 associations across five concepts (blood, vein, wrinkles, skin, and fur). On average, each participant generated approximately five associations within this semantic domain (0.99 associations per concept).

Table 3. *Features of living organisms*

Categories	Responses
Symbols and concepts	Largest category (94 synonyms). Examples: *blood* - body, humanity; *vein* - hand/body parts; *wrinkles* - aging, stress; *skin* - coverings, human figure; *fur* - warmth, softness.
Nature-related references	35 synonyms. Examples: *blood* - injury, war; *fur* - warmth, links to animal context.
Animals	16 synonyms. Examples: *fur* - kittens, dogs; *blood* - lambs.
Everyday objects	9 synonyms. Examples: *fur* - clothing; *skin* - cotton/materials.

Most responses fell within the category of symbolic or abstract meanings. For example, blood was commonly associated with injury and bodily functions, whereas wrinkles were frequently linked to aging and stress. Associations related to animals, nature, and everyday objects were also identified, but they occurred less frequently. Thus, symbolic and abstract meanings represented the dominant response category in this domain.

4. Physical processes

The domain of physical processes elicited the fewest responses overall, with a total of 77 associations. On average, participants produced fewer than one association for each concept within this domain (0.89 associations per concept).

Table 4. *Physical processes*

Categories	Responses
Symbols and characteristics	51 synonyms. Examples: *Dust* - dirt, ground, itching, allergy, blowing; *Rust* - post-rain, strong smell, insufficient care, uncleanliness, odour; *Mold* - spoilage, sneezing, rotting.
Natural phenomena	20 synonyms. Examples: *Dust* - wind, storms; *Rust* - rain, post-rain.
Objects	6 synonyms. Examples: *Mold* – walls; *Rust* - iron.

Most associations described characteristic properties, such as dust - dirt, rust - uncleanliness, and mould - spoilage, while references to natural phenomena or objects appeared less frequently. In this domain, the responses were mainly grouped within the category of symbols and characteristics, with fewer associations related to natural phenomena and objects.

DISCUSSION

Vision represents one of the primary channels through which children acquire information about the surrounding world. In concept development, visual input often helps integrate multisensory experiences, such as touch, hearing, and smell, into coherent mental representations (Hollins, 2022). For children with VI, this process takes place under different experiential conditions. In the absence of vision as the dominant organising modality, learning may depend more strongly on explicit instruction, structured experiential activities, verbal mediation, and repeated multisensory engagement (Loftin, 2022). When opportunities for direct experience are limited, conceptual understanding may become uneven, with greater reliance on verbal descriptions or on isolated and highly noticeable characteristics.

The findings of the present study provide insight into how students with VI organise knowledge across different semantic domains. Participants appeared to draw on language-based knowledge, familiar environmental references, functional properties, auditory cues, and shared cultural descriptions when generating associations. This supports the view that conceptual development in students with VI should not be understood as simply reduced or deficient, but rather as organised through alternative sensory and linguistic pathways. From an educational perspective, this emphasises the importance of connecting verbal explanations with concrete, meaningful, and repeated sensory experiences.

Within the domain of colour concepts, associations related to nature and everyday objects were the most frequently reported. This finding is consistent with previous research showing that children with VI can acquire and use visually-based vocabulary through linguistic input and indirect experience (Landau & Gleitman, 1985). Emotional and animal-related associations appeared less frequently, which may suggest that some aspects of colour meaning are less detailed when they are not reinforced through direct or contextual experience. Research has also suggested that language contributes not only to learning associations about colours, but also to understanding the broader role and meaning of colour in objects and natural phenomena. In this respect, the present findings support the view that individuals with VI can develop coherent colour concepts through linguistic and social interaction, despite their limited visual experience (Kim et al., 2021). Educationally, this suggests that colour-related vocabulary should be linked to meaningful examples, object functions, cultural uses, emotional associations, and everyday contexts, rather than presented only through verbal definitions.

The findings related to natural phenomena further point to the importance of non-visual sensory experience in conceptual organisation. Associations such as “rustling” in relation to leaves illustrate the role that auditory cues may play in the understanding of natural concepts. At the same time, several concepts elicited a relatively narrow range of responses, which may reflect reliance on shared verbal knowledge and culturally familiar descriptions, rather than highly individualised experiential representations. This points to the value of providing students with VI more systematic opportunities to experience natural phenomena through touch, sound, temperature, movement, and guided observation. Such experiences may help connect verbal knowledge with richer sensory and contextual understanding.

In the domain of living organisms, participants frequently relied on symbolic and functional associations, rather than concrete experiential references. Concepts such as blood and wrinkles were commonly associated with injury, aging, stress, or bodily function. This pattern is consistent with previous observations indicating that limited opportunities for direct exploration may influence the development of biological concepts in children with VI (Warren & Hatton, 2002). These findings suggest that biological concepts may need to be

supported through tactile models, real-life examples, guided comparison, and careful explanation of bodily and biological processes. Such support can help students move beyond general verbal associations toward more elaborated functional and experiential understanding.

A similar tendency was observed in the domain of physical processes. Responses were mostly descriptive and functional, while the total number of associations was lower than that observed in the other semantic domains. This may indicate that more abstract or less directly observable processes are more difficult to elaborate when they are not strongly connected to everyday sensory experiences. Similar difficulties in abstract and spatially complex domains have been reported in earlier research involving children with VI (Tobin, 2008; Gottesman, 1973). Concepts such as dust, rust, and mould may, therefore, require explicit demonstration, safe tactile exploration where appropriate, comparison with familiar materials, and clear explanation of cause-and-effect relationships.

Taken together, the findings suggest that conceptual development in students with VI follows an adaptive pattern shaped by language, social interaction, and multisensory experience. Although participants generated associations across all semantic domains, the richness and type of responses varied depending on the level of abstraction and the availability of experiential information. The richest associative responses were observed in the domain of natural phenomena, whereas the fewest responses were generated in the domain of physical processes. These differences point to domain-specific variation in conceptual organisation. The results underline the need for systematic multisensory instruction, direct exploration, explicit verbal mediation, and the repeated linking of abstract concepts to concrete experiences. Such an approach may support more flexible and elaborated conceptual understanding among students with VI.

CONCLUSION

The present study contributes to our existing understanding of conceptual development and semantic organisation in students with visual impairments. Across semantic domains, participants demonstrated the ability to form coherent associations, although responses were more frequently based on verbal and descriptive knowledge, rather than on direct perceptual experience. The findings support previous research emphasising the importance of language and multisensory experience in conceptual development among individuals with visual impairments (Dokecki, 1966; Gleitman, 1989; Rosel et al., 2005). At the same time, differences between semantic domains were evident. More concrete and experientially accessible concepts elicited richer and more varied associations, whereas abstract domains generated fewer responses and relied more heavily on descriptive or generalised meanings. The richest associative responses were observed in the domain of natural phenomena, while the fewest responses were found in the domain of physical processes. These patterns suggest that conceptual development in students with visual impairments is adaptive, but uneven across domains, particularly when opportunities for direct sensory experience are limited.

The study also highlights the importance of carefully structured educational support for students with visual impairments. Opportunities for active exploration, explicit verbal explanation, and multisensory learning experiences may play an important role in strengthening conceptual understanding and semantic development. Providing richer opportunities for interaction with objects, natural phenomena, and everyday environments may support the development of more differentiated conceptual representations. Future research should examine larger and more diverse samples and incorporate more detailed assessments of functional vision and conceptual development.

LIMITATIONS

The present study has several limitations. The relatively small sample from a single specialised educational setting limits the generalisability of the findings. In addition, participant classification was based on available school documentation, rather than standardised functional vision assessments. Additionally, the free association method provides only a partial insight into conceptual organisation.

REFERENCES

Bigelow, A. (1986). The development of reaching in blind children. *British Journal of Developmental Psychology, 4*(4), 355–366. https://doi.org/10.1111/j.2044-835X.1986.tb01031.x

Bigelow, A. (2003). Development of joint attention in blind infants. *Development and Psychopathology, 15*, 259–275. https://doi.org/10.1017/S0954579403000142

Boldt, W. (1969). The development of scientific thinking in blind children and adolescents. *Education of Visually Handicapped, 1*(1), 5–8.

Brambring, M. (2007). Divergent development of verbal skills in children who are blind or sighted. *Journal of Visual Impairment & Blindness, 101*(12), 749–762. https://doi.org/10.1177/0145482X0710101205

Brooks, R., & Meltzoff, A. N. (2008). Infant gaze following and pointing predict accelerated vocabulary growth through two years of age: A longitudinal, growth curve modeling study. *Journal of Child Language, 35*(1), 207–220. https://doi.org/10.1017/S030500090700829X

Campbell, E., Casillas, R., & Bergelson, E. (2024). The role of vision in the acquisition of words: Vocabulary development in blind toddlers. *Developmental Science, 27*, Article e13475. https://doi.org/10.1111/desc.13475

Carvill, S. (2001). Sensory impairments, intellectual disability and psychiatry. *Journal of Intellectual Disability Research, 45*(6), 467–483. https://doi.org/10.1046/j.1365-2788.2001.00362.x

Chen, D. (2001). *Visual impairment in young children: A review of the literature with implications for working with families of diverse cultural and linguistic backgrounds* (Technical Report No. 7). Early Childhood Research Institute on Culturally and Linguistically Appropriate Services, University of Illinois at Urbana-Champaign.

Cutsforth, T. D. (1932). The unreality of words to the blind. *Teachers Forum, 4*(1), 86–89.

Davidson, P., & Harrison, G. (2000). The effectiveness of early intervention for children with visual impairments. In M. J. Guralnick (Ed.), *The effectiveness of early intervention* (pp. 483–495). Paul H. Brookes Publishing.

Dokecki, P. R. (1966). Verbalism and the blind: A critical review of the concept and the literature. *Exceptional Children, 32*(8), 525–530. https://doi.org/10.1177/001440296603200803

Eccles, R. M., Kritzinger, A., & van der Linde, J. (2015). Language and communication development in preschool children with visual impairment: A systematic review. *South African Journal of Communication Disorders, 62*(1). https://doi.org/10.4102/sajcd.v62i1.119

Fraiberg, S., & Fraiberg, L. (1977). *Insights from the blind: Comparative studies of blind and sighted infants*. Basic Books.

Gleitman, L. (1989). The structural sources of verb meaning. *Papers and Reports on Child Language Development, 28*(1), 1–48.

Gottesman, M. (1973). Conservation development in blind children. *Child Development, 44*(4), 824–827. https://doi.org/10.2307/1127731

Harley, R. K. (1963). *Verbalism among blind children: An investigation and analysis* (Research Series No. 10). American Foundation for the Blind. https://eric.ed.gov/?id=ED025067

Hollins, M. (2022). *Understanding blindness: An integrative approach*. Routledge.

Holte, L., Prickett, J. G., Van Dyke, D. C., Olson, R. J., Lubrica, P., Knutson, C. L., Knutson, J. F., & Brennan, S. (2006). Issues in the evaluation of infants and young children who are suspected of or who are deaf-blind. *Infants & Young Children, 19*(3), 213–227. https://doi.org/10.1097/00001163-200607000-00006

House, S. S., & Davidson, R. C. (2000). Speech-language pathologists and children with sensory impairments: Personnel preparation and service delivery survey. *Communication Disorders Quarterly, 21*(4), 224–236. https://doi.org/10.1177/152574010002100404

Iverson, J. M., Tencer, H. L., Lany, J., & Goldin-Meadow, S. (2000). The relation between gesture and speech in congenitally blind and sighted language learners. *Journal of Nonverbal Behavior, 24*(2), 105–130. https://doi.org/10.1023/A:1006605912965

James, D. M., & Stojanovik, V. (2007). Communication skills in blind children: A preliminary investigation. *Child: Care, Health and Development, 33*(1), 4–10. https://doi.org/10.1111/j.1365-2214.2006.00621.x

Jaworska-Biskup, K. (2011). The world without sight: A comparative study of concept understanding in Polish congenitally totally blind and sighted children. *Psychology of Language and Communication, 15*(1), 17–34. https://doi.org/10.2478/v10057-011-0002-4

Kim, J. S., Aheimer, B., Montané Manrara, V., & Bedny, M. (2021). Shared understanding of color among sighted and blind adults. *Proceedings of the National Academy of Sciences, 118*(39), Article e2021862118. https://doi.org/10.1073/pnas.2021862118

Landau, B. (1983). Blind children's language is not "meaningless." In A. Mills (Ed.), *Language acquisition in the blind child* (pp. 105–125). Croom Helm.

Landau, B., & Gleitman, L. R. (1985). *Language and experience: Evidence from the blind child*. Harvard University Press.

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

Loftin, M. (2022). *Making evaluations meaningful: Determining additional eligibilities and appropriate instructional strategies and visual impairment* (2nd ed.). Texas School for the Blind and Visually Impaired. https://www.tsbvi.edu/product/making-evaluations-meaningful

Millar, S. (1983). Language and active touch: Some aspects of reading and writing by blind children. In A. E. E. Mills (Ed.), *Language acquisition in the blind child: Normal and deficient* (pp. 167–186). Croom Helm.

Nelson, K. (1985). *Making sense: The acquisition of shared meaning*. Academic Press.

Owens, R. E. (2019). *Language development: An introduction* (10th ed.). Pearson.

Perez-Pereira, M., & Conti-Ramsden, G. (1999). *Language development and social interaction in blind children*. Psychology Press. https://doi.org/10.4324/9780203776087

Rosel, J., Caballer, A., Jara, P., & Oliver, J. (2005). Verbalism in the narrative language of children who are blind and sighted. *Journal of Visual Impairment & Blindness, 99*(7), 413–425. https://doi.org/10.1177/0145482X0509900704

Rulebook on the assessment of vision and the degree of disability in persons with mental or physical developmental disabilities. (2016). *Official Gazette of the Republic of Macedonia, 172*.

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*(6), 696–705. https://doi.org/10.1111/j.1469-7610.2009.02200.x

Tobin, M. (2008). Information: A new paradigm for research into our understanding of blindness? *British Journal of Visual Impairment, 26*(2), 119–127. https://doi.org/10.1177/0264619608089264

Tomasello, M. (2003). The key is social cognition. In D. Gentner & S. G. Medin (Eds.), *Language in mind: Advances in the study of language and thought* (pp. 47–57). MIT Press. https://doi.org/10.7551/mitpress/4117.003.0008

Warren, D. H., & Hatton, D. D. (2002). Cognitive development in visually impaired children. In I. Rapin & S. J. Segalowitz (Eds.), *Handbook of neuropsychology* (2nd ed., Vol. 8, Part II, pp. 439–458). Elsevier Science.

Yu, C., & Smith, L. B. (2012). Embodied attention and word learning by toddlers. *Cognition, 125*(2), 244–262. https://doi.org/10.1016/j.cognition.2012.06.016