The Impact of Congenital Deafblindness on the Struggle to Symbolism

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Most children who are congenitally deafblind are severely delayed in their communication development and many will not achieve symbolic understanding and expression. This article discusses developmental markers cited in the research literature as predictive of or facilitative of the development of symbolism. These markers include the growth toward more abstract representations, the rate of intentional communication, joint attention to objects and others, achievement of abstract play, consonantal and interactive vocalisations, distal gesture, varied early vocabulary and categories, use of varied cues for recall, object permanence, 1:1 correspondence, cause–effect, discrimination skills, and imitation. The impact of congenital deafblindness on the achievement of these milestones is presented, along with compensatory strategies to support the child’s development.

Keywords: Communication; Deafblindness; Gesture; Joint Attention; Play; Symbolism; Vocalisation

Introduction

Van Dijk (1967) described the acquisition of symbolic understanding as “the essential problem” of the pre-linguistic stage. Most children who are congenitally deafblind are severely delayed in communication development and many will not make the transition from intentional pre-symbolic communication to symbolic reference or language (Mar & Sall, 1994; Siegel-Causey & Downing, 1987; Stremel-Campbell & Matthews, 1988). The achievement of symbolism is significant because it is necessary to linguistic expression and it supports higher cognitive development. Language

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and cognition share a reciprocal relationship. Language is more than a form through which we express our thoughts—language accelerates thought (Scholnick, 2002).

Congenital deafblindness places severe limitations on the child’s access to communication and language. Many do not have sufficient vision or hearing to observe the uses of language shared between others or to use others as models who they might imitate. This makes such children more reliant on adults who possess a keen awareness of communication development and who can provide compensatory strategies to break down the barriers imposed by congenital deafblindness. A clear understanding of the sequence of communication development is critical because premature instruction at the symbolic level (or any level that does not correspond to the child’s readiness) is unlikely to benefit the child’s development (Rowland & Stremel-Campbell, 1987; Wilcox & Shannon, 1998).

The following sequence of development was proposed by Rowland and Schweigert:

- **Level I**: Preintentional behaviour
- **Level II**: Intentional behaviour
- **Level III**: Pre-symbolic, nonconventional communication
- **Level IV**: Pre-symbolic, conventional communication
- **Level V**: Concrete tangible symbols
- **Level VI**: Single, abstract symbols
- **Level VII**: Combinations of 2-3 abstract symbols. (2000, p. 71)

Children at Level I are pre-intentional, although adults may interpret their behaviours as intentional, which will facilitate the eventual development of intentional communication. Children functioning at Level II engage in intentional behaviour, but it is not communicative in nature. For example, the child might pick up a favourite toy without the intent to communicate to another. Intentional communication (Level III) can be distinguished from intentional behaviour (Level II) because the child now engages in communication for the purpose of impacting the behaviour of another. Children communicating at Level III are still pre-symbolic and their means of communication are often non-conventional and highly individualistic. For example, a child may vocalise the sound “ah” for the purpose of drawing others into his/her space. When Level IV is achieved the child expresses through conventional communication, such as the conventional gesture of waving. Level V, understanding and expressing through concrete tangible symbols, has been suggested by Rowland and Schweigert (2000) as a level that is unique to those that may fill the gap between conventional pre-symbolic communication and the emergence of symbolic expression (Level VI) for these children, including those with congenital deafblindness. Level VI is accomplished when the child uses single abstract symbols; and Level VII is achieved when the symbols are used in combination, and marks the beginning of linguistic understanding and expression. Learning the meaning of symbols is not enough to ensure that the child will share quality interactions. It is the child’s rich history of interactions at the pre-symbolic level that prepares the child to most fully use the symbols in interaction with others, to express thoughts, and to gain access to the thoughts of others. Even when symbolic expression is achieved, meaning continues
to be conveyed through body language, breathing patterns, and other previously used forms (Rowland & Schweigert; Rowland & Stremel-Campbell, 1987).

Levels of Representation

The achievement of symbolic expression is integrally tied to the child’s understanding of abstract representations. Park (1997) described three levels of representation: icon, index, and symbol. Icons share a strong physical resemblance with the object to be represented. Duplicate objects, photographs, and partial objects are examples of icons. Along the continuum from concrete to more abstract, index is the next level of abstraction. An index shares an association, but does not bear a clear resemblance to the object of reference. For example, car keys may become a representation for going for a car ride because the two are associated. In contrast, a symbol is the most arbitrary representation, bearing no physical resemblance to the referent and having a meaning that is commonly understood by others. A symbol is understood through its association with other symbols within the language system. Individuals with severe developmental delays have demonstrated the ability to learn all three levels of representation (Romski, Sevcik, & Pate, 1988).

Icons are learned because of the child’s ability to perceive some aspect of similarity with the object of reference (Golinkoff & Hirsh-Pasek, 2000). This similarity is usually visual, but it can be based on other sensory experiences of the object. Indices and symbols are learned because of some aspect of association, and that association is understood through repeated experiences (Golinkoff & Hirsh-Pasek). It is commonly believed that iconicity shared between the object of reference and the representation positively influences the learning of representations when the child already knows a receptive word for an object. However, Sevcik, Romski, and Wilkinson (1991) suggest that if the child has no receptive word for the object of reference, then the arbitrarity of the expressive representation may not be so important to learning the representation. They also suggest that long-term generalisability may be greater for more arbitrary representations, although there is a need for research evidence to support this speculation. Park (1997) proposed that we consider teaching not only icons, but indices as a bridge to the use of symbols.

Learners who communicate at the symbolic level can communicate about a referent that is not in the current physical or temporal environment (Rowland & Schweigert, 2000). Symbolic expression frees the child from being bound to communicating about the immediate context. The use of more abstract representations requires the learner to draw on memories of experiences and representations. The following sections describe developmental milestones that are often identified as being predictive or facilitative to the achievement of symbolic expression. It is important to note that these milestones are generally achieved in the context of experiences that are shared and scaffolded by caring adults. Many of the studies cited are of children with disabilities other than deafblindness. This is necessary to capture the many milestones that have been found to be important but not yet studied in children who are congenitally deafblind.
**Joint Attention to Others and Objects**

Joint attention is attention that is shared between two people. This is then extended to become joint attention on objects. The child must learn to sustain joint attention on objects, to differentiate objects, and to hold thoughts about the object before representations of the object will have meaning (Bloom, 1993; Pennington, Lloyd, & Wallis, 1991; Werner & Kaplan, 1988). The ability to establish joint attention on objects provides adults with opportunities to scaffold the child’s understanding of object features and functions. Symbolic representation can only be achieved when the child understands the object and also understands that it can be used to represent something else, what DeLoache, Miller, and Rosengen (1997, p. 308) call the “dual representation hypothesis”.

There is some evidence that children with disabilities may have lower rates of joint attention. McCathren (2000) found that children with Down syndrome demonstrated lower rates of joint attention than maturation-matched participants and that children with autism demonstrated rates of joint attention that were lower than the children with Down syndrome. Vision loss also has been reported to be an obstacle to the establishment of joint attention (Hobson, 1993; Preisler, 1995), although joint attention can be expressed through not only gaze shift, but shifting touch from object to person. When vision and/or hearing loss is severe, the child must accomplish sequentially what the hearing and sighted child may perform simultaneously through multiple senses (Rodbroe & Souriau, 1999). For example, the hearing and sighted child can maintain joint attention visually, receive clues about the affective state of the play partner visually and audibly, and explore tactually, all at the same time. The child who is deafblind may need to accomplish each of these tasks through one mode, tactile. The sequential use of one sense is far more demanding than the simultaneous use of multiple senses.

The child’s rate of joint attention is important because it impacts on the level and type of responses provided by adults. The child’s ability to sustain attention on objects and other people has an impact on how adults will respond. For example, Tamis-Lemonda and Borstein (1996) found that children with lower rates of attention had mothers who were more directive. In addition, McCathren, Yoder, and Warren (1999) found that the rate of joint attention was predictive of later expressive vocabulary in young children with intellectual disability. In addition, there is a positive correlation between length of time attending to objects and play competencies (Tamis-Lemonda & Borstein).

**Facilitating joint attention in children who are congenitally deafblind.** Children who are deafblind need adults who inform them of the presence of others. This creates one necessary condition for the establishment of joint attention. Some children will need to achieve joint attention without eye gaze, so physical proximity is of importance. Equally important is the need to be highly responsive and interpretative of the child’s attempts to draw adult attention. Children are most likely to sustain joint attention around objects of greatest interest to them (Anisfeld, 1984; Warren,
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1991), so adults should first establish joint attention on a variety of preferred objects. Stilson and Harding (1997) found that children increased their deliberate interactions with objects following observations of adult handling of the same objects. When scaffolding the child’s exploration of objects, adults will want to demonstrate how to experience the object through multiple senses. They can point out the visual, auditory, olfactory, and tactile features of the object according to the function of the child’s senses. Hand under hand exploration, as described by Miles (1998), is an effective way to share exploration of an object with a child who is deafblind and will be perceived as far less directive than hand over hand methods. In this method the adult’s hands remain under the child’s with the child’s hands slightly overlapping. With this technique, the child is free to leave and return to the adult’s hands for exploration. This is important so that the child can moderate his/her level of stimulation.

Representations in Play

While there are numerous schemas to describe the developmental sequence of play, they share the common notion that children develop from more concrete play to abstract play with the support of scaffolding. McCune proposed the following five-level play sequence:

- Level 1: Pre-symbolic play schemes
- Level 2: Self pretend
- Level 3: Other pretend
- Level 4: Combinatorial pretend

The child grows from deliberate handling of objects (Level 1) to pretending about things that actually happened in his/her life (Level 2). Level 3 play involves others and pretending to do what others have done. Eventually the child learns to incorporate more than one agent into a play scheme (e.g., feed bear, feed Dad) or more than one play scheme is enacted upon one agent (e.g., feed and rock doll). Level 5 is marked by play that includes pretending the agent can act independently and evidence of a play plan (McCune, 1995).

The child who engages in symbolic play is providing a clear picture of his/her representational abilities (Stilson & Harding, 1997). Vygotsky believed that the use of objects to represent other objects and people (known as substitution) was a reflection of the child’s capacity for abstract thought (cited in Smolucha & Smolucha, 1998). Such substitutions occur at Level 2 of McCune’s schema. McCune (1995) found significant correlation between the onset of pretend play and the expression of first words. Casby and Ruder (1983) and Wilcox and Shannon (1998) found that representational play was one predictive element of later language performance. Tamis-Lemonda and Borstein (1996) found that symbolic play was related to flexible language comprehension, while children with restricted language comprehension engaged only in non-symbolic play. Anisfeld (1984) found that looking for invisibly
placed objects (based on understanding object permanence), deferred imitation (requiring temporal distancing and holding an image in mind), and gestural representation in play were all critical to the development of symbolic play.

There is a growing body of research on the play development of children with disabilities. Mundy, Sigman, Kasari, and Yirmiya (1988) and McCathren (2000) concluded that symbolic play significantly correlated with language development in children with Down syndrome (and children with developmental delay). Yoshinaga-Itano, Snyder, and Day (1999) studied 170 children with congenital, bilateral hearing loss and found that the development of symbolic play was highly related to the development of symbolic gestures, the number of words understood, the number of phrases understood, and the number of words produced. It is interesting to note that these relationships were stable across children with various types and levels of hearing loss and various levels of cognition. Hughes (1998) found that children who were blind engaged in symbolic play, but less often than sighted peers, and that children who were deaf engaged in socio-dramatic play less often and were also less likely to use objects as symbols than hearing peers.

Facilitating the development of symbolic play in children who are congenitally deafblind.

Providing children with interesting playthings and time for independent play is not enough. Play assessment should be included as one area of evaluation for children who are congenitally deafblind. Adults can model behaviours, such as the use of objects and gestures in pretend play, turn-taking, pausing, and other social skills that support the sharing of language. Play intervention, coupled with language facilitation, can enhance the social and cognitive development of both children who are typically developing and those with developmental delays (Fowler, Ogston, Roberts-Fiati, & Swenson, 1997). Duplicate objects can be used in parallel play, with the adult modelling play on one of the objects while the child plays with the other object. Adults can provide modelling in forms that are accessible to the child to support development of more advanced play skills. For example, if the child currently only pretends about his/her own experiences, the adult might imitate the child’s experiences to demonstrate pretending about others. Siblings and peers can also be mentored to fulfil roles as play partners.

Vocalisations and Gestures

McCathren (2000) found that the frequency of interactive vocalisations was predictive of later expressive vocabulary for children with varied aetiologies who later expressed through verbalisation. McCathren, Warren, and Yoder (1996) concluded that the frequency of prelinguistic vocalisation, and specifically the frequency of expressed consonants, was predictive of later vocabulary development and the amount of speech produced. Wilcoxon and Shannon (1998) found that consonantal babbling facilitated speech while vowel babbling inhibited speech production. McLean, Synder-McLean, Brady, and Etter (1991) reported that higher rates of
Communicative acts involving word-like vocalisations paralleled the development of conventional gestures. Since vocal babbling is correlated with later verbalisations, babbling in gesture or sign is likely to be of equal importance for children who are deafblind.

There is a sizeable body of literature on the importance of gesture to language development (Wetherby, Reichle, & Pierce, 1998; Yoshinaga-Itano et al., 1999). Contact gesturers are limited to gesturing about something through touch, meaning that they are restricted to communicating in “near space”. In contrast, distal gesturers are able to gesture about things that are at a distance, and this is often accomplished by pointing. Visual awareness of objects and people in distant space motivates the child to point. It is also notable that adults are more likely to linguistically map (provide words for objects) when the child engages in pointing (McCathren et al., 1999). This phenomenon of increased adult responses may be due to the fact that distal pointing and first words emerge simultaneously in typically developing children (McLean, Brady, McLean, & Behrens, 1999). Thus, even though blindness delays the distal point, it may be worthwhile to teach (when sufficient vision exists for motivation) because it quantitatively and qualitatively alters the responses of adults.

**Facilitating vocalisation and/or gesture in children who are congenitally deafblind.** The first step to facilitate vocalisation is to maximise the child’s access to auditory input through appropriate augmentation. Adults may also want to create opportunities for the child to vocalise by reinforcing babbling, especially consonantal and interactive babbling. It is also important to determine whether the child is making specific vocalisations to express intents. This can be accomplished by determining the child’s use of forms to express particular messages and functions. For example, the child may consistently vocalise “ah” for the purpose of gaining attention. When functional analysis of the child’s intents is accurate, adults are more able to provide appropriate responses.

Gestures initially develop out of the child’s motoric experiences. Daelman, Nafstad, Rodbroe, Souriau, and Visser’s (2001) work on Bodily Emotional Traces of interaction experience (BETs) illustrates the connection between the gestures a child produces and the emotional salience of the child’s experiences. BETs are the memories of the body in motion and the associated emotional responses experienced by the child. Trusted adults can increase the number of opportunities for the child to develop BETs by being sensitive to what interests and excites the child, and then using this knowledge of the child to develop experiences. Vege (2004) describes the importance of creating shared experiences that are emotionally charged for the child because it is the affective side of the experience that will “trigger bodily and gestural expression” (p. 6). The emotional emphasis and excitement that is modulated by the adult is attached to what the child is most attentive to within the experience. The gestures that emerge in these experiences are more likely to hold meaning for the child and thus will more probably be recalled and reproduced. Later, the adult can
use the gestures that occurred during such experiences, demonstrating that a memory of the experience and a common representational gesture is shared.

While pointing is often regarded as a distal gesture, pointing can also be used in near space and may involve touching something with the index finger, known as a contact point. One of the primary purposes of pointing is to draw the attention of another so that joint attention can be established. This same purpose can be achieved in near space when adults engage with the child in mutual tactual exploration. As the child explores, the adult may join in, placing hands to the side of the child’s hands or offering to co-actively explore through hand under hand exploration. While adults often create opportunities for the child to join them in tactual exploration, this approach requires that the adult be responsive to the child’s interest and join the child without assuming control in much the same way adults respond to distal pointing. By repeatedly joining the child, the adult helps the child to understand that he/she is able initiate the topic of joint attention with others.

Some children will more readily develop gestures and may create “home signs” that are gestures of their own invention. It is important that adults use the child’s gestures and invented signs instead of immediately shaping them into conventional signs. The invention of home signs may be a learner strength that could relate to both level of intention and rate of communication. Again, responsiveness to the child’s communicative attempts will ensure that babbling across forms (vocalisation, gesture or emerging sign) is recognised as legitimate intentional communication.

First Words and Categories

First words (expressed in multiple forms) often occur in the context of action-evoked social games, such as “Pat a Cake” and “Peekaboo”. The repetition of these active games is important to learning representations that will occur when the child has developed “word-image representations” (Bloom, 1993, p. 83).

Early word acquisition is supported by repetition of experiences with objects in the same contexts. Young children develop an impression of an object’s key features through the sense of vision, but the role of touch and object manipulation is critical to understanding the object and will support its subsequent classification. The child’s actions performed on objects are fused with the object’s name and provide the basis for the development of categories (Werner & Kaplan, 1964). In fact, early words are often action words. The notion of activity is so important to word learning that Bruner (1990) asserted that communicating while performing actions was more important than being exposed to the language stream.

Understanding that objects have names is accomplished through what Werner and Kaplan (1964) called “contexts of action” (p. 119). The classic story of Helen Keller at the water pump can be used to illustrate this concept. Helen’s teacher, Anne Sullivan, repeatedly provided the label for water and Helen repeatedly touched the water and imitated spelling, but without representational understanding. Then her teacher took her to the water pump and allowed the water to flow over one of Helen’s hands while fingerspelling into her other hand. Helen later wrote, “I knew
then that w-a-t-e-r meant the wonderful cool something that was flowing over my hand. That living word awakened my soul, gave it light, hope, joy, set it free!” (Keller, 2003, pp. 27–28). This scene drives home the point that repeated labelling combined with tactile input is not enough to ensure conceptual understanding, even though repetitions may support the child to imitate a label. Helen was able to cite this singular context of action as being critical to her making the leap to understanding names and symbols. Her first recollection of learning a name for an abstraction was the word “think”, which was also learned in a context of action. Helen was struggling to imitate a pattern of beads. Observing this struggle, her teacher provided a label at precisely the time that Helen was thinking deeply (Keller), demonstrating that contexts of action have relevance to the learning of words to represent both concrete and abstract concepts.

Retention of early words is maintained by the repetition of experiences for which the child has learned a name (Wetherby et al., 1998). The lack of repetition of some experiences may well explain why words come and go for very young children. So, with early words, it is the experience itself that triggers the memory and results in the child’s ability to reproduce the words. Eventually, after the child has developed a repertoire of representations, the word itself will become a cue to the child’s recall of the experience.

Memories of first exemplars of a category are retrieved when another potential exemplar is compared (Hayne, 1996). New objects are related to previous experiences based on overall physical features, as well as function and context similarities. There is some research evidence, according to Hayne, that both functional similarity and context similarity are more powerful determinants of categorical membership than physical similarities (Hayne). These early categories, sometimes called proto-categories, do not necessarily share the meaning that is commonly known to adults. Early names are often for classes of objects that incorporate the same movement or key characteristics, such as the word “ball” for all round things or all thing that are thrown.

Facilitating first words and categories in children who are congenitally deafblind. Learning to name an object and identifying new objects that are similar or dissimilar will be impacted by the perception of the first exemplar. Extensive joint exploration of objects and the provision of multiple exemplars will support the child to identify similar key features in new objects. This may be provided through the child’s use of functional vision or through the tactile sense. Bloom (1990) found that touch was more helpful to the formation of classification than hearing. It is important to provide repetitive experiences with objects so that the child can more fully understand the features of the object to support categorisation. It is important to remember that sighted children learn about the world through a whole to parts process, children who are blind or with low vision learn through the parts to whole approach whether they are using remaining vision or touch or both (Bruce, 2005). This means that they will miss information that can be seen and not felt. It also means that they will have to
work harder to make a realistic whole from the parts they experience. What is defined as a salient feature through the sense of vision may not be what is perceived and defined as salient by the child using primarily another sense to gain understanding of objects. This is why exploring through multiple senses is so important to children who are deafblind. Simply put, understanding an object through multiple sensory input allows the child to have more points of comparisons when considering other possible exemplars for membership in the same category. Children who are congenitally deafblind will need support to identify key physical features, functional uses of objects, and similar contextual characteristics to support categorisation.

Wetherby et al. (1998) discussed three principles of early word acquisition. Each of these principles holds implications for adult intervention. First, the principle of relevance states that children learn words that represent what they have in mind. This speaks to the importance of noting the child’s interest and providing words (that can be represented through icons, indices, or symbols) for those objects and experiences. Adamson (1995) found that providing names for objects of the child’s interest correlated with higher levels of vocabulary. Children are more likely to learn the names of objects that are intentionally labelled rather than to pick up the label from the speech stream (Golinkoff & Hirsh-Pasek, 2000). This concept may be applied to the sign language stream. Early labels, provided by the parents, support the child’s formation of categories (Hayne, 1996). Adults may also incorporate the use of the child’s “proto-categories” in their speech, thus supporting connections between potential new vocabulary and existing categories. For example, one proto-category could be “food.” Adults might use the word “food” when the child is eating, making such comments as “Mmm, this is good food.” New vocabulary could be emphasised, such as naming an exemplar of food by pointing out a favourite food—as in “Mmm, crackers are a favourite food.” The use of categorical words should be intermingled with the use of exemplar names to support the child to identify categorical membership.

The principle of relevance continues to be of importance in later literacy development. Sylvia Ashton-Warner (1963) applied this same principle when introducing first words in reading instruction to Maori children. She found that her students most readily learned the words they were most interested in learning to read, calling these words the key vocabulary. The learning of words, in sign, speech, print, or braille, must emerge from the child’s interest. “First words must have an intense meaning for a child. They must be part of his being” (Ashton-Warner, p. 33).

Second, the principle of elaboration (Wetherby et al., 1998) states that as the child’s ability to mentally represent expands, there is a greater need for words to express these ideas. So, adult provision of words must accelerate as the child’s ability to mentally represent grows.

Third, the principle of response efficiency (Wetherby et al., 1998) states that children will select a symbol and means of expression that is most efficient. Therefore, it is important to identify the form(s) of expressive communication that are most efficient for the child. The reader is encouraged to review the following references for further information on the selection of forms for children who are deafblind: Miles

_RATE AND LEVEL OF INTENTIONAL COMMUNICATION_

The rate of intentional communication may have predictive value for the transition to initial symbolic communication. Wetherby, Yonclas, and Bryan (1989) found that rates of intentional communication acts approached 1.0 acts per minute as children made this transition. Wilcox and Shannon (1998) looked at rate as one of several dependent measures, and found a “consistent trend with rate of intentional communication and rate of word use. A mean rate of at least 9.0 intentional communication acts per 10 minute unit was observed in the measurement point immediately prior to onset of words” (p. 394). McCathren et al.’s (1999) study of 58 toddlers with intellectual disability also found that the rate of communication was a statistically significant predictor of later expressive vocabulary. While rate may be of predictive value, McLean et al. (1999) cautioned that intentional communication should not be regarded as the sole predictor of symbolic expression as many individuals with intellectual disability communicate at rates of about 1 intentional act per minute, yet do not communicate symbolically. The accessibility and availability of appropriately skilled communication partners often limits the rate of communication expressed by children who are congenitally deafblind.

A child who initiates communication for the purpose of having an impact on another person is intentional, but this says little about the child’s ability to adjust to the responses, or lack of responses, from others. The child’s willingness to repeat (as a measure of persistence) may be an indicator of a higher level of intention. The child’s use of repair strategies may reflect an even higher level of intention than repetition alone. The use of repair strategies occurs when the child comprehends that his/her message was misunderstood and moves beyond mere repetition to making variations on the expression to clarify the message. This is yet another form of persistence and may be an important marker of higher quality intentional acts (Iacono, Carter, & Hook, 1998). The ability to adjust the intended message or the form in which it is expressed allows the child to repair communication breakdowns, which supports increased responsivity from others (Prizant & Wetherby, 1990).

**Facilitating higher rates of intentional communication in children who are congenitally deafblind.** Intervention researchers have been successful in increasing the rate of communication expressed by children. McCathren et al. (1999) found that the rate of communication could be increased in children with developmental delays. Frequent rates of communication provide adults with a greater number of opportunities to be responsive and to linguistically map to the child’s level of communication, which is thought to promote language development (McCathren et al.). Therefore, it makes a great deal of sense to recognise the importance of responsiveness as a motivator and as a reinforcement of intentional communication. Adults will
want to encourage children to repeat messages that are not immediately understood. This encouragement can be expressed in a variety of ways, including verbalisation of "tell me again" for the child with sufficient hearing or by maintaining physical contact with the child who is expressing through body language. The adult may develop a contact gesture to indicate encouragement while listening. Teaching repair strategies to children who are congenitally deafblind may include such techniques as giving a choice of objects when the child’s choice is unclear or facilitating the child to point to a choice.

Number of, and Complexity of, Intents of Communication

Ogletree, Fischer, and Turowksi (1996) noted that children exhibiting conventional communication were able to communicate for a variety of intents (purposes). Stephenson and Linfoot (1996) found that distal gesturers exhibited a greater variety of intents than contact gesturers. They suggested that certain communication intents may be necessary to achieve as a prerequisite to symbolic understanding. The following intents have been cited as occurring early in the communicative development of young children: protesting, calling for attention, greeting, showing objects, giving objects, answering, labelling, requesting objects, requesting actions (including more), answering, commenting on objects, commenting on actions, and requesting information (Carpenter, Mastergeorge, & Coggins, 1983; Cirrin & Rowland, 1985; Dore, 1974; Stremel-Campbell & Matthews, 1988; Stremel & Schutz, 1995; Watson & Snow, 1978).

There is evidence that children with severe disabilities are restricted in their expressive intents (Stremel-Campbell & Matthews, 1988). There is also evidence that disability impacts the sequence that children learn the early intents. Nicholas, Geers, and Kozak (1994) found that the acquisition of most early intents for children who are deaf were similar to that of hearing children, but answering and requesting information were delayed by 12 months. Wetherby and Prutting (1984) and Wetherby (1986) reported a different acquisition order for children with autism with intents connected to interest in others, such as greeting, being delayed. It is entirely possible that there is a unique developmental pattern for children who are congenitally deafblind, although it would be difficult to study given the diverse characteristics (vision, hearing, motor) of the population.

Facilitating the acquisition of early functions in children who are congenitally deafblind.

The first step in supporting children who are congenitally deafblind to develop a repertoire of communicative intents is to recognise the impact of deafblindness on accessibility. For example, the ability to greet is dependent on knowing that another potential communication partner is present. Children who are congenitally deafblind need to be provided with models of the early functions (in a form that is accessible to them), and they also need adults who can create opportunities for them to rehearse the early functions. For example, adults may want to create situations that would
normally elicit a protest from the child to provide an opportunity to shape appropriate protest. They may also leave something out of a well-known routine to create an opportunity for request. Adults should also monitor their own use of functions. If adults communicate primarily through questions and directives, they are creating very limited opportunities for children to express a variety of functions. Access to peers must also be considered because the functions that are naturally expressed by adults may not be a good match for the functions young children need to have modelled.

Recognising and Responding to Varied Cues for Recall

Hollich, Hirsh-Pasek, and Golinkoff (2000) described attention, social, and linguistic cues for recall. Attentional cues include perceptual salience (cues related to physical features), temporal contiguity (cues provided by time), and novelty, although little research has been done on perceptual salience and temporal contiguity. Social cues include eye gaze, pointing, and later recognition of speaker intent. The ability to follow eye gaze supports the child to understand that adults differentiate their attention. Linguistic cues are hints provided by the language itself. Children must learn which words to attend to in the voice or sign language stream. Cross-cultural studies tell us that hearing children notice stress patterns and that they attend to the prosody of their own language.

Initially, children recognise cues for recall that bare a striking similarity to their initial experience with a named object (Bloom, 1993). The child’s ability to make use of a range of cues is inextricably connected to his/her knowledge of objects and ability to connect memories of experiences with current perceptual information (Bloom). Children with a child-oriented point of reference are dependent on adults to repeatedly label an object that is already the focus of their attention. Children with a more mature reference are able to understand the adult or other’s point of view and thus make use of cues provided by adults (Hollich et al., 2000, p. 28).

Facilitating children who are congenitally deafblind to use varied cues of recall. Whereas Hollich et al. (2000) suggest that the child must learn to recognise cues for words, adults can become more effective communication facilitators by watching for cues that are particularly meaningful to the child. Exploration of objects and environments through multiple senses, coupled with adult support to identify key features and functions, will support the child to establish a greater number of relevant attentional cues. When interacting with the child, sufficient time must be allowed to provide the child with an opportunity to learn about the play partner’s affective responses. For the child without functional vision or hearing this will mean guiding the child’s hand, using the hand under hand technique to feel the facial expressions associated with different emotions. The child may also note different breathing patterns associated with emotional states. These strategies help the child to learn about the psychological states of others, which will support the child’s ability to use
social cues. Linguistic cues are provided by the form of communication, such as cues that come from speech (Hollich et al.) or sign language. Signs that are more iconic may be more easily learned by children who can perceive the visual or motor similarities between the sign and the referent. Adults may place more emphasis on words they are teaching to the child. The use of pause just prior to and after a word of emphasis may also be important.

Cognitive Milestones

There has been a significant amount of research on cognitive milestones that are important to the emergence of symbolic expression and language (Bloom, 1990). Object permanence, cause–effect, 1:1 correspondence, matching/sorting, imitation, and the achievement of symbolic play are often cited as being important to either early word use or the first vocabulary spurt, a period of rapid vocabulary growth in young children.

Moore, Borton, and Darby (1978) considered object permanence as a strong prerequisite for symbolic expression. Children first understand that an object still exists when they see it moved or partially concealed. Then they learn that the object still exists when they witness its full concealment. Only later will they understand that the object still exists at another time or in another place or when its concealment was not witnessed. Therefore, the achievement of object permanence is a process and that process is greatly facilitated by vision.

There are also levels of understanding associated with cause–effect, also referred to as means-end or tool-use. At the most simplistic level the child understands that something he/she does impacts an object or another person. Causality extends to complex problem-solving, which is accomplished when the child is able to represent internally (Yoshinaga-Itano et al., 1999). Vision and hearing support understanding causality; therefore, it is more difficult for children with deafblindness to achieve (Siegel-Causey & Downing, 1987).

Rowland and Stremel-Campbell (1987) cited 1:1 correspondence as being necessary to the use of symbols. Rowland and Schweigert (2000) found that many learners with severe disabilities are not able to achieve 1:1 correspondence between an abstract symbol and its referent. They suggest that this may be due to limited memory and representational abilities.

Matching and sorting tasks allow the child an opportunity to practice skills of discriminating physical features. Such discrimination is necessary to the use of any pictographic system (Bloom, 1990). Discrimination skills are also important to the process of categorisation, which is critical to both the learning of language and to cognitive development.

The imitation of vocalisations and gestures has been found to have a strong relationship to language development (Yoshinaga-Itano et al., 1999). Children who are blind are more likely to engage in vocal imitations than other types of imitations (Urwin, 1978). Between 15 and 24 months old, typically developing children are able to defer imitations, indicating that they are storing the observation (Anisfeld, 1984).
McClean and Snyder-McLean (1991) studied 16 students with intellectual disability (and normal sensory functioning) and found that the children did not represent symbolically even though they had achieved means-end and object permanence. The missing cognitive achievement seemed to be verbal and motor imitation and the function of naming. Prompted imitation alone is not enough to support language development (Warren, 1991). Kahn (1984) divided 24 children with profound disabilities into three groups. The first group had speech training combined with instruction on object permanence, with 62% of these children learning words. The second group had speech training combined with means-end instruction, with 75% of the children producing words. The third group had only speech training, and none of these children learned to produce words during the study. This study speaks to the importance of direct instruction of early cognitive milestones.

**Facilitating the development of early cognitive milestones in children who are congenitally deafblind.** The child who is congenitally deafblind can be supported to achieve object permanence through the tactile mode. Partial and full concealment can be accessed tactually. In addition, the child’s home environment should provide predictable locations for his/her belongings, so that the child can learn that objects remain in the same place. Cause–effect must be demonstrated for the child. If–then statements can be verbalised for the child with sufficient hearing and signed for others. The child must be allowed to initiate problem-solving when appropriate. Examples might include getting a favourite toy out from under the sofa or getting an adult to flip over a riding toy that is too heavy for the child to lift. Perhaps most important is that adults imagine all the different examples of cause–effect, tool-use and means-end behaviours and not restrict the child to learning about primarily one type, such as use of switches. Matching and sorting tasks can be easily adapted to be both functional and age appropriate. Such tasks address both 1:1 correspondence and discrimination skills that enhance the development of language. Imitation can be initially taught in the context of gross and fine motor activities, such as jumping, clapping, or hand tapping. For some children, these imitations and turn-taking experiences can be refined to hand shapes in preparation for more formal sign language experience. Adults may want to first imitate the child and then encourage the child to imitate them. The learning rate can be enhanced as the child more readily imitates adults. With today’s emphasis on the general education curriculum, it is critical that we not lose sight of the importance of early cognitive milestones. Stremel-Campbell and Matthews (1988) suggested that direct instruction of these milestones, with ample provision for repetition, will enhance the child’s performance.

**Need for Future Study**

Since no single developmental marker has been shown to be of primary importance to the communication development of all typical learners, it is equally unlikely that
any single marker will rise to the top as the strongest indicator of later performance for learners who are deafblind. McLean and Snyder-McLean (1991) called for intervention studies that yield detailed descriptions of the communicative behaviour of children with severe disabilities. Detailed accounts, such as those contributed to the field of blindness by Selma Fraiberg (1977), can enlighten our understanding of how symbolic understanding and expression is achieved by children who are congenitally deafblind. Wilcox and Shannon (1998) suggest that the development of profiles of readiness that include multiple predictors of linguistic performance might be most useful to our intervention efforts. Translating these profiles into intervention plans that are meaningful to teachers and parents is of the utmost importance.

References


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