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Blind children's language: resolving some differences*

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ABSTRACT

Although the role of visual perception is central to many theories of language development, researchers have disagreed sharply on the effects of blindness on the acquisition process: some claim major differences between blind and sighted children; others find great similarities. With audio-and video-recorded longitudinal data from six children (with varying degrees of vision) aged 0;9–3;4, we show that there ARE basic differences in early language, which appear to reflect differences in cognitive development. We focus here on early lexical acquisition and on verbal role-play, demonstrating how previous analyses have failed to observe aspects of the blind child's language system because language was considered out of the context of use. While a comparison of early vocabularies does suggest surface similarities, we found that when sighted peers are actively forming hypotheses about word meanings, totally blind children are acquiring largely unanalysed 'labels'. They are slow to extend words and rarely overextended any. Similarly, although verbal role-play appears early, attempts to incorporate this kind of language into conversations with others reveal clear problems with reversibility – specifically, the ability to understand the role of shifting perspectives in determining word meaning. Examination of language in context suggests that blind children have difficulties in just those areas of language acquisition where visual information can provide input about the world and be a stimulus for forming hypotheses about pertinent aspects of the linguistic system.

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INTRODUCTION

Vision plays an important role in theories of cognitive development and language acquisition. Research on the nature of input language describes the 'here and now' quality of language addressed to children as a potential aid to acquisition, in that it allows the child to make full use of contextual (i.e. visual) clues to decipher meaning (Macnamara 1972, Phillips 1973, Snow, Arlman-Rupp, Hassing, Jobse, Joosten & Vorster 1976, Snow & Ferguson 1977).[1] Clark & Clark (1977: 322), for instance, stated that the 'here and now' usually includes 'whatever is directly under the child's eyes'. One major issue in semantic acquisition involves the importance of perception (in particular, visual perception) in children's first hypotheses about categories and early word meanings (Andersen 1975, 1978, Bowerman 1976, 1978, Clark 1973, Nelson 1973*a*, Rescorla 1980) and in their strategies for commenting and referring (Atkinson 1979, Greenfield & Smith 1976). And finally, work on child discourse has suggested that gesture and gaze/eye contact, particularly as they contribute to turn-taking interaction, may be central not only in learning to recognize language as communicative, but also in learning to produce more complex propositions with both given and new information (Bates 1976, Bates, Benigni, Bretherton, Camaioni & Volterra 1979, Bruner 1975, Scollon 1979, Ochs, Schieffelin & Platt 1979).

Taken together, these theories of acquisition suggest that children who are born blind should face an extremely difficult task. Yet children with severe visual impairments usually do learn to talk. Surprisingly, this population has received little attention from developmental psycholinguists.

The small amount of research that has considered the language development of blind children has been mainly limited to assessing when these children attain the 'milestones' established for sighted children, using, for example, the Bayley Scales of Infant Development. Some of these 'milestones' tend to be reached within the upper limits of the 'normal' range for sighted children, or only slightly later, while others are actually attained earlier (e.g. 'jabber expressively') (Fraiberg 1977). However, there has been little investigation of how this is done or of any aspects of communication not assessable with the child development scales. In the few studies that do exist, researchers have disagreed sharply as to the effects of blindness on language acquisition (see Warren (1977) for a review). Some earlier studies of blind children found consistent delays (e.g. Burlingham 1961) or use of 'meaningless) language (Cutsforth 1932), while more recent ones have found 'close parallels' between blind and sighted children (Urwin 1978*a*, 1979) or even claimed that blind and sighted children at the same linguistic level talk about

[1] For a discussion of differences in the 'here and now' quality of input to blind and sighted children, see Andersen & Kekelis (1982).

things in the same way (Gleitman 1981, Landau 1982, 1983). Indeed, in the Piaget–Chomsky debates (cf. Piattelli-Palmarini 1980), Chomsky suggests that blind children's language is, if anything, advanced:

> There have been numerous studies on the rate of acquisition of language in blind children, who have, if not one hundred percent reduction, at least a significant reduction in their capacity to develop constructions of sensorimotor intelligence, especially those constructions that involve the visual world. Yet in this case it appears that blind children acquire language more rapidly than sighted children, which isn't so surprising in certain respects because they are more dependent on it. In any event, there is no linguistic impairment in such cases (from Piatelli-Palmarini 1980, p. 171).

Our review of the literature has not uncovered studies reporting more rapid acquisition of language by blind children. Thus, it seems that it is yet to be established how alike or different the course of development is for those aspects of language focused on by Chomsky. The data to be reported here, however, strongly suggest that 'rapid' acquisition is certainly NOT the case if one maintains a broader notion of language, including both semantic and pragmatic factors.

The purpose of this paper is to show (1) that while many earlier studies may have underestimated blind children's ability, at least in the early stages there are some basic differences between blind and sighted children's language that appear to reflect differences in cognitive development due to the absence of visual input, and (2) that the lack of consensus in the literature results in large part from methodological problems of both data collection and data analysis. To support our argument, we will present data from a longitudinal study of six full-term children with varying degrees of vision: two who are totally congenitally blind, two with minimal residual vision (capable at times of visually directed reaching), and two who are fully sighted. The children were audio- and video-recorded monthly in their homes over a three-year period, when they ranged from nine months to four years. These naturalistic data were supplemented by diaries of productive vocabulary development kept by the parents (following the general format in studies such as Nelson 1973*a*, Rescorla 1980), as well as by 'individualized experiments' (Greenfield & Zukow 1978) and a variety of developmental assessments administered by the experimenters. The assessments included the Reynell–Zinkin Mental Development Scales: Developmental Scales for Young Visually Handicapped Children (1979) and the Maxfield–Buchholz Social Maturity Scale for Blind Preschool Children (1957). To highlight some ways in which previous analyses failed to reveal potentially important differences between blind and sighted children, we will focus in this paper on two aspects of early language that have recently been proposed as illustrating successful development: lexical acquisition and verbal role play. Before presenting the

data, however, we will first comment on some more general problems that have contributed to much of the confusion in this literature.

Problems in data collection

Most obvious, perhaps, of the numerous methodological problems involved in investigating this topic are those related to the population. Because blind children constitute a very small percentage of the general population (fewer than 7,000 children under age 5 in the entire United States as of 1978 – according to the research council of the National Society to Prevent Blindness) and because there is no central agency in the United States that registers them, it is difficult to locate legally blind preschool children. Most researchers have therefore accepted whatever children were available and typically studied heterogeneous groups. One serious source of heterogeneity is the degree of blindness involved. The legal definition of blindness requires that visual acuity in the better eye with correction be no more than 20/200 Snellen, an amount of vision which is very different from the common conception of blindness as the total absence of visual information.[2] Even among those considered totally congenitally blind, there can be significant variation in light and shadow perception that may lead to differences in sensory-motor understanding, verbal comprehension, and expressive language (Reynell 1979). Yet in most of the research reported, the visual acuity of the subjects is rarely specified, which makes it difficult to interpret the findings.[3]

A second type of heterogeneity is the presence of confounding handicaps among the children. After hereditary etiologies, the most common cause of congenital blindness is infectious disease, especially maternal rubella: the majority of these blind children is likely to be multiply handicapped, with some kind of confounding neurological or physiological problem in addition to blindness. Again, the exact nature of such populations is often not provided in reports of early development in blind children.[4] In studies where the researchers are careful to include only blind subjects who are otherwise intact, it is sometimes the case (as in Norris, Spaulding & Brodie 1957) that a large proportion of the children had retrolental fibroplasia, a type of blindness often resulting from excessive oxygen in an incubator. In these cases the role of prematurity must be considered, since the largest use of the incubator is to aid premature babies.

Before we begin to assess the effects of visual impairment on language acquisition, it is essential first to isolate this 'deficit' from other potential

[2] Note that the legal definition also includes acuity greater than 20/200 Snellen IF the field of vision is no greater than 20 degrees in its widest diameter.

[3] Indeed, among the subjects in this study, those with minimal residual vision often pattern more like their sighted than their blind peers.

[4] In one study which did describe a multiply handicapped sample, there was a higher incidence of speech deviations than in sighted and blind groups (Miner 1973).

sources of developmental differences, and either to have some certainty that the visual deficit is uniform across subjects or to examine the effects of differences in acuity rather than overlook them by grouping all the children's data together (Warren 1978). Variation both within and across study populations may thus account for a great deal of the disagreement in the literature.

A second substantial source of disagreement has been the varied nature of the data base from which conclusions are drawn. Few of the investigators in these studies have been linguists (they have usually been clinicians or educators), and most have come to their research with limited understanding of the intricacies of the language acquisition process in general. As a result, much of the data on language that has been collected is of such limited scope that it allows little insight into the child's developing system. As we have mentioned, the most common procedure has been the observation of age of attainment of certain milestones on standard child development scales. These document only the broadest and most superficial language achievements of very young children – noting, for example, when they first imitate words, modulate pitch, or combine two or three words (Fraiberg 1977).

For somewhat older children (3–6 years), there are some data on the frequency of questions, commands, proper names, and pronouns, but little information on the nature and use of such forms (e.g. Maxfield 1936). Data of this kind, usually contained only in written notes of the researcher, provide little basis for describing the actual language use of these children or for exploring potential differences between blind and sighted populations.

Differences in data analysis

Two recent studies – Landau (1982) and Urwin (1978*a*) – avoided many of the methodological problems involved in the earlier studies (although some of Landau's subjects were premature), while focusing on current psycholinguistic concerns. Urwin (1978*a*) made the pioneering effort to describe the first stages of language and social development by conducting extensive naturalistic observations of three blind children under two and a half years (Urwin also followed a fourth child, but those data were not presented in any detail because of unusual circumstances in the family situation). Her primary focus was the development of social play and verbal and nonverbal interaction between parent and child. Landau, together with Lila Gleitman, studied three slightly older congenitally blind children, and described their early vocabularies, the semantic–syntactic relations in their early multiple-word utterances, and the use of visual terms by one of the children (Landau 1982, 1983, Gleitman 1981). Because these two studies provide detailed descriptions of research comparable to our own, we were especially concerned about differences between their conclusions and ours. In particular, we were interested in: (1) how Landau (1983: 66) came to the conclusion that 'blind children do talk about objects and their locations in space, actions, and events,

TABLE 1. *Sex, degree of visual function, causes of blindness, age range and MLU range for each subject*

Subject	Sex	Amount of vision	Cause of blindness	Age range	MLU range[b]
Teddy[a]	M	None	Leber's congenital amaurosis	0;5–2;10	0–3·21
Lisa[a]	F	Light perception	Leber's congenital amaurosis	1;3–3;4	0–3·51
Julie[a]	F	Shadow or more in left eye	Microphthalmia	1;0–3;1	0–2·09
Lydia	F	Form, periphery in right eye	Hypoplasia of optic nerve	1;3–2;4	0–2·73
Brett[a]	M	Full vision	—	1;4–2;0[c]	0–1·86
Bonnie	F	Full vision	—	1;0–1;5[c]	0–n.a.

[a] Participated in diary study of early lexical acquisition. When first located, Lydia had already acquired too many words to participate in a diary study; Bonnie is younger than the other subjects and her lexical records are incomplete.

[b] Mean Length of Utterance (MLU) was computed using the conventions established by Brown (1973:57).

[c] The sighted subjects were added midway into the study. Data are available for later ages (Andersen & Kekelis 1982), but are not included in the present analyses.

and do so IN JUST THE SAME WAY as sighted children at the same linguistic level' (emphasis ours), when we found consistent differences in early lexical development (e.g. Dunlea 1982); and (2) why Urwin found that her children's role play provided evidence of 'reversibility' when our children, who also role played with language, revealed a great deal of difficulty with reversibility. (By reversibility we mean that the child understands that roles in interactions are not static – for example that the child can assume an initiating or responsive role in routines, for example – and has the ability to take the perspective of another, an important component for understanding the shifting reference involved in deictic distinctions (cf. Bruner 1975).) As we tried to reconcile our findings with theirs, it became clear that it was the nature of our linguistic analyses rather than differences in the children's language that led us to different conclusions. In the sections that follow, we will first describe our children more fully. We will then go on to consider our data on lexical development, and then our data on verbal role play.

METHOD

The children

The six children who participated in our longitudinal study represent a range of visual function from total congenital blindness (Teddy) to full vision (Brett

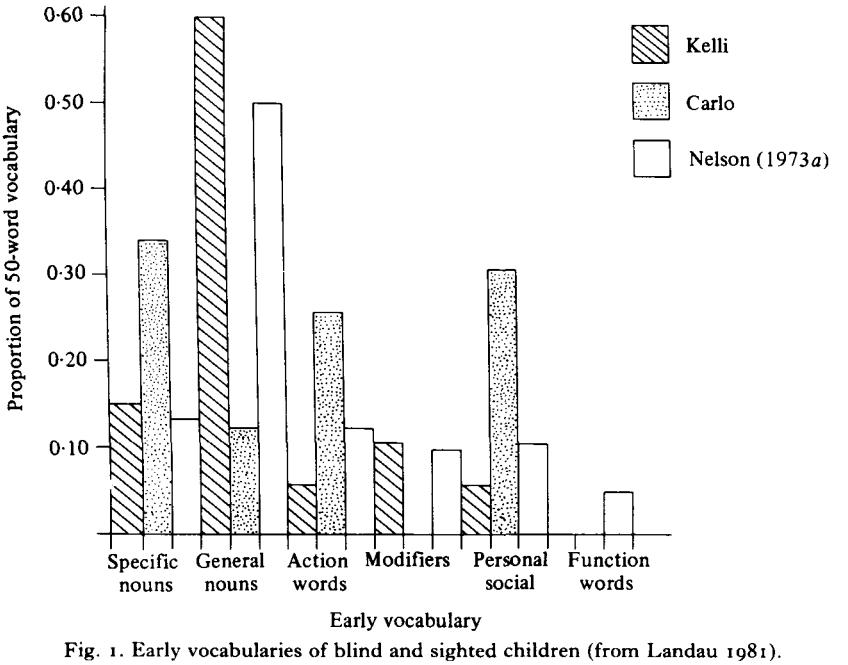

Fig. 1. Early vocabularies of blind and sighted children (from Landau 1981).

and Bonnie). All the children were full-term infants without any other handicaps. They were all from intact middle-class families that were monolingual in English. They were developing normally and functioned at average and above-average levels on tests of early social and cognitive development. Table 1 presents the sex, degree of visual impairment and cause of blindness for each child, and the age range and MLU range documented in the study.[5]

RESULTS

Lexical semantics

In her study, Landau compared the early vocabularies of two of the three children in her project to those of the sighted children studied by Nelson (1973*a*), and found 'no evidence from these data that blind children cannot express words for the concepts normally expressed by young children' (Landau 1983: 66). From the data presented in Fig. 1 she noted that 'the early words expressed by both blind and sighted children are primarily objects and

[5] For a more detailed description of the population and of the study in general, see Andersen (1981).

people (subsumed under specific and general nouns) and some action words (e.g. *go*, *up*) and personal-social words (*please*, *no*, etc.)'.[6] It is dangerous, however, to assume from such a surface analysis that the underlying lexical systems are the same, since studies of child language show consistent differences between the early meanings of children's words and meanings in the adult language (Clark 1973, Bowerman 1976, 1978, Braunwald 1978, Nelson 1973*a*, 1979, Rescorla 1980). These differences occur because children construct hypotheses about the meanings of words based on their unique experiences, their understanding of the world in general, and the way in which their vocabularies are structured at a particular point in time. Ascribing meaning to words involves much more than simply establishing a set of one-to-one correspondences between a vocal form and a referent. Rather, the child must abstract information associated with early referents and use it to extend the domain of application for a word to new and recognizably different referents that share criterial features. This is the process of extension, and it sometimes results in highly salient overextensions, as when a child calls all four-legged creatures *doggie*. Lexical development, then, involves repeated structuring and restructuring of meanings as the child's uses move closer to those of the adult language (Andersen 1975).

If individual differences are common among children who share the same means for perceiving and exploring the environment, researchers must be especially cautious in comparing data from children who have different perceptual modalities available and therefore potentially different bases for ascribing meanings to words. Thus it is important to evaluate the PROCESSES involved in lexical development. Like other researchers, when we began to look at early lexical acquisition we did not expect big differences in the kinds of words represented, but we did consider two alternative hypotheses about differences in the conceptual basis of word meaning. In particular, since visual information was not available, we hypothesized that blind children would show greater reliance on functional characteristics (e.g. everything you drink from is a *cup*) than on perceptual characteristics, or that over-extensions would be based on non-visual perception (e.g. things that feel soft are *blankets*, foods that taste sweet are *cookies*). What we did not expect was that these children would virtually never over-extend their early words, yet this is what we found. While, superficially, the blind and sighted children in our study used many similar forms, a closer examination of WORD USE itself revealed differences that underline the important role vision plays as a stimulus in motivating children to construct hypotheses about the nature and meaning of words as symbolic vehicles.

[6] Actually there appear to be a number of suggestive differences between the two Landau subjects, with Kelli patterning more like a sighted child and Carlo more like the blind children in our study. In addition there is a lack of function words in both subjects' vocabularies. These differences will be dealt with in a future paper.

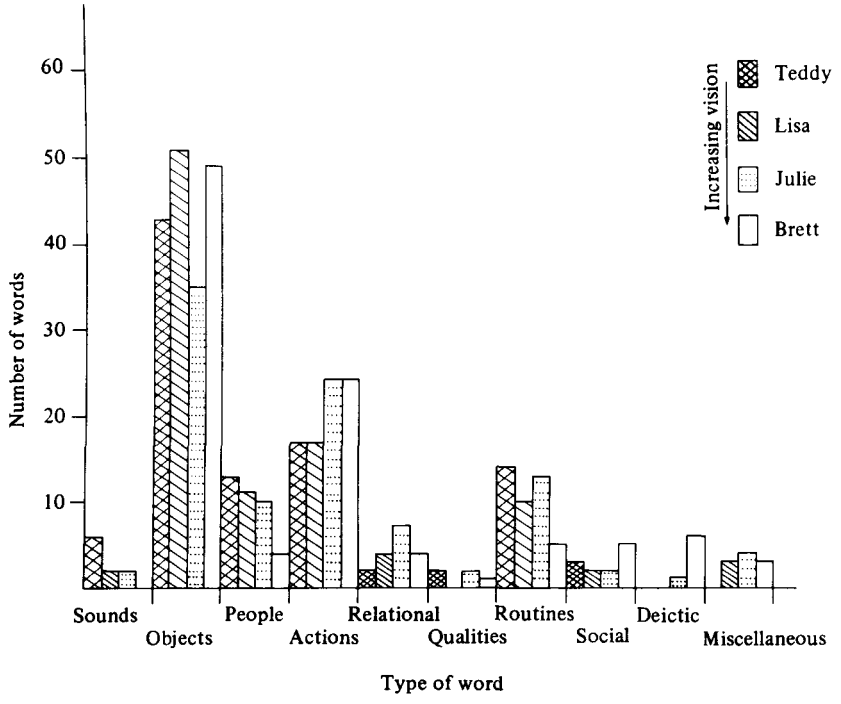

Fig. 2. Number of different word types in first 100 words.

The referents for which the children acquired their first 100 lexemes were fairly similarly distributed among 10 mutually exclusive categories (see Fig. 2), regardless of the degree of visual impairment. Object names and words for actions predominated in the vocabularies of all four children (3 blind, 1 sighted) who participated in the diary study (cf. Table 1). Terms associated with nursery routines (e.g. *patty-cake*) or associated with sounds (e.g. *beep beep* for mechanical noises) were more common in the blind children's lexicons, whereas deictic terms were only present in the vocabulary of the sighted children, with one instance in the partially sighted child's lexicon.

Despite these similarities, there were three important qualitative differences that clearly distinguished the lexicons of the blind children from those of not only the sighted child in this study, but also the sighted population as described by others (Bates *et al.* 1979, Bowerman, 1978, Clark 1973, Nelson 1973*a*, Rescorla 1980).

First, there were no idiosyncratic forms in the blind children's lexicons and there was a zero mortality rate for early words. Child-created forms, such as

gai for hat, have frequently been reported in diary studies and were observed in the sighted child's early lexicon: such forms were not, however, observed in any of the blind children's vocabularies. Likewise, though it is common for some early words to fall into disuse as sighted children's vocabularies expand and evolve, they did not disappear from the blind children's lexicons.

Secondly, words for actions were restricted to self actions among the blind children, while sighted children use these terms to refer to a variety of activities involving other people and objects, as well as their own activities. In fact, self orientation is typical of all children's earliest action expressions (see Huttenlocher & Charney 1983), but sighted children soon move from referring to their own activities or to objects on which they are acting (e.g. saying *down* while climbing off a chair, saying *cup* while drinking) to referring to the activities of others and the objects others act on (e.g. saying *down* as a parent climbs down a ladder, saying *cup* as another drinks) (Bates *et al.* 1979, Greenfield & Smith 1976, Lock 1980; see also Dunlea (1983) for a discussion of decentration problems in blind children's early language).

Thirdly, the blind children used 'functional' or 'relational' terms (e.g. *no*, *more*, *again* – cf. Bloom 1973) to satisfy their own needs, but not to encode information about the dynamic states of entities. Thus, while forms corresponding to relational terms in adult language are present, they are not used to encode true relational meaning (e.g. saying *more* to request another cookie, but not to comment on the additional instance of something). In contrast, sighted children's use of these forms reflects an awareness of some of the transformations encoded by them in the adult language.

In summary, the blind subjects' early lexicons seemed to depend on terms supplied by others, since there were no innovations and no discarded forms. The words they used were applied largely to their own activities and needs.

In addition to these differences, analysis of the range of use for the first 100 lexemes revealed that the blind children's applications were considerably more restricted than sighted children's are. These data are presented in Table 2. Approximately half of their words were never generalized beyond the original context during the study. Moreover, many of the forms that were not tied to one context referred to food products or to specific people. Both of these are marginal types of generalization, since they do not involve grouping together a class of recognizably different items. For example, identifying different tokens of a type of cookie in various contexts around the house is very different from constructing a class of 'cookie' comprised of an assortment of baked goods. Thus the extensions credited to the children represent a generous estimate. In contrast, the sighted child spontaneously extended (or over-extended) 93 of his first 100 lexemes and constructed a variety of heterogeneous groupings, a finding consistent with previous diary studies (Braunwald 1978, Leopold 1939–49).

The three blind children over-extended very few of their first words

TABLE 2. *Instances of non-extended words and of child-initiated extensions and over-extensions for the first 100 words*

Subject[a]	Number non-extended	Number extended	Number over-extended
Teddy	53	34	13
Lisa	53	34	13
Julie	58	34	8
↓ Brett	7	52	41

[a] Arrow indicates direction of increasing vision

(8–13 %), and those that were over-extended were applied to only one or two referents in addition to the original token.[7] The sighted child in this study over-extended 41 % of his early words and frequently applied terms to a wide variety of referents. Again, this profile is consistent with that of other sighted children (see Rescorla 1980).

Perceptual information was an important basis for extension for all of the children. Not surprisingly, the blind children relied mainly on haptic–kinaesthetic dimensions, particularly shape and texture, as illustrated in Table 3.

Since the diary records for the blind children suggest that the process of extension was restricted, we used individualized experiments in an attempt to elicit extension. The children were presented with new referents for words that had not been extended and were asked to identify the items. We also tested to see if a word not extended in production was extended in comprehension by asking the child to find various items from an array of objects placed in front of him or her. Consonant with the diary records, the children were successful only when they were presented with the referents they had originally associated with the term. Moreover, there was no evidence of spontaneous sorting behaviour in the blind children's play, and it was not possible to elicit sorting behaviour in experimental probes. These findings appear to indicate that the absence of visual input has a detrimental effect on category formation, a cognitive difference that leads to a language difference, since categorization schemata are thought to underlie lexical extension (Nelson 1973*b*, 1977, Rescorla 1981).[8]

Thus, as Landau suggests, the categories represented in the early vocabularies of blind and sighted children may be similar. But behavioural and

[7] Those words that were over-extended tended to be instances of CATEGORICAL OVER-INCLUSION rather than ASSOCIATIVE COMPLEXES. See Bowerman (1976) for a detailed discussion of this distinction.

[8] For a more detailed discussion of early lexical and cognitive development than presented here, see Dunlea (1982).

TABLE 3. *Instances of different perceptually based over-extensions*[a]

	Shape	Size	Movement	Colour	Sound	Taste	Texture	Olfactory
Teddy	4	—	—	—	3	1	4	—
Lisa	3	—	2	—	2	—	4	1
Julie	1	1	—	—	—	—	1	—
↓ Brett	21	4	3	3	1	—	1	—

[a] Other instances of over-extensions were based on functional or affective criteria, or a combination of features. Arrow indicates direction of increasing vision.

linguistic evidence both suggest that the process that enables young sighted children to abstract criterial features of a referent and to extend the domain of application of early words is not functioning at the same level for blind children at the onset of language.

Verbal role play

A recurrent finding among developmental studies of the blind is that these children have difficulty mastering the pronoun system, especially appropriate usage of the deictic *I–you* distinction (Urwin 1979, Fraiberg 1977, and others). Fraiberg & Adelson (1975) suggest that this problem is tied to a concomitant delay in the emergence of self-representation in pretend play, evidenced not only by the absence of symbolic play involving object transformations (e.g. using a spoon as if it were a car), but also by a lack of interest in dolls through which the child could act out the distinction between self and other. Urwin (1978*a*, *b*, 1979) also noted some connection between play and language, at an earlier stage of development than Fraiberg. Urwin found that a rapid expansion of vocabulary at about age 18 months co-occurred for her children with the beginnings of representational play. However, while her partially sighted child's early pretend play involved objects, the fantasy play of her totally blind children was mostly confined to verbal role-playing involving the reconstructing of past conversations between himself and others. Urwin provided the following example as an illustration:

(1) Jerry (4;6.2)
(Jerry is rambling round the room while both parents are elsewhere.)
Father's voice: Are you sure?
Jerry's voice: I sure Dad.
Father's voice: Are you sure?
Jerry's voice: I sure Dad.
Father's voice: You sure?
Jerry's voice: I sure Dad. I sure Dadda. (and bursts of hysterical laughter) (from Urwin 1979: 124)

Examples like the above led Urwin to argue that this child had an 'understanding of the reciprocal roles in interaction' (1979: 120) and that his 'use of words expresses a REVERSIBILITY OF PERSPECTIVE dependent on the past history of interaction through which the meaning of the words has been derived' (1978*b*: 101, emphasis ours).

Like Urwin, Fraiberg and others, we also found that verbal role-play appeared early and was used extensively in our children's language. However, a closer examination of this kind of speech in their spontaneous interactions revealed clear problems with 'reversibility', the ability to understand the role of shifting perspectives in defining meaning. Consider, for example, the two sequences from one child that follow:[9]

(2) Lisa (3;2.19)
(Lisa plays with two cooking timers. Both her brother and a researcher (R) are nearby.)

Lisa	*Researcher*
Wanna bell?	
(*loud*) Click.	
(*high pitch*) More?	
(*low*) Okay.	
Wanna [pla] on the tim-?	
(*sweetly*) It doesn't work honey [hɛ].	
h-	
(*low and soft*) here's the ( )	
Here's the bell. (*laugh*)	
and here's a (.) [blak] of timer.	
See?	
Lisa.	
Lisa.	
No [mɑrs] there?	
*(*louder*) Wind up the ti-timer for her.	
	Linda's not here.

(3) Lisa (3;2.19)
(Lisa plays with two cooking timers as researcher sits nearby.)

Lisa	*Researcher*
(*soft*) Lisa how bout (*whisper*)	
this timer?	
She- (*loud*) How bout this one?	
(*softer*)//How bout this] one?	
	//How bout that one?]

[9] A slightly modified version of Ochs's (1979) transcription method is used for the transcribed exchanges. The children's utterances are written in modified orthography with incomprehensible portions transcribed in the International Phonetic Alphabet and enclosed in brackets.

(*loud*) I want that one ( ).
(*soft*) Lisa how bout this one?
(*louder*) Did I go ( )?
It's Mary's timer Lisa.
Should I put ( ) on for you?

Okay.
That's the other one.
(*sweet*) it doesn't work Lisa.
Your-
*(*louder*) She wants the other one.
(*soft*) Take this.

Both of these sequences look much like the example from Urwin's subject cited above. If one looks only at the role-play discourse preceding the final child utterance in these two examples, it appears that Lisa (who had no interest in dolls) does by age three have a clear notion of reversibility of perspectives and the consequences for language. This is especially clear in (3), where she appears to demonstrate a mastery of the deictic *I–you* pronoun distinction. However, once we examine the discourse context of these sequences, we find that her attempts to incorporate this kind of language into conversations with others reveal clear problems with 'reversibility'. For instance, in the last line of (2) and (3) respectively, Lisa refers to herself as *her* and *she* when making requests. A real control of reversibility would mean that the child understands the shifting reference of pronouns (Clark 1978), such that *she* can refer to ego when used by others but must refer to others when used by the speaker. Similar problems with establishing the referents of pronouns are common in the data of three of the blind children in our study – specifically those with the most severe visual impairments. Other examples from Lisa are listed in (5) (below),while some from Teddy are provided in (6). The pronouns in parentheses under the child's utterances indicate the intended reference.

(5) Other examples from Lisa:
at (3;1)
(*a*) (*Mother had offered to comb hair.*)
I don't want to comb your hair.
(my)
(*b*) (*Lisa asks Researcher for permission to wind doll.*)
She wants to wind it.
(I)
(*c*) *Lisa asks for doll that had been given in previous visit.*)
She wants the little toy that Linda brought her for my birthday.
(I) (me)

at (3;2)

(*a*) (*Talking to Mother*)

I want a little cup that Nelly gave you.

(me)

(*b*) (*Playing with Researcher*)

I want Linda gave you the dolly.

(me)

(*c*) (*While offering an object*)

I give it to me.

(you)

(*d*) *Attending to ticker of timer*)

She wants to hear.

(I)

(6) Examples from Teddy:

at (1;8.24)

(*a*) *on waking from a nap*)

Did you have a (.) nice nap?

(I)

(*b*) (*on hearing water running in the tub*)

Wanna take a bath?

(*c*) (*in tub, hunting for a toy frog that has slipped away*)

Where's froggie, Teddy?

at (1;10.8)

(*a*) (*After falling down by slide*)

Teddy	*Mother*
You did it.	
(I)	What did you do?
Did you fall down?	
(I)	Yeah, you did fall down on the ladder.

(*b*) (*Teddy and Researcher taking turns dropping basketball through hoop which rings when basket is scored.*)

Teddy	*Researcher*
	(*makes basket*)
	I dinged it.
(*makes basket*)	
uh you dinged it.	
(I)	No Teddy dinged it.

at (1;11.9)

(*a*) (*drops a doll called 'Baby Bolts'*)

Did you drop the baby bolts?

(I)

As discussed earlier, examples like these have been noticed by a variety of other researchers, and discussed in detail by Fraiberg and her colleagues.[10] But unlike Fraiberg (1977), who believed that the problem with pronouns comes from a lack of self-representation, and unlike Urwin, who believed that the ability to reproduce the speech of others in a play situation shows a grasp of reversibility, we believe that detailed micro-analysis of such 'errors' in blind children's discourse context suggests that they are but one manifestation of a more general problem: a general lack of PERSPECTIVE-TAKING ability. Thus, in examples (7) and (8) below, the language of both Teddy and Julie demonstrates problems in conveying their messages and especially in establishing reference, not only because their pronouns are reversed, but also because they use a question to introduce a topic that should have been introduced by a statement. (In (7), the intent was '*I* went to see Nicole'; in (8) it was '*I* want *you* to do it'.)

(7) (*Just after Teddy wakes up from nap in crib*)

Teddy (1;11.9)	*Researcher*
	Can you say, 'Hi'?
	Hm?
Did *you* go see Nicole?	
	Nicole? What did you say?
Did you?	
	Did I what?
Did you?	
	(*exaggerated intonation*) Did I (*high pitch*) what?
Did you see Nicole?	
	Did you go see Nicole?
Did you ( )?	
-h ( )	
	Did Teddy go see Nicole?
hm?	
	Huh?
	I//bet] Teddy saw Nicole.
// ( )]	
did you saw Nicole?	
I did it.	

[10] Chiat (1982) reports observing superficially similar problems with pronouns for a sighted child (aged 2;5) whom she studied. The kind of system she reports for that child is NOT, however, demonstrated in the language of blind children. Moreover, this appears to be relatively rare for the sighted population, while very common among the blind, where the problems also continue for a MUCH longer period of time.

who did it?

Who did it?

I did it.

(*high pitch*) You did it?

(8) *Julie* (2;10.29)

Mother
You're gonna bring *me* the baby doll?

Yeah. me to *do* it.

What should I do?

do it.

Do what?

do the baby doll.

In (7) and (8), the language the children use would be appropriate spoken TO them in this context, but not spoken BY them.

Resolving some differences

As Urwin (1978, *a*, *b*) suggested, our children also appear to be buying language 'ready-made': that is, they borrow utterances directly from the speech of others without fully analysing the components and making the appropriate adjustments necessitated by changes in speaker/perspective. In this case, then, as in the case of the Landau and Gleitman research, the data appear to be similar across projects, but crucial differences in the nature of the analyses have led investigators to interpret these data as demonstrating quite different findings for lexical acquisition and pragmatic development. The results of all three studies indicate that at a purely structural surface level, the language of blind children looks like that of their sighted peers. But when examined in its discourse context, there are consistent discrepancies in language use that suggest that the availability of visual input produces subtle differences in the process of language acquisition. Early lexical acquisition suggests that, though blind children's vocabularies contain the same sorts of words as their sighted peers, their use of these words indicates that they have less understanding of words as symbolic vehicles and are slower to form hypotheses about word meaning than sighted children. Similarly, their role-play speech in its discourse contexts shows that, while blind children may be very good at producing chunks of discourse with apparently shifting perspectives, this appears actually to be no more than delayed imitation, without any fine level of analysis.

The differences we have noted between blind and sighted children certainly are not totally qualitative: all children probably use some unanalysed 'chunks' (delayed imitation?) in constructing language (see Clark 1974, 1977, Peters 1977, Johnson 1981, Snow 1981). The absence of visual input, however, appears not only to lead blind children to rely particularly heavily on this strategy in acquiring language but also to delay the analysis of meaning necessary for the extension of early words.

CONCLUSIONS

We are NOT arguing that vision is NECESSARY for language development, only that visual input is an important, and perhaps major, stimulus for the processes underlying acquisition in lexical and pragmatic aspects of language. Blind children have difficulties in just those areas of language acquisition where visual perception, combined with context-based linguistic input, offers information about the world for forming hypotheses about certain aspects of the linguistic system.

It is interesting to note that the atypical subjects studied by Curtiss and her colleagues have difficulties exclusively in these same areas, leading Curtiss to suggest that 'lexical and relational semantic abilities are deeply linked to broader conceptual development but morphological and syntactic abilities are not' (Curtiss, in press). Further investigation of the morphosyntactic development of blind children may contribute to our understanding of the relationship among these different aspects of language.

What we have discussed in this paper is clearly just the 'tip of the iceberg' in understanding blind children's linguistic systems and the acquisition processes that underlie their language development. Claims that blind children 'catch up' may be premature; but even if they do, understanding HOW they do should tell us a lot about the flexibility of the language learning system. Only careful examination of children's language use IN NATURAL CONTEXTS, combined with experimental probes, will allow us to fully understand the relationships between visual perception, cognitive development and language acquisition.

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