

Methodology for conducting linguistic research into visual impairment: Challenges and recommendations

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Abstract

Despite great value of research into visual impairment (VI), there is a dearth of empirical studies in linguistics investigating the extent to which the sense of seeing impacts language development, processing and production. The lack of methodological rigour in previous studies as well as large diversity of the population, small incidence of visual impairment and little awareness of blind people's needs make this field of study challenging for researchers. This article presents and discusses the most challenging aspects of performing experimental studies in the field of VI. The overarching aim of this paper is to guide good research practice which ensures robust and unbiased experimental design and at the same time respects individuality of people with VI.

Keywords: methodology, linguistics, research, visual impairment

1. Introduction

Visual impairment (VI) is known to affect various areas of development. Such areas include cognition, concept formation and language acquisition which constitute important components in the development of other, more complex skills and competencies (Finello, Hanson and Kekelis 1992). Although the impact of VI has been explored in different disciplines, to this day the actual consequences of vision loss for language acquisition, comprehension, perception and production are, at best, unclear. Despite a considerable significance of linguistic research into VI, a number of methodological issues make this area of study a daunting challenge.

The aim of this article is to discuss the most difficult aspects of conducting empirical studies on people with VI. The observations presented in this article are based on the author's personal experience acquired from running different research projects into VI, as well as the experience of other researchers reported in their publications. Presently, there is a handful of publications specifically devoted to the methodology of linguistic research into VI and discussing challenges and problems, which normally constitute the backstage of the research process. The purpose of this article is to provide assistance for researchers (both those with some experience and those

who are beginning their scientific careers) who are interested in running an experimental study into VI. The article is intended to help develop accurate and reliable methods for the investigation of blind people which allow them to demonstrate their abilities to the same extent as sighted people. This paper focuses on the methodological issues of linguistic research into VI, but it should be noted that many aspects discussed in the following sections also concern testing individuals with other disabilities such as hearing impairment, autism or Asperger syndrome.

2. Previous research: methods and challenges

In the field of linguistics, one can observe a growing interest in the impact of vision loss on various aspects of language acquisition, comprehension and production. Studies in this area help researchers to better understand the role of vision in the processes, and consequently provide new information to existing language theories, models and approaches which can be further subjected to empirical verification. Such studies also have significant practical applications, since they provide support for teachers and practitioners to develop appropriate educational methods, strategies and aids for the children to progress. Unfortunately, this area of study is very unsystematic, inconsistent and seriously underexplored.

Not surprisingly perhaps, much more attention has been given to VI in medical and social sciences and psychology (see e.g. Dekker and Koole, 1992; Krakowiak, 2017; Khorrami-Nejad, Sarabandi, Akbari and Askarizadeh, 2016; Huber, Chang, Alvarez, Hundle, Bridge and Fine, 2019; Rokach, Berman, and Rose, 2021), which have developed various scientific methods to investigate causes and consequences of this disability. Due to the shortage of adequate research in linguistics, it is often necessary for linguists attempting to conduct a study on blind people to reach for medical, sociological and psychological findings. This is in order to better understand the specificity of VI and gain a broader perspective on a linguistic phenomenon currently analysed. In other words, linguistic research into VI (and other impairments as well) is an interdisciplinary exercise, which encourages a researcher to search for cues and solutions beyond linguistics.

Linguistic research in VI started approximately in the 1950s, but for many years it lacked scientific rigour in terms of method used (Perez-Pereira, 2006). The main reason for this was that linguistics was mainly studied theoretically and before the 1980s there was little awareness of empirical methods which could be applied to investigate linguistic phenomena. As an empirical approach to the study of language grew in popularity, experimental linguistics started to mark its place among linguistic disciplines, employing psycholinguistic methods to test various hypotheses. Early studies into VI showed specific difficulties and delays of blind children; this led to the occurrence of many misconceptions about blindness, several of which have never been dispelled.

So far in the empirical studies of VI two main approaches have been used. The first approach involves anecdotal observations of individual children (usually tracked longitudinally) who are recorded when playing or interacting with their parents (see e.g. Andersen, Dunlea and Kekelis 1984, Kekelis and Andersen 1984, Landau and Gleitman, 1985). In addition, the parents are often asked to keep a word-diary or note down specific behaviour between observation

sessions to help a researcher closely monitor a child's language development. The observational method is said to "provide a greater opportunity to investigate the role of vision in particular stages of the acquisition process" (Norgate 1997: 166). Many a time, it is also the first to supply the information about any alarming or atypical behaviour, as it can be used with infants or very young children. Longitudinal studies, as indicated by Perez-Pereira and Conti-Ramsden (1999), "allow us to observe changes across time, to document the course of development, to evaluate the impact of blindness at different stages of development and so on. Other advantages include being able to obtain an actual picture of the development of blindness and different routes that children may follow, and thus, open up the opportunity for the researcher to appreciate individual differences in development."

The problem is that, as indicated above, the observations are made on individual children rather than groups. This raises the question to what extent we can draw valid conclusions on their basis about the entire population if they are not performed on a representative sample. Another problem is that researchers often fail to publish detailed information about specific factors which may distinguish between children. Among other things, such factors include the aetiology of VI, age of onset of VI, extent of vision, existence of concomitant disabilities or prematurity (Norgate *ibid.*, Warren 1994). The information was often omitted in early research, which makes it practically impossible for other researchers to compare results between studies. Without adequate characteristics of participants it is also hard to determine what impact specific factors have on obtained results and in what way these factors have "contributed to the course of acquisition" (Norgate *ibid.*: 167).

Another method used by linguists is direct comparison between the development of blind and sighted children, or, to be more precise, the rate at which the two groups differ in the acquisition of phonological, syntactic, morphological, semantic and pragmatic aspects of language (see e.g. Mills, 1983; Wilson, 1985; Dunlea, 1989; Dunlea and Andersen, 1992). The cross-sectional approach adheres to normative view and assumes that all children go through the same route in their development. This approach ignores the fact that blind individuals do not constitute a homogenous group and may follow different developmental patterns (see e.g. Kaczorowska-Bray and Milewski 2022). The studies concentrate on mean tendencies, which conceals individual differences, characteristic to this population. What is more, such studies do not provide "information about possible patterns of change, [or] differences in patterns of change" (Perez-Pereira and Conti-Ramsden *ibid.*); as a result of this it is difficult to determine which behaviour should be considered typical or atypical to the population. Normally, cross-sectional comparative studies involve a considerable group of participants, but because of relatively low incidence of blindness and the fact that it is difficult to find blind individuals with appropriate characteristics, they are usually small scale studies. It is important to remember that large individual differences of blind participants as well as relatively small sample size greatly impact the power of statistical tests used to determine potential differences between the blind and the sighted. This means that any conclusions need to be drawn with great caution and in relation to potential limitations of such studies.

Beside the above mentioned problems, there are other methodological issues which occur in both comparative and observational studies. Early studies in VI did not use appropriate and precise terminology in relation to participants with VI who were called 'blind', irrespective of

whether they were early-blind, adventitiously-blind, totally blind or partially sighted (Norgate 1997). This made it practically impossible to draw any valid conclusions, make comparisons between studies or duplicate them. Presently, researchers are much more careful to use appropriate nomenclature in the description of levels of VI and are consistent in documenting the information in publications. Nevertheless, due to the low incidence of blindness they are not very strict in participant selection, grouping together individuals with, for example, total blindness and low vision. Although so far little is known about the extent to which people with total blindness and low (or partial) vision differ in language development, the study by McConachie and Moore (1994) indicates that individuals with even a small amount of vision may be more similar in the way they acquire language to sighted children. In consequence, by grouping them with totally blind children we obtain an internally heterogeneous group of participants who may differ too much to be compared.

Another thing is that researchers are not always fully aware of special needs of people with VI and tasks, tests and techniques they use for testing this group of people are not always appropriately chosen or adapted. This results from the fact that the researchers use instruments designed for sighted people who, unlike people with VI, rely on visual information to the greatest extent. By doing this, they provide blind individuals with qualitatively different information than sighted people, and consequently are not given an equal opportunity to perform in a given task. For example, in Dunlea's experiment (1989) blind children were found to have more difficulties in the generalization of concepts than children with normal vision. However, the techniques used in the study did not allow for the manipulation of objects, as a result of which the blind individuals were not given a fair chance to demonstrate their skills, and their capacities were underestimated (see Norgate 1997; Pérez-Pereira and Conti-Ramsden 1999 for criticism of this study). It also happens that the conditions under which subjects are tested are not clear or fully reported in a publication. The information about the instruction given by experimenters, the amount and type of information the subjects are expected to provide or how much time the subjects were given to complete the task may be crucial to assess validity of findings.

The final problem concerns the interpretation of results. As observed by Perez-Pereira and Conti-Ramsden (*ibid.*), many researchers assume that behaviour which occurs both in the blind and in the sighted has the same function in the two groups. By the same token, the lack of a given behaviour is interpreted as a specific deficit. The truth is that "two apparently identical behaviours may serve different functions and can be the result of different underlying processes, and vice versa, two different behaviours may fulfil a similar function" (Perez-Pereira and Conti-Ramsden *ibid.*). For example, gestures have been found to have different functions in language development for the blind and for the sighted, and the two groups use them at different rates and in different fashions (e.g. Sak-Wernicka 2023, Iverson, Tencer, Lany and Goldin-Meadow, 2000). It should be noted that many studies make comparisons only between blind and sighted subjects without introducing blindfolded controls. As a result, it is often unclear whether sighted people whose access to visual information is temporarily limited would demonstrate behaviours similar to these of the blind or the sighted people. Such comparisons can also indicate whether a specific difference between blind and sighted individuals is due to different ways they acquire information or because of some developmental or cognitive difficulties.

In the light of above mentioned methodological pitfalls, it is crucial to refine methods used in linguistics “to address difficulties in recruiting participants, and to capture the diversity of strengths and needs of visually impaired people” (Duckett and Pratt, 2001: 815). It must be stressed that previous studies have provided an important insight into the impact VI has on language development, but present and future studies should meet higher standards and be more rigorous in the methodology they use. The recommendations presented in the next section are intended to promote good research practice and help to develop objective, reliable and accurate methods of the investigation of VI in linguistics.

3. Design of experiments

Not many people with normal vision understand what limitations blindness imposes on a person and what impact it has on the individual’s experiences, comprehension and mobility. Contrary to what many sighted people think, this cannot be fully grasped if we simply close our eyes. This is because blindness is not only about the accessibility of information here and now, but also about the impact of information accessible to a blind person on the person’s knowledge, comprehension and interpretation. In other words, things that sighted people take for granted as visually accessible (even if not present at the moment), people with VI may perceive differently as they acquire information in a different way. For the above-mentioned reasons, researchers who are planning or preparing research on blind people may need assistance of educators, therapists or other specialists in VI. Among other things, they can provide important information about prospective subjects they work with and special needs the subjects have. Also, preliminary observations and pilot studies should be considered standard procedure before proper studies in VI. The knowledge of how blind individuals learn, communicate or perform various activities in everyday situations can hardly be found in publications, but appears indispensable in designing a research project.

As indicated by Perez-Pereira and Conti-Ramsden (ibid.), research in the field of VI (and other impairments as well) “is always carried out under difficult conditions and with scarce knowledge of the topic.” Therefore, it is important for researchers to be prepared to expect the unexpected and not to take things for granted. For example, in our recent studies (still in progress) we use tactile graphics¹ to test blind children on their understanding of scalar terms (*some, at least, at most, almost all*). The subjects are learners at Special School for the Blind and Visually Impaired aged 7 to 13. The children are asked to explore tactile graphics and then they respond to questions about the elements in the pictures. In the course of experiment, we have discovered that some of the children have little experience in reading tactile graphics, or cannot remember having done it before. This is even though, at least theoretically, books with tactile graphics should be freely available to them at schools. There were also children who, despite prior experience in reading tactile graphics, found elements presented to them incomprehensible. This was even though the tactile graphics were prepared by specialists having experience in adapting educational aids, games and books for blind individuals. One blind girl,

1 Tactile graphics are raised pictures appropriately adapted to make them accessible to people with VI (for more information concerning principles of making tactile graphics see e.g. Edman 1992).

for example, could not recognise chairs presented from the side in the picture (see Picture 1 below). When asked to make her own raised picture of a chair using modelling dough, the child modelled the chair from the front with two legs, the seat and the back as indicated in Picture 2. Such minor differences may have enormous impact on the performance of blind children and can easily be misinterpreted by the researcher. Clearly, the fact the child had different representation of the object in her mind than it was portrayed in the picture did not have to negatively affect her abilities to understand scalar terms. Therefore, additional explanation was necessary in order to give the child a fair chance to perform the task. This illustrates that it is important to look at the participants individually.

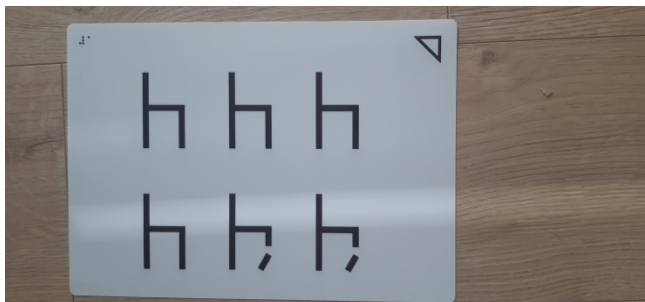


Figure 1: Tactile graphics presenting 6 chairs (2 broken) used in an experimental study.

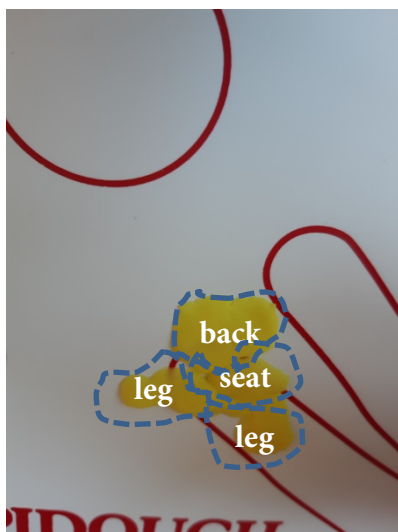


Figure 2: The Raised picture of a chair made by a blind child

It is also necessary to remember that due to their visual limitations blind individuals may need more time to perform a task. Therefore, they should be given fifty per cent more time than sighted individuals. It should be noted that reading tactile graphics differs from viewing a picture, as it is more fragmentary and therefore effort-consuming. Also finding information in a text (irrespective of whether it is in Braille or large print) can take more time.

Researchers should also make sure that blind people obtain a sufficient amount of information and the information is not different from this provided to sighted people. This means that the adaptation of research tools to the needs of the blind should not change the content of the materials. For example, if sighted people are given a picture-based task and blind people are given a description-based task, we can expect to obtain unreliable and incomparable results. In order to provide the same load of information, researchers should not only carefully

design and adapt research tools, but also they should consider supplying blind individuals with audio-description (AD), which is rarely employed in research, but which can provide blind people with important information they cannot normally access, giving them a chance to perform as successfully as sighted people.

4. Participant selection

Visual impairment imposes very different consequences on different people and people with VI do not constitute a homogenous group. This poses a serious challenge for researchers in the selection of a representative sample of participants with characteristics they require. Blind people generally differ from each other in many ways including their visual experience and acuity, extent of blindness, age of onset of VI, the existence of concomitant disabilities, educational record and many other medical, social and psychological aspects. Each blind person is an individual who has unique life experiences, which cannot be easily categorised. For instance, in the group of blind adults there are people with congenital blindness, those who were blinded in early infancy or late childhood, and those who were partially sighted in early childhood and whose vision decreased until it was totally lost in adulthood. Some visually impaired people have residual vision, while some can see light and recognise shapes. It is therefore difficult to specify what effect VI and its course may have on a person's functioning, and to which group the person should be assigned. Taking into consideration the above mentioned differences, there are two possible solutions to the problem. The first possibility is to keep strict selection criteria, even if this means performing a study on a relatively small group of participants. The second solution is to perform a study on a large group of blind people but to some extent accept the lack of homogeneity as characteristic to the population. The fact is that even if we are determined to meet strict selection criteria in a study, obtaining detailed information about participants is very often difficult (if not impossible). This is because people working with blind children not always have such detailed information, and the information they have is not always correct or updated. Some blind children have been wrongly diagnosed with multiply disabilities, while in others, the severity of the disabilities changes over time. Blindness frequently co-occurs with additional disabilities, but to this day there are hardly any studies which would address the questions of how the disabilities interact and interfere with the development of language and comprehension, and how much people with ocular-plus blindness differ from people with ocular blindness (see Bedny, Pascual-Leone and Saxe 2009 for one of very few studies in this field).

Finally, many studies into VI are performed on a small group of people. This is not only because of small incidence of blindness, but also because it is very difficult to recruit blind individuals to take part in a study. Not all educational institutions and parents of blind children are willing to collaborate, and not all blind adults are associated with some institutions, work or keep contact with other blind people. For these reasons it is often time- and effort-consuming to contact prospective participants. It needs to be stressed at this point that previous studies have mainly concentrated on the investigation of language development of blind children. There are however hardly any studies which explore the impact of VI on language competence of blind adolescents or adults, both born blind or who lost vision in the course of their life (see

Jęczeń, 2023 for one of very few studies in the area). Such studies are of great scientific value as they provide evidence of whether early difficulties of blind children reported in previous studies are overcome in the course of language development.

5. Summary

Linguistic research into VI and its impact on language development, comprehension and production is of great practical and theoretical value. Unfortunately, the lack of appropriate methods of conducting research in this area diminishes significance of many previous studies which did not give people with VI a fair chance to demonstrate their language abilities and underestimated the performance of the individuals. The methodological pitfalls were related to research design, selection of participants, procedure and interpretation of findings.

This article was aimed to present and discuss the most difficult aspects of carrying out linguistic research on blind people. The article was intended to provide assistance for researchers interested in performing a study in the field by providing practical solutions, suggestions or recommendations they may find useful when planning the project. It is also intended to encourage researchers of various linguistic disciplines to undertake research in this seriously underexplored but fascinating field of study. Future studies should not only meet higher scientific standards and respect the needs and individuality of blind people, but they should also pay more attention to aspects which so far have been neglected or completely ignored in literature. This includes communication and comprehension abilities of blind adults, the impact and inference of multiple disabilities on language performance, or the use of modern and assistive technology in examining linguistic abilities of blind individuals.

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