

Early language development in children with autism (ages 3 - 5 years) in Bloemfontein, South Africa: A comparative study

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Background. Autism is a developmental disorder, which presents during the childhood years, with social communication difficulties and signs of delay in early language development.

Objectives. The aim of the study was to compare the early language development of children aged 3 - 5 years with a Diagnostic and Statistical Manual of Mental Disorders (DSM) V diagnosis of autism with that of children of the same age with typical early language development. The secondary aim was to determine if certain children with autism have better language development in the language to which they are exposed on television (English) than in their home language (Afrikaans).

Methods. The Language Development Survey was translated into Afrikaans, modified and used as a questionnaire. For the control group, questionnaires were distributed at preschools and completed by the parents. For the sample group, questionnaires were distributed at the practice of a developmental paediatrician.

Results. The median percentages of Afrikaans words used in all the categories were lower in the sample group than in the control group. More children in the sample group tended to speak English the best, use words not spoken at home, and imitate words and sounds in the incorrect context. Most of the parents of children in the sample group considered their child's language development poor. Children in both groups watched television for long periods of time.

Conclusions. Afrikaans-speaking children with autism have a poorer vocabulary in Afrikaans and used more English words than in the control group. The television exposure of children under the age of two years is high.

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Autism is a lifelong developmental disorder that influences social interaction. It is not a scarce condition and epidemiological studies indicate a minimum prevalence of 1 in 59 children.^[1] The core problem in autism is that of social communication which normally manifests with slow and atypical language development.^[2,3]

There is a subgroup of children with autism who do not acquire language from interaction with their parents but from television, which can manifest as palilalia (involuntary repetition of phrases heard on television), among other signs.^[2] In a multilingual country such as South Africa (SA), this can create the impression that the language these children are exposed to on television is better than their home language.

Measuring instruments are available that may act as screening tools to evaluate the early language development of toddlers (age 18 - 35 months).^[4] An example is the Language Development Survey, which has been adapted for multicultural conditions, translated into Sesotho and Afrikaans, and specifically adapted for SA.^[5]

At present, no study has been published in SA that describes the early language development of a group of children on the autistic spectrum. It would be useful to investigate a specific language development variant (that of children whose vocabulary in the language that they are exposed to on electronic media is better than in their home language) to evaluate if this specifically applies to autism.

Objective

The main aim of the study was to compare the early language development of children aged 3 - 5 years with a Diagnostic and Statistical Manual of Mental Disorders (DSM) V diagnosis^[6] of autism with that of children of the same age with typical early language development in Bloemfontein.

The secondary aim was to determine if certain children with autism have better language development in the language to which they are exposed on television (English) than in their home language (Afrikaans).

Methodology

Study design and setting

This was a comparative study.

Study population and sampling strategy

A sample group of 12 children, aged 3 - 5 years, diagnosed with autism according to the DSM V by a developmental paediatrician in Bloemfontein, was compared with a group of 24 children with typical early language development, also aged 3 - 5 years. Typical language development is the development between variances (two standard deviations) according to standard development tables, e.g. the Ages and Stages questionnaire.^[7]

To be included in the study, all children had to be 3 - 5 years of age with only Afrikaans as home language and with access to a television at home.

Children who were never exposed to any other language on television except for their home language were excluded from the study. Children with deafness, who had a delay in language development for reasons other than autism, or who had a developmental delay but did not show the diagnostic characteristics of autism, were also excluded.

For the control group, two preschools were initially selected using random sampling from a list of five Afrikaans medium preschools in Bloemfontein. Owing to low response, other preschools and organisations were approached to recruit children for participation.

Data collection and measurement

The measuring instrument, the Language Development Survey,^[4] is a standardised and validated checklist.^[5] The survey has been adapted for South African (SA) use, and was included as part of the questionnaire. The survey comprised words in 14 categories and parents had to indicate which words the child said, and in which language (Afrikaans or English).

The questionnaire also determined demographic information as well as the time exposed to electronic media and the language of the children's audiovisual media exposure.

Pilot study

A pilot study was conducted on three children in the control group. Questions were simplified and reordered and the layout of the questionnaire improved based on pilot feedback. These three control children were excluded from the main study.

Data analysis

Data were captured on an Excel spreadsheet and analysed by the Department of Biostatistics, Faculty of Health Sciences, University of the Free State. Medians and percentiles were calculated to summarise numerical data. Frequencies and percentages were calculated for categorical data. Fisher's exact tests (categorical variables) and Mann-Whitney or median tests (numerical variables) were performed to compare groups. Statistical significance was set at 0.05.

Ethical considerations

The study was approved by the Ethics Committee of the Faculty of Health Sciences, University of the Free State (ref. no. HSREC-S 08/2016). Permission to conduct the study was obtained from the clinic where the sample group was obtained, Head of the Department of Paediatrics and Child Health, Free State Department of Health, Free State Department of Education, and school principals of the preschools. Parents of the participating children gave written informed consent. Data were handled confidentially and no identifiable information was recorded on the questionnaire itself.

Results

The median age of the children included in the sample group ($n=12$) was 4.3 years while the median for the children in the control group ($n=24$) was 5.0 years. The median weight at birth for the sample group was 3.24 kg and for the control group 3.09 kg. Only 16.7% of the sample group children and 20.8% of the control group were born before 37 weeks. Before the age of two years, 90.9% ($n=10/11$) of the sample group and 87.5% ($n=21/24$) of the control group had five or less ear infections. A family history of a delay in language development was reported by 16.7% ($n=2$) children in the sample

group and 8.3% ($n=2$) children in the control group. There were no statistically significant differences between the sample group and the control group regarding any of these variables.

Table 1 shows that significantly more parents of children in the sample group felt that their child's language development was poorer than his or her peer group ($p<0.01$). Significantly more parents of children in the sample group were concerned about this delay in language development ($p<0.01$). More children in the sample group tended to speak English the best, use words not spoken at home, and imitate words and sounds in the incorrect context. Some feedback from parents of children in the sample group were 'Hy herhaal frases of sinsnedes uit kinderstories, bv. "Thomas the Tank Engine."' [Translation: He repeats phrases or clauses from children's stories, for example Thomas the Tank Engine.] and 'Hy sal Engels goed naboots.' [Translation: He will mimic English well.]

Most children in both the sample group ($n=7/12$; 58.3%) and in the control group ($n=14/23$; 60.9%) were first exposed to television before the age of one year ($p=1.00$).

According to Table 2, 83.4% of the sample group watched television between 1 and 4 hours per weekday and 75.0% on weekends. The majority of children (87.0%) in the control group watched television between 1 and 4 hours per weekday and 95.6% on weekends. There was no statistically significant difference between the two groups ($p=0.69$ and 0.61, respectively).

Most of the children in both groups (66.7% sample group; 82.6% control group) watched television in both English and Afrikaans ($p=0.40$). In the sample group, 91.7% of children watched television mainly in English v. 77.0% in the control group ($p=0.08$).

Most of the children in both groups (91.7% sample group; 87.0% ($n=20/23$) control group) watched DVDs, which included Afrikaans and English DVDs.

In the sample group, 41.7% of the children watched DVDs between 1 and 4 hours per weekday and 83.4% on weekends (Table 3). In the control group, 60.0% watched DVDs between 1 and 4 hours per weekday and 90.0% on weekends. There was no statistically significant difference between the two groups (p -values 0.48 and 0.46, respectively).

A higher percentage of children in the sample group ($n=5/11$; 45.5%) watched only English DVDs v. 10.0% ($n=2/20$) in the control group ($p=0.07$). Almost all children in the sample group ($n=10/11$; 90.9%) watched DVDs mainly in English v. 40.0% ($n=8/20$) in the control group ($p=0.01$).

According to Table 4, the median percentages of Afrikaans words used in all the categories were lower in the sample group than in the control group.

The median percentage of English words used per category was 0 in both groups, but owing to differences in the 75th percentile, the sample group had significantly higher percentages for the categories 'animals', 'body parts', 'vehicles', 'actions', 'places', 'modifiers' and 'other'.

Discussion

The slow early language development of the children with autism v. that of children with typical early language development was apparent. More parents of children in the sample group were concerned about their child's language development. It would be of interest to see how old the child was when the parents became concerned and whether they sought professional help. This finding shows the importance of delving deeper to determine the underlying reasons. We should, therefore, be careful about only reassuring these parents. This finding is also important as early intervention in autism makes a difference.^[8,9] Children with this condition are still

Table 1. Parental responses regarding early language development

Early language development	Sample group (n=12), n (%)	Control group (n=24), n (%)	p-value
Other languages (English, Sesotho), apart from Afrikaans, also spoken at home	3 (25.0)	4 (16.7)	0.66
Child speaks English the most/best	2 (16.7)	0 (0)	0.10
Child's language development is poorer than his/her peer group	11 (91.7)	1 (4.2)	<0.01
Parents are concerned about child's language development	7 (58.3)	1 (4.2)	<0.01
Child uses words not spoken at home	5/11 (45.5)	6/23 (26.1)	0.43
Child imitates words and sounds in the correct context	8 (66.7)	22 (91.7)	0.15

Table 2. Comparison between the two groups regarding the number of hours of television exposure per day

Hours	Sample group (n=12), %		Control group (n=24), %	
	Weekdays	Weekends	Weekdays	Weekends
0	8.3	8.3	8.7	4.4
1 - 2	41.7	25.0	60.9	47.8
2 - 4	41.7	50.0	26.1	47.8
>5	8.3	16.7	4.4	0

Table 3. Percentage comparison between the two groups regarding the number of hours watching DVDs per day

Hours	Sample group (n=11), %		Control group (n=20), %	
	Weekdays	Weekends	Weekdays	Weekends
0	45.5	0	40.0	10.0
1 - 2	27.3	72.7	50.0	80.0
2 - 4	18.2	18.2	10.0	10.0
>5	9.1	9.1	0	0

Table 4. Summarised data of the percentage of Afrikaans words used per category by children in the sample group and the control group

Category	Sample group, Median (IQR)	Control group, Median (IQR)	p-value
Food	54.8 (41.5 - 87.1)	88.7 (80.7 - 98.4)	0.01
Toys	59.1 (36.4 - 90.9)	100 (100 - 100)	<0.01
Outdoors	75.0 (50.0 - 75.0)	100 (75.0 - 100)	<0.01
Animals	83.3 (50.0 - 97.6)	100 (95.2 - 100)	0.01
Body parts	88.1 (66.7 - 97.6)	100 (100.0 - 100)	<0.01
Vehicles	100 (50.0 - 100)	100 (100.0 - 100)	0.01
Actions	76.5 (59.8 - 91.2)	100 (96.0 - 100)	<0.01
Household	69.4 (35.5 - 91.9)	96.8 (91.9 - 100)	0.01
Personal	75.0 (21.4 - 92.9)	100 (92.9 - 100)	<0.01
Places	50.3 (37.5 - 87.5)	87.5 (75.0 - 100)	0.02
Modifiers	71.7 (45.0 - 88.3)	100 (95.0 - 100)	<0.01
Clothes	56.3 (37.5 - 93.8)	100 (93.8 - 100)	<0.01
People	84.6 (61.5 - 92.3)	100 (92.3 - 100)	0.01
Other	59.4 (45.3 - 81.3)	85.9 (81.3 - 98.4)	<0.01

IQR = interquartile range.

parents are not aware of important language developmental milestones.

As language should be acquired during social interactions,^[11] it was concerning that many children before the age of two years spent hours watching television. The parents of one child in the sample group indicated that their child spent more than five hours in front of the television daily. There is concern about the effect of screen activities on a child's brain development, and the American Academy of Pediatrics recommends no screen activity before the age of 18 months.^[12]

It is unclear why more children in the sample group watched television and DVDs in English. This may explain why the sample group used more English words, but it can also mean that the parents allowed the child to watch English programmes and DVDs, as they perceive this to be the child's best language. This statement is supported by the parents of children in the sample group who indicated that English was their child's best or most complete language. This aspect should be addressed in a larger prospective study.

Though different factors play a role in a child's language development, the children in this study came from a relatively homogeneous, socio-economic group. This included families with Afrikaans as their home language, with children in a preschool, and who could afford private medical services.

A study by Griessel and Van Jaarsveld^[13] comparing two groups of children with attention deficit, of which one group was initially incorrectly diagnosed with autism, showed an 80% sensitivity and a 100% specificity for this occurrence. It was found that learning a language seen on television rather than the home language was an early indication of autism. This atypical language development is thus a specific finding in children with autism, something that has not been previously described in the literature.

This is the first study in SA that quantified the early language development of young children with autism, and can serve as a basis for a more comprehensive study.

Children with autism have a specific cognitive profile in that they are more visually inclined and focus more on objects than on people. They also tend to have difficulty with make-believe games.^[14] It is of interest that the children with autism had the weakest results in the body parts, clothing (people) and toys categories. The group performed best in the vehicle category.

Study limitations

The two study groups were smaller than planned, which may have influenced the

identified often too late after the age of three years, and awareness of the importance of a delay in language development may help early identification.^[10]

Nearly half of parents of children in the sample group (n=5/12) were not concerned about their child's early language development. This may indicate that the

accuracy of the findings. Factors such as socio-economic background and quality of stimulation were not controlled. The different media platforms, e.g., YouTube and streaming, that the children were exposed to, were not specified and were only listed as 'other'.

Recommendations

A larger study should be done to determine whether the findings of the present study can be replicated. It would also be of value to hold a similar investigation in other languages, such as Sesotho, in the case of the Free State.

Parents should be made aware, through the media, magazines, etc., of the importance of the influence of early language stimulation on later school performance and the importance of quality language stimulation through social interaction.

Parents should be made aware of the typical development of language milestones and where to go for assistance, should they be concerned.

The public should be part of the debate around the dangers of early exposure to electronic media.

Conclusion

This study is the first in SA to use a valid measuring instrument to determine the language ability of children with autism and compare it with a control group with typical early language development. Most parents of the children with autism were aware of their child's delay in language development; however, not all these parents were concerned about this. Children with autism have a vocabulary that is poorer than a group of children with typical early language development. We found a trend in that children with autism use more English words than the control group, which is possibly due to audiovisual media exposure. An unacceptably high exposure to audiovisual media was found in children under the age of two years.

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with protocol development, data collection and interpretation of data, and write-up of the study. GJ (Department of Biostatistics, University of the Free State) assisted with the planning, performed data analysis and assisted with the interpretation and write-up of the article.

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1. Lord C, Elsabbagh M, Baird G, Veenstra-Vanderweele J. Autism spectrum disorder. *Lancet* 2018;392(10146):508-520. [https://doi.org/10.1016/S0140-6736\(18\)31129-2](https://doi.org/10.1016/S0140-6736(18)31129-2)
2. National Institute for Health and Clinical Excellence. Autism spectrum disorder in under 19s: Recognition, referral and diagnosis. Clinical guidelines CG128. 2011. <https://www.nice.org.uk/guidance/qs51> (accessed 20 November 2015).
3. Tager-Flusberg H, Rogers S, Cooper J, et al. Defining spoken language benchmarks and selecting measures of expressive language development for young children with autism spectrum disorders. *J Speech Lang Hear Res* 2009;52(3):643-652. [https://doi.org/10.1044/1092-4388\(2009\)08-0136](https://doi.org/10.1044/1092-4388(2009)08-0136)
4. Rescorla L. The Language Development Survey: A screening tool for delayed language in toddlers. *J Speech Hear Disord* 1989;54(4):587-599. <https://doi.org/10.1044/jshd.5404.587>
5. Gonasillan A, Bornman J, Harty M. Vocabulary used by ethno-linguistically diverse South African toddlers: A parent report using the language development survey. *S Afr J Commun Disord* 2013;60:10-15.
6. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Washington, DC: American Psychiatric Association, 2014.
7. Ages & Stages Questionnaires (ASQ). ASQ-3 48-month questionnaire. Baltimore: Paul H. Brookes Publishing. <http://agesandstages.com/resource/asq-3-48-month-questionnaire/> (accessed 20 November 2015).
8. Dawson G. Early behavioral intervention, brain plasticity, and the prevention of autism spectrum disorder. *Dev Psychopathol* 2008;20(3):775-803. <https://doi.org/10.1017/S0954579408000370>
9. Caron V, Bérubé A, Paquet A. Implementation evaluation of early intensive behavioral intervention programs for children with autism spectrum disorders: A systematic review of studies in the last decade. *Eval Program Plann* 2017;62:1-8. <https://doi.org/10.1016/j.evalprogplan.2017.01.004>
10. Sheldrick RC, Maye MP, Carter AS. Age at first identification of autism spectrum disorder: An analysis of two US surveys. *J Am Acad Child Adolesc Psychiatry* 2017;56(4):313-320. <https://doi.org/10.1016/j.jaac.2017.01.012>
11. Bronfenbrenner U. The ecology of human development: Experiments by nature and design. Cambridge, Massachusetts: Harvard University Press, 1979.
12. Council on Communications and Media. Media and Young Minds. *Pediatrics* 2016;138(5):e20162591. <https://doi.org/10.1542/peds.2016-2591>
13. Griessel DJ, Van Jaarsveld A. The early development of children with an autism spectrum disorder and attention deficit disorder. A comparative study. 2016. Poster presented at the XI Autism - Europe International Congress. Edinburgh International Conference Centre, Edinburgh, Scotland, 16-18 September 2016.
14. Ozonoff S, Young GS, Belding A, et al. The broader autism phenotype in infancy: When does it emerge? *J Am Acad Child Adolesc Psychiatry* 2014;53(4):398-407:e2. <https://doi.org/10.1016/j.jaac.2013.12.020>

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