ASSOCIATION ANALYSIS BETWEEN CHILD DEVELOPMENT RISKS AND CHILDREN EARLY SPEECH PRODUCTION BETWEEN 13 AND 16 MONTHS

Análise da associação entre índices de risco ao desenvolvimento infantil e produção inicial de fala entre 13 e 16 meses

Anelise Henrich Crestani(1), Anaelena Bragança de Moraes(1), Ana Paula Ramos de Souza(1)

ABSTRACT

Purpose: to investigate the association between the presence of child development risk and children early speech production between 13 to 16 months of age, and the predictive value of child development risk inventory for language initial acquisition. **Methods:** the sample consisted of 52 mother-child dyads, followed by cut study from 0 to 18 months, and on the evaluation of children's lexical production between 13 and 16 months through spontaneous memories of the mothers and the observation of child behavior. Data were organized in categories and analyzed through the STATISTICA 9.0 software. **Results:** the initial acquisition of language, measured by the number of words spoken by the baby differs significantly in the presence of risks to development in the first phase (0-4 months) and considering babies who were at risk in any of the four phases (0 – 18 months), whereas babys at risk have production number of words statistically lower compared to those without risk. **Conclusion:** through data analysis, the research demonstrated statistical association between child development risk and language acquisition. Children with more risk have minus lexical production.

KEYWORDS: Infant Care; Speech, Language and Hearing Sciences; Risk Factors; Language; Child Development

INTRODUCTION

From birth babies already show communicative signals in interactions with their mothers, called initial protoconversation between mother and baby[1]. Such protoconversation is in the origin of dialogue, in which one can characterize the interlocutors (mother and baby), the speech shifts from the mother and the baby's "speech", these being filled in various ways such as vocalizations, gaze, babble, tonic-postural dialogue, among others[2].

In an enunciable perspective, protoconversation is an element generating disjunctive and conjunctive mechanisms in mother-infant dialogues, that will be instrumental in rearing the baby in and by the language[3], whose first evidence is the baby's early lexical production. In this study, such production is taken as an index of how much the baby is doing regarding the passing from the shown reference to the spoken one.

Studies have shown that flaws in the psychic constitution, as in the case of a baby with autism, may be seen in almost absence of protoconversation[2]. Therefore, there seems to be a relationship between what is detected in the initial protoconversation, psychological risk and future constitution of the baby in language[4]. Thus, it is believed that protocols to investigate psychic risks and/or risks to the child development may predict risks for language acquisition.

In these relationships of the I-you conjunction[3] (infant-mother) in the initial dialogue, the assumption of a subject by the mother is a fundamental aspect, because initially she represents a key role in the

(1) Universidade Federal de Santa Maria – UFSM- Santa Maria (RS), Brasil.

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Conflito de interesses: inexistente

linguistic interpretation of the actions of the baby who does not yet speak (*infans*). To capture such enunciable relations, it was necessary to seek indices of risk for the development which had psychoanalysis as the epistemological basis. Clinical Risk Indicators (CRIs) in Child Development proposed in a Brazilian multicenter research[5-7] are based on four pillars of the psychoanalytic theory about development: establishment of demand, supposition of a subject, alternating presence and absence and paternal function, which were designed on items to note in pediatric consultations in four stages (0-4 months, 4-8 months, 8-12 months, 12-18 months) (Figure 1).

Regarding such indicators (CRIs), they form a set of indices which are observed in the first 18 months of the child's life, anchored in the psychoanalytic theory, whose absence may indicate a disturbance of the evolutionary course of the child. In this perspective, the index functions as a sign that relates to others of the discursive network[7].

By the bias of psychoanalysis and also the enunciable theory, the phase comprising the CRIs belongs to the time when the child is in full construction of their psyche and their subjectivity[8]. Studies indicate that in this period, where the first relationships occur, babies develop a strong bond with the mother or someone replacing her who makes visible the maternal role in the mother-child interactions. It is believed that at this time it is already possible to detect signs that something is not right and intervene if necessary[9].

Therefore, the professional staff working in the care of children from their birth must be attentive to the ways of interaction developed in the family environment, by watching the actions and the repercussions of these on the child development[10].

Some studies using CRIs for the Brazilian reality show that the presence of risk to development may be related to difficulties in the feeding transition of babies[11, 12], the presence of Attention deficit hyperactivity disorder (ADHD)[13], maternal mood changes[14,15], and also affecting change in the initial mother-baby protoconversation[4].

Considering these assumptions, the present research proposes to investigate the association between the presence of risk to child development and initial production of speech of children between 13-16 months of age, in addition to analyzing the predictive value of risk indices of child development in relation to initial language acquisition.

0-4 months	4-8 months	8-12 months	12-18 months
1 – When the child cries or screams, the mother knows what they want. SS/ED 2 – The mother talks to the child in a style particularly directed to them (momish). SS 3 – The child reacts to the momish. ED 4 – The mother offers something to the child and awaits their reaction. PA 5 – There is an exchange of glances between the child and the mother. SS/PA	6 – The child uses different signs to express their different needs. ED 7 – The child reacts (smiles, vocalizes) when the mother or another person are addressing her. ED 8 – The child actively seeks the look of the mother. ED/PA	9 – The mother realizes that some of the child's requests may be a way to draw her attention. ED/SS 10 – During physical care, the child actively seeks games and loving playfulness with the mother. ED 11 – Mother and child share a specific language. SS/PA 12 – The child feels an estrangement towards persons unknown to them. FP 13 – The child is playful. ED 14 – The child accepts a semi-solid, solid and varied diet. ED	15 – The mother alternates moments of attention to the child with her other interests. ED/FP 16 – The child bears well brief absences of the mother and reacts to prolonged absences. ED/FP 17 – The mother no longer feels obliged to meet all the child's demands. FP 18 – The parents establish a few rules of behavior for the child. FP

Final CRIs (KUPFER, 2008)

Figure 1 – Clinical Risk Indicators (CRIs) in Child Development

METHODS

Mandatory ethical norms for research in humans have been used to conduct the research (Resolution 196/96 of the National Health Council – CNS), approved by the Ethics Committee of the University in which the study was conducted, in protocol number 0284.0.243.000-09. All subjects involved in the study were informed about the objectives and procedures, and afterwards read and signed the Statement of Informed Consent.

The sample consisted of 52 mothers and their babies, and full term, preterm or post-term babies were included, who passed the newborn hearing screening in a University Hospital from March to June 2010 and had a positive result. Children born with malformations or syndromes were excluded from the study and also babies whose mothers, assessed by psychologists in the first step of the study, had a compromised psychic structure such as psychosis and schizophrenia.

The dyads were followed from the birth of the babies until 18 months of age, and this time corresponds to the time of collection of the Clinical Risk Indicators (CRIs) in Child Development. This collection started with 182 babies for the more general analyses, but only 52 were part of the study sample, because of the requirements for collecting of the four phases (zero to 18 months) of the protocol, together with the analysis of language in the step of 13 to 16 months, which seeks to capture the initial production of speech.

The collection of the CRIs was conducted in four phases, applying the CRIs corresponding to each phase, as shown in Figure 1. Therefore, the babies were seen between 0 and 4 months; between 4 and 8 months; between 8 and 12 months; and 12 and 18 months. Besides the natural observation of the CRIs during observation of the dyad, a filming was made, lasting about ten minutes, to record the mother-infant interaction and enable a second assessment of the CRIs by another experienced reviewer. If there were any questions, the infants were retested within a range of up to one week.

In the step where the babies were aged between 13 and 16 months, the initial production of speech was collected during a visit by the researchers to the family home. The collection on this day included spontaneous comments by the mothers, given that the babies had not expanded their vocabulary and spoke a few words, and considering what some authors say about the reliability of spontaneous comments by mothers up to 1 year and 10 months by means of the comparison of a check list applied to mothers and vocabulary evocative tests[16].

In this research, besides the spontaneous comments about words spoken by the baby, which was aimed at obtaining quantitative data of child vocabulary, one sought to observe, in home visits, mother-baby or other family member-baby scenes of dialogue for the researcher to confirm that this number actually showed the ability to use a declarative mechanism for co-reference in their verb form, i.e., the baby was producing recognizable words as a sign by the adult. This was achieved by means of observation during the interview for the CRI protocol, and also by some filming of adult-child interaction. In general, one observed more than 70 % of the lexical items reported by mothers during the collecting session in observation of the dyad and/or dialogue of the examiner with the child.

For purposes of analysis, was considered the ability or not of the child to produce words on a quantitative scale. Taking into account that the more words the child could produce the more they would be using the possibility of establishing a verbal co-reference, and the memory of the mothers is built from natural conversational contexts, in which the child regularly uses the same words in situations of communication with them.

The pooled data, i.e., maternal remembrance and observation of the researcher, is presented in Table 1.

Such data was organized into categories of responses that were stored in a spreadsheet. For statistical analysis, the computer application used was STATISTICA 9.0. The categories used were:

- Analysis of standardization of age of children with and without risk to see if there was a statistical difference in age between the two groups;
- Number of words: where the mother indicated what the child was speaking at collection from her perspective, related to an obvious ability to verbally co-note during the observation of the examiner. One considered the number of words spoken by the child between 13 and 16 months;
- Regarding the CRIs, the children were separated into two major groups: no changed CRI, one or more changed CRIs.
- Considering the great subdivision between presence and absence of risk, the groups were analyzed by age group of the indices (0-4 months, 4-8 months 8-12 months and 12-18 months) in its association with speech production between 13 and 16 months.

The quantitative data analysis was performed using descriptive and inferential statistics. The non-parametric Mann-Whitney U test was used, with a significance level of 5 %.

Table 1 – Age of observation (the researcher's assessment and maternal memory) and production number of the babies' words

Baby	Age in months of the collection	Number of words
1	13	5
2	13	4
3	13	5
4	15	7
5	14	5
6	13	2
7	13	3
8	16	17
9	16	12
10	13	3
11	14	4
12	13	4
13	15	6
14	13	6
15	13	12
16	15	7
17	16	8
18	13	6
19	13	5
20	16	7
21	16	9
22	13	5
23	16	12
24	14	9
25	16	15
26	13	8
27	15	4
28	13	6
29	16	17
30	15	8
31	13	7
32	15	0
33	13	4
34	13	6
35	16	11
36	14	5
37	16	10
38	14	8
39	13	4
40	13	6
41	14	15
42	13	5
43	14	15
44	14	11
45	13	4
46	13	6
47	14	9
48	14	16
49	14	13
50	14	8
51	13	6
52	14	6

RESULTS

Considering the possible linguistic effects of children's ages, it is worth noting that care was taken to compare the ages of children at the time when communicative performance was assessed, according to classification of absence or presence of risk in relation to these CRIs of each step (0 – 4; 4 – 8; 8 – 12; 12 – 18), in order to verify if the age of the children (13-16 months) would influence the communicative performance in the presence and absence of risk to child development, namely, the effects of different ages in the language were considered, as a child of 16 months generally speaks more than a child of 13 months.

Statistical analysis of the results in Table 2 indicated that the age of the children did not differ significantly between risk and without risk, in all ranges of the CRIs tested (p value > 0.05). In verifying the babies that showed or not some changed CRI at some collection period (0-18 months), the result also showed that the age of the children did not differ for these two groups, with risk and without risk. This made it possible to compare the groups in relation to the initial production of speech and results in the CRIs protocol.

In Table 3 above is the result of the analysis comparing the children's initial production of speech and CRIs in each age group (0-18 months).

The results show (Table 3) that the range of assessment of the CRIs of zero at four months had a statistically significant higher sensitivity to predict differences between the initial number of words in relation to the CRIs because children at risk of development at this stage (changed CRIs) were the ones with the fewest words produced between 13 and 16 months.

Also the overall analysis of change of the CRIs during the 18 months (0-18 months) showed that the protocol as a whole could predict risks to language development, in view of the significance observed when analyzing the continuous range of zero to 18 months, i.e., children who were at risk at some stage produced fewer words between 13 and 16 months compared with those who were at no risk.

Table 2 – Measurements of the ages of the children in the assessment of the communication performance regarding the Clinical Risk Indicators (CRIs) in Child Development

Range of CRIs	Age (months)*		p-value
	Without risk	With risk	
0 – 4	14,0 ± 1,2	14,1 ± 1,2	0,847
4 – 8	14,1 ± 1,2	13,7 ± 0,6	0,766
8 – 12	14,1 ± 1,2	14,1 ± 1,2	0,918
12 – 18	14,1 ± 1,4	14,1 ± 1,1	0,874
0 – 18	14,0 ± 1,2	14,1 ± 1,2	0,649

CRIs = Clinical Risk Indicators (CRIs) in Child Development; *Average ± standard deviation (number of words); Without risk = children without changed CRI; With risk = child that showed at least one changed CRI; **Significant by the U test of Mann-Whitney

Table 3 – Measurements of the verbal co-reference by the number of words in the range of 13 to 16 months regarding the Clinical Risk Indicators (CRIs) in Child Development assessed in the four phases of the CRIs

Age range (months)	CRIs*		p-value
	Without risk	With risk	
0 – 4	8,2 ± 4,0	4,9 ± 3,5	0,024**
4 – 8	7,7 ± 4,2	6,3 ± 1,6	0,763
8 – 12	8,2 ± 4,4	6,7 ± 3,2	0,240
12 – 18	8,0 ± 4,2	6,2 ± 3,4	0,339
0 – 18	9,5 ± 4,3	6,3 ± 3,3	0,009**

CRIs = Clinical Risk Indicators (CRIs) in Child Development; *Average ± standard deviation (number of words); Without risk = children without changed CRI; With risk = child that showed at least one changed CRI; **Significant by the U test of Mann-Whitney

DISCUSSION

The results of this research show that the acquisition of language in its dimension of speech production significantly correlates to the presence of risks to child development, evidenced in the ongoing analysis of the four age groups of the collection of analyzed CRIs. Thus, children at risk of development between zero and 18 months, produced statistically significant fewer words than the ones without risk.

These results demonstrate the connection between psychological risk and/or development and presence of risk to the acquisition of language. One can not say that these children will develop language disorders, but that they are in a less favorable situation for such development than children without the presence of risk.

Regarding the analysis of the four phases that constitute the CRIs, one can notice that the first phase comprising zero to four months of age of the child was more sensitive to capture a delay in language acquisition. A possible explanation for this result is that the indices of this important phase significantly capture the functioning of the maternal position, because the maternal Other takes the baby's manifestations, expecting that it is taken as something to be read and not as something of the observation field[17]. The aforementioned aspect could be observed in the analysis of each index of phase I (0-4 months).

CRI 1, that is related to the mother knowing what the baby wants when they cry, assigns an interpretation in language attuned to the demands of the baby, which can facilitate the insertion of the baby in language functioning, according to several authors [4,12,14,15].

This is also connected to CRI 2, in which it is analyzed if the mother uses the *momish*, and to CRI 3, in which it is observed if the baby reacts to it. Both reflect the essence of protoconversation[1,2]. If they are absent, they demonstrate that the initial mother-baby dialogue is not being well processed.

Some authors claim that the mother's speech is a rehearsal of who carries the maternal role of making sense of bodily impulses of the baby[18], and both the desire and the "no desire" of the mother are expressed through her voice. It can be hypothesized from the results of this research that the baby who does not live this qualified experience may not be being inserted with the same magnitude in the world of language.

Also CRI 4 is in that context, as the mother is related to being able to propose something and giving time for the baby's response, which may have a reading related to the genesis of shifts in the dialogue[4].

Regarding CRI 5, it is observed that the exchange of glances is under no verbal communication between mother and baby and it can therefore be assumed that this aspect is the initial basis of protoconversation that features both maternal investment and the baby's symbolic appetite[19-21].

Assuming that the dialogue is the basic element of the language in the enunciable perspective used in this research[3], the statistical association of the CRIs in phase zero to four months may therefore be justified in the sample studied with the initial production of speech searched between 13 and 16 months of the children.

This study proves, therefore, that both the baby's appetite and skills assessed in CRIs, e.g., CRI 3: The child reacts to momish; IRDI 5: There is an exchange of glances between the child and the mother; IRDI 6: The child uses different signs to express their different needs; IRDI 7: The child reacts (smiles, vocalizes) when the mother or another person are addressing her; IRDI 8: The child actively seeks the look of the mother; IRDI 10: During physical care, the child actively seeks games and loving playfulness with the mother; IRDI 13: The child is playful, etc., as the parental investment exemplified in the indices, e.g., IRDI 1: When the child cries or screams, the mother knows what they want; IRDI 2: The mother talks to the child in a style particularly directed to them (momish); IRDI 4: The mother offers something to the child and awaits their reaction; IRDI 9: The mother realizes that some of the child's requests may be a way to draw her attention; IRDI 17: The mother no longer feels obliged to meet all the child's demands; IRDI 18: The parents establish a few rules of behavior for the child, etc., and this is a factor that can interfere with the initial language acquisition. However, future studies that can establish a broader assessment of language of these children may deepen and qualify the analysis of the acquisition of language in children at risk for development in a combined perspective between the psychoanalytic and the enunciable fields and provide further insight into the process of early intervention.

It is believed that this research could be taken, however, as an indicator that there is a positive relationship between what is in the CRI protocol and the initial process of language acquisition, demonstrating the potential of the protocol used to predict risks of development of language acquisition.

The implication of this study suggests the importance of implementing the CRI protocol in primary care services for maternal and child health, and the need for future research for the follow-up of infants who are at risk of child development until more advanced ages than this research proposed to investigate.

CONCLUSION

Considering the objectives of this research, it was observed that there was an association between the CRIs and the initial production of speech. Thus, infants at risk had lower initial production of speech than babies without risk.

Regarding the predictive value of each age group analyzed by the indices of risk to child development, it was observed that CRIs of the first phase (0-4 months) are the best evidence that the initial production of speech, i.e., the absence of these indices, was crucial to the lower initial production of speech.

RESUMO

Objetivos: investigar a associação entre presença de risco ao desenvolvimento infantil e produção inicial de fala de crianças na faixa de 13 a 16 meses de idade e analisar o valor preditivo dos índices de risco ao desenvolvimento infantil em relação à aquisição inicial da linguagem. **Métodos:** a amostra foi constituída de 52 díades mães-bebês, seguidas em estudo de coorte de zero aos 18 meses, por meio dos Índices de risco ao desenvolvimento infantil e avaliadas quanto à produção de fala entre 13 e 16 meses por meio de lembranças espontâneas das mães e da observação do comportamento infantil. Os dados foram organizados em categorias e lançados para a análise estatística no aplicativo computacional STATISTICA 9.0. **Resultados:** a aquisição da linguagem inicial, medida pelo número de palavras faladas pelo bebê, difere de modo significante na presença de riscos ao desenvolvimento na primeira fase (0 – 4 meses) e considerando bebês que apresentaram risco em alguma das quatro fases (0 – 18 meses), visto que bebês com risco apresentam número de produção de vocábulos estatisticamente inferior em relação aos sem risco. **Conclusão:** pela análise dos resultados a pesquisa demonstrou associação estatística entre risco ao desenvolvimento infantil e produção inicial de fala. Quanto maior o risco menor a produção de fala.

DESCRITORES: Cuidado do Lactente; Fonoaudiologia; Fatores de Risco; Linguagem; Desenvolvimento Infantil

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Mailing address:
Anelise Henrich Crestani
R. André Marques, 185/301
Santa Maria – RS – Brasil
CEP: 97010-041
E-mail: any.h.c@hotmail.com