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This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1631661> since 2017-04-01T22:03:35Z

Publisher:

Medimond International Proceedings

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UNIVERSITÀ DEGLI STUDI DI TORINO

This is an author version of the contribution published on:

Questa è la versione dell'autore dell'opera:

Molina P., Guidetti M., Thommen E., Sala M.N., Bulgarelli D., Ongari B., Schadee H., Berland A., Cochard N., Barone P., Deguine O., Rossini E., Di Fulvio A., Rudelli N., Cattelan C., Zecchin M., Molteni M. (2016). Evaluating early communicative development, *Proceedings of 17th European Conference on Developmental Psychology* (103-109). Bologna (I): Medimond International Proceedings [ISBN 978-88-7587-733-0]

The definitive version is available at:

La versione definitiva è disponibile alla URL:

<http://www.edlearning.it/proceedings/moreinfo/20150908.htm>

Evaluating early communicative development.

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Abstract

The communicative context is a key aspect of development in early childhood; it is therefore of critical importance to develop instruments for evaluating young children's competence in communication and social interaction. The ECSP scale (the acronym for *Echelle d'évaluation de la Communication Sociale Précoce* – the standardized and adapted French version of the American *Early Social Communication Scales* [1], by Guidetti and Tourrette [2]) is one of the most promising tools currently available for the evaluation of early social communication in all its complexity. This paper presents the data for the standardization and validation of the ECSP in two different countries (France and Italy), as well as two further studies testing the scale's effectiveness in evaluating child development in atypical populations (composed of deaf and autistic children, respectively). Overall, we found that the ECSP is an effective tool with rich potential for the evaluation of early communication in both typical and atypical populations.

Keywords: infancy, communication, ECSP, deafness, autism.

Introduction

Recent studies on early development have identified the communicative context as a key factor not only for the development of communication and language, but also for the development of relational and affective competence, and social cognition [3, 4, 5]. Hence the requirement for reliable and effective measures of early child-adult communication. The ECSP scale (the acronym for *Echelle d'évaluation de la Communication Sociale Précoce* – the standardized and adapted French version of the American *Early Social Communication Scales* [1], by Guidetti and Tourrette [2]) is one of the most promising tools currently available for the evaluation of early social communication in all its complexity. The ECSP was first devised over 20 years ago to supply the lack of instruments for evaluating communicative development. Two theoretical paradigms informed the definition of the scale's content and structure. The first of these was Bruner's vision [6, 7] of developmental pragmatics based on the notion of continuity between prelinguistic and linguistic communication, together with Bates, Camaioni and Volterra's [8] distinction between protodeclaratives and protoimperatives. This paradigm led to the definition of the three communicative functions evaluated by the ECSP: Social Interaction (SI), Joint Attention (JA) and Behavior Regulation (BR). The second theoretical paradigm followed was Fisher's [9] neo-Piagetian model, which prompted the structuring of the scale to reflect five developmental levels (see Fig. 1).

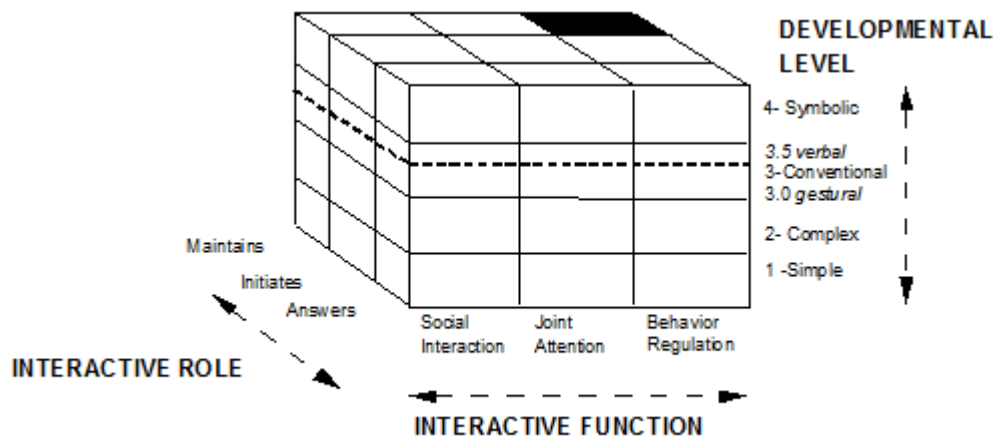


Figure 1: The ECSP structure and content

The ECSP comprises 23 interactive situations, such as being presented with a mechanical toy or other appealing and age-appropriate materials, singing a conventional action song, looking at a picture book, receiving basic instructions, and so on. The child is shown a selection of toys and objects (balls, toy cars, puppets, posters, books, etc.), in order to elicit occurrences of a possible 108 communicative behaviors.

Each occurrence is then coded in terms of its communicative function, the level of development it reflects and the child’s role in the interaction. For each communicative function – with the exception of “behavior regulation” – the child may play three alternative roles in the interaction: he/she may initiate the interaction, respond to it or maintain it. The scores for the coded behavioral occurrences may take the form of *total scores*, corresponding to the sum of the scores received for all the behaviors actually produced, or of *optimal levels*, corresponding to the highest levels at which the child produces behaviors for each function. Finally, each participant’s *mean level*, i.e. the mean of the optimal levels attained for the three functions, may also be computed. The difference between children’s *scores*, reflecting the overall range of behaviors they currently engage in, and their *optimal levels*, corresponding to the most advanced behaviors they are currently able to produce, can inform the design of personalized therapeutic interventions targeting their “zone of proximal development” [10].

To date, this scale has proved useful for assessing children with disabilities and developmental disorders (autism, language delay, intellectual disability, etc.). In France, it is recommended by the National Health Authority and the French Federation of Psychiatry for evaluating communication in subjects with autism and deafness. It is generally administered to children aged 3-30 months, but given that its upper limit of application is the point at which the child begins to combine words, it may also be used with older children displaying atypical development.

The ECSP is of particular interest because:

- it enables the development of communication to be assessed from the earliest months of life;
- it evaluates interactive and pre-linguistic communication;
- it has been standardized on typically developing children in two countries;
- its reliability has been confirmed by studies conducted with large samples;
- it clearly discriminates between typical and atypical development.

Our ongoing work is focused on adapting the scale to meet the specific needs of different groups of children with atypical development (deaf children, children with autism, blind children, etc.) and on exploring how it may be used to evaluate intervention strategies.

Method and results

1.1 Study 1: Standardization and validation of the ECSP in French and Italian samples.

The French sample was composed of 190 typically developing children (93 females) aged between 3 and 30 months (M = 16.9, SD = 7.8). The data were collected in the Poitou-Charentes region in the 1990s, prior to the initial publication of the scale. In this sample, both scores and optimal levels were found to increase with age and internal validity was confirmed. This result provided support for the scale’s hierarchical structure. The external validity of the ECSP was computed with a second sample comprising 145 children, who were also administered the Brunet-Lézine scale (BL [11]). The findings in this case included a significant correlation ($r = .352$, $p < .01$) between the language scores obtained on the BL and the JA scores obtained on the ECSP, suggesting that joint attention plays a role in the emergence of lexicon.

The Italian sample on the other hand, was recruited in different waves. The first round of data collection concerned a sample of about 200 children, recruited over the 1994-1997 period, mainly in Trento and Milan; data from an additional 200 children were collected subsequently, in the course of multiple research projects conducted in Piedmont, Trento and Milan. Currently, the total Italian sample comprises 423 children (207 girls), aged between 2 and 30 months ($M = 16$ months, $SD = 8$ months). After controlling for age, we did not find any significant differences in the mean levels of the earlier and later subsamples (regression on Mean Total Scores, $N=423$: age effect: $\beta=.887$, $R^2=.786$; $p<.001$; sample effect: $\beta=.044$, $\Delta R^2=.001$, $p=.362$, on residuals of first step scores). Using the data from the first subsample, we performed confirmatory factorial analysis on participants' optimal levels [12], finding evidence for a single factor model. In addition, we found substantive correlation between participants' ECSP scores and their scores on the McArthur questionnaire [13, Italian version 14] as completed by their parents, in a subsample recruited in Trento [15].

On comparing the two country samples, we found a small but significant difference in mean levels of communication ability (regression on Mean Total Scores, $N = 613$: age effect $\beta = .874$, $R^2 = .772$, $p <.001$; sample effect: $\beta = .126$, $\Delta R^2 = .007$, $p <.002$, on residuals of first step scores). Nonetheless, both groups displayed a similar pattern of development as a function of age: specifically, as illustrated in Fig. 2, there was strong correlation between communicative competence and age in both cultural samples (Mean Total Scores: French sample $r = .861$, $p <.001$; Italian sample $r = .887$, $p <.001$), as well as in the overall sample ($r = .874$, $p <.001$); there were no significant differences between the two samples in relation to degree of correlation ($Z=1.257$, $p > .05$, two-tailed Fisher's Z Test).

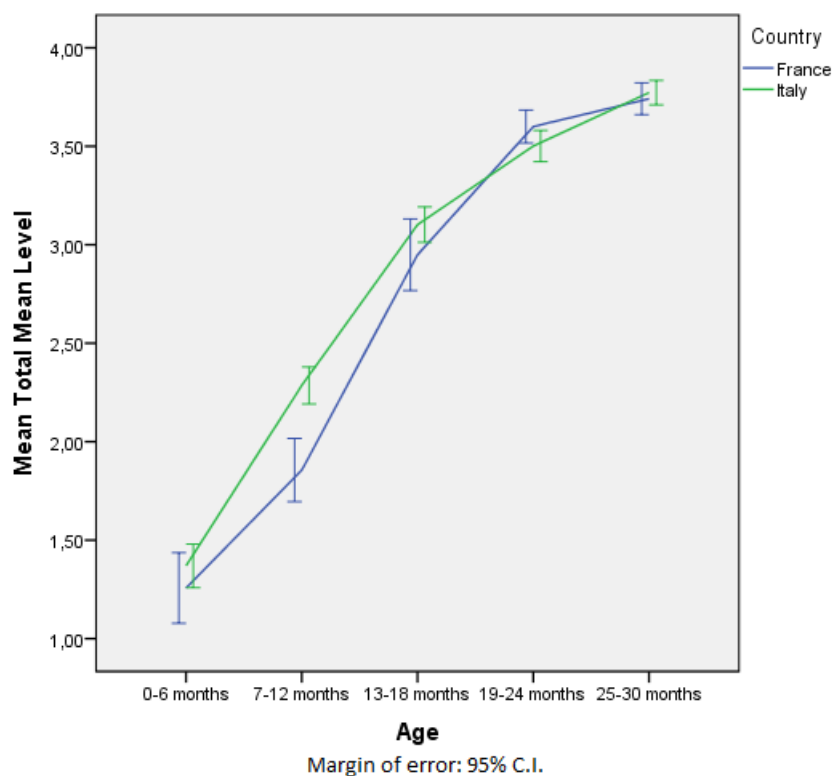


Figure 2: Developmental trend of mean level scores in French and Italian samples

1.2 Study 2: Early communication in cochlear implanted children.

Cochlear implants (CI) allow profoundly deaf children to develop their understanding of spoken language and acquire speech. Numerous studies have indicated that children implanted before the age of twelve months display more advanced perceptual and communication skills than children implanted later. However, even the children implanted at the youngest ages display considerable inter-individual variability in outcomes. We set out to investigate this variability by conducting a longitudinal study designed to determine the impact of cognitive development on communication and perceptual development. We also evaluated whether additional factors (e.g., other characteristics of the children and their families, the device used, and educational environment) were correlated with the outcome variables of communication and perceptual skills. Seven participants aged between 1 and 3 years old were evaluated before receiving the implant and subsequently reassessed at 3-month intervals, up to 12 months after activation of the implant. Test measures included: the ECSP [2], used to assess cognitive and communication abilities; the Brunet-Lézine-Revised

scale [11], chosen to evaluate global development; and the “Sound Room” detection task, deployed to measure participants’ ability to perceive non-linguistic everyday sounds. We hypothesized that the development of pre-linguistic skills would influence performance at 6, 9 and 12 months post-implantation, and that the inherent characteristics of the child and its family (presence of siblings, maternal education, etc.) and the child’s auditory characteristics would be associated with later outcomes. The data showed that, at pre-implantation, subjects displayed an overall delay in communicative ability compared to normative values. However, their early social communication development was broadly in line with normative patterns up to the age 17 months (see Fig. 3), with a more sizeable gap appearing to develop from the age of 18 months onwards. Despite the heterogeneity among subjects, a positive and significant correlation between joint attention and language skills was observed 12 months after CI activation.

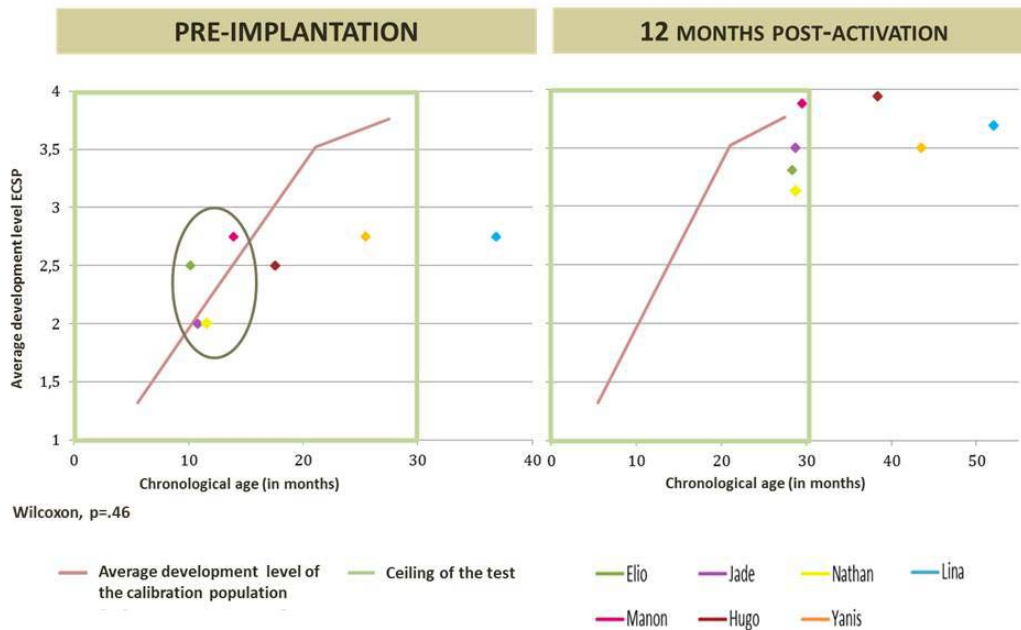


Figure 3: Early social communicative development in deaf children with CI, before implantation and 12 months post-activation

This study (see also [16]) contributes to our understanding of the developmental trajectory for language and communication in deaf children with a CI, which is different to that of normally hearing children of the same chronological age, but similar to that of hearing children of the same hearing age. It follows that these children’s communicative competence should not only be compared to standardized data, but also evaluated in relation to their hearing age, while taking into account their pre-implantation level of linguistic competence. The findings also suggest the importance of assessing deaf children not only in terms of their speaking competence, but also in terms of their ability to engage in multimodal communication in response to given inputs. However, the size of the cohort did not allow us to control for other variables that may have significantly affected the results, such as etiology of deafness, age at implant, or type of communication background (pre-implantation exposure to oral or sign language in the home). Future studies are needed to specifically investigate these factors.

This research also advanced our awareness of how best to administer the ECSP with deaf children and helped us to adapt the scale to suit the characteristics of deafness. One key issue concerns identifying the most appropriate type of communication/speech to use in the evaluation of young deaf children. Given that the majority of deaf children are born into hearing families, they communicate on a bipolar continuum that runs from speech only to sign language only. As a consequence, they should be assessed in the modality in which they are currently most competent. In this regard, when assessing children in sign language, some of the interactive situations in the ECSP are difficult to reproduce, such as asking subjects to point to body parts. In sum, any assessment of children with atypical development should take into account the heterogeneity of their clinical profiles.

1.3 Study 3: A training study with autistic children.

Intervention focused on enhancing social skills is of key importance for subjects with autism, and is especially critical for very young children who have just been diagnosed. The most effective means of evaluating and monitoring these children’s social development – and particularly what instruments should be used for this purpose – is still a matter of debate. The ECSP scale [2] is one of the tools currently available for analyzing the social and communicative development of children with autism.

In this study, we used the ECSP to evaluate 34 children with autism (2 to 4 years old, $M = 3$ years). Two assessments were carried out six months apart. During the 6-month interval between assessments, all children underwent one of two types of early intervention. Seventeen subjects received intensive ABA intervention and the other 17 received twice-weekly training in social abilities (SAS, [17]). Assignment to the two groups was quasi-randomised. The evaluators were blind to the type of intervention programme followed by the children they tested.

Overall, the participating children displayed enhanced social communication skills at the end of the six-month trial. This trend was found in both treatment groups. Gains varied significantly as a function of developmental age ($F(1,32) = 16$; $p < .001$). Only six children obtained no improvement in their global score.

In order to validate our use of the ECSP, we compared subjects' ECSP scores with their CARS scores [18], finding a significant correlation between the two evaluations ($r = -.64$): higher levels of autistic symptoms corresponded to poorer outcomes on the ECSP.

Concerning the ECSP subscales, when the individual scores for the different communicative functions were analysed, significant improvements from pre- to post-test were found for two of the three subscales: the subscale Joint Attention ($F(1,32) = 8.9$; $p = .005$) and the subscale Social Interaction ($F(1,32) = 11.8$; $p = .002$).

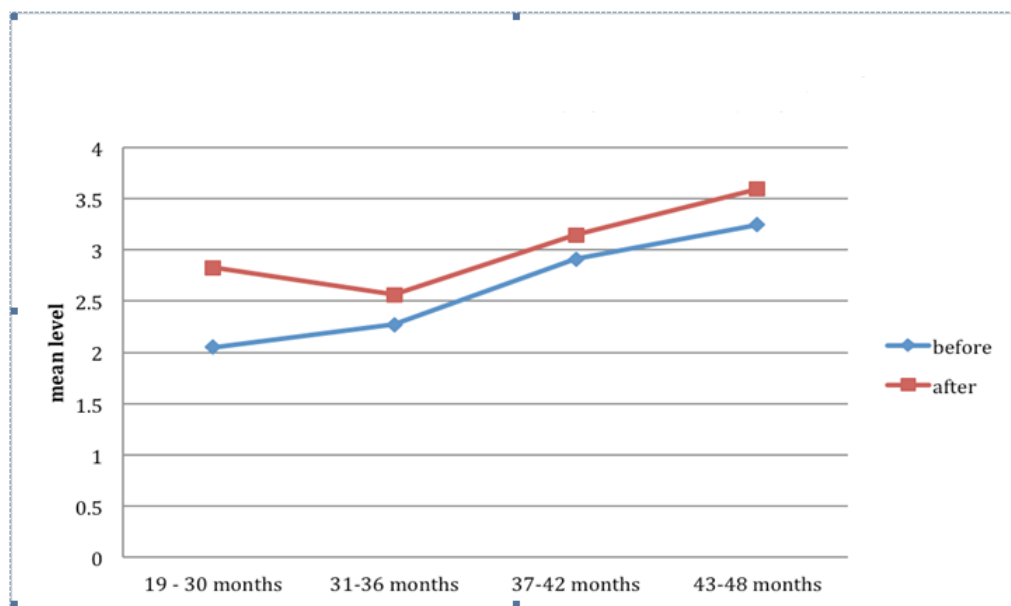


Figure 4: Mean optimal level of children with autism by age group and time of evaluation

These research findings have multiple implications. First, the effectiveness and sensitivity of the ECSP in evaluating the development of autistic children's social abilities means that this scale is a valuable tool for tracking ongoing progress, which should be incorporated into clinical practice. Second, monitoring the developmental trajectory for social understanding in children with autism is helpful to those attempting to understand this process and train children in social competence. Our study captures this pattern of development, showing that although children with autism are impaired in social interaction, their social competence increases over time.

Conclusion

Overall, our results confirm that the ECSP scale offers a sensitive instrument for the evaluation of early communication development, with the potential to capture change over time. The standardization sample comprised a large number of young children, and the comparison between French and Italian samples seems promising, although the slight difference between the scores requires further analysis. We are currently collecting additional data from clinical samples, such as deaf children with deaf and hearing parents, children with autism and other neurodevelopmental disorders. Our ultimate aim is to adapt the ECSP administration procedure and materials to these different pathologies, and to inform clinical practice by producing differential developmental profiles for different clinical groups.

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