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Assessment of Conversational Pragmatics: a screening tool for pragmatic language impairment in a control population of children aged 6–12 years

Running title: Screening for pragmatic language impairment

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ABSTRACT

Pragmatics can be defined as the way in which language is used to communicate in a given social context. Although there is a lack of a standardized assessment, healthcare professionals find themselves confronted with pragmatic language skill impairments in children with neurodevelopmental disorders or brain injuries. The characterization of language use causes problems in social interactions, which has clinical implications in daily life. However, this is still underestimated because there is currently no quick, easy-to-use screening device to rank these deficits.

We have developed a pragmatic deficits screening chart that has been tested on a control population of children aged 6–12 years. The chart comprises 26 items exploring seven areas of pragmatics (intentionality, governance of exchange, organization of information, adaptation strategies, conversational implicit language, nonverbal skills, and paralinguistic aspects). Parents select one of four possible answers to describe how frequently their child demonstrates each type of behavior (*never*, *rarely*, *sometimes*, *often*). We distributed 1666 charts; 760 were returned, of which 552 could be analyzed.

Internal consistency as measured with Cronbach's alpha coefficient (0.88) was satisfactory. There was no influence of age on total score, nor of the department/type of schooling. The population distribution was non-Gaussian so the results are presented in percentiles.

We propose a first-line screening tool that is quick and easy to complete by family, which facilitates referral to specialists for further investigations into the etiological implications of pragmatic language impairment.

KEYWORDS

Pragmatics, Assessment, Test, Standards, Children

1 INTRODUCTION

Pragmatics is a complex subject encompassing linguistics, psychology, sociology, and philosophy disciplines, and has many definitions depending on these different fields of research. In accordance with Rondal et al., language is not just a question of mastering the structural aspects (lexical, syntactical, etc.), but also implies an appropriate use in a situation requiring communication [1]. A pragmatic disorder therefore implies a mismatch between language and context [2].

Pragmatic disorders are mentioned as a new diagnostic category in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) [3]; it is called social (pragmatic) communication disorder (SCD), which is similar to the semantic-pragmatic deficit syndrome in the last DSM edition [4]. SCD appears to be a contributing factor in the diagnosis of autism spectrum disorder (ASD) when disorders include "restricted, repetitive patterns of behavior, interests or activities." It may also be a comorbidity in other language disorders. Finally, pragmatic disorders may be considered as a symptom or a syndrome within the clinical situation.

One of the difficulties for healthcare professionals is identifying pragmatic language impairment and therefore suggesting a more extensive assessment of communication abilities and structural language skills. They need effective screening tools to detect pragmatic disorders. According to the World Health Organization (WHO) definition, these tools should enable "presumptive identification of unrecognized disease or defect by the application of tests, examinations, or other procedures which can be applied rapidly (…to…) those with previously undetected disease." [5]

The diagnostic tools available today are chiefly in English [6], and include the Pragmatic Protocol [7] or the 1st [8] and 2nd editions [9] of the Children's Communication Checklist (CCC). The 1st edition of the CCC was translated into French by Maillart in 2003 [10] and the

2nd was translated into Canadian French by Vézina et al. [11], following the guidelines laid down by the International Commission for the Adaptation of Tests [12]. This is of particular importance since any evaluation of pragmatic language ability must be conducted in a given language and thus requires translation into the appropriate language with allowances made for cultural factors [13]. However, the time required to give, correct, and interpret these evaluations is not always compatible with the clinical reality of nonspecialist professional practice in this field, either in private practice or within a healthcare structure.

Therefore, the need for a screening tool addressing the following criteria became apparent:

- Quick and easy to use in real time for the therapist and the family;
- Easy to obtain as much information as possible from the parents about how the child uses language in everyday situations (information that is not easily accessible during the consultation time) [14].
- Valuable to assess the presence of pragmatic difficulties suspected by the practitioner.

With such a tool, it would be possible to objectify the "clinical judgment (…) including a feeling of social discomfort when interacting with the patient" [15]. The TOPICC [16], an English-language tool, meets these criteria since it was developed with the same concern for real-time use. It includes 18 items corresponding to key behaviors in pragmatics with an evidence-based practice pre- and post-intervention, but this tool has not yet been standardized. We therefore developed the Assessment of Conversational Pragmatics (ACP) evaluation chart. The name is a reference to the conversational component of pragmatics based on the work of Pouscoulous and Novek, who distinguish the conversational meaning of the statement from its conventional linguistically encoded meaning [17].

The ACP questionnaire was based on different theories defining pragmatics in order to discriminate between the different domains of conversational pragmatics to be explored. Austin's speech act theory differentiates the speaker's intention, what is said and the effects

on the listener [18]. Our questionnaire sought to explore intentionality. Grice's theory of conversational principles [19] emphasizes cooperative principles in conversation such as politeness, turn-talking, and topic management. Adaptive strategy, governance of exchange and implicit language were also explored. Organization of information was linked to the theory of mind by perspective-taking skills [20]. We also distinguished nonverbal and paralinguistic skills [21] involved in conversational pragmatics.

The objective of the current study was to test the ACP in a control population with a view to establishing norms for use in clinical practice.

2 METHOD AND POPULATION

2.1 Population

2.1.1 Recruitment

With the consent of the local education authority, 1666 charts were randomly distributed to all children between the ages of 6 and 12 years in six state schools of the Pas-de-Calais department in the north of France (individual distribution and replies gathered in a closed box at school). Also, with the consent of the head teachers concerned, in five state-registered private schools in Vendée (distribution by post and replies gathered in a closed box at school). The parents were also sent an explanatory letter with the chart. Given that parents were under no obligation to respond, all documents completed and returned were deemed to represent parental permission.

Exclusion criteria were determined to limit the risk of bias in recruiting the control population:

- **Children who had had speech therapy since preschool and for more than 2 years**. This enabled us to exclude any children with an undiagnosed speech disorder. Speech therapy initiated during preschool is more often than not to treat spoken language disorders; a disorder is considered persistent if it lasts for more than 2 years.

- **Psychological monitoring**, to ensure none of the children in this group had suspected autism spectrum disorder or any other psychological disorder likely to affect the pragmatic skills of the child.

2.1.2 Control group

A total of 1666 charts were given out and 760 were returned. Of these, 552 could be used while 208 were excluded:

- in 100 cases, the exclusion criteria (detailed in section 2.1.1) applied;
- the remaining 108 could not be included because of missing data (e.g., history of prior therapy, socioprofessional category of the chart-filler, school grade or date of birth of the child, items not answered) or age limit not applicable (minimum 6 years old).

The final control population sample was made up of 282 boys (51%) and 270 girls (49%), aged 6.0 years to 12.0 years when the charts were given out, i.e., between 4 and 28 January 2016. The sample was well balanced in terms of the number of participants per age group (Table 1), with the exception of the 11- to 12-year-old age group, which was under-represented. The sample population distribution according to the socioprofessional origins of the parent filling in the chart was also documented in line with the 2003 classification of socioprofessional categories laid down by the French National Institute for Statistics and Economic Studies (Institut National de Statistiques et d'Etudes Economiques [INSEE]) [22]: agricultural workers, 1%; skilled craftsmen, retailers, entrepreneurs, 5.43%; managers, senior management, and professionals, 13.77%; technicians and associate professionals, 6.16%; employees, 44.93%; trades workers, 18.48%; retired people, 0.36%; others, without employment, 10.69%. With the exception of the "unemployed" category, with greater numbers in Pas-de-Calais than in Vendée, the department of origin did not influence the distribution of the socioprofessional categories of the population.

2.2 Material: assessment of pragmatic conversational skills

The first step was the development of a questionnaire in three versions to study the relevance of the tool and the pre-feasibility. One version was for parents and teachers with 75 items and the other version was for speech-language pathologists with 115 items. The second step was a feasibility study on a trial group of 54 patients allowing the questionnaire to be reduced to 35 items for parents and teachers and 60 items for speech-language pathologists.

The third step consisted of a sensitivity study, but was not relevant because an insufficient number of questionnaires was returned. No inter-judge correlation was discovered however. The questionnaires were found to be longer in the qualitative assessments and some items difficult to understand and rarely completed.

These preliminary results finally enabled us to produce a single and shortened version of the ACP questionnaire for parents only.

Development of the ACP adhered to the following guidelines:

- Great care was taken in the way the different items were worded and presented: explanations and examples were added and the layout simplified. Only items seen as meaningful and important in the screening of pragmatic impairment were retained, while allowances were made for subfields of language pragmatics and interim correlations that were too high (redundant).
- There was a single version of the ACP; it was completed by the parents and confirmed or contested the practitioner's suspicions, given that it was based on the parents' detailed report of their child's personality and behavior [23].

The ACP is a booklet with an information section that includes date of birth, date of the evaluation, school grade/class, gender, family tie with the person completing the chart, and socioprofessional category. It also contained 26 items (Table 2), a score chart, and, for the

purposes of this study, a number of optional additional questions on other aspects of the chart (time required to complete it, visual appearance, any further comments).

Most of the 26 items were followed by an explanation and/or an example to ensure it was as clear as possible.

Twenty-six items were included according to different areas of pragmatics. We defined seven subscales referring to intentionality (items 1, 2, 5), governance of the exchange (items 4, 6, 7, 9, 10), organization of information (items 8, 12, 14), adaptive strategy (items 11, 12, 13, 18), conversational implicit language (items 15, 16, 17, 24, 26), nonverbal skills comprising eye contact, distance, facial expression (items 3, 18, 19, 20, 21), and para-linguistic aspects, which mostly concern expression and understanding of intonation (items 22, 23, 25) [23, 24].

The parent filling in the chart was asked to estimate how often their child demonstrated each type of behavior pattern from: *never*, *rarely*, *sometimes*, or *often* (Figure 1).

2.3 Method of analysis

The charts were analyzed by a single assessor (A-FR). Points were attributed for each answer: *never* = 0 point, *rarely* = 1 point, *sometimes* = 2 points, *often* = 3 points. The total score is the sum of the points obtained for each item. Anticipated scores ranged from 0 (minimum possible score) to 78 (maximum possible score), from the least to the most appropriate reply in terms of pragmatic language.

2.3.1 Analysis of the ACP

Statistical analysis of the results was conducted using the Statistica [25] and SPSS [26] software packages; internal consistency of the chart was assessed with the Cronbach alpha coefficient, the Gaussian distribution of the population with the Shapiro-Wilk test, and the sensitivity of the scores to age and department/type of schooling using the Kruskal-Wallis test.

2.3.2 Analysis of additional questions

Replies to the optional additional questions provided input on the time required to complete the chart, its visual appearance, and any further subjects the chart-fillers wished to raise.

3 RESULTS

3.1 Internal consistency of the new chart

The internal consistency of the ACP was measured to ensure that all items assessed the same dimension. The Cronbach alpha coefficient was used to assess the strength of the interim correlation. The alpha level was satisfactory at 0.88 (internal consistency between 0.70 and 0.90 is generally considered acceptable).

3.2 Analysis of responses to the ACP

The average score of the 552 charts accepted for inclusion was 66.88/78 (range, 32–78), (confidence interval [CI], 66.20–67.55) with distribution of the results as follows (Figure 2): the distribution of scores according to age (Figure 3) showed identical maximum scores with similar ranges and median scores. Given that the distribution of the total scores of each age group was not Gaussian, a Kruskal-Wallis nonparametric test was conducted and confirmed that there was no influence of age on the total score ($\chi^2(5) = 4.42$, $p = .49$).

Figure 2 illustrates the non-Gaussian distribution of the results, as confirmed by the Shapiro-Wilk test where $p<0.001$ ($p<0.05$ rejects the hypothesis of a normal distribution). The results are therefore expressed as percentiles (Table 3) for all age groups.

As for the sensitivity of the scores to the department/type of schooling, a Kruskal-Wallis nonparametric test was conducted and confirmed that there was no influence of department/type of schooling on the total score ($\chi^2(1) = 1.946$, $p = .163$).

We also studied the distribution of responses per item to analyze those that were unexpected. Given that none of the control group showed evidence of language impairment or psychological disorders, we expected to find the answer *often* (type of behavior frequently

observed), followed by *sometimes*, *rarely*, and lastly, *never*, whereas several items were not at all consistent with this ranking (Table 4).

For item 4 (*Speaks when it is his turn*), the most frequently selected reply was *sometimes* rather than *often*, thus demonstrating the idea that overlapping speech is a physiological concept [20].

No significant differences were observed between the replies *sometimes* and *often* to items 17 (*Understands humor, word play*), 19 (*Adapts his manner of looking at others*), and 26 (*Understands implicit language*), demonstrating not only a cultural family bias (familiar with word play, the meaning of facial expressions, implicit language) but also the low nuance of meaning between *sometimes* and *often*, as highlighted in certain comments.

3.3 Analysis of replies regarding quality

3.3.1 Time required to complete the chart

One of the original objectives when we developed this chart was that it should be quick to complete. Chart-fillers were therefore asked (optional question) to indicate how long it had taken them to complete the chart. They were also asked a more subjective question, i.e., whether it felt like it had taken longer.

Three hundred charts were collected (54.4% of the charts included). The average time required to complete the chart was 10 min (range, 2–60 min; standard deviation, 6.05 min; CI, 9.45–10.82).

In reply to the question *Did you feel the chart took a long time to fill out*?, we received 280 subjective responses, i.e., 50.7% of the control group. Among these replies, 86.4% (242 replies) of the chart-fillers did not feel the chart had taken a long time to complete, whereas 13.6% (38 replies) felt it had been long.

3.3.2 Visual appreciation

To ensure the ACP chart was as clear and as easy to read as possible, we took particular care over the visual appearance. We received 271 replies (49% of the selected sample) to the question *Did you enjoy filling in the chart*?: 89.3% (242) gave positive responses and 10.7% (29) negative responses.

4 DISCUSSION

The ACP is the first pragmatic language difficulty screening tool for children aged 6–12 years of age, designed in French, and that could be used in real time by medical and paramedical professionals. With a Cronbach alpha score of 0.88, internal consistency was satisfactory, confirming that all the items of the questionnaire related to the same dimension.

There were no significant differences between the mean scores according to age, supporting the idea that children acquire most pragmatic language skills before the age of 10 [27, 28]. General knowledge found in the literature agrees with improvements in conversational skills in preschool-age children while it is the narrative skills, not assessed by the ACP, that are improved at school age [15].

The average time required to complete the chart was 10 min and 86.4% of the chart-fillers rated it as quick to complete. The ACP chart therefore achieved our objective that it should be easy to use.

Among the feedback comments from chart-fillers, some suggested that *always* would be preferable to *sometimes* and *often* since the difference between the latter two can be very small. Although the distinction is perhaps tenuous and likely accounts for the almost identical scores between the two, we felt that the term *always* has an absolute connotation that is not necessarily appropriate with detectable reality. Certain patterns of behavior can indeed be *never* present – such as conversation initiation in a child with hypospontaneous language

deficits – but variables such as mood or motivation mean it is far more difficult to find a behavior pattern that is *always* present.

A few of the chart-fillers mentioned difficulties understanding certain items, whereas others considered the statements clear and the explanations and examples helpful. However, the small number of comments made (7% of the charts submitted) – and especially the negative comments (2% of the charts submitted) – suggest that there were no major comprehension difficulties and that the chart was therefore quick and easy to complete.

Nevertheless, analysis of the replies and comments showed that completing the chart involved a significant degree of subjectivity. Given that it is not easy to reduce subjectivity in the context of pragmatics, this inevitably affects the reliability of any test claiming to use standardized techniques. Certain authors are reluctant to normalize their assessment tools [9].

ACP is a new tool and avoids certain limitations of the CCC/CCC-2 [8-10]:

- Certain questions about the frequency of observed behaviors;
- A single version of the questionnaire due to low inter-judge reliability [28, 29];
- A shorter questionnaire more suitable in a multidisciplinary context while CCC/CCC-2 is a longer one (70 items in nine sub-scales);
- Easy comprehension and rapid scoring, which does not require calculation of subscales with positive or negative points or need to exclude items in order to extract a pragmatic component as in the CCC/CCC-2;
- The specific questions dedicated to pragmatic skills but not the structural aspects of language such as speech, phonology, syntax, as is required in the CCC/CCC-2 questionnaire.

These differences can be explained by different objectives in each test. The aim of the ACP is to detect pragmatic impairment in children without taking into account other possible pathologies (including oral language). The aim of the CCC/CCC-2 is to expose and categorize pragmatic difficulties in children with language impairment.

The TOPICC [16], closer to the ACP in its form (18 items divided into seven subdomains such as reciprocity, turn talking, topic management), would require conceptual and metric equivalence work to be used reliably in France. In addition, certain behaviors sought by the TOPICC seem to be more related to the search for ASD indicators (obsessional topic or stereotyped or unusual language, for example), whereas the ACP only targets pragmatic skills. The ACP aims for a screening action while the TOPICC aims for evaluation of an evidence-based practice and is not standardized.

By collating information on key behavior patterns, as well as providing explanations and examples to ensure that chart-fillers clearly understand what they should be watching for, our project specifically targets pragmatic language impairment. The data collected are coded as a score, not to provide an absolute value but as a rapidly accessible indicator of a child's skills. The child can then be referred to the most appropriate professional, such as a speech therapist or a specialist in child and adolescent psychiatry, to undergo further in-depth assessment of pragmatic language skills.

The ACP chart is a first-line screening device that is filled out by the parents while the child is being examined by a healthcare professional. As such, it provides an opportunity to initiate discussions with the parents of children in whom the clinician suspects pragmatic language impairment. Both the chart and the subsequent discussions provide valuable qualitative data.

The ACP aims to improve the screening of pragmatic difficulties in childhood, whether or not they are involved in other conditions such as developmental language disorder, SCD, or autism spectrum disorder.

Early detection can lead to earlier diagnosis and therefore to appropriate management and a lower impact of the disorders.

5 CONCLUSION

Although various tools are available for diagnosing pragmatic language impairments, very few have been developed or produced in French. Translating them requires finding linguistic, conceptual [12], and metric equivalences [11]. Our investigations have led to the development of a screening chart with satisfactory internal consistency, which is quick and easy to use, and has been validated in a large control population of 552 individuals.

The next step will be to confirm the sensitivity of the ACP chart in a population of children with overt pragmatic language impairment. These investigations are currently underway; they will provide complementary input to these preliminary findings and help determine the threshold for initiation of further investigations into the pragmatic language skills of the children identified.

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Table 1. Distribution of the final sample population according to age.

Age group	[6; 0 to 6; 11 years]	[7; 0 to 7; 11]	[8; 0 to 8; 11]	[9; 0 to 9; 11]	[10; 0 to 10; 11]	[11; 0 to 12; 0]	Total
Number of children	112	103	117	124	78	18	552
Proportion of the sample	20.3%	18.7%	21.2%	22.5%	14%	3.3%	100%

Table 2. English translation of the 26 items from the ACP (Assessment of Conversational Pragmatics) chart.

	Your child:
1	Understands that he or she must apologize when he or she does something wrong.
2	Likes to communicate.
3	Reacts to what the other person says during the conversation.
4	Talks when it's his/her turn.
5	Shows interest in what happens to other children.
6	Initiates the conversation.
7	Stays on the topic of the conversation.
8	Notices what the other person says to continue the conversation.
9	Repeats or rephrases if he or she is not understood.
10	Reports when he or she does not understand what is being said.
11	Adapts his/her language to his/her interlocutor (politeness, language level)
12	Takes into account what you already know or don't know yet.
13	Adapts to the situation, to the place and time of the exchange.
14	Gives enough information for you to understand what he or she is talking about.
15	Is able to imagine the cause or consequence of an event.
16	Understands irony.
17	Understands humor, puns.
18	Adapts his/her physical distance from the other according to the place, time, and person.
19	Adapts the way he/she looks at the other.
20	Adds gestures to his/her words.
21	Is expressive.

22	Can modulate his/her voice to ask a question or give an order.
23	Understands by the sound of your voice if you ask him/her a question, give an order, or joke.
24	Understands the figurative expressions used in everyday language.
25	Decodes your mood from your attitude and tone.
26	Understands implicit formulations.

Table 3. Distribution of scores across the total sample, expressed as percentiles.

Percentiles	C2	C3	C5	C10	C25	C50	C75	C90	C95
Scores	47.00	49.59	52.65	56.00	62.00	68.00	74.00	76.00	78.00

Table 4. Distribution of the different levels of response (total, 552 children) to items with unexpected answers, N (%).

	Never	Rarely	Sometimes	Often
4. Speaks when it is his turn	6 (1.1)	69 (12.5)	314 (56.9)	163 (29.5)
17. Understands humor, puns	9 (1.6)	55 (10)	241 (43.7)	247 (44.7)
19. Adapts his manner of looking at others	3 (0.5)	60 (10.9)	223 (40.4)	266 (48.2)
26. Understands implicit language	5 (0.9)	49 (8.9)	254 (46)	244 (44.2)

Figures:

Figure 1. Translation of a sample item from the ACP (Assessment of Conversational Pragmatics) chart

Figure 2: Total scores and frequency rate of answers reported on the ACP assessment chart.

ACP: Assessment of Conversational Pragmatics

Figure 3: Box-plot of total ACP scores according to age

ACP: Assessment of Conversational Pragmatics

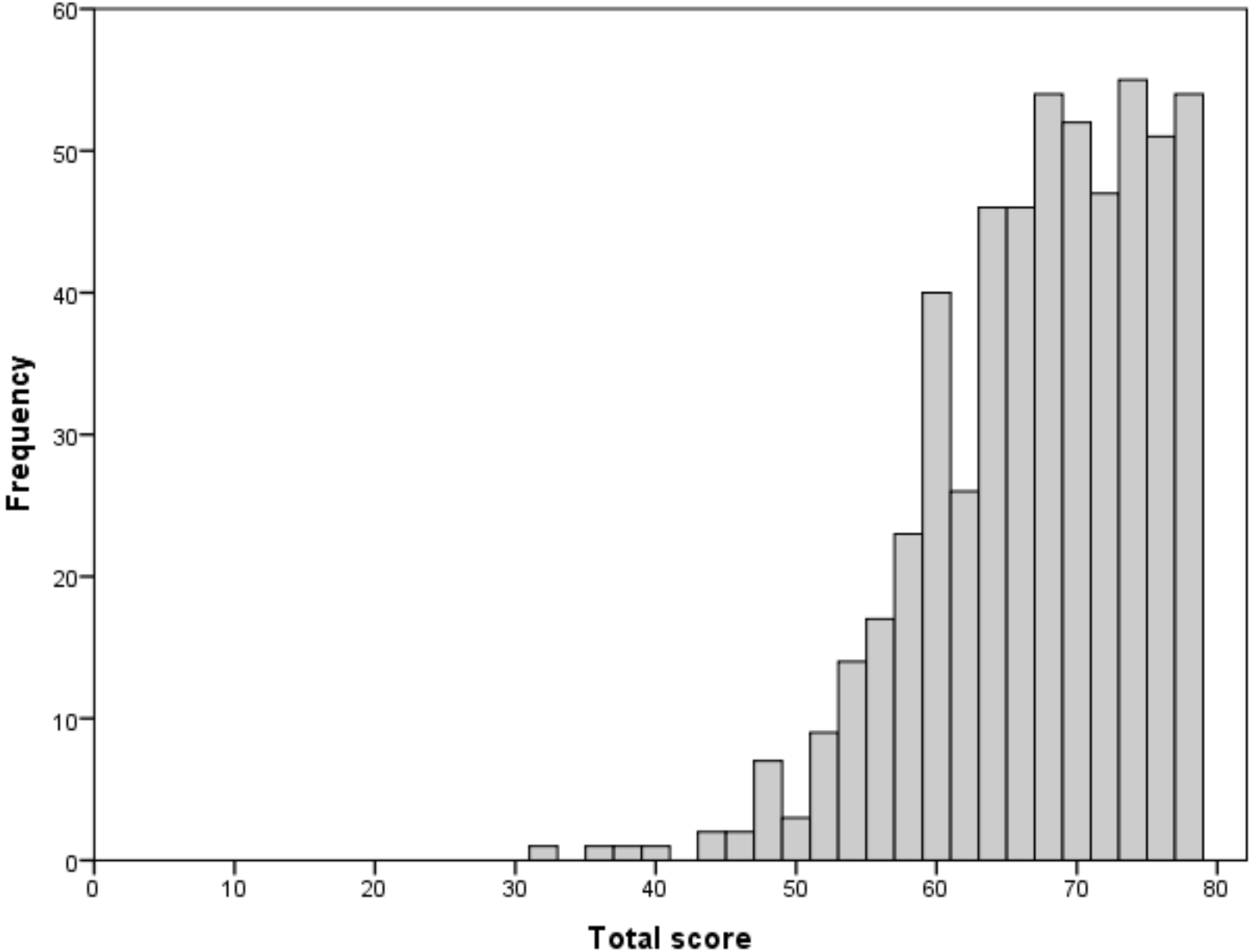
Your child:

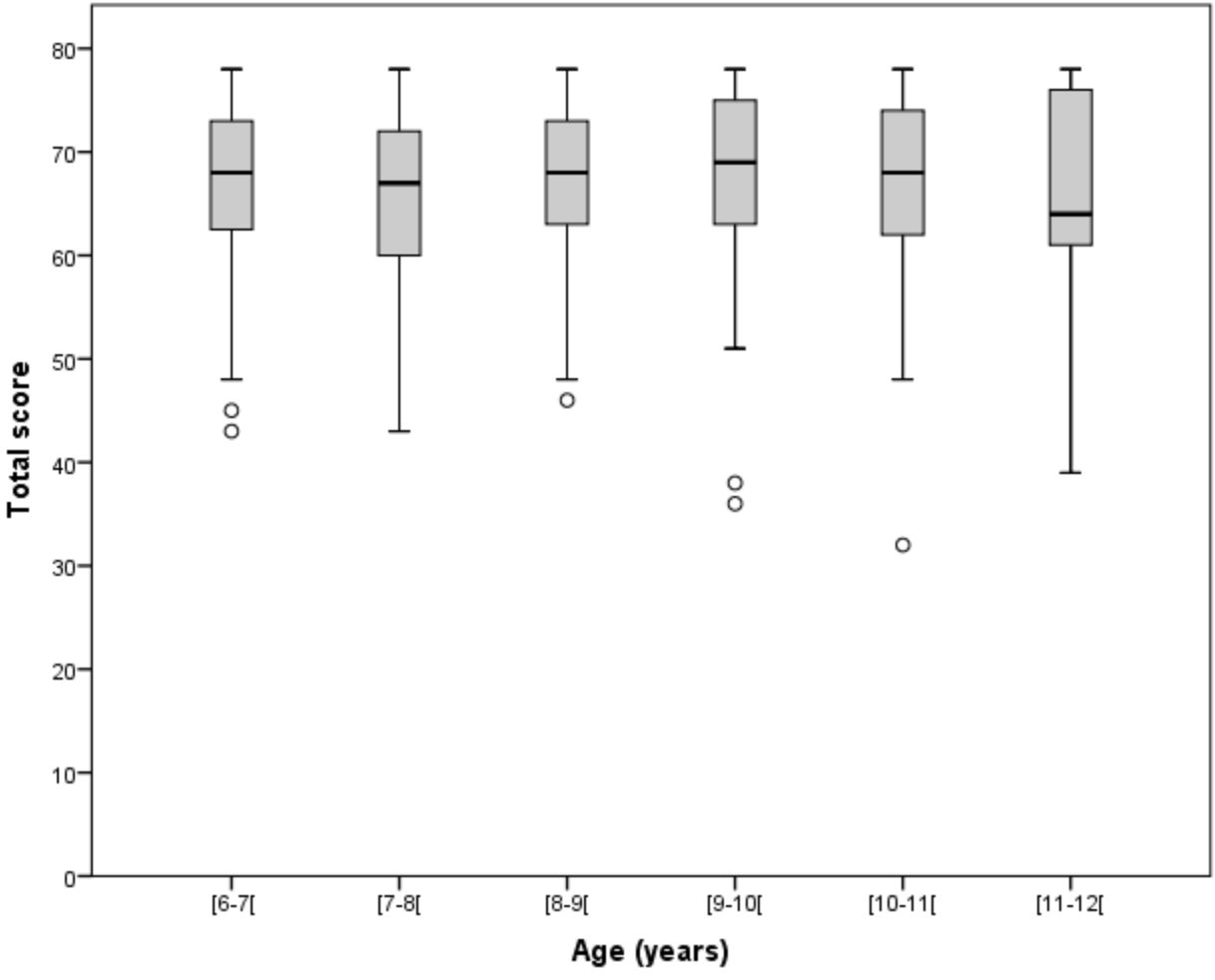
Adapts his language to the person he is addressing (politeness, correct use of "*tu*" or "*vous*" in French, appropriate language level)

The child does not use the same sort of language when he speaks to another child, an adult, someone he knows, or someone he does not know.

- When speaking to another child: Hey, give me the green felt pen!
- When speaking to his teacher: Please may I have the green felt pen?

Never | Rarely | Sometimes | Often


Frequency
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
Total score


Total score
80
70
60
50
40
30
20
10
0
[6-7[
[7-8[
[8-9[
[9-10[
[10-11[
[11-12[
Age (years)