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PRAGMATIC FUNCTIONING IN NATURAL SETTING
AND THE EMERGENCE OF ‘THEORY-OF-MIND’
IN AUTISTIC AND CONTROL CHILDREN:
A COMPARATIVE STUDY

The pragmatic functioning of six 7 to 9 year-old moderately retarded autistic children is compared to that of nine control children (2 to 8 years old) selected according to comparable ranges of verbal measures. Each child was video recorded at home during naturally-occurring play and meal times. The present study focuses on conflicting situations and on children’s abilities a) to offer justifications; b) to take into account the justifications offered by their interlocutors; and c) to adapt their productions according to the online unfolding of the conversational exchange in these oppositional contexts. Results show the existence of resemblances and differences in the pragmatic functioning of autistic and normally developing children. Findings will be discussed for their theoretical and methodological implications for the advancement of our understanding of autistic children’s communicative competencies and of their implicit knowledge of the mind, as well as for the potential use as analytical tools for innovative evaluation and intervention.

Introduction

Since Kanner’s (1943) first descriptions, the peculiar problems of language and communicative behavior presented by autistic children have attracted the attention of psychologists, linguists and psycholinguists. Although delay and deviance in language development often constitute the first alerting signs for parents and may be at the origin of diagnostic investigations, the most striking clinical report is the extreme heterogeneity through which language and communicative deviances manifest themselves in autistic children. A proportion of these children never speak at all, and, among those who do speak, verbal production ranges from sparse single-word utterances to fluent speech containing complex sentences and a wide vocabulary. The majority of investigators do

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agree, however, that all autistic children – even those who develop some language abilities – suffer from a broader communication impairment probably linked to “subtle but far-reaching” cognitive dysfunctions (Frith, 1989). Several authors consider that one of the main characteristics of this core disorder is children’s difficulty to use behaviors they have in their repertoire – gaze, facial expressions, gestures and speech – in a socially meaningful way. For instance, these children may use pointing frequently and adequately for instrumental purposes, but they rarely use it to get people’s attention to simply share one’s focus of interest (Camaioni, Perucchini, Muratori, Parrini & Cesari, 2003; Stone & Caro-Martinez, 1990). Such incongruity between structural and functional competencies strongly suggests impairments in children’s apprehension of other people as “psychological” beings, having intentional and epistemic states of their own (e.g., Baron-Cohen, Tager-Flusberg & Cohen, 2000; Happé, 1993; Tager-Flusberg, 2000).

Although most researchers nowadays acknowledge the existence of socio-pragmatic dysfunctions in autistic children, and try to integrate them in the recent cognitive models of autism (i.e., theory-of-mind, executive dysfunctions, or central coherence hypotheses), a clear understanding of their manifestations and impact, and of their relation to cognitive impairments, is limited by prevailing current research methods. Some studies provide information based on indirect observation obtained through the use of clinical inventories/checklists with parents or teachers (e.g., Bishop, 1998; Bishop & Baird, 2001; Charman, Drew, Baird & Baird, 2003; Cohen, Schmidt-Lackner, Romanczyk & Sudhalter, 2003). Other studies, the most common, gather information on children’s pragmatic competencies at a metacognitive level through the use of test-like situations, which, because of their high metacognitive demands, cannot be easily applied to children below a certain developmental level (Dennis, Lazenby & Lockyer, 2001; Fine, Bartolucci, Szatmari & Ginsberg, 1994; Happé, 1993; Leekam & Prior, 1994; Norbury & Bishop, 2003; Ozonoff & Miller, 1996; Surian, Baron-Cohen & Van der Lely, 1996). Relatively few, on the other hand, are studies of children’s communicative functioning in naturally-occurring interactional settings (Bernard-Orpitz, 1982; Loveland, Landry, Hughes, Hall, & McEvoy, 1988; St James & Tager-Flusberg, 1994; Stone & Caro-Martinez, 1990; Wetherby & Prutting, 1984). Yet, given the prevailing belief that autistic children’s socio-pragmatic functioning is peculiar and possibly distinctive of the syndrome, studies that specifically analyze the pragmatic dimension of autistic children’s naturally-occurring behavior appear to be most needed to advance understanding. All the more so considering that, even if autistic children succeed in metacognitive tasks, they still have difficulties in real-life communicative situations that seem to imply the same kind of socio-cognitive skills (Fombonne, Siddons, Achard, Frith & Happé, 1994; Frith, Happé & Siddons, 1994; Leekam & Prior, 1994; Plumet & Tardif, 2003). Furthermore, in the different studies there is an overemphasis on what is lacking as well as dysfunctions relative to what functions more or less adequately.

To have a clearer grasp of the nature of autistic children’s overall functioning it is necessary as well to evaluate how they use knowledge implicitly in everyday familiar environments, focusing on communicative situations that are particularly demanding from the viewpoint of socio-pragmatic adaptation, and trying to capture deviant as well as adequate behaviors.

Oppositional episodes

This study focuses on the production and comprehension of justifications occurring in “oppositional episodes”, where contrasts of intentions or opinions between children and their interlocutors arise. For example, one partner intends to do something, makes a demand on the other, asserts something, and the other partner makes his/her disagreement known. These interactional situations are particularly interesting to consider in the present context, and this for several reasons.

On the one hand, they solicit the participants to draw upon their resources in order to find a solution to the social problem that has arisen. We may expect that, in these situations, autistic children also would be more likely to bring to the surface competencies that might otherwise remain hidden.

Moreover, earlier studies have shown that, from a very early age (the second half of the second year), normally developing children can provide justifications of their oppositions, explaining to their partner the reason for his/her disagreement (Veneziano, 2001; Veneziano & Sinclair, 1995). This behavior may help to persuade one’s interlocutor to change his/her initial intent and prevent his/her subsequent insistence (Dunn, 1993; Dunn & Munn, 1987; Eisenberg, 1992; Eisenberg & Garvey, 1981; Haight, Garvey & Masiello, 1995; Slomkovsky & Dunn, 1992; Tesla & Dunn, 1992; Veneziano, 1999, 2001). Since children as young as 19 months are found to produce justifications in this interactional context, only minimal language knowledge is required to provide them. Language knowledge *per se* is thus not an obstacle to the manifestation of this pragmatic competence.

On the other hand, as is the case for other kinds of language use (e.g., verbal adaptations during online interactions, narratives and planning, etc.), children’s handling of these episodes provides information on the emergence of an *implicit theory of mind*, that is, on the emergence of a practical understanding of the other’s mind at the level of *know how* (e.g., Dunn, 1991; Golinkoff, 1993; Veneziano, 2001, 2002; Veneziano & Hudelot, 2002; Veneziano & Sinclair, 1995). Indeed, in “oppositional episodes”, the obstacles children need to overcome are of a mental nature, internal to the interlocutor. The way children try to influence their interlocutor’s intentions and beliefs provides a glimpse into their greater or lesser ability to take into account the mental states of other people, or at least those of their immediate interlocutors.

Specific aims of the present study

More specifically, this paper will provide comparative data concerning children’s ability: a) to offer justifications of their own position, even when these are expressed verbally in very minimal terms; b) to take into account the justifications produced by their interlocutors; and c) to adapt their productions to the successive interventions of their interlocutors during the online unfolding of the conversational exchange. These analyses constitute a first step towards the elaboration of three indices of pragmatic functionality:

- 1) an index of Pragmatic Impact – PI – determined by the effect the child’s justifications are able to solicit from the interlocutor;
- 2) an index of Pragmatic Comprehension – PC – provided by a measure of the way children take into account the justifications of their partners;

3) an index of Pragmatic Adaptation – PA – given by a measure of the on-line changes children make as a function of their interlocutors' reactions.

Given the pragmatic impairment hypothesis, as well as known deficits in explicit theory of mind, we expect autistic children to present some delays and differences in behavioral profiles, but not necessarily across the board, particularly when the developmental level is controlled for. Indeed, in naturally-occurring familiar situations, and considered with a finer grained analysis, these children may exhibit certain mental-age appropriate pragmatic behaviors, embedded, however, in overall profiles that result in a general impression of deviance.

The discussion will come back to this point as well as to the significance that our results have for an understanding of children's practical "theory of mind".

Method

Subjects

The data presented here concern 6 autistic children and 9 typically-developing children of whom 6 are matched to the autistic children's mental/verbal age and 3 are younger (2 years old). All the children were observed while engaged in everyday situations occurring naturally in their familiar environment.

Autistic children: Diagnostic tools and developmental measures

The children participating in the present research are part of a broader research project on communication and theory of mind in autism. They were all diagnosed by experienced clinicians on the basis of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV, APA, 1994), and the Autism Diagnostic Interview-Revised (ADI-R, Lord, Rutter & LeCouteur, 1994). They were recruited through the Psychopathology Unit for Children and Adolescents at the Robert Debré Hospital in Paris and through an organization called the SESSAD (Service d'Education Spécialisée et de Soins à Domicile), specialized in the evaluation and guidance of autistic children. None of the autistic children was reported to have associated organic pathologies. All had at least one sibling.

Although all the autistic children had received cognitive or language standardized evaluations at the hospital or at the SESSAD, the instruments used¹ and the time of the last examination varied too much to allow for useful comparisons within this autistic group and the matched controls. All the children were, however, tested with the same verbal test at the beginning of the study. The TVAP (Test de Vocabulaire Actif et Passif, Deltour & Hupkens, 1980) is the French test closest to BPVT – the British Picture Vocabulary Test, with fewer items and a heavier load of object-action identifications. The receptive sub-test

¹ Cognitive measures (Performance vs Verbal): a few children could be tested with classical intelligence tests – the *Wechsler Preschool and Primary Scale of Intelligence-Revised* (WPPSI-R, 1995), or the *Wechsler Intelligence Scale for Children-Revised* (WISC-R), the others were administered the PsychoEducational Profile-Revised (PEP-R, Schopler, Reichler, Bashford, Lansing & Marcus, 1994); Language measures: part of the children were tested with the Reynell Developmental Language Scale for syntactic measures (Reynell & Gruber, 1990); Socio-adaptive measures: Vineland Adaptive Behavior Scales (Sparrow, Balla & Cicchetti, 1984).

Table 1. Chronological and verbal age (receptive vocabulary) of autistic children

Group	Child	Chronological age	Verbal age (TVAP receptive subtest)
AV-	1	7 ;11	4 ;0
	2	8 ;3	3 ;6
	3	9 ;2	3 ;6
	Mean	8.4	3.7
AV+	4	7 ;11	6 ;0
	5	7 ;11	7 ;0
	6	9 ;1	6 ;3
	Mean	8.3	6.4

was chosen because it could be administered to all the children, even to those with poor expressive language. It consists of 30 carton boards each containing six pictures. The child had to designate the picture that corresponds to a word label uttered by the experimenter. Age-equivalents are derived from the scores on the basis of normative tables.

The 6 autistic boys whose data are presented here (their chronological age ranges between 7;11 and 9;2 years) were divided into two groups according to their TVAP score: a “low verbal age” group (AVA-) comprising children with a TVAP score of 3 to 4 years, and a “high verbal age” group (AVA+) comprising children with a score of 6 to 7 years. Table 1 presents the chronological age and the verbal mental age of the autistic children included in this study.

Control children

The six control children matched on mental/verbal age were recruited through kindergarten and primary schools in Paris and all had at least one sibling. Three 2-year-old children, younger than the verbal ages of the autistic children, were also included. Their data provide the “floor” level allowing to compare the autistic children’s functioning to that of children who are just beginning to show the behaviors studied here.

Table 2 schematically presents the composition of the five groups (two autistic and three typically-developing children) on which results will be reported.

Table 2. Number of children studied and their distribution into five groups

Groups	Verbal/mental age	Number of children	
Autistic	AVA-	3-4 years	3
	AVA+	6-7 years	3
Matched Controls	CVA-	3-4 years	3
	CVA+	6-7 years	3
Younger Controls	YVA	2 years	3

Data collection

All children were filmed in their home environment after a familiarization session. Autistic and matched control children were observed for at least three half days over a period of three to four weeks. Younger control children were observed at bi-weekly intervals over a longer period of time. All children were video recorded while engaged in different activities, such as a variety of play situations, dinner table conversations and book reading (the latter being more frequent for the younger children) – and interacting with their familiar partners (mother, father, sibling(s) and/or friend).

For the present study we analyzed a total of 15 hours of recording – one hour per child – offering a representative sample of activities.

Data analysis

Data were analyzed following a method developed by Veneziano (e.g., 2001) for young normally developing children. First, all naturally-occurring “oppositional episodes” were identified in the video recordings. These are defined as episodes in which the child or the partner *explicitly manifests* dislike, disagreement, aversion or any other behavior contrary to the immediately previous action, proposal, demand or statement of the other partner. The interactional course of these episodes was followed and analyzed from the First Oppositional Movement (hitherto, FOM) through the resolution of the conflict. This was considered to occur when one of the participants either accepted, explicitly or implicitly, the other’s position, or till the proposition of a compromise was mutually accepted. All the different movements were coded and the presence or absence of justification was noted.

The analysis was performed by several persons, all well trained in the coding system. When comparing across two coders the proportion of agreements (placement in one category, or coding absence for that category) over the total number of cases under scrutiny, reliability measures performed on about 40% of the sample obtained an average agreement of 85%.

In this paper we will focus on certain aspects of the broader analysis we performed.

Justifications of Oppositional Movements

First, we will consider children’s capacity to justify their oppositional acts. A justification consists of a statement that provides the reason (the *explanans*) for the opposition which, from an interactional and pragmatic perspective, is supposed to be an *explanandum* (an act that needs to be explained). Operational definitions and adjustments for tracing their emergence are detailed elsewhere (e.g., Veneziano, 2001; Veneziano & Hudelot, 2002). The following are two examples of justifications of children’s protests, one produced by a 2 year-old (YVA) and one by an autistic child from the AVA+ group:

EXAMPLE 1 – Child’s justified opposition – YVA (A= Child’s name)

The mother suggests that the child use the water contained in a small bottle saying

Mother 1: *l’r t’as de l’eau A #l’r dedans* ‘here you have some water A # in there’

- (1st movement of the episode: Mother's suggestion)
 The child, holding a bathtub toy, looks back at his mother and says
 Child 2: *non, pas assez* 'no, not enough'
 (then goes to the bathroom to take some water)
 (2nd movement -FOM-: Child's refusal accompanied by a justification);
 Mother 3: (lets the child carry out his action – to get water from the faucet)
 (3rd movement: Mother doesn't insist on her initial suggestion).

EXAMPLE 2 – Child's justified opposition – AVA+

- Mother 1: (puts the dinner plate in front of the child)
 (1st movement of the episode: Mother's implicit invitation to eat right away)
 Child 2: (pushing his plate away says)
trop chaud, 'too hot'
 (2nd movement – FOM – the child declines in action and justifies his behavior);
 Mother 3: *bah tu souffles* 'just blow on it'
 (3rd movement: the mother insists on her demand integrating the child's justification offering a solution to the child's invoked reason);
 Child 4: (starts eating)
 (4th movement: the child accepts the mother's position).

In Example 1, in his FOM, the 2-year-old justifies the refusal of his mother's suggestion with an evaluation of the quantity of water he needs, estimated to be more than that proposed. In Example 2, the higher verbal age autistic child (AVA+) justifies his decline of the mother's implicit invitation to eat right away by invoking a good reason for the postponement (too hot).

We will provide results on the proportion of oppositional turns that are justified, even if by only a minimal verbal expression, distinguishing justifications of FOMs – the first oppositions in an oppositional episode – from those occurring in the subsequent moves of the episode. Indeed, in FOMs, children's justifications try to prevent a possible insistence on the partner's side, and are thus anticipatory, while, in subsequent movements they react, possibly adaptively, to the partner's overt insistence.

Indexes of Pragmatic Functionality: Impact and comprehension

We will now consider the pragmatic functionality of justifications and this according to the subsequent unfolding of the episode. Two main cases will be distinguished here according to the nature of the turn that follows the FOM:

Unfolding (a) – The partner does not insist and gives up explicitly or implicitly on his initial action, request or belief, either immediately on the third turn (see Example 1 above and 3 below, where it is the mother who produces the FOM), or after a request for justification, clarification or confirmation (see Example 4 below presenting this latter profile where, in the third turn, the child asks his mother to justify her opposition):

EXAMPLE 3 – Mother's justified FOM; Child AVA- (R) complies

The child sits at the dinner table, while the mother is about to serve the dinner.

Child 1: (spreads Lego pieces on the table)

Mother 2: *R, est-ce que les jouets viennent à table? Non, tu sais bien !*
 'R, do toys go on the dinner table? No, you know that.'

Child 3: (C removes the Lego pieces from the table).

EXAMPLE 4 – Mother's unjustified FOM; Child AVA- (R) asks M for justification

Mother and child are sitting at the dinner table

Child 1: *R il a fini* 'R has finished'

Mother 2: *non, non, R n'a pas fini # mange!*
 'no no, R has not finished # eat!'

Child 3: *pourquoi il a pas fini?* 'why hasn't he finished?'

Mother 4: *parce qu'il reste plein à manger dans son assiette*
 'because he still has plenty of food in his plate'

Child 5: (R eats his dinner)

Unfolding (b) – The partner insists on his/her initial intention or position, opening in this way an overt conflict, which can be resolved more or less promptly (see Example 2 above, where it is resolved in the fourth movement of the episode).

By distinguishing justified and unjustified FOMs according to the type of unfolding we can obtain results on the following two measures of pragmatic functionality:

1) a measure of the effect that the child's justification has on the interlocutor – called an index of Pragmatic Impact (PI) – obtained by comparing justified and unjustified children's FOMs on the occurrence of unfolding (a) (see Example 1 above) and of unfolding (b) (see Example 2 above);

2) a measure of the effect that the partner's justification (by any of the familiar interacting partners) has on the child – called an index of Pragmatic Comprehension (PC) – obtained by comparing justified and unjustified FOMs of the partner on the occurrence of unfoldings a) or b). Obviously, in this case the initial opposition is produced by the partner whose productions have undergone the same kind of analysis as the children's. Example 5 below presents an oppositional episode between an AVA-child and his mother, whose unjustified FOM is followed by the child's insistence:

EXAMPLE 5 – Mother's unjustified FOM; Child AVA+ (J) insists

Mother and sister are talking about the sister's day at school.

Child 1: (fidgets in his chair and whines)

Mother 2: *J, tu te tiens tranquille à table!* 'J, sit still at the table!'

Child 3: *Non, j'veux pas rester pendant que vous parlez de son travail*
 'No, I don't want to stay while you are speaking about her schoolwork'

Mother 3: *Mais S a le droit de parler de son travail. J, tu parles...chacun son tour, on a dit!*

'But S has the right to speak about her work. J, you may speak...we

said everyone has his turn!’

Child 5: *hein* (whining and screaming)

Mother 6: *Bon J* (with a firm tone of voice)

Child 7: *J’veux pas rester avec S!* ‘I don’t want to stay here with S!’

Index of Pragmatic Adaptation

Finally, we will provide data relative to children’s ability to modify their on-line behavior when confronted with the interlocutor’s oppositional movements, first and/or subsequent. Can they modify their subsequent behavior so as to render it more adaptive for the interlocutor? “Adaptive” turns are considered those movements that present, relative to the previous ones in the episode, modifications supposed to add something to their power of persuasion: for instance, changing prosody, expanding previous utterances, providing a justification, or countering the partner’s response. Example 5 above contains three opportunities for the child to show his repertoire of adaptive behaviors (turns marked as Child 3, 5 and 7). Of these, Child 3 and Child 7 are considered adaptive: Child 3 expands on Child 1, and Child 7 expands on Child 5.

The measure provided here – called an index of Pragmatic Adaptation (PA) – is given by the proportion of “adaptive” turns over the total number of opportunities to produce a change: that is, the number of children’s turns occurring after FOMs.

Results

Children’s oppositions and justifications of oppositions

For the five groups of children: (1) lower verbal age autistic children (AVA-); (2) 2 year-old younger controls (YVA); (3) controls matched to AVA- children (CVA-); (4) higher verbal age autistic children (AVA+); and (5) controls matched to AVA+ children (CVA+), Figure 1 presents (1) the proportion of FOMs (over their total number)

Figure 1. Children’s justifications of First Oppositional Movements, of subsequent insistence, and anticipatory justifications

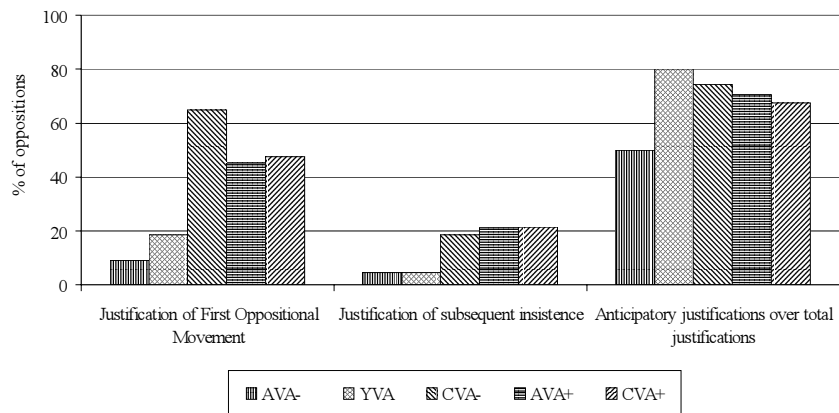


Figure 2. Children's Pragmatic Comprehension. Children's insistence following justified and unjustified first oppositions

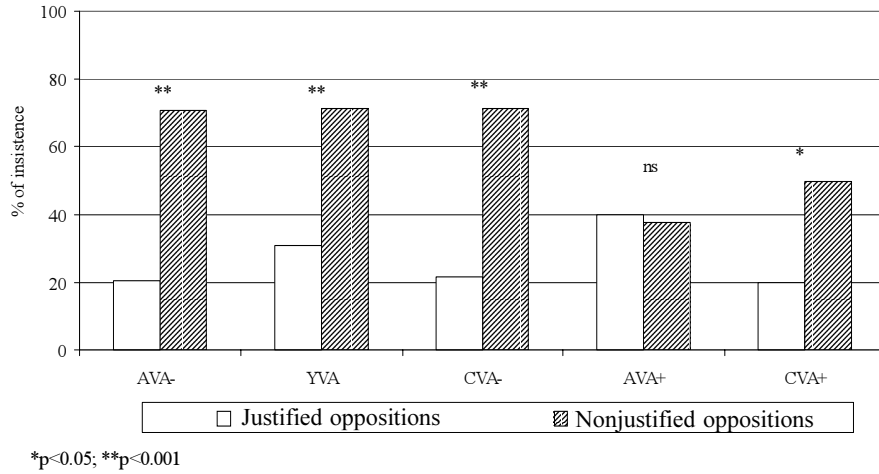
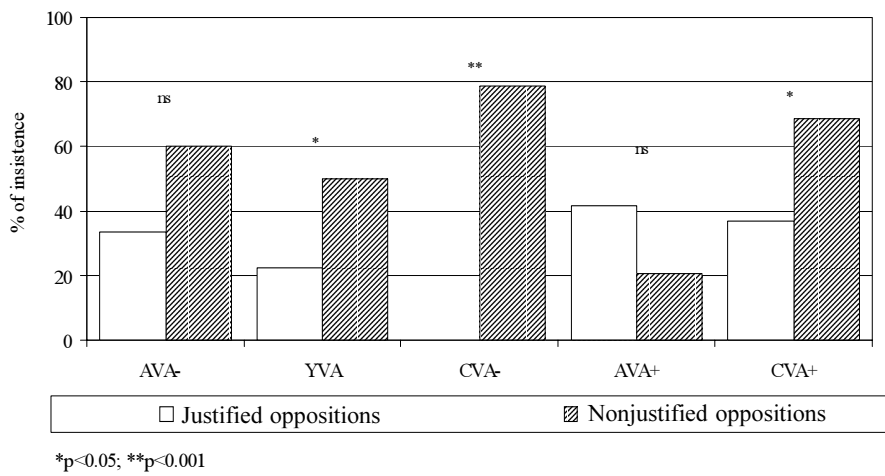


Figure 3. Children's Pragmatic Impact. Partner's insistence following justified and unjustified first oppositions



that are justified; (2) the proportion of subsequent oppositional movements (over the total number of subsequent movements) that are justified; and (3) the proportion of the total number of justifications produced by the children that appear with FOMs, justifications that are thus offered in anticipation, to prevent a possible insistence on the partner's side.

These data show that AVA+ children are similar to their matched controls in the capacity to justify their FOMs and to use justifications in their later insistence movements (χ^2 values are respectively, 0.006 and 0.045, ns, for $df=1$; all the probabilities of the chi-square values reported hereafter are also for $df=1$). AVA+ children are also similar to CVA- in their overall production of justifications ($\chi^2=0.016$, ns), as well as in the fact that they use justifications mostly with their FOMs, as anticipatory movements likely to prevent the partner's insistence ($\chi^2=0.0037$, ns).

Autistic AVA- children are similar to YVA controls in all these measures (respectively, $\chi^2=0.704$, 0.218, and 0.484, all ns). They are however quite different from their matched controls (CVA-) in the ability to provide justifications of their FOMs ($\chi^2=21.33$, $p<0.001$), and of their subsequent insistence movements ($\chi^2=4.367$, $p<0.05$), as well as in the overall production of justifications ($\chi^2=28.49$, $p<0.001$). Matched control children produce a higher proportion of justifications in all these cases.

Moreover, AVA- children differ significantly from AVA+ children in the rate of justification of their FOMs ($\chi^2=10.74$, $p<0.001$), of their subsequent insistence movements ($\chi^2=5.99$, $p<0.02$), as well as in the overall rate of justifications ($\chi^2=22.47$, $p<0.001$). Instead, CVA- and CVA+ controls do not differ from each other on any of the three measures (respectively, $\chi^2=2.33$, 0.0315, and 0.302, all ns). Both groups of children differ, however, from the 2-year-olds².

It should be noted that none of the comparisons concerning the proportion of anticipatory justifications (justifications provided with the first oppositional movements relative to the total number of justifications produced) result in significant differences: all the chi-square values testing the difference between AVA-, and AVA+, each compared to the other four groups separately, are non-significant.

It is also interesting to note that, in all five groups, the partners do not seem to differ among themselves in any of the above measures³. None of the chi-square tests comparing partners in the AVA- group to partners in the CVA-, YVA, AVA+ and CVA+ groups on rate of justification of FOMs, of subsequent turns, of overall justifications, and of the proportion of anticipatory justifications over the total number of justifications produced, revealed significant differences.

² For justifications of FOMs, justifications of subsequent oppositional turns and overall rate of justifications, the comparison between YVA vs. CVA- gives respectively the following values (all probabilities are for $df=1$, * $p<0.05$; ** $p<0.01$; *** $p<0.001$): $\chi^2=16.57$ ***, $\chi^2=7.21$ ** , $\chi^2=16.47$ ***; for YVA vs. CVA+ respectively, $\chi^2=8.27$ ** , $\chi^2=4.81$ * , and $\chi^2=13.13$ ***).

³ Results concerning the children's partners and their individual relations to the children's profiles are presented elsewhere (Veneziano, Plumet, Cupello and Tardif, in preparation).

Effects of children's justifications on the partner (Pragmatic Impact – PI)

Do children's justifications help in persuading their interlocutor to accept the child's position? As mentioned earlier, to start answering this question we compared children's justified and unjustified FOMs on the type of unfolding (type a. or b.) following each of them, with the expectation that unfolding (a) (the partner doesn't insist) is more likely to occur after justified than after unjustified FOMs. This comparison enables the evaluation of the *pragmatic impact* of children's justifications thus providing a rough index of their efficiency and relevance.

The difference of unfolding has been tested for each group by a chi-square test (with Yates correction) applied to 2x2 contingency tables (justified vs. unjustified FOMs x type of unfolding – (a) or (b)). Figure 2 presents the results obtained for each of the 5 groups.

As it appears, for the three control groups, the children's partners insist on their initial position significantly less frequently when the children's FOMs are justified than when they are not justified. For YVA the proportion of insistence is 22% after justified FOMs and 50% after unjustified FOMs ($p(\text{Chi}^2) < 0.03$), for CVA-: 0% vs. 78.6% ($p(\text{Chi}^2) < 0.001$); for CVA+ 36.7% vs. 68.6% ($p(\text{Chi}^2) < 0.03$).

For the two groups of autistic children, on the contrary, the partner doesn't show a difference in behavior following a justified or an unjustified FOM. For the AVA- group, although the difference in proportions may seem important (33.3 vs 60%), the number of justified FOMs is too small to allow testing. However, even if simulating a number of overall occurrences four times as large, the difference still does not rise above the significance level of 0.05.

For the AVA+ group there appears a nonsignificant tendency for the partner to insist more when the child's opposition is justified than when it is not (41.7% vs. 21.7%) ($\text{Chi}^2 = 1.84$, $p = 0.175$).

Effects of the partner's justification on the child (Pragmatic Comprehension – PC)

Do children understand and take into account the justifications of their interlocutors' opposing views? As previously, to start answering this question we have compared the impact of the justifications produced by the partner on the subsequent behavior of the child, distinguishing this time the *partners'* justified and unjustified FOMs. This analysis yields a rough measure of children's *pragmatic comprehension* of the justifications offered by their interlocutors in this setting. Figure 3 presents the results obtained for each of the 5 groups.

For the three control groups, all the children insist significantly less when their partners' FOMs are justified than when they are not. For YVA the proportion of insistence is 30.9% after justified FOMs, and 71.4% after unjustified FOMs ($\text{Chi}^2 = 6.1$, $p < 0.01$); for CVA- children the proportion is respectively 21.4% and 71.4% ($\text{Chi}^2 = 12.8$, $p < 0.001$) and for CVA+ children, 20% vs. 50% ($\text{Chi}^2 = 4.99$, $p < 0.03$). This is also the case for the AVA- children where the proportion of insistence is respectively 20.5% after justified FOMs and 70.8% after unjustified ones ($\text{Chi}^2 = 14.62$, $p < 0.001$). Instead, AVA+ children insist about equally in the two cases (40% vs. 37.5%, $\text{Chi}^2 = 0.03$, ns).

Table 3. Index of Pragmatic Adaptation. % of „adaptive” changes over opportunities to change per group of children

AVA-	YVA	CVA-	AVA+	CVA+
57,6%	33,3%	73,5%	59,6%	67,1%

Pragmatic Adaptation (PA)

Concerning children’s ability to adaptively modify their behavior “on-line” during the unfolding of the oppositional episode, (for example, by providing a justification, by expanding on their previous utterances, by directly countering the partner’s response, etc), Table 3 shows the proportion of adaptive changes over the total number of opportunities children had to produce a change, for each group of children.

Both autistic and control children can modify their productions a considerable proportion of the time. None of the comparisons between autistic and their matched controls show significant differences, all being significantly better in this respect than the YVA controls⁴.

Discussion

The results presented above show the existence of resemblances and differences in the pragmatic functioning of autistic and normally developing children.

Less advanced autistic children (AVA-) are similar to young 2-year-olds in their ability to produce justifications of their oppositional movements but differ both from their verbal age-matched normally developing children (CVA-) and from the more advanced autistic children (AVA+). Thus, from the point of view of trying to manage the social relationship and to affect the interlocutor by providing a justification, autistic children whose cognitive and verbal level is much lower than their chronological age, show an even greater retardation in their pragmatic functioning. AVA- children are similar, however, to both younger (YVA) and verbal age-matched controls (CVA-) in their comprehension abilities: all these children tend to insist less when their partner’s opposition is accompanied by a justification than when it is not so accompanied. They also show a similar rate of on-line adaptation of their subsequent moves to matched controls, and are better than the 2-year-old controls in this respect.

More advanced autistic children (AVA+) are similar to their matched controls (CVA+) in their ability to provide justifications of their oppositional moves, and present a similar ability to adapt their subsequent moves as a function of their interlocutor’s response. Nevertheless, contrary to their matched controls (CVA+), their justifications do not seem to

⁴ All comparisons are with YVA, $p(\text{Chi}^2)$ are given for $df = 1$. For the comparison with AVA-: $\text{Chi}^2 = 5.9$, $p < 0.01$; for the comparison with CVA-: $\text{Chi}^2 = 14.6$, $p < 0.001$; with AVA+: $\text{Chi}^2 = 6.12$, $p < 0.01$; with CVA+: $\text{Chi}^2 = 12.21$, $p < 0.001$.

have an impact on their partners who are as likely to insist if the child's opposition is justified or not, with a non significant tendency in the opposite direction.

Moreover, and again contrary to their matched controls (CVA+) who tend to insist less when their partners justify their oppositions, autistic AVA+ children do not seem to make the difference between the two types of occurrences.

Thus both groups of autistic children present a different pragmatic functioning profile than do their matched controls. The less advanced autistic children are lacking in the production of justifications, while the more advanced ones produce a similar proportion of justifications to their matched controls. While the impact of the justifications produced by the AVA- children cannot be clearly established (there is a tendency in the right direction but is not statistically conclusive) the justifications produced by the more advanced autistic children (AVA+) are less effective than those of their matched controls in persuading their partners. Furthermore, AVA+ children do not seem to be immediately convinced by the justifications offered by the partner.

These results, while pointing to functional differences in the behavior of the autistic children that go in the direction of a lesser sensibility and responsiveness to the partner, do not show a clear absence in this domain. They rather suggest the presence of heterogeneities in their functioning that need to be further elucidated.

One possibility is that heterogeneities may result from one or several combined specificities of autistic children's cognitive functioning. Some of these may affect the very construction of *competencies* in the realm of communication and of social comprehension (according to the theory-of-mind hypothesis). Others may instead affect *performance*, particularly in rich and fast changing contexts that require flexible selection and activation of processing modes and highly-tuned behaviors. Anomalies in central coherence, on the one hand, and executive dysfunctions, on the other, may play an important part in the variations of pragmatic functioning of autistic children (Martin & McDonald, 2003).

Several issues need to be addressed in further research. On a general level, it is important to find out the extent to which the peculiarities of communicative functioning found here are present in other autistic children of similar developmental levels, as well as to determine individual profiles for the measures developed. Another interesting point concerns the effect of the gap between chronological and verbal/mental age. The autistic AVA- and AVA+ children of this study, who are similar in chronological age, differ in the extent of this gap. One issue for future research is to pull apart the effect of verbal/mental age from that of the difference between chronological and verbal/mental age. The lag between the two might in fact contribute to creating different kinds of expectations in the partners, and of correspondingly different interactional dynamics. It might thus reveal itself crucial in understanding the observed differences in the pragmatic functioning of the dyads.

More specifically, it will be necessary to investigate some of the interactional dynamics results obtained here. For instance, why do the justifications of the first oppositional movements of more advanced autistic children (AVA+), as against the control groups, not have an immediate persuasive power on their partners, and may, on the contrary, lead to greater partner's insistence than unjustified oppositions? And

why do the justified oppositions of their partners not help the latter in convincing the children? It might be the case that AVA+ children and their partners are more inclined than their VA matched control dyads to counter-argue after the partner's justified than after the partner's unjustified oppositional moves. But then, what would be the reason for this functioning? Is it the form and/or the nature of the justifications? Is it a problem of interpretation of the other's intentions and beliefs, a problem linked to "theory of mind" deficits? These are some of the questions that are currently under scrutiny in our research.

Finally, it is important to mention that the analytical tools used here may have important clinical implications. Indeed, this kind of fine-grained study of autistic children's communicative behavior in everyday natural settings, is believed to open up the path to innovative methods of evaluation and diagnosis, and to provide indications for remedial work. It permits a relatively precise identification not only of certain pragmatic specificities of the verbal exchanges involving autistic children as partners, but also and more constructively, of what there is to build upon for further development. It may thus contribute to the development of well-targeted interventions that can build efficiently upon what does function, even when the latter may be embedded in communicative efforts that present peculiarities and need attention in order to be understood.

Furthermore, as already argued for normally developing children, on the basis of the theoretical assumptions of conversational analysis, we believe this kind of study of children's behaviors allows a finer and more differentiated appraisal of children's practical understanding and "know how" about other people's internal states, intentional and epistemic. Even if limited to the immediately present interactant, the selective display of given behaviors provides essential information on the emergence and early development of components of what is known as "theory of mind".

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