Compliance with requests by children with autism: the impact of sentence type

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Abstract

This study assesses the extent to which children with autism understand requests performed with grammatically non-imperative sentence types. Ten children with autism were videotaped in naturalistic conditions. Four grammatical sentence types were distinguished: imperative, declarative, interrogative and sub-sentential. For each category, the proportion of requests complied with significantly exceeded the proportion of requests not complied with, and no difference across categories was found. These results show that children with autism do not rely exclusively on the linguistic form to interpret an utterance as a request.

Keywords

indirect speech acts, naturalistic study, non-literal speech, pragmatics

Introduction

The receptive and expressive language of people with autism spectrum disorders (ASD) shows well-documented pragmatic deficits (e.g. Tager-Flusberg 2000). In particular, many studies revealed difficulties with the comprehension of non-literal uses of language, such as metaphor, irony, jokes, hyperbole or understatement (e.g. Happe 1993; Kaland et al. 2002; Martin and McDonald 2004; MacKay and Shaw 2005; Dennis et al. 2001; Norbury 2005; Rundblad and Annaz

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2010). Non-literalness can be broadly defined as discrepancy between the linguistic meaning of the sentence uttered and the message conveyed by the utterance. In this paper, we examine another type of non-literal use of language: indirect requests, and the extent to which they are understood by children with ASD.

A chief pragmatic aspect of utterance interpretation is Illocutionary force assignment. The illocutionary force determines which speech act – for example assertion, order, request, question or promise – the utterance constitutes. Crucially, an utterance's illocutionary force is not always explicitly encoded within the morphosyntactic structure of the sentence used. With respect to the subject matter of this paper, the grammatical imperative mood is the prototypical morphosyntactic marker of the directive illocutionary force, that is, of speech acts aiming at prompting an action from the addressee (requests, commands, orders, and the like). However, many requests are performed using morphosyntactic forms that are not exclusively linked to directive speech acts: most frequently, questions (1), grammatically declarative sentences (2) or nominal phrases (3).

(1) Can you close the door?
(2) You leave tomorrow morning.
(3) Your coat.

At the literal level, (1) remains a question and (2) an assertion – and in some contexts only the literal interpretation is correct/available. As for (3), its linguistic form gives no clue as to the utterance's illocutionary force. Directive speech acts performed by non-imperative sentences are often called 'indirect'; for simplicity, we will refer to 'indirect requests' (rather than of 'indirect directive speech acts'). Indirect requests require extra-linguistic information to be taken into account to interpret the sentence in an appropriate way.

Although it is often mentioned that people with ASD have difficulties in interpreting indirect requests, to date only scarce evidence is available. Paul and Cohen (1985) evaluated the comprehension of indirect requests by individuals with autism (60–70 non-verbal IQ range) in two different settings. In the 'structured' setting the participant was given a sheet of paper with circles drawn on it and two pencils of different colours, and was told by the experimenter: 'I'm going to ask you to colour some circles. Colour them either red or blue, according to what I say'. Next, the experimenter produced requests to colour the circles in blue or red using different linguistic forms (e.g. 'Can you make the circle blue?' or 'You should colour the circle blue'). In the 'pragmatic' setting the participant was encouraged to draw during an informal conversation with the experimenter. When a drawing was completed, the experimenter requested the participant to fill it with a particular colour, again using various linguistic forms. In the structured setting, the ASD participants performed similarly to the controls, but in the pragmatic setting the performance of the ASD group was considerably poorer than that of the controls. Yet, even in this second condition, participants with ASD performed well on simple indirect requests, such as 'Can you…?', 'Why not…?', 'You should…?', 'Shouldn't you…?', 'It needs…' and 'I'll be happy if…'. Participants with ASD did have difficulties with sentences like 'Must you…?', 'I'll be sad unless…', 'Doesn't it need…?' or 'It doesn't need…'. However, intuitively, these latter forms involve greater linguistic complexity, and are rather convoluted means of formulating a request; absence of reaction to such utterances does not suffice to claim that ASD participants fail to discern the illocutionary force whenever it goes beyond the literal meaning. In fact, in Clark and Lucy's (1975) study – from which the stimuli used by Paul and Cohen originate – such forms proved relatively difficult to process even for typical adults. Moreover, the fact that in the 'structured' settings even such unusual requests were complied with (that is, when the participants were told that they would be requested to do things)

shows that ASD people do not unequivocally attach the directive illocutionary force to the imperative grammatical mood.

Ozonoff and Miller (1996) presented a group of ASD adults with tape-recorded stories ending with an utterance that, depending on the context, should be interpreted either as a literal question or as an indirect request. Participants were asked to choose between four endings: one corresponding to a literal answer to the final question of the story, one compatible with the interpretation of this question as a request, and two factually incorrect endings, which corresponded neither to a literal answer nor to the directive interpretation. Although the participants in the ASD group chose fewer correct continuations than controls, they chose significantly fewer literal continuations than ones compatible with the indirect request interpretation. This result goes against the assumption that people with ASD have problems in going beyond literal interpretations.

MacKay and Shaw (2005) found that children with Asperger syndrome or high-functioning autism have problems in explaining why the protagonist of an illustrated story uttered an indirect request. The authors report that most children with ASD provided answers such as 'I don't know', 'Sometimes people say that' or 'Just said it in a different way'. However, the inability to provide a correct meta-communicative assessment of the utterance does not demonstrate a failure to grasp the illocutionary force of this utterance.

Likewise, Capps et al. (1998) report that in semi-structured conversations children with autism are more likely than controls to offer literal 'yes/no' responses to indirect requests like 'Can you tell me what happened at school today?'. However, such a literal answer does not provide, per se, evidence for lack of illocutionary force understanding; unfortunately, the authors do not mention what proportion of such answers was followed by compliance with the request.

Given existing evidence, it thus remains unclear to which extent indirect request comprehension is impaired in ASD. Questioning the lack of indirect request understanding in ASD makes particular sense in the light of recent findings that people with ASD are capable of going beyond literal meaning in some cases. For instance, metonymy comprehension (e.g. 'Robbie Williams' for 'CD of Robbie Williams') has been shown to be less impaired than metaphor comprehension (e.g. 'flood' for 'lots of people') and to be reliably predicted by receptive vocabulary (Rundblad and Annaz, 2010). Dennis et al. (2001) report that high-functioning autistic children successfully resolve lexical ambiguity on the basis of contextual information. de Villiers et al. (2007) and de Villiers et al. (in press) claim that some of the pragmatic determinants of the literal meaning of an utterance are preserved in the conversation of people with high-functioning autism and Asperger syndrome. Finally, adults with high-functioning autism and Asperger syndrome are good at deriving 'scalar implicatures', that is, non-logical – and thus not-literal – readings of 'some' and 'or' (Pijnacker et al. 2009; Chevallier et al. 2010).

It should not be taken for granted that to interpret indirect requests the hearer needs to make hypotheses about the speaker's communicative intentions. One major reason is that very young children are good at indirect request interpretation (Carrell 1981; Reeder 1978; Shatz 1978), well before the age when they acquire complex mind-reading skills and come to master irony, jokes, insinuation and lies (Winner and Leekam 1991; Leekam and Prior 1994; Sodian et al. 1991; Talwar and Gordon 2007). Ozonoff and Miller (1996: 415) claim that '[in] contrast to appreciation of jokes and [conversational] inferences, cognitive flexibility and the ability to revise initial interpretations do not appear to be of primary importance in indirect request comprehension. Instead, the listener must use background information to drive interpretation of ambiguous material'. It is thus a fully plausible theoretical option that illocutionary forces can be assigned with some success without attributing complex communicative intentions. Our aim here, however, is not to develop such an account, but rather to reassess indirect request comprehension by

people with ASD without endorsing a priori theoretical assumptions about the cognitive skills required.

Testing indirect request comprehension in a setting in which an (unfamiliar) experimenter issues requests may result in underrating the participants' performance. Given the social and communicative deficits that otherwise characterize ASD, the participants may fail to react for reasons independent of utterance comprehension. As for presenting the child with a story and asking them to explain the speaker's motivation for issuing a certain utterance or asking them to choose between two alternative continuations, these are tasks that presuppose that the participants with ASD can provide adequate, coherent and relevant answers to questions, and that they can construct coherent narratives, something that cannot be taken for granted.

To avoid these potential biases, we decided to run a naturalistic observational study, where children with ASD are videotaped in interaction in a familiar environment (e.g. at a day-care centre or with a therapist they know). Our aim is to find out whether, among all the linguistic types of requests addressed to children with ASD, the indirect ones are complied with less often than the direct ones, that is, than those performed by uttering grammatically imperative sentences. Clearly, many extra-linguistic cues can help the hearer to assign the correct interpretation to a sentence. However, taking such cues into account presupposes the ability to rely on other sources than the literal, conventional sentence meaning in the course of utterance interpretation. Another important methodological issue is that of scoring. Obviously, lack of compliance does not mean lack of understanding. Although such a bias is impossible to eliminate altogether, collecting observations in a milieu in which the child feels familiar and secure reduces it considerably. Moreover, this bias is not a problem in the present study because, if anything, it makes more difficult the task of confirming our hypothesis that children with ASD at least sometimes understand indirect requests. The absence of any significant difference in compliance between direct and indirect requests would constitute a strong indication that, contrary to what is claimed in the literature, children with autism go beyond the sentence's literal meaning to access the correct illocutionary force. Such a result would, of course, leave open the question of other factors possibly influencing their understanding of indirect requests.

Methodology

Participants

Eleven participants were chosen at a day-care centre (n = 3) and a specialized school in the region of Charleroi (n = 5) and in two day-care units in two hospitals in Brussels (n = 3), in Belgium. One participant filmed at a hospital (the only female one) was subsequently dropped out of the study, as the diagnosis of ASD appeared less certain a year after our data were collected. In the remaining group, the chronological age ranged from 4 years 3 months to 12 years 5 months (mean (m) = 8 years 7 months, standard deviation (SD) = 9 months). All children received an independent diagnosis of autism from psychiatrists and physicians specialized in ASD. None of the children had a history of neurological or hearing impairments. All children had French as their first language, as did all the adults filmed in the collected corpus. The parents of every participant gave their written consent for the participation of their child in the study.

Non-verbal IQ, as measured by the Leiter-R scale, ranged from 73 to 36 (m = 50.78, SD = 11.21). The verbal capacity of the participants was assessed by administering the Receptive Vocabulary and Receptive Morpho-Syntax sub-tests of the *Évaluation du Langage Oral* battery (Khomsi 2001). For Receptive Vocabulary the mean score was 0.46 and for Receptive Morpho-Syntax the mean score was 0.39. However, this measure did not prove fully reliable, as two participants scored

nearly at zero in each sub-test. It is entirely possible that this failure was due to motivational factors independent of linguistic ability. Furthermore, both sub-tests consist of a picture-pointing task,[1] an aspect with which these children may have an independent difficulty. Unfortunately, these two children were among the group that was chronologically the last to be filmed, which made it impossible to assess all the participants with another battery. Nevertheless, when the two problematic participants were removed, the scores remained relatively homogeneous. Receptive Vocabulary: m = 0.59, SD = 0.14 – the standard score for typical 3-year-olds being 0.52; Receptive Morpho-Syntax: m = 0.49, SD = 0.09 – the standard score for typical 3-year-olds being 0.4.

Data collection

In the day-care centre and in the specialized school everyday interactions were filmed by the first author (MK). A period of adaptation of at least six day-long visits, weekly, without the camera, ensured that the children could get used to his presence. This period was followed by two or three day-long visits during which the children were familiarized with the camera and with being filmed. The material videotaped during these visits was not used in the study. Finally, data were collected with a view to having at least 4 hours of interaction for each child.

At the hospital, children were filmed during an individual session with a familiar therapist. The children were filmed either by MK after having been familiarized with him and with the camera (in which case the first 2 hours were excluded from the study) or by a camera set up in the room during the session and MK waiting outside. Data in this set involved one-to-one interaction between an adult and a child, whereas in the day-care centre and in the specialized school adults were interacting with several children. Therefore, in the former case the number of utterances addressed to the child was considerably higher. For this reason, for the children filmed at the hospital, only 2 hours of interaction were analysed.

Data coding

Four sentence types were distinguished: imperative, interrogative, sub-sentential and declarative. An occurrence was coded as imperative if it presented the morphosyntactic characteristics of the French imperative mood (that is, the absence of grammatical subject and pronoun inversion for pronominal verbs); for example:

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(4)   verse le lait
      Pour the milk
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In French the interrogative sentence type is marked either by the syntactic interrogative construction (verb-subject inversion or clause initial interrogative adverb) or by a distinctively rising prosodic pattern. In spoken conversation the latter form is the most commonly used, and it was the only kind of interrogative sentence type we found in our corpus.

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(5)   tu fermes le pot?
      You close the jar?
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As in English, in French, some requests with an interrogative intonation/structure can nevertheless be followed by *s'il te plait* (*please*), which is standardly regarded as indicating the directive illocutionary force: e.g.

> (6)   tu peux jeter ça à la poubelle s'il te plait?
>   Can you throw this in the bin, please?

As it may be unclear whether the sentence type is genuinely interrogative when followed by *please*, such cases where excluded from the analysis. The same policy was adopted whenever a declarative or a sub-sentential was followed by *please*. An occurrence was coded as sub-sentential if the sentence did not contain a main verb.

> (7)   ta place
>   Your place. [Meaning: Get back to your place.]

Finally, in all the remaining cases, the occurrence was coded as declarative: e.g.

> (8)   tu vas remettre la bouteille dans ton cartable
>   You are going to put the bottle in your bag.

> (9)   tu as oublié l'eau dans ton cartable
>   You forgot the water in your bag.

Note that (8) and (9) exemplify different types of request. In the former case, the state of affairs the speaker aims to achieve by their request is explicitly represented. By contrast, in uttering (9), the speaker does not represent explicitly the compliance state they attempt to provoke (that is, that the child should get back and take the water from their bag). Requests of this type most probably require some or a greater amount of inferential work to be complied with. To avoid any potential bias, such 'inferential' declarative requests were explicitly tagged during the coding phase.

The following coding conventions were followed. (a) Whenever doubts arose with respect to compliance, the request was excluded from the analysis. This included cases in which the recording did not show clearly the child's action or the child seemed to be engaged in the requested action anyway. (b) Only clear requests were included; offers or permissions were excluded. (c) When two requests directly followed each other, compliance was determined by identifying the onset of the child's action. Whenever this was not possible, the transcribers followed the convention of coding the last occurrence only. Finally, (d) it was not the child's proper performance of the requested action that was coded as compliance, but the intent to comply demonstrated by their action. Given that our focus is on illocutionary force understanding, such an intent suffices to demonstrate that the utterance has been interpreted as a request.

The data were transcribed and coded by the first author, using ELAN software (The Language Archive of the Max Planck Institute for Psycholinguistics, 2012). Coding reliability was assessed in the following way. A trained graduate student coded a randomly chosen 4-hour-long sample (in which a total of three children were filmed). Cohen's kappa was calculated to assess agreement (a) on linguistic type; $\kappa = 0.88$; (b) on compliance vs. non-compliance; $\kappa = 0.86$. The second author (PDB) coded another 2-hour sample (involving the other six children). Nearly perfect agreement was reached both on linguistic type ($\kappa = 0.94$) and on compliance ($\kappa = 0.92$).

Results

A total of 525 requests were analysed (m per child = 58.33; SD = 16.98). The corpus contained considerably more requests performed using the imperative mood (Table 1). More importantly, Table 2 show the proportion of requests complied with for each linguistic category.

Table 1. Requests by sentence type

Sentence type	Imperative	Declarative	Interrogative	Sub-sentential
n	259	117	66	83

Table 2. Proportion of compliance by sentence type

Sentence type	Imperative	Declarative	Interrogative	Sub-sentential
Proportion of compliance (SD)	0.71 (0.1)	0.62 (0.18)	0.74 (0.2)	0.79 (0.16)

Paired t-tests revealed that, for each category, a significantly greater proportion of requests were complied with. Imperatives: (m = 11.67, t = 5.72, p < .001); declaratives: (m = 3.44, t = 2.49, p < .05); interrogatives (m = 3.11, t = 3.94, p < .005); sub-sententials (m = 5.00, t = 4.20, p < .005). A repeated ANOVA revealed no significant difference as to compliance with respect to the linguistic type: $F(3,24) = 1.51$, p = .24. Declaratives seemed a little less often complied with than other types of requests. It is the only category where, for two participants, the proportion of compliance was below 50%. This was so even after 'inferential' declarative requests (see Methodology section) were excluded (n = 26); neither did the proportion of declaratives complied with change: 0.62 (SD = 0.18). Finally, no correlation was found between compliance and non-verbal IQ, or between compliance and chronological age. Finally, no positive correlation was found between compliance and non-verbal IQ (r = –.60, p = .085), and no correlation was found between compliance and chronological age (r = .195, NS).

Discussion

Despite the fact that requests performed with an imperative sentence are more frequent, using another sentence type – declarative, interrogative or sub-sentential – does not affect the ability of children with autism to comply. For each category the proportion of requests complied with significantly exceeded the proportion of requests not complied with. This result is all the more important because compliance is a very narrow window on request understanding. There are many possible reasons why one does not comply with a request besides not understanding it – and particularly so in a population with interactional and social problems. Our data unambiguously show that children with autism do not rely exclusively on the linguistic form of an utterance to interpret it as a request or not. Of course, 'Go to your place', 'Will you go to your place' and 'Your place' can all be argued to represent, to some extent, the same situation – that in which the addressee goes to her place. But whatever one's theory of utterance interpretation is, some extra-linguistic processing is required to interpret such utterances as a request to sit down.

An obvious limitation of the present study is that we have no reliable measure of the verbal capacity of our participants. Further investigation will need to assess the relationship between linguistic competence and request compliance in a finer-grained way. Note, however, that the mean verbal age was relatively low, and that even those children who scored at zero level showed comprehension of indirect requests. (In the same vein, it has been reported that verbal IQ does not predict successful interpretation of indirect requests (Ozonoff and Miller 1996).)

It is well known that neurotypical children understand indirect requests from a very young age (see the Introduction). Our results do not suffice for arguing that when they interpret a

non-imperative sentence as a request, children with autism proceed in the same way as typically developing children. What our data do exclude is a complex alternative strategy, because the IQ of the participants was very low. Given that compliance did not correlate with IQ, a plausible hypothesis is that an interpretative path, specific to verbal and non-verbal communication, explains indirect request understanding. It is possible, for instance, that children with autism treat each utterance as a cue for an action, independently of its linguistic type. To assess this hypothesis, in our ongoing research, we are investigating the possible impact of contextual factors on compliance: gestures, the kind of activity the child is involved in, and preceding discourse information.

Note

1. The child is presented with four pictures and told to point at one. The prompts in the Receptive Vocabulary sub-test have the form 'Show me the picture where there is (a)…' followed by the test item (e.g. bicycle) and in the Receptive Morphosyntax sub-test have the form 'Show me the picture where…' followed by the test sentence (e.g. the car is on the bed).

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