

# Indirect Speech Acts in High Functioning Autism

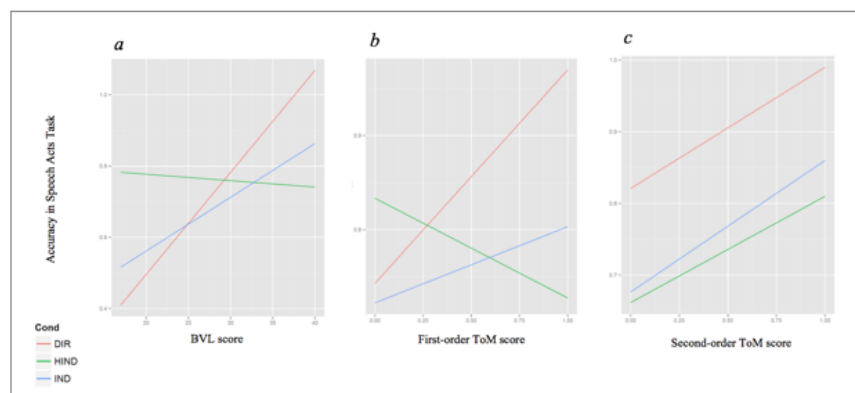
Greta Mazzaggio      Simona Di Paola      Eleonora Marocchini      Filippo Domaneschi

(University of Florence) (University of Genoa) (University of Genoa) (University of Genoa)

**Background.** Traditionally, pragmatic abilities are thought to be impaired in ASD and this is attributed to an impairment of Theory of Mind (ToM). Yet, a clear characterization of pragmatic impairments in ASD and, particularly, in High Functioning Autism (HFA) is still lacking. Recently, the traditional view has been mitigated by the finding that some pragmatic phenomena (e.g., scalar implicatures) are partly preserved in HFA. What about Indirect Speech Acts? The picture is fragmented. On the one hand, some studies suggest that HFAs perform well on conventionalised indirect requests [1]; on the other, some studies report HFAs' difficulties in explaining why indirect requests are used in a given context [2]. However, following the traditional view, one would expect ASD population to experience difficulties with indirect speech acts. Beyond this, it is a shared idea that typical subjects show more difficulties with indirect speech acts than conventionalized indirect requests [3, 4].

**Kissine et al. (2015)** tested indirect speech acts comprehension in HFAs and typically developing (TD) children. In a 3-pronged semi-structured task involving Mr. Potato Head, they found that HFAs performed better than TDs and concluded that indirect requests understanding may be preserved in HFA. However, this study compared TDs and HFAs at very different age ranges (TDs: 2;7-to-3;6 years; HFAs: 7-to-12 years) and only assumed a homogeneous development of ToM, given that no measure for children's ToM skills and general cognitive functioning was collected. As such, it is unclear whether the HFAs' better performance reflects age group-related differences rather than genuine speech acts comprehension in autism. Here, we further explore the hypothesis that indirect requests may be preserved/compromised in autism by comparing HFA and TD participants matched for age in a semi-structured task. We also assess children's linguistic and ToM skills, to investigate whether such cognitive functions predict indirect requests comprehension.

**Methods.** 43 Italian children were tested: 14 HFA children [MA = 10,6; SD = 1.17; 2f] and 26 age-matched TD children [MA = 11.03; SD = 0.61; 9f]. To test indirect speech acts understanding, we designed a task in which children were first presented with the drawing of a farm



**Figure 1.** Correlations between children's accuracy in the Speech Acts Task (separate regression lines per condition) and children's scores in BVL test (a), 1<sup>st</sup> order ToM test (b) and 2<sup>nd</sup> order ToM

showing several animals and objects; then, while still looking at the drawing, they were asked some questions about the drawing (N. 24). The goal was to answer the questions in order to help the experimenter recreating the drawing. Questions were presented in 3 conditions: *Direct* (DIR: *Is there a bunny in the farm?*), *Indirect* (IND: *I don't remember if there is a bunny in the farm*) and *Highly Indirect* (HIND: *It is hard to remember whether there is a bunny in the farm*). This generated 3 levels of the indirectness of the request (Direct, Indirect, Highly Indirect), which involved increasing processing efforts. Children's accuracy to target questions was collected. After the indirect speech acts task, we administered the BVL test (morphosyntactic abilities) and 2 ToM tests (1<sup>st</sup> and 2<sup>nd</sup> order ToM).

Speech Acts Task				Linguistic and Mind Reading abilities		
Condition	Overall Accuracy (%)	Accuracy by Group		Test	Score by Group	
		TD	HFA		TD	HFA
<i>Direct</i>	91(0.27)	100(0)	76(0.42)	<i>BVL</i>	37,25(2.28)	30,12(5.94)
<i>Indirect</i>	78(0.41)	83(0.36)	68(0.46)	<i>1<sup>st</sup> order ToM</i>	0,92 (0.25)	0,50 (0.50)
<i>Highly Indirect</i>	75(0.43)	73(0.44)	78(0.41)	<i>2<sup>nd</sup> order ToM</i>	0,71(0.45)	0,35 (0.48)

**Table 1.** Left: Mean frequency (%) and standard deviation of children's correct responses in the Speech Acts Task. Right: Mean scores (standard deviation) of children's linguistic and ToM performance.

**Results.** Data were analysed with binomial logistic regression models. We analysed (i) whether children's speech acts understanding varies depending on the indirectness of the request (i.e., DIR, IND, HIND) and on Group (i.e., TD vs. ASD); and (ii) whether this ability is predicted by their linguistic and ToM skills. Table 1 reports the accuracy rates in the speech act task as well as the BVL and ToM tests scores. (i) *Accuracy in Speech Acts.* Children's accuracy significantly differed depending on condition only (Condition:  $p < .0001$ ). Importantly, children performed significantly worse with indirect and highly indirect requests than with direct requests (DIR vs. IND:  $p < .005$ ; DIR vs. HIND:  $p < .0001$ ; IND vs. HIND:  $p = n.s.$ ). (ii) *Predictors.* Both children's linguistic and ToM skills significantly predicted their accuracy, as revealed by a significant positive correlation between accuracy in speech acts task and the scores in BVL ( $p < .05$ ;  $\beta = 4.78$ ) and ToM tests (1<sup>st</sup> order ToM:  $p < .05$ ;  $\beta = 1.59$ ; 2<sup>nd</sup> order ToM:  $p < .05$ ;  $\beta = 2.71$ ). Interestingly, a significant negative correlation also emerged between (i) children's BVL scores and their accuracy to HIND ( $p < .05$ ;  $\beta = -0.16$ ); and (ii) children's scores in the 2<sup>nd</sup> order ToM test and their accuracy in both Indirect and HIND (Cond Indirect X 2<sup>nd</sup> order ToM:  $p < .05$ ,  $\beta = -2.55$ ; Cond HIND X 2<sup>nd</sup> order ToM:  $p < .05$ ,  $\beta = -3.04$ ) (see Fig 1).

**Conclusion.** These data support three main results. First, in line with previous studies on adults [4, 5], both TDs and HFAs exhibit more difficulties understanding indirect - and highly indirect - than direct requests (i.e., effect of condition). Second, both ToM and morphosyntactic abilities seem to predict the ability to understand speech acts: participants with better morphosyntactic and ToM skills also exhibited a better understanding of speech acts (i.e., positive correlations with the BVL and ToM test scores), thus suggesting that the better the linguistic and ToM abilities the better children's understanding of speech acts. However, third, this general pattern seems to be influenced by the indirectness of the request. In fact, participants with better morphosyntactic and 1<sup>st</sup> order ToM abilities still performed lower with highly indirect requests than direct and indirect ones (i.e., negative correlations). Similarly, the better 2<sup>nd</sup> order ToM the better speech acts understanding, but still this was more the case with direct requests than indirect and highly indirect requests (i.e., negative correlations). Overall, this suggests that the cognitive functions under scrutiny likely enhance children's speech acts understanding, but the level of indirectness of the request might involve these functions to different extents, at least in the age-range targeted here. To the best of our

knowledge, though still preliminary, this is first evidence of the cognitive functions involved in indirect speech acts comprehension in typical and atypical development. It might be worth exploring further the possibility that ToM is more prominently involved than linguistic abilities. Finally, differently from Kissine et al. (2015), we observed no significant accuracy differences between TDs and HFAs. This result deserves further clarifications. However, two tentative interpretations can be outlined. First, contra Kissine et al. (2015), when matched for age, HFAs are not more facilitated in understanding indirect speech acts than TDs. Second, the sample of HFA participants is still too narrow to make any appreciable difference emerge. We are collecting more data to cast light on this.

**References.** [1] Paul R., Cohen DJ. (1985). Comprehension of indirect requests in adults with autistic disorders and mental retardation. *J Speech Hear Res.* 28:475-9; [2] MacKay G., Shaw A. (2005). A comparative study of figurative language in children with autistic spectrum disorders. *Child Lang Teach Ther.* 20(14):13-32; [3] Clark H. H. (1979). Responding to indirect speech acts. *Cogn Psych* 11. 430-477. [4] Clark H. H. & Lucy P. (1975). Understanding what is meant from what is said: A study in conversationally conveyed requests. *J Verbal Learn and Verbal Behav.* 14, 56-72.; [5] Coulson & Lovett (2010). Comprehension of non-conventional indirect requests: An ERP study. *Ita J of Linguistics*, 22(1), 107-124.