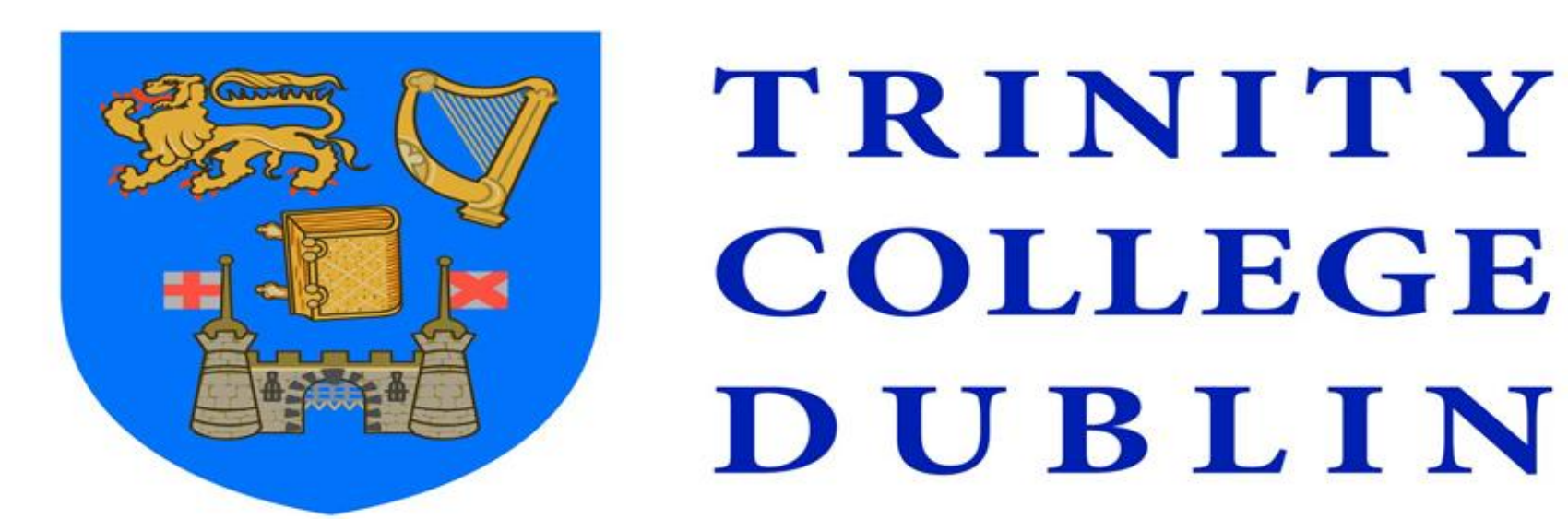


Pragmatic language profile of high-functioning girls with Autism Spectrum Disorder



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Introduction

- The concept of pragmatics refers to how language is used in the context of social interactions and comprises both linguistic and non-linguistic functions (Eigsti, et al. 2011). Therefore **Pragmatic ability is a measure of the integration of two areas associated with core deficits in ASD - language production and social understanding.**
- Pragmatic deficits are highly prevalent in the speech of individuals with autism spectrum disorders (ASD). While other elements of language, such as syntax and phonology, can be relatively unimpaired in people with high functioning ASD, **pragmatic impairments occur in the speech of individuals across the entire autism spectrum** (Tager-Flusberg, 2000).
- The profile of pragmatic deficiencies varies considerably across individuals with autism, which may suggest that other factors, such as gender, can play a role in the expression of pragmatic impairment.
- Socio-communicative skills show an early female advantage in typical development. Similar investigations with ASD populations however have produced mixed results, possibly confounded by the wide range of cognitive abilities of those on the spectrum (Rivet & Matson, 2011).
- In family members of individuals with autism, there has been **some evidence of a gendered expression of pragmatic deficits and gender-specific traits** (Schwichtenberg et al, 2010), but these gender associations have yet to be explored in children with ASD and specific pragmatic deficiencies have not been explored in girls with ASD.
- Girls with autism have been neglected in autism research, especially in studies with high functioning individuals, where the gender ratio of male to female may be as high as 11:1 (Fombonne, 2005).
- Girls with high functioning ASD may retain the advantage in socio-communicative skills over their male peers, which is seen in typical development. Girls place more importance on friendships and have more complex social relationships than boys, which can motivate and require a higher level of social skills and awareness (Lagerspetz, Bjorkqvist & Peltonen, 1988).
- With so little known about the female expression of autism, this study provides a first step in exploring areas of interest in pragmatic language for identification of girls with ASD and subsequent intervention.

Method

SAMPLE

- 27 girls with high functioning autism and 27 typically developing girls matched on non-verbal mental age (Table 1).

Table 1. Mean chronological ages and Non-verbal mental age of ASD and TD samples

ASD		TD	
Age (Years)	NVM*	Age (Years)	NVM*
13.14, SD=1.77	11.87, SD=2.65	11.02, SD=0.53	12.1, SD=1.96

- Girls from ages 9-17 years were recruited from schools in Ireland and the United Kingdom
- For the ASD sample, a diagnosis on the spectrum from a trained clinician was required prior to enrollment. Diagnostic status was confirmed by administration of the ADOS-R (Lord et al, 2011).

MEASURES & PROCEDURE

Children were interviewed and standardized questionnaires and assessments were administered during a home or school visit, of 2-3 hour duration. Child conversation samples were adapted from the ADOS interview.

Detroit Tests of Learning Aptitude-4: Standardized assessment of cognitive ability comprised of ten sub scales which can be combined into measures of verbal and non verbal abilities and a measure of overall cognitive ability.

Pragmatic Rating Scale (PRS, Landa et al, 1992): A measure of pragmatic impairment across 34 items. Conversational samples were coded from video by trained coders. Reliability of coders was computed by percent overlap and considered reliable >65% or greater for each item.

Pragmatic Rating Scale Items

Subscale	Sample Items	Sample Utterances/ Coded Examples
Presupposition/ ToM	<ul style="list-style-type: none"> Overly personal Overly detailed Insufficient background Inadequate clarification 	"Well there's 120 students, 300 in the whole school, 100 in the class, but this school only has 9 in a class"
Discourse Management/ Speech behaviors	<ul style="list-style-type: none"> Interrupting Acknowledging and Elaboration Perseveration Quality of reciprocal conversation Overly formal or informal Scripted 	"Can I tell just one more thing about Toby?... I name everything Toby!" "Also, my teddy bear, Edison, is very important to me. I've had him since I was very young so he needs to be close to me"
Suprasegmental Characteristics	<ul style="list-style-type: none"> Prosody Character voice Language formulation difficulty 	"Now let's see, what should I call the boy?" (self-talk)
Nonverbal Communication	<ul style="list-style-type: none"> Use of gestures Mannerisms or posturing Expressions and gaze Inappropriate sounds or grooming 	"ughhhh"

Results

Preliminary Investigation: Non-verbal Mental IQ

- The 5 subtests of the DTLA which comprised the non-verbal age equivalence were examined for differences between girls with ASD and girls with Typical Development (TD).
- While there was no group difference on NVM, other differences did emerge between the groups in nonverbal mental abilities. The girls with ASD were significantly different from girls with Typical Development (TD) on their performance on only one subtest, Story Sequences. On average, girls with ASD (M=12.8; SD= 4.2) performed on a lower age expectancy than girls with TD (M= 15.5; SD= 3.3) on Story Sequences ($t(57) = -2.506$, $p = .015$). For all other DTLA subtests, the performance differences were non-significant.

Pragmatic Ability

- The PRS was totalled for overall score of pragmatic impairment. Subscale measures were also computed for group comparison.
- Girls with ASD had significantly higher total scores on the PRS than TD girls (Mean ASD=16.64, SD=7.51; Mean TD=4.48, SD=4.39; $t(57) = -6.03$, $p < .001$). (Figure 1)
- Girls with ASD also had significantly higher scores on all sub scales of the PRS: TOM (Mean ASD=3.00, SD=2.00; Mean TD=0.88, SD=1.55; $t(57) = -3.92$, $p < .001$.)
- Discourse Management (Mean ASD=2.76, SD=2.07; Mean TD=1.48, SD=1.69; $t(57) = -2.13$, $p < .05$).
- Suprasegmental Mean ASD=4.58, SD=3.31; Mean TD=0.59, SD=1.00; $t(57) = -4.82$, $p < .001$).
- Nonverbal Mean ASD=3.23, SD=1.92; Mean TD=0.55, SD=0.97; $t(57) = -5.33$, $p < .001$). (Figure 2)

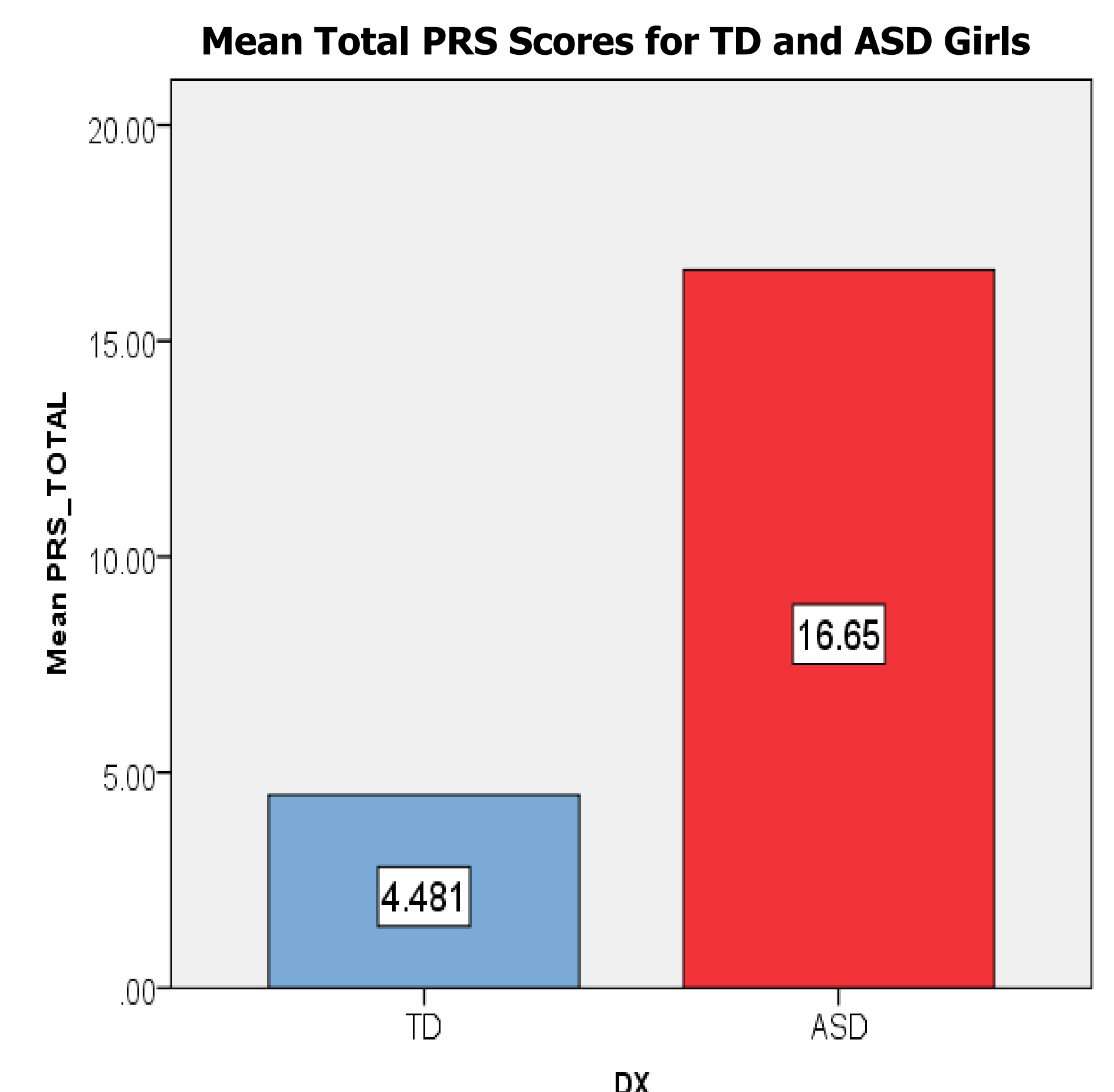


Figure 1. Mean differences for Total PRS scores for ASD and TD girls

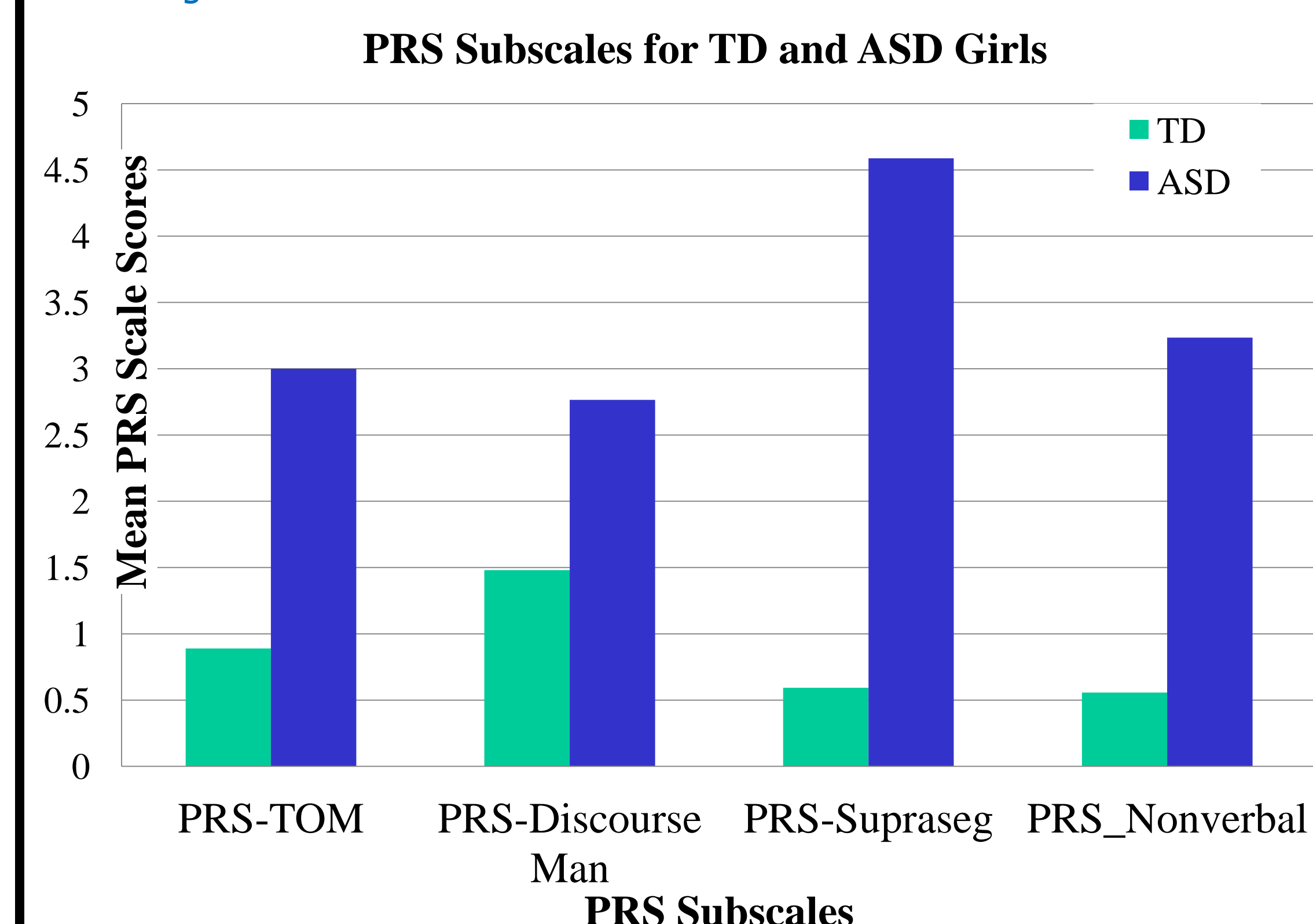


Figure 2: PRS Total and subscales mean differences by group

Discussion

- Not surprisingly, PRS total scores are higher overall for ASD girls than TD girls. However, the pattern of impairment for each group are different. The subscale with the highest impairment in ASD is 'Suprasegmental Speech', one of the lowest for girls with TD. TD girls displayed the most errors in 'Discourse Management', where ASD girls had the lowest amounts of error. This finding may support a specific profile of impairment for ASD girls, instead of considering pragmatic impairment as a whole.

- However, with the wide variation seen in the samples, all conclusions must be interpreted with caution. The variation seen in individuals in the sample, even in the subset of high functioning ASD, speaks to the continued difficulty of defining meaningful phenotypes of ASD.

- An interesting finding with the investigation of non verbal ability is the importance of Story Sequences (SS) when considered with Pragmatic abilities. SS is the only subscale to show significant differences between groups, and may be measuring a non-verbal component of pragmatics.

- Further analysis is needed to more closely investigate the patterns of pragmatic error. We will be investigating both Theory of Mind abilities and Executive functioning in the sample of girls in relation to Pragmatic impairment.

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