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USE OF *UM* AND *UH* IN SPONTANEOUS SPEAKING IN AUTISM SPECTRUM DISORDER

Jessica de Villiers
University of British Columbia

Abstract: This paper reports on the use of hesitation fillers in the spontaneous discourse of speakers with autism spectrum disorder (ASD). It illustrates some general patterns of disfluency in an excerpt from one conversation with an adolescent speaker with ASD, then focuses particularly on the hesitation fillers *um* and *uh*. The paper takes as its departure point a study by Clark and Fox Tree, using *uh* and *um* in spontaneous speaking.

Keywords: hesitation fillers, autism spectrum disorder/ASD, Asperger syndrome, *um*s and *uh*s

IN THE FIELD OF LINGUISTICS, it has long been recognized that naturally occurring spoken discourse is messier than people generally assume. In spontaneous speech, speakers produce false starts, fluency errors, word fragments, pauses, incomplete utterances, and overlapping speech. An important recent development in discourse analysis, however, is the idea that even hesitation fillers (e.g., *um* and *uh*) have meaning beyond what is usually ascribed to them. The recent work of linguists Clark and Fox Tree (2002) has shown that the hesitation filler *um* is systematically used before longer pauses while the hesitation filler *uh* is used to signal shorter pauses. In an extensive corpus-based study, they found this core contrast to be present across a variety of contexts in both British and North American speakers. This differential use of hesitation fillers is not done on a conscious level, but is an unconscious performance feature that speakers employ, much along the same line as nonverbal communication. Clark and Fox Tree suggest that the function of *um* and *uh* is to signal the length of an upcoming pause to listeners, anticipating their communicative needs.

In light of these findings, this paper investigates the use of hesitation fillers in the spoken spontaneous discourse of speakers with autism spectrum disorder (ASD). It is well-known that individuals with ASD have difficulty with spoken communication, especially in conversation. Disfluency is also an acknowledged difficulty (Spek et al. 2009), but investigations have tended to focus on tasks of verbal fluency rather than disfluencies in extended conversations (e.g., Geurts et al. 2004; Minshew et al. 2002; Turner 1999). Extended discourse is generally quite difficult for speakers with ASD. Perhaps as a result, the patterns of disfluency in conversation tend to be quite different from those found in the speech of typically developing speakers, although they are of the same kind. That is, where there is disfluency in talk, it is reflected in familiar phenomena such as incomplete utterances, false starts, and

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hesitation fillers, but there may be more hesitation phenomena for some speakers who have planning difficulties.

A hallmark of ASD communication is pragmatic difficulties, and in particular, having more pragmatic and discourse difficulties than structural problems (Tager-Flusberg 1994). Another area of consensus in autism research is that people with autism have difficulties in the area of Theory of Mind (ToM), the ability to recognize other people's mental states and to use information about mental states to predict and explain behaviour (Baron-Cohen et al. 1985). Communication difficulties are thought to be related to such difficulties in ToM: The understanding is that failure to read what an interlocutor may be feeling or believing as a conversation progresses interferes not only with understanding certain intended meanings (especially implicatures), but also with anticipating an interlocutor's needs in conversation.

This paper investigates the use of the hesitation fillers *um* and *uh* in 41 speakers with ASD, following Clark and Fox Tree's work. The results of the investigation suggest that speakers with ASD achieve surprising success when it comes to signaling the length of upcoming pauses in spoken discourse. To the extent that the successful use of hesitation fillers to signal pause length reflects both an appreciation of and anticipation of listener needs, the ability to use hesitation fillers in this way points to a potential strength in communication abilities in ASD and calls for a more nuanced account of pragmatic abilities.

1. OUTLINE. The paper first provides a brief description of ASD from the perspective of communication, as background to that field. It then presents a stretch of discourse that reflects a typical kind of pattern seen in Asperger Syndrome (e.g., Asp and de Villiers 2010) to give an example of what disfluencies can look like in ASD communication. Clark and Fox Tree's 2002 study is then introduced, with a focus on those details relevant to the present investigation. Next is the present study, which analyzes the use of uh and um in spontaneous conversations of 41 speakers with ASD and compares the results with those of Clark and Fox Tree. Finally, some conclusions and future directions are offered.

2. BACKGROUND. Autism is neurodevelopmental disorder profoundly affecting communication (APA 2000). Diagnostic criteria, for example, include impairments in social interaction, one-sided communication or a lack of social reciprocity, as well as restricted or repetitive activities including language (APA 2000). Since it was first defined some 66 years ago (Kanner 1943), widening of the diagnostic criteria has led to an umbrella term, autism spectrum disorder (ASD), to describe a spectrum of associated disorders including autism, high-functioning autism and Asperger Syndrome. And while high-functioning individuals with ASD may be quite productive in their speaking, this can be dependent on intensive interventions, and many people with autism still do not achieve a high level of functional communication, even with interventions. For high-functioning individuals, communication patterns and difficulties associated with ASD are quite varied, but commonly observed characteristics include irregular intonation patterns (Fine et al. 1991), idiosyncratic language (Volden & Lord 2001), echolalia (Prizant and Duchan 1981), focus on a single topic (Ghaziuddin and Gerstein 1996; de Villiers and Szatmari 2004), literalness (Happé 1995), and pedantic characteristics (sounding more rehearsed or bookish than a context demands,

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often with intonation patterns that are marked or 'wooden' [Ghaziuddin and Gerstein 1996; de Villiers and Szatmari 2004]).There is growing literature on problems with inferencing (Saldaña and Frith 2007). There is also consensus about pragmatic difficulties in ASD, including a common observation that in conversations and other social interactions, individuals with ASD do not take into account the knowledge of their interlocutors, or anticipate listeners' needs (Gomez et al. 1993).

Closer text analyses have also shown: difficulties shifting focus and collaborating in topic development (de Villiers 2005) and repetitive language use (de Villiers and Szatmari 2004). But a less commonly explored area of difficulty is fluency.

3. TEXT ILLUSTRATION. Text (1) is a short stretch of discourse from a youth with high-functioning autism. It is an excerpt of a longer semi-structured conversation and occurs almost at the beginning. While there is no single profile or characterization for discourse of high-functioning youths on the autism spectrum, the fluency issues seen represent one fairly characteristic pattern. (The youth's lines appear in bold.)[1]

(1) 1. Chi: uh Mrs Potter Mrs Potter I have lots of work to do in class.
2. Chi: and I hate school.
3. Res: what kind of work do you have to do?
4. Chi: math um -: ## the.
5. Chi: [audible exhale].
6. Chi: uh well I got math and uh uh -: # it's a little complex for me.
7. Chi: uh # spelling # uh -: story # um -: uh well uh -: ,
8. Res: what's your favourite subject James?
9. Chi: my favourite subject is # absolutely nothing but playing lots of video games and waiting for summer which will be coming in a few weeks.

In Text (1), there are some noticeable disfluencies, fluency phenomena that look more like what are typically associated with problems in performance, rather than simply blending in as a natural, sometimes even helpful, part of free-flowing, spontaneous spoken discourse. In this short excerpt (7 utterances and an audible exhale), James has 2 incomplete utterances (lines 4 and 7), 10 hesitation fillers (lines 1, 4, 6 and 7), 6 noticeable pauses (lines 4, 7 and 9) and a false start (line 4). The first line, a response to a question about how he's doing, goes well. However, when he is asked for details, and in particular to classify or categorize the "kind of work" he has to do, there are many disfluencies. Then in the last line, 9, the disfluencies disappear, possibly because he has returned to a familiar topic, with material that is recalled. It is an interesting feature of the discourse that the disfluencies are reduced on a "favourite subject," something that is often a clinical observation with ASD. Among

[1] Transcription conventions:
Chi: child
Res: researcher
-: lengthened syllable
noticeable pause

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the disfluencies are the hesitation fillers *um* and *uh*, and while the other fluency features are of interest in themselves, it is these two hesitation fillers that are the focus of the rest of the present discussion. The hesitation fillers *um* and *uh* are considered, in this speaker's discourse and in the broader study from which this speaker's discourse was drawn.

However, it is first useful to provide some background to Clark and Fox Tree's innovative 2002 study on *um* and *uh* in spontaneous speaking (Clark & Fox Tree 2002). *Um* and *uh* have traditionally been considered as belonging to the broad category of performance phenomena (errors or additions that are outside of language, although they may be useful indicators of a speaker's performance). And while some accounts have treated some performance phenomena as belonging within the study of language, such as, for instance, signaled self-repairs (cf. Schegloff, Jefferson & Sacks 1977, cited in Clark & Fox Tree 2002:74), *um* and *uh* have not been among those considered. They have, instead, typically been seen as belonging to the 'messier' variety.

In more specific discussions, *um* and *uh* have commonly been treated as fillers of various types. Goldman-Eisler (1968) treated them as filled pauses, the assumption being they are pauses that are filled (involuntarily) with sound, perhaps because of a problem with speaking. They have also been seen as non-linguistic signals, as a way of indicating one's intention to hold the floor (e.g., Maclay & Osgood 1959) or as a way for speakers to indicate they are working on producing speech (Goffman 1981). They have, in addition, been treated as interjections (James 1972), where a speaker comments on his or her own performance. These three perspectives on *um* and *uh* as 'filler types' are summarized in Clark and Fox Tree's paper (2002).

Clark and Fox Tree approached *um* and *uh* in a different way. Pointing to patterned regularities in how *um* and *uh* are used differentially to signal pause length, they argue that these two fillers should in fact be regarded lexically. Clark and Fox Tree investigated the length and frequency of pauses following hesitation fillers in several corpora. The primary data for their study was the London-Lund (LL) corpus, a corpus of 170,000 words from 50 face to face conversations (from the Svartvik & Quirk 1980 corpus of English conversations [Clark & Fox Tree 2002:80]). Auxiliary analyses of three other corpora were also used, including the Pear Corpus (recounts of a dialogue-free movie about pear-pickers from 20 individuals [Chafe 1980]), the Answering Machine (AM) corpus (a 5000 word corpus of 63 calls to telephone answering machines [Svartvik & Quirk 1980]), and the Switchboard corpus (SW) (a 2.7 million word corpus of telephone conversations [Godfrey, Holliman & McDaniel 1992]). The Switchboard corpus is not considered in the present discussion because it did not mark pauses. (See Clark and Fox Tree 2002). The data from the ASD study discussed here is most similar to the LL corpus (face-to-face conversation).

4. CLARK AND FOX TREE'S METHODS. Clark and Fox Tree found there was substantial variation by speaker in how often and with what preference speakers used hesitation fillers. Their summary of variation by speaker in their primary data set provides a useful indication:

> The 65 speakers in the LL corpus who produced more than 1000 words each ranged from 1.2 to 88.5 fillers per 1000 words (median 17.3). They also varied in which filler they used more often. One used only *uh* (85 instances), and another used only *um*

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> (but just four instances). The median speaker used 52% *uhs* and 48% *ums*. So speakers have characteristic preferences in fillers, just as they do for other words in their vocabulary. (Clark & Fox Tree 2002:97)

Given this variance, Clark and Fox Tree only used data from speakers who produced both categories of filler in their statistical tests.

Clark and Fox Tree measured the length of pauses following um and uh using listener judgment. In their study, the pauses represent the judgments of trained coders, who considered the pause lengths and judged them (in their immediate contexts) as normal or abnormally long. That is, ultimately it was the perception of pause length that was studied. The exception was the Pear Corpus, where coders measured the pauses in seconds to the nearest .05 s. Coders gave the unit pause (one stressed unit) a value of 1 unit long [(-)], and the 'brief pause' (one light foot) was treated as .5 units long [(.)]. These were judged according to the speaker's rate of speech (Clark & Fox Tree 2002:81). Thus (.-) would be a value of 1.5; (.) would be a value of .5; and (-) would be a value of 1.

4.1. RESULTS OF CLARK AND FOX TREE'S INVESTIGATION. Clark and Fox Tree found that speakers use the hesitation fillers *um* and *uh* systematically when they expect a major or minor delay in speaking. Specifically, *um* was used to signal longer delays and *uh* was used to signal shorter delays. In the LL corpus, *um* was followed by delays far more often than *uh* (69 to 29 % of the time, almost 2.38 times as often) and *um* was also followed by much longer pauses than *uh* (0.68 to .25 units, or 2.72 times longer). In the AM and Pear corpora there were also longer pauses on average after *um* than after *uh*. In the AM corpus, the mean pause lengths were 0.54 to 0.15 units (3.6 times longer after *um*). In the Pear corpus pause lengths were 0.80 to 0.52 s, with a ratio of 1.54 (pauses were 1.54 times as long after *um*). **Figure 1** (overleaf) illustrates the mean length of pauses after *um* and *uh* in Clark and Fox Tree's study.

Clark and Fox Tree point out that the phenomenon is not simply a technique or signal of floor-holding, since there would be no need for this in the AM and Pear contexts, which were monologic. Rather they suggest that the function of um and uh seems to be singularly directed toward signaling the initiation of a delay. The results also suggest a core contrast between major and minor delays.[2] These findings have implications for cognition, suggesting that speakers who successfully use *um* and *u*h to signal imminent delays can estimate how long it will take them to retrieve an answer or formulate an utterance before they do so and monitor their speech plans for upcoming delays worthy of comment.

5. USE OF UH AND UM IN SPONTANEOUS CONVERSATIONS OF SPEAKERS WITH ASD.

5.1. PARTICIPANTS. Participants came from a follow-up study of children with high-functioning autism and Asperger syndrome at the Offord Centre for Child Studies in Hamil-

[2] Clark and Fox Tree's study also analyzed other aspects of *um*s and *uh*s not addressed in the present paper, including whether the hesitation filler was attached as a clitic to the previous word, as in *and-uh*, and whether it was prolonged.

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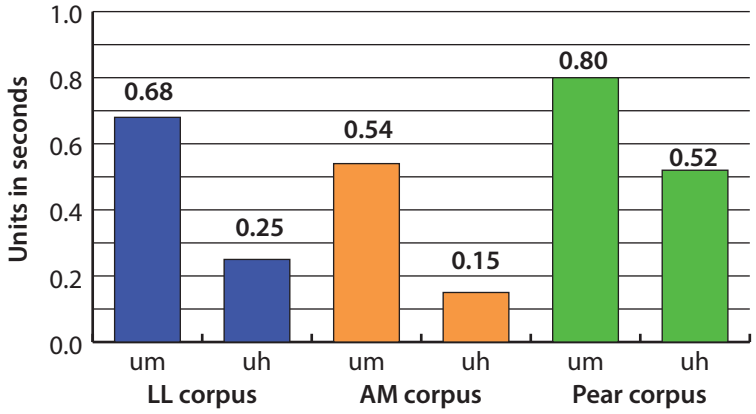

Figure 1. *Mean length of pauses after* um *and* uh *in Clark and Fox Tree's study.*

ton, Ontario. There were both male and female participants, ranging in age from 10 to 13 years, and all had fluent language abilities. A full description of participants at the time of the follow-up study, and of the diagnostic details, can be found in Szatmari et al. (2000).

5.2. PROCEDURES. The present study of *um*s and *uh*s in ASD builds on Clark and Fox Tree's study but employs pause analysis software for the measurement of pause lengths. Most of the pause analysis was done through the use of the program Praat, (an application developed by Paul Boersma and David Weenink at the University of Amsterdam).[3] Additionally, an open-source script for Praat was used (mark pauses by Mietta Lennes, University of Helsinki). This script automatically delineates pauses in speech on the basis of a series of parameters.[4]

Audio recordings of 41 conversations with youths diagnosed with ASD were digitized into WAV format. The average length of pauses after *um* and after *uh* was used for each individual, and measurement of pauses in seconds was to 2 decimal places. The criteria were that they had to produce at least 3 *ums* and 3 *uhs*. Data from 41 speakers was originally analyzed. Four of the 41 speakers had either no *ums* or no *uhs* and were therefore not used for the final measure of pauses after *ums* vs. *uhs*. Six had only 1 *um* or 1 *uh*. (Of these, 5 had longer pauses after *um* than *uh*, 1 had the opposite pattern.) Therefore, in the final analysis there were 26 participants. One 21 second pause was also taken out since it was deemed to have occurred for reasons outside the discourse context.

5.3. RESULTS IN THE ASD DATA. **Figure 2** illustrates the mean length of pauses after *um* and *uh* in the ASD data. *Um* was followed by much longer pauses than *uh* (.62 to .36), with a ratio of 1.72, and this was statistically significant (P<.008).

[3] *http://www.fon.hum.uva.nl/praat/*

[4] *http://www.helsinki.fi/~lennes/praat-scripts/*

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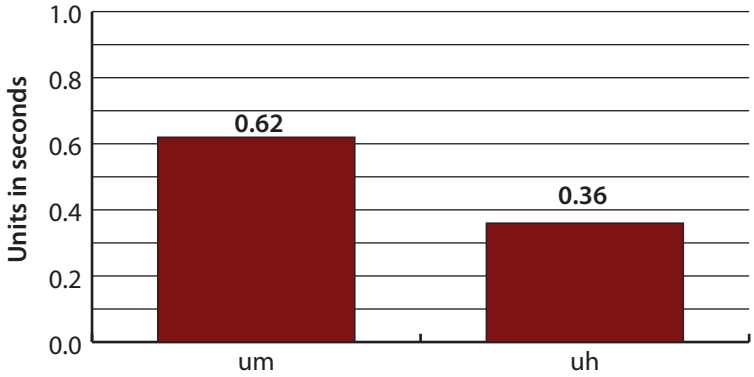

Figure 2. *Mean length of pauses after* um *and* uh *in ASD data.*

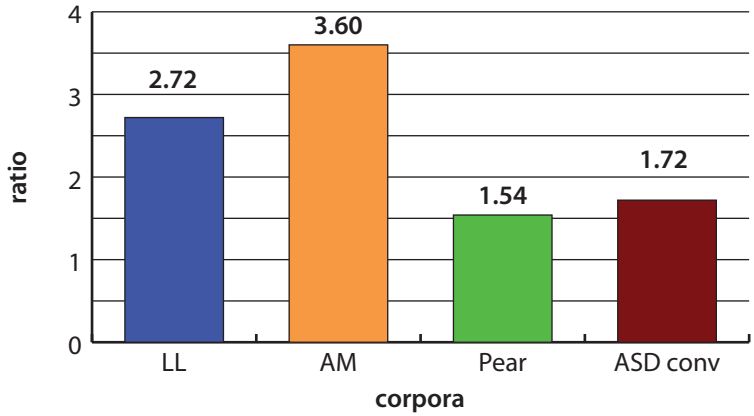

Figure 3. *Ratios of pauses following um and uh*

Our results were compared with the results of Clark and Fox Tree's study. Recall that in the LL Corpus (face to face dialogue), the mean length of pauses after *um* was 0.68, after *uh* was 0.25, with a ratio of 2.72. In the AM Corpus (answering machine), the mean length of pauses after *um* was 0.54, after *uh* was 0.15, a ratio of 3.6. In the Pear Corpus (narrative retelling), the mean length of pauses after *um* was .80, after *uh* it was .52, a ratio of 1.54.

In the ASD sample, the same pattern occurs, with a ratio of 1.72 (*um* = .62; *uh* = .36), as can be seen by comparing **Figure 1** and **Figure 2. Figure 3** illustrates that the differences in pause length in the ASD data are less dramatic than in the LL corpus and AM monologue data used in Clark and Fox Tree's study. However, the core differentiation between major and minor pauses is still present. The ratio is most similar to the Pear data, where there is a retelling of material recently viewed and committed to memory.

6. DISCUSSION. In some ways this study provides confirmatory support for Clark and Fox Tree's study. An interesting finding is the closeness in ratio of the ASD data to the Pear stor-

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ies. It might be tempting to see this closeness as reflecting something of the cognitive style of ASD, and this is one possibility. But it may also be an artifact of the methodology (measuring pauses in seconds, rather than measuring perception of pause length). In the Pear data, pauses were measured in seconds. Clark and Fox Tree did not employ this method in the other cases because they were working with existing transcribed corpora, but it is arguably a more systematic way (though time-consuming, since each pause is measured separately in a different file.)

The study had several complicating factors. The first, as stated, is that it measured total length of pause, not rater judgment. This makes a more imperfect comparison between studies. Also, the fact that participants in the ASD study had a diagnosis along the spectrum may have caused some problems, since in ASD there can be fluency issues, including very long pauses in some individuals' speech. In addition, some of the participants in the ASD study simply do not talk very much in conversation, because they find it difficult, so some participants had few hesitation fillers as a consequence of having less opportunity to produce them (e.g., in polar responses). An attempt was made to address this, and also to address this kind of individual variation driving the results, by only including speakers who produced at least three each of *um* and *uh*. But it is possible this step also eliminated a host of participants who have difficulties in prefrontal functioning. With larger and especially longer data samples, this could be improved upon. It was also necessary to take out pauses longer than 10 seconds, where something may have happened to interrupt the discourse. In one case, there was a 21 second pause that was eliminated.

7. CONCLUSIONS AND FUTURE WORK. The present paper has shown that speakers with ASD achieve surprising success when it comes to using hesitation fillers to signal pause length in spoken conversation, demonstrating a level of conversational cooperation not usually ascribed to speakers with ASD. The results showed the same core contrast between major and minor delays following *um* and *uh* as Clark and Fox Tree's study using normative data, suggesting that speakers with ASD do signal pause length systematically, anticipating interlocutor needs, but that this may be to a lesser extent than is usually found in face to face interaction. When compared to Clark and Fox Tree's results, the pauses for the group of speakers with ASD in face to face interaction were closer to the norms for recalled narratives. If we accept Clark and Fox Tree's conclusion that the function of *um* and *uh* is to signal the length of upcoming pauses to interlocutors, these results point to an attunedness to the signaling of upcoming delays in speech that runs counter to the general perception of ASD communication. It may be that there is less attunedness than in ordinary conversation, but this is conjecture, since the data samples used are very different. To explore this idea, a study with a control sample would be needed, and we are currently in the process of doing this.

There is also a possibility that the similarity to the Pear data signals something about cognition and language in ASD, in that the pattern in the Pear data was associated with recounting. One further possibility, then, is that in spontaneous speech the discourse used by speakers with ASD is over-rehearsed or memorized, with recalled structures playing a larger part than is usual. Understanding how this might relate to neurocognitive function is also a matter of further investigation. Thus several areas remain for extension and improvement.

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8. SUMMARY. The present study suggests that in ASD there are the same (albeit unconscious) patterns of using *um* and *uh* to signal pause length as those found in spontaneous speaking, as investigated by Clark and Fox Tree. This is significant in that it furthers Clark and Fox Tree's work and provides confirmatory support for *ums* and *uhs* as pause length signalers, support which is based on fine-grained measurement of pause length in milliseconds. It is also the first study to extend this research to a clinical context.

From a clinical perspective, the study also uncovers a relative strength in ASD communication, typically understood as being one-sided and unregarding of interlocutor needs. This may have clinical implications for monitoring and assessing communication skills, but also for highlighting essential similarities in communicative goals and strategies of speakers with ASD. Future research will look at several discourse contexts, with a control group and other neurocognitive measures.

REFERENCES

AMERICAN PSYCHIATRIC ASSOCIATION 2000. *Diagnostic and statistical manual of mental disorders*, 4th ed. Washington DC: American Psychiatric Publishing.

ASP, ELISSA & JESSICA DE VILLIERS. 2010. *When language breaks down: Analysing discourse in clinical contexts*. Cambridge: Cambridge University Press.

BARON-COHEN, SIMON, ALAN M. LESLIE & UTA FRITH. 1985. Does the autistic child have a 'theory of mind'? *Cognition* 21:37–46.

CHAFE, WALLACE. 1980. *The pear stories: Cognitive, cultural and linguistic aspects of narrative production*. Norwood NJ: Ablex.

CLARK, HERBERT H. & FOX TREE, JEAN E. 2002. Using ums and uhs in spontaneous speaking. *Cognition* 84:73–111.

DE VILLIERS, JESSICA. 2005. Discourse analysis in autism spectrum disorder. *Linguistics and the human sciences* 1(2):245–60.

——— & PETER SZATMARI. 2004. Message organization in autism spectrum disorder. *LACUS forum* 30:207–14.

FINE, JONATHAN, GIAMPIERRO BARTOLUCCI, GARY GINSBERG & PETER SZATMARI. 1991. The use of intonation to communicate in pervasive developmental disorders. *Journal of child psychiatry* 32(5):771–82.

GEURTS, H. M., S. VERTÉ, J. OOSTERLAAN, H. ROEYERS & J. A. SERGEANT. 2004. How specific are executive functioning deficits in attention hyperactivity disorder and autism? *Journal of child psychology and psychiatry* 45:836–54.

GHAZIUDDIN, M. & L. GERSTEIN. 1996. Pedantic speaking style differentiates Asperger syndrome from high-functioning autism. *Journal of autism and developmental disorders* 26(5):585–96.

GODFREY, J. J., E. HOLLIMAN & J. MCDANIEL. 1992. SWITCHBOARD: Telephone speech corpus for research and development. *Proceedings of the IEEE conference on acoustics, speech, and signal processing*, 517–20. San Francisco CA: IEEE.

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Goffman, Erving. 1981. Radio talk. In *Forms of talk*, ed. by Erving Goffmann, 197–327. Philadelphia pa: University of Pennsylvania Press.

Goldman-Eisler, Frieda. 1968. *Psycholinguistics: Experiments in spontaneous speech*. New York: Academic Press.

Gomez, J.C., E. Sarria & J. Tamarit. 1993. The comparative study of early mind communication and theories of mind: Ontogeny, phylogeny, and pathology. In *Understanding other minds: Perspectives from autism*, ed by Simon Baron-Cohen, Helen Tager-Flusberg & Donald J. Cohen. New York: Oxford University Press

Happé, F. 1995. Understanding minds and metaphors: Insights from the study of figurative language in autism. *Metaphor and symbolic activity* 10:275–95.

James, Deborah. 1972. Some aspects of the syntax and semantics of interjections. In *Papers from the eighth regional meeting of the Chicago Linguistic Society*, 162–72. Chicago il: Chicago Linguistic Institute.

Kanner, Leo. 1943. Autistic disturbances of affective contact. *Nervous child* 2:217–50.

Maclay, H. & C. E. Osgood. 1959. Hesitation phenomena in spontaneous English speech. *Word* 15:19–44.

Minshew, N. J., G. Goldstein, l. R. Muenz & J. B. Payton. 1992. Neuropsychological functioning in nonmentally retarded autistic individuals. *Journal of clinical and experimental neuropsychology* 14:749–61.

Prizant, Barry M. & Judith F. Duchan. 1981. The functions of immediate echolalia in autistic children. *Journal of speech and hearing disorders* 46:241–49.

Saldaña, D. & U. Frith. 2007. Do readers with autism make bridging inferences from world knowledge? *Journal of experimental child psychology* 96(4):310–19.

Schegloff, E. A., G. Jefferson & H. Sacks. 1977. The preference for self-correction in the organization of repair in conversation. *Language* 53:361–82.

Spek, A., T. Schatorjé, E. Scholte & I. van Berckelaer-Onnes. 2009. Verbal fluency in adults with high functioning autism or Asperger syndrome. *Neuropsychologia* 47(3):652–56.

Svartvik, Jan & Randolph Quirk. 1980. *A corpus of English conversation*. Lund: Gleerup.

Szatmari, Peter, Susan E. Bryson, David l. Streiner, Freda Wilson, Lynda Archer & Cynthia Ryerse. 2000. Two-year outcome of preschool children with autism or Asperger syndrome. *American journal of psychiatry* 1576:1980–87.

Tager-Flusberg, Helen. 1994. Dissociations in form and function in the acquisition of language by autistic children. In *Constraints on language acquisition: Studies of atypical children*, ed by Helen. Tager-Flusberg, 175–94. Hillsdale nj: Erlbaum.

Turner, Michelle A. 1999. Generating novel ideas: Fluency performance in high functioning and learning disabled individuals with autism. *Journal of child psychology and psychiatry* 40:189–201.

Volden, Joanne & Catherine Lord. 1991. Neologisms and idiosyncratic language in autistic speakers. *Journal of autism and developmental disorders* 21(2):109–30.

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