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Pragmatic Abilities in Autism Spectrum Disorder: A Case Study in Philosophy and the Empirical

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A Case Study in Philosophy and the Empirical**

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I. Introduction

“You can observe a lot by watching”

This paper has two aims. The first is to introduce some novel data which highlights rather surprising pragmatic abilities in Autism Spectrum Disorder (ASD). The second is to consider a possible implication of this data for an emerging empirical methodology in philosophy of language and mind.

In pursuing the first aim, we expect our main audience to be clinicians and linguists interested in pragmatics. It is when we turn to methodological issues that we hope to pique the interest of philosophers. Still, the methodological issue becomes pressing precisely because of the empirical finding – thus the first part is important for the philosophical readers as well.

The game plan is as follows. Given our intended dual audience, we begin with background on autism and pragmatics. Some of this material will be familiar to some of our readership, but few will know all of it. (Those that do are invited to skip these sections.) We then present some results from our pilot study on a corpus of speech by people with ASD. The heart of our finding is that certain speakers with ASD, who have severe trouble with familiar pragmatic phenomena such as metaphor and conversational implicature, exhibit surprising abilities with respect to what is often called “pragmatic

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determinants of what is said”. We turn next to a possible implication of this finding: it seems to suggest that hitherto seemingly promising evidence from ASD about the semantics/pragmatics boundary is illusory. We hope to show that, though a tactical retreat is called for, the overall methodological project is not ultimately threatened by our emerging empirical results.

II. Background, Part One: Autism Spectrum Disorder

“If the world were perfect, it wouldn’t be”

Autism Spectrum Disorder is a neurodevelopmental disorder with a biological basis, which manifests in the first three years of life. Diagnoses along the spectrum include autism, Asperger’s Syndrome and pervasive developmental disorder not otherwise specified (PDDNOS). ASD is frequently understood to be characterized by three core deficits: in socialization and social interaction, in language and communication, and in a preference for repetitive stereotyped behaviour rather than creative play. The conditions on the spectrum differ largely on the severity of symptoms. Specific behaviours, which may vary depending upon age and where the person is situated on the spectrum, include:²

Socialization and Social Interaction:

- Lack of playing peek-a-boo
- No anticipatory posture in infancy when being picked up
- Difficulty with “mind reading”
- Failure, or at least trouble with, false belief tasks
- Social skills applied in a “robot-like” fashion
- Flat affect
- Temper, outbursts, and crying when interrupted during play
- Lack of shared attention
- Poor eye contact and gaze

² This list of behaviours is compiled from Asperger (1944), Baltaxe (1977), Baron-Cohen (1995), de Villiers & Szatmari (2004), Frith (2003), Kanner (1943) and the Fourth Edition of the Diagnostic and Statistical Manual of Mental Disorders.

- Lack of peer relationships
- Aloneness
- Treating parts of people as objects (and instruments)
- Difficulty relating to people; other people regarded as intruders when absorbed in play
- Not a matter of *withdrawal*; rather sufferers are delayed from the beginning in the ability to achieve social reciprocity contact³

Language and Communication:

- Delay or lack of spontaneous functional speech
- Echolalia (both immediate and delayed imitation of speech heard elsewhere)
- Pronoun reversal
- Violation of turn-taking and other informal rules governing roles in dialogue
- Idiosyncratic lexical meanings
- Flat inflection
- Inappropriately formal speech (especially in Asperger's)
- Absence of gesture to compensate for limited speech
- Pointing, if present, only instrumental, not ostensive (i.e., not intended to achieve joint or shared attention)
- Limited facial expressions
- Marked reduction of cohesion and coherence in discourse
- Stereotypies in speech (words) and thought (same thoughts run through head)
- Perseveration on a single topic
- Lack of freely asked questions or answers (especially those WH questions which do not have one word answers)
- Violations of Grice's (1975) conversational maxims
- Saying things that lack relevance to the hearer(s)
- When interpreting, not projecting themselves into the speaker's point of view
- When speaking, not anticipating what hearers will understand or want to know

³ This distinguishes autism from one sort of negative-symptom schizophrenia.

- Literalism: having trouble with figurative expressions (metaphor, sarcasm, irony)
- Impairment in foregrounding and backgrounding of information
- Language acquisition delayed (except in Asperger's)

Imagination:

- Child absorbed by objects with a lot of stimulatory content
- No spontaneous pretend play
- Trouble with the appearance/reality distinction
- Stereotypical behavior or movements
- Desire for sameness and routine
- Circumscribed interests
- Rituals or adherence to non-functional routines
- Resistance to changing routines or surroundings

Other:

- Odd posture
- Peculiar gestures
- Hand flapping, spinning, and other motor mannerisms
- Especially prone to phobias
- Hypersensitivities (to light, certain sounds, etc.)
- Excellent rote memory, visual-spatial skills
- Other special skills (drawing, puzzles, calendars, etc.)

III. Background, Part Two: Pragmatics

“If you come to a fork in the road, take it”

Having reviewed ASD, we turn now to pragmatics. We revisit the definition of ‘semantics’ and ‘pragmatics’ below. For now, think of semantics as cognitive capacities and stored information regarding the context-invariant standing meaning of expressions. Pragmatic abilities, in contrast, concern the appropriate use of language. That is, we think

of pragmatics as cognitive capacities and stored information which, together with semantics and other specifically linguistic knowledge, allows speakers and hearers to exchange linguistically information that extends beyond what semantics assigns to a linguistic string.

There is one sort of pragmatic phenomenon which is very familiar: cases where the merely conveyed content is found pragmatically, as in metaphor, Grice's conversational implicatures, irony, etc. To give an example familiar from the literature, it takes pragmatic abilities to understand what a recommendation letter that said only 'Mr. X has neat handwriting and usually arrives on time for class' would mean, namely that Mr. X is not an acceptable candidate. The ability to use language appropriately goes beyond such figurative cases however: typically, the literal content of the speech act is partly determined by extra-linguistic knowledge. That is, finding what the person states, asserts or claims, asks, demands, or requests, draws not just on knowledge of the standing meaning of the expression used (on semantics, in the intended sense of that word), but also upon things like what it would be reasonable for a person to mean, where the speaking happens, etc. (i.e., on pragmatics in our sense).

Two such cases are very familiar and are accepted as genuinely pragmatic -- in our sense, though emphatically not in every sense of 'pragmatic' in the literature -- by nearly everyone who writes on these topics. When a genuinely ambiguous expression is deployed, knowing its standing meaning cannot be sufficient for fixing which of its various contents is meant on a particular occasion. That is, the standing meaning stored within semantics for a genuinely ambiguous expression, by its very nature as genuinely ambiguous, allows for two or more discrete and independent meanings; beyond affording these two or more options, semantics must remain silent on which one is at play in a given use of the sentence. In such cases, selecting the right reading draws on knowledge of other minds, general purpose social and physical information, and familiarity with the specific speech situation -- hence, by our definition, it draws on pragmatics. To use the hackneyed example, if someone says 'Mark is at the bank', which sense of 'bank' is at play must be sorted out by considering things like whether Mark frequently goes angling at the river or whether he works at Chase Manhattan. Again, when a sentence containing indexical pronouns (e.g. 'he', 'you', 'it') and other context sensitive expressions (e.g.

tense and terms like ‘here’ and ‘now’) is put to use, knowledge of the standing meaning determines only that something (an object, a time, a property, etc.) must be supplied from context. It does not itself supply this content. Thus this contribution to finding the literal content of a use of a context-sensitive expression is clearly pragmatic as well, not semantic.

There are, then, two patent cases of pragmatic determinants of literal speech act content: disambiguation of accidental homonyms (e.g., ‘bank’, ‘staple’, ‘pen’) and overt context sensitivity (e.g., ‘here’, ‘he’, ‘you’). These appear as (i a) and (iii a). There are also a series of less familiar cases, six of which are also listed immediately below. (We will explain these in due course, when we provide examples from the speech of people with ASD.)

- i) *Contextually salient entity being discussed*
 - a) Indexical pronouns and other explicitly context sensitive items
 - b) Subsentences
 - c) Null complements
 - d) Possessives
- ii) *Unspoken domain or comparison class*
 - a) Quantifier domain
 - b) Degree on a scale
- iii) *Sense determination*
 - a) Accidental homonymy
 - b) Polysemy

To repeat, what makes these eight of special interest is not merely that pragmatics plays a part, but that it plays a part in finding the *literal* content of the speech act made. (For extended discussion and many more examples, see: Bach 1994a, 1994b, 2001; Carston 1998, 2002; Perry 1986; Récanati 2001, 2002, 2004; Searle 1978, 1980; Sperber & Wilson 1986; Stainton 2006; Travis 1985, 1991.)

Let’s now put these two elements of background, autism and pragmatics, together. As can be seen by revisiting the list above, many of the symptoms of ASD smack of deficits in cognitive capacities concerning the appropriate use of language. That is, ASD is characterized by pragmatic disabilities. Most importantly of all for our purposes,

certain speakers with ASD have immense trouble understanding metaphor, irony, sarcasm, indirect speech acts, and conversational implicature. These speakers with ASD exhibit surprising competence when it comes to abilities that are widely assumed to be properly linguistic, e.g., complex syntax, phonology and compositional semantics. They do exhibit some difficulties, specifically pronoun reversal (using ‘you’ for oneself, the speaker), flat intonation, and some highly idiosyncratic meanings for lexical items. Notoriously as well, many speakers with autism exhibit delays in acquiring language. However, for the most part, the language-related difficulties of so-called high functioning individuals with autism don’t lie on the “encoding/decoding” side; instead, they have to do with appropriate use. The issue we want to focus on are pragmatic abilities specifically with respect to the literal content of speech acts.

IV. Pragmatic Abilities in Autism Spectrum Disorder

“The future ain’t what it used to be”

Having introduced Autism Spectrum Disorder and the notion of pragmatics, we move now to the emerging results of our recent research on pragmatics and speakers with ASD. The participants were males, ages 6-22. They came from a study of 68 children with autism and Asperger Syndrome in southern Ontario. They were assigned the diagnosis after extensive diagnostic assessments that included structured interviews and observational instruments. The diagnostic criteria employed were those of DSM-IV. As such, they exhibit the range of pragmatic deficits described above. What is striking, we suggest, is their relative comfort with what, in the literature, are classified as “pragmatic determinants of what is said”. (We ourselves prefer to talk of pragmatic determinants of *literal speech act content*, because the phrase ‘what is said’ has acquired a range of technical uses that confuse the central issue.)

We will shortly present a variety of examples from our corpus. Specifically, we will provide examples of each of (i)-(iii). A few caveats are in order, however, before we begin. First, some of these examples illustrate more than one variety of such pragmatic determinants. What’s more, contrasting analyses of an example are often possible: what we treat as polysemy, say, could be reinterpreted as a null complement. We are not

especially concerned about these otherwise interesting details, because our point is that *some* surprising and (apparently) pragmatic ability is at work. Thus we do not defend our analyses of particular examples with great care when the only alternative analysis is equally a pragmatics-based one. Finally, we have made a point of selecting some of the clearest cases from the corpus. That's because our aim is a sort of "existence proof". But, let us stress, it should not be inferred that speakers with ASD have no troubles with pragmatic determinants of literal speech act content – that, for instance, they perform as well as non-ASD controls with typical communication abilities. Nor are we claiming that any person with ASD who performs well on one of our sub-varieties of pragmatic determinants of literal speech act content will perform equally well on the other seven. (We are presently investigating precisely this issue.) The crucial point is comparative: in general, speakers with ASD appear to do rather better with (i)-(iii) than they do with things like metaphor and irony.

We begin with examples from the corpus in which people with ASD use without difficulty indexicals and accidental homonyms. Here is a brief passage from Participant 1. (Any names appearing in the texts have been changed to protect anonymity.) Examples of his use of indexical pronouns appear in bold. Participant 1 is by no means our best case when it comes to the use of indexicals. Other conversations from our corpus are simply flawless. Yet even he is clearly quite competent with them. (Note also the use of context-sensitive tense markers. Also evident is Participant 1's ease at *understanding* the researcher's use of indexicals and tense. Our focus throughout, however, will be on production only.)

1. THE BLUE LAGOON⁴

Researcher: what are you making there Ben?

⁴ The transcription symbols mean the following:

[>] overlaps with following text

[<] overlaps with preceding text

xx undecipherable speech

pause

-.: lengthened syllable

[!] marked stress

Participant 1: Um **I**'m repairing something that **my** dad doesn't want **me** um didn't want **me** to destroy

Researcher: did your dad make it?

Participant 1: no

Researcher: what is it?

Participant 1: ever seen The Blue Lagoon?

Researcher: um -: I don't remember if I have.

Researcher: I don't think so

Participant 1: uh the monster that comes from the black lagoon

Participant 1: and **he** has webbed fingers and webbed toes and webbed things

Participant 1: and **this** is supposed to be **his** hand

It's worth noting that Participant 1 is able to use both demonstratives ('this', 'that') and pronominals ('he', 'it'). Moreover, he can use these not only to pick out salient objects in the context, but also to refer to absent objects. He is, thus, quite competent with respect to (i a).

We also find examples of accidental homonym resolution, (iii a), in Participant 1's speech. A minute or so after the exchange above, for example, he says:

2. Participant 1: and uh he and then they wrapped him up like a **mummy**

Here he uses 'mummy' to mean *mummified body*, not *female parent*. But, of course, the sound can mean either.

Another young man is talking about baseball leagues, and the waiting list to join one. He says:

3. Participant 2: you know it's a **hard** long list waiting list

Now, among other things, hard can mean either *difficult* or *rigid*. Participant 2 clearly means the former, however. Participant 1 provides another example. He is describing the events in his favourite movie as follows:

4. CAUGHT IN ICE

Researcher: what's the story about?

Participant 1: um -: these explorers go out into the rainforest.

Participant 1: and they find fossils of # of the the # the monster from the black lagoon.

Researcher: mmhm?

Participant 1: they find clay mo they find skeletons and stuff f from the.

Participant 1: and they find one that's living still that was **caught in ice**.

In this case, the ambiguity is structural rather than lexical: 'caught' can be an adjective or the passive form of 'catch'. Here it is the former. (Participant 1 is not saying that some unidentified someone used the ice to catch the creature.)

A 15 year old boy, Participant 3, produced the following in an exchange with a researcher:

5. THE MAGIC OF THE UNIVERSE

Participant 3: what's my favourite what?

Researcher: your favourite game on the computer.

Participant 3: well there's ex # well there's uh # eh # there's the there's this **strange** unusual game

Participant 3: uh well # there's a la a computer called an IBM Aptiva comes with games

Participant 3: uh # like my favourite is the # is from I is from a -: place where there's a k

Participant 3: it's the game's about # it's a it's about a **light** bodied cube # k running getting the opposite colour on another **light** force called endorfun which is spelled e n d o r f u n

Researcher: mmhm?

Participant 3: and uh uh -: **light** bodied cubes flying everywhere.

Participant 3: and I have the power.

Participant 3: I feel the magic of the universe

Here we have multiple uses of indexical pronouns and tense. Of particular note here, however, are two uses of accidental homonyms. 'Strange' can mean *unfamiliar* and *bizarre*; Participant 3 employs it with the latter reading above. Similarly, 'light' is opposite both of 'dark' and 'heavy'. Here, it turns out, Participant 3 is using 'light' in the sense of *illuminated*.

The corpus contains dozens and dozens of examples of these two sorts. We rest content with this small sample, however, because it could hardly be controversial that speakers with ASD have these sorts of pragmatic abilities – too much of the use and

understanding of language is overtly context sensitive and ambiguous, thus anyone who uses language at all successfully must be pragmatically competent to some significant degree with respect to (i a) and (iii a). Indeed, it's widely supposed, on similar grounds, that indexicality and ambiguity must be granted as violations of the idea that the literal content of speech acts is fixed semantically (again, in our sense).

We continue with other cases of pragmatic determinants of literal speech act content. Let us focus for the moment on additional cases in which a contextually salient entity is being discussed. One such is (i b), the use of bare words and phrases to perform full-fledged speech acts. Here, what semantics assigns to the item used is an object or property. Yet what is asserted is a proposition. The gap between the semantic content and the content asserted is supplied by pragmatics. (See Stainton 2006 for extended discussion.) Here is one example from Participant 1:

6. Participant 1: and then they can grow back from any amount of tissue left

Participant 1: **even from one one cell**

Another example appears in Participant 4's text:

7. STINK HAIRY

Participant 4: what would scratch you.

Participant 4: wouldn't that be terrible?

Researcher: mmhm

Participant 4: **awful!**

Participant 4: **stink.**

Participant 4: and then you hate lions

Participant 4: **stink hairy**

Yet another series of subsentences⁵ appears in the following exchange between a researcher and Participant 5, discussing what classes he has been absent from:

8. I DON'T LIKE MATH

⁵ It might be suggested that at least the first of these, 'math', is really syntactically elliptical – given that it is a response to a wh-question. There are a host of reasons, however, for thinking this is not the case. For present purposes it's enough to notice that the source sentence from which 'math' would derive, by deletion, would have to be something like 'Math is among the kind of things that I missed'. But notice two things about this purported source. First, it is not straightforwardly derived from the question and the answer. Second, to get the remnant 'math' from it, the non-constituent 'is among the kind of things that I missed' would need to be deleted. Each excludes this alleged source as that to which syntactic ellipsis applies. Again, see Stainton 2006 for lengthy and detailed discussion.

Researcher: what kinds of things did you miss?

Participant 5: **math**.

Researcher: math?

Participant 5: I don't like math

Researcher: mmhm

Participant 5: **science**

Participant 5: I like making experiments.

Participant 5: **but alone**

Here is another such sequence, from the same individual:

9. DEATH

Researcher: what other kinds of things do you draw at home Victor?

Participant 5: **death** -: .

Researcher: death?

Participant 5: **yeah**.

Researcher: death what?

Participant 5: **death**.

Researcher: you draw about death?

Participant 5: **yeah**.

Researcher: oh.

Researcher: what's the what's the what do you draw about that?

Participant 5: **death**.

Researcher: hm.

Participant 5: **and jus getting killed and all these cool stuff**.

Researcher: mmhm.

The interview with Participant 1, excerpted below, affords further examples of sub-sentential speech acts. We leave it to the reader to find them. We also find another case of pragmatics at work in literal speech act content in his talk, however, namely (10c), the use of null complements:

10. COOK IT UP

Participant 1: <and> [<] uh I don't think we're gonna eat the liver.

Researcher: 0 [coughs].

Participant 1: I don't think we're gonna eat the kidneys xx either # I don't
think.

Participant 1: but we could eat the stomach.

Participant 1: put them in water.

Participant 1: and then **put** different meats and stuff **in.**

Participant 1: vegetables.

Participant 1: cook it up.

A null complement construction involves a verb or other word, which normally requires a syntactic complement, but may optionally appear without one. Examples include 'Mary arrived ___ yesterday' (where?), 'Vodka is more expensive ___' (than what?), 'I prefer milk ___' (to what?), 'John's ___ is delicious' (John's what?), and so on. (See Iten *et al.* 2005 and Junker, Stainton & Wearing 2006, and references cited there, for introductory discussion.) In the above text we find Participant 1 using 'I don't think' -- but clearly not in the intransitive sense of 'I have no thoughts'. Instead, he is using the *transitive* verb 'think' but without its usual complement. The content of the complement -- namely *that we will eat the kidneys* -- is supplied pragmatically from the context. Similarly, 'put in' semantically requires two complements: one must put X in Y. Above, however, Participant 1 leaves the second complement implicit: that the "meat and stuff" will be put *in the aforementioned water* is fixed pragmatically.

The following sequence from Participant 2 also provides several good examples of competence with filling in null complements pragmatically:

11. AND THEN I JOINED

Participant 2: I think I was twelve four fourteen I started **playing.**

Participant 2: and then **played** for about two or three years.

Participant 2: **practised up.**

Participant 2: I got **good enough.**

Participant 2: and then I # **joined.**

The participant leaves the hearer to fill in what he was playing (baseball), what he practiced up and got good enough for (to join a baseball league) and what he eventually did join (just such a league).

Another familiar case of pragmatics determining literal speech act content is the possessive. The need in this construction for pragmatic filling in is evident when one thinks of ‘Joan’s picture’. Is that the picture Joan owns, the picture of Joan, the picture Joan has been instructed to buy? It is only background knowledge and familiarity with the present speech context, not the standing meaning of the phrase alone, that allows the hearer to sort out what relation of “possession” is said to obtain between Joan and the picture. The following texts, taken from Participant 5, illustrate just such uses of possessives in the speech of individuals with ASD.

12. MY AUNT

Researcher: who does the cooking when there’s seven people?

Participant 5: **my aunt**

Researcher: oh your aunt does

Researcher: hm

Researcher: that must be nice for your mom

13. MY GRANDPA

Researcher: so what did you do for your holidays last summer Ben?

Researcher: do you remember?

Participant 5: last summer was good [!] .

Researcher: mmhm.

Participant 5: like yeow [!] .

Researcher: did you travel?

Participant 5: yeah.

Researcher: where did you go?

Participant 5: Windsor.

Researcher: did you?

Participant 5: it was like yeow [!] .

Researcher: do you have relatives in Windsor?

Participant 5: yup.

Researcher: mmhm.

Researcher: who lives there?

Participant 5: **my grandpa**.

14. MY COMICS, PART I

Participant 5: they have a good comic shop there.

Researcher: Oh. [% chuckles]

Participant 5: that's where I get all -: half of **my comics**.

15. MY COMICS, PART II

Participant 5: well I'm willing to sell **my comics** half or some that are priceless

Researcher: is that right?

Participant 5: yeah

Researcher: what do you mean by priceless?

Participant 5: I got a comic for eleven dollars

In the second two cases, Participant 5 uses 'my comics' to mean *the comics I own*. This is very like 'Joan's picture': this phrase could equally well be used, in other contexts, to speak of *the comics I want to buy*, *the comics I drew*, etc. It's thus clear that we have pragmatic determinants of literal content at work. In the first two cases, however, namely 'my aunt' and 'my grandpa', the possession relation amounts to a familial one, and it may seem in light of this that pragmatics is unnecessary here. (Isn't this just what 'my aunt' and 'my grandpa' mean in English?) But notice, if each of us were tasked with bringing exactly one grandfatherly figure from the local retirement home to a concert, in that context, 'my grandpa' could refer to the grandfather that I am driving to the concert. So even in the familial cases, pragmatic abilities are making a contribution.

Recall the eight sub-varieties of pragmatic determinants of literal speech act content that are our focus:

- i) *Contextually salient entity being discussed*
 - a) Indexical pronouns and other explicitly context sensitive items
 - b) Subsentences
 - c) Null complements
 - d) Possessives
- ii) *Unspoken domain or comparison class*

- a) Quantifier domain
- b) Degree on a scale
- iii) *Sense determination*
 - a) Accidental homonymy
 - b) Polysemy

So far we have seen examples of (i a-d) and (iii a) in speech produced by individuals with ASD. Speaking for ourselves, we think five sub-varieties adequately make the case that speakers with ASD do indeed have surprising pragmatic abilities, specifically abilities with respect to the pragmatic determinants of literal speech act content. We recognize, however, that our conclusion flies in the face of a long and very well-established tradition in the description of the disorder. It is thus worthwhile to provide still more evidence. We turn, then, to (ii a-b) and (iii b).

Quantifier domain restriction will be familiar to philosophical readers. In ordinary speech we use quantifier phrases like ‘every student’, ‘no student’, and ‘the student’ even when it’s perfectly clear that, for instance, not *all students everywhere* or *no student anywhere, ever* are under discussion. The role of pragmatics in this case is to fix how extended the domain is. Continuing with the example, if a professor says ‘Every student passed’, is she making a statement about domain = {students taking the class}, domain = {students currently present when she speaks}, domain = {students taking classes in her department}, etc.? A very nice illustration of successful domain restriction with the definite article in ASD speech shows up in this brief monologue by a child we haven’t encountered till now, Participant 6. He is describing a trip on a subway – subway cars are his passion – and he uses ‘the yellowish’ to mean ‘the yellowish car’. (Such nominal omission is a pragmatic skill in itself, closely related to (i c). But let’s set it aside here.) Participant 6 says:

16. THEN I TOOK THE SUBWAY NORTH
 and then I took **the** subway north.
 and I saw **the** yellowish going south at Bloor on the other side.
 and **the** yellowish going north came.

and I saw **the** yellowish going south through the windows of **the** yellowish going north.

and I got in **the** yellowish going north.

Repeatedly in this example the speaker uses ‘the’ even though it’s quite clear that if the domain were not pragmatically restricted, the uniqueness presumption of the definite article would not be met. Though this speaker sometimes has difficulty with the definite/indefinite distinction, our point here is that he is relatively proficient with domain restriction. There isn’t just one subway, as the child knows very, very well; there isn’t just one yellow-coloured subway car going south, nor only one going north – indeed, earlier in the monologue the child himself had described others. Yet he uses ‘the’ successfully here.

A sequence of quantifier domain restrictions appears in the following excerpt from Participant 2. He is describing working at the YWCA shortly after a fire:

17. I CLEANED THE WHOLE PLACE UP

Researcher: and where did you work Ben?

Participant 2: well I worked at Wendy's for two and a half three years.

Participant 2: and then I worked at the the YWCA in Burlington.

Participant 2: the one in Burlington.

Researcher: mmhm?

Researcher: <on> [>].

Participant 2: <the> [<] one the one had the fire.

Researcher: is that the one on Drury Lane?

Participant 2: yeah.

Researcher: oh -: I used to take my children there.

Participant 2: yeah.

Participant 2: and um I used to clean there.

Researcher: yeah.

Researcher: I hadn't realized they had a fire.

Researcher: when was that?

Participant 2: it was about I think it was four months ago or three months ago.

Researcher: oh was it?

Participant 2: it was while I was working um ## while I was at work.

Participant 2: and # so I had to do **some stuff**.

Participant 2: and then #.

Participant 2: yeah and then # it's kinda funny.

Participant 2: because I cleaned **the whole place** up.

Participant 2: and then the next # like then the xx soon **the whole place** got covered in black soot.

Here 'some stuff' cannot be the bare existential, for it is all too obviously true that he had to do *some* stuff: e.g. arrive at work, walk around, breathe. Instead, there is an implicit domain restriction to stuff involving cleaning. (Note also the two uses of 'the whole place'. What counts as *the whole place* is contextually restricted: he does not need to clean absolutely everything.) Another interesting example of quantifier domain restriction shows up a bit earlier in the same recorded conversation with Participant 2. In this instance he restricts the domain of an adverb of quantification, namely 'usually':

18. Participant 2: um # they either gave me # first base or I **usually** played outfield. Here he means: *In those cases in which I was playing baseball in league such-and-such, it was usual for me to play outfield*, rather than, for instance, *A usual day in my life would involve my playing outfield*.

Identifying the right domain of quantification is closely related to finding an appropriate comparison class. We find this pragmatic ability as well in the speech of certain people with ASD. From Participant 2, to give one of many examples, we find 'it was really **small**' applied to a baseball park, and 'it wasn't **hot**' applied to a day out on the baseball field. Given how large baseball fields are compared to, say, grains of sand, his first claim would be absurdly false, without a specification of the degree of smallness at issue. And given how cool even mid-summer days are compared to, say, boiling oil, his second claim would be unhelpfully (because too obviously) true, without a contextually specified range on a scale of hotness. In context, however, each was perfectly appropriate – precisely because such a scale was presupposed. A similar example shows up in Participant 5's discourse. He is describing how he makes soup:

19. VERY HOT

Participant 5: I like put all this water put all this spice and then put all this noodles.

Researcher: oh.

Participant 5: **very hot**

We have canvassed examples of (i a-d) and (ii a-b). The last kind of case involves sense determination, but not of the sort one finds in accidental homonymy. In those cases, a single sound happens to have two discrete meanings, that are not semantically related to one another. The senses of ‘bank’ are like this. (A hallmark of accidental homonyms is that the same ambiguity does not show up across historically unrelated language families.) In contrast, there are various senses of ‘cut’: what one does to the grass is very different, in some regard, to what one does to birthday cakes; yet these are all variants on a core meaning. This is polysemy: an amorphous class of related meanings. Now, sometimes what is literally stated in a context depends on which sense of a polysemous term is intended. And, as in genuine ambiguity, finding the right sense involves pragmatics.

We find just such cases in the speech of certain people with ASD. Participant 5 is explaining what he is missing at school by coming in for the interview. He says:

20. Participant 5: I don’t **like math**.

Now in this standing sentence, ‘like math’ can mean *like studying math*, *like teaching math*, etc. What Participant 5 means by it in context, however, is that he does not like attending math class. Participant 6 provides another example. He is the boy who is fascinated by subway cars. In the same monologue that we cited from before, he says:

21. Participant 6: and I wouldn’t leave there until I saw the round doors going west
because I wanted to **catch** them when they came east

In this utterance, ‘catch’ means *get on to the subway*.

This section has established, we believe, that speakers with ASD have a rich array of pragmatic abilities. In particular, they fairly successfully deploy eight sub-varieties of pragmatic determinants of literal speech act content. This is emphatically not to say that their performance with respect to (i)-(iii) is perfect. It is not. The point, rather, is that given their severe impairments in more familiar “pragmatic” tasks (e.g. metaphor and indirect speech acts), they exhibit quite surprising abilities in this sub-domain. We hope that both clinicians and linguists interested in pragmatics will find these results striking. It

remains to address our philosophical audience by considering one possible methodological/philosophical implication of these empirical results.

V. A Threat to A Novel Empirical Methodology?

“Always go to other people’s funerals, otherwise they won’t go to yours”

A standard way of finding out how something works is to see what happens when things go awry. The earliest insights into what function was performed by what parts of the brain, for instance, came from observing which abilities were impaired by lesions or trauma to the part in question. The relevance of this in the context of the present volume should be clear: For those of us who are keen to find new sources of empirical evidence and methods in philosophy, the panoply of “nature’s experiments in pathology” seems a very promising resource. Of particular interest to us is an emerging method in philosophy of language and mind: taking evidence from cognitive and linguistic breakdowns as evidence for “normal” cognitive and linguistic function. It is against that backdrop that the methodological/philosophical question of this paper arises.

The specific application of this deficit-based methodology that will be our focus is the use of language and cognitive deficits to help trace the boundary between knowledge of language on the one hand, and knowledge of non-linguistic facts on the other. We begin by explaining this idea, and then we consider its apparently problematic relation to the empirical findings about pragmatic abilities in ASD given above.

To those not overly steeped in Quinean indeterminism in the Analytic tradition, or postmodernism in the Continental tradition, it can seem obvious that there is a divide between knowledge of language and knowledge of facts about the non-linguistic world. Knowledge of phonology and syntax seem to be clearly linguistic. To know, for example, that ‘exile’ can be both a noun and a verb, and that it is pronounced /egzail/, looks to be knowledge about language – specifically, knowledge about English. In contrast, knowledge about other minds (“folk psychology”), general knowledge about history, geography, physical science, etc., and specific knowledge about the physical and social situation in which a conversation takes place, all seem to be non-linguistic. Continuing with the example, to know that exile is most often a punishment for a political

transgression, that the reason people find it insufferable is because they miss their home and their kin, and that in ancient times the Jews were exiled to Babylon, seem to be bits of knowledge about the social and mental world which are not properly linguistic. Similarly, knowing who has said 'I am in exile', where they said it, and why, are all beliefs about the speech situation that are not derived from knowledge of language. When one presses a little, however, it becomes hard to see exactly which information fits where: Is the fact that exile can be self-imposed a fact known about the word 'exile' or a fact known about the state of exile? Is knowledge of the etymological history of the word 'exile' knowledge of language? The answer does not come pat. It is because of such hard cases that the issue of the language/world boundary arises.

An especially fraught class of cases of knowledge of language versus knowledge of the non-linguistic world involves the semantics/pragmatics boundary. Let us stress once again how we use these terms. This is crucial because these terms are employed in a wide variety of ways. As noted, we use 'semantics' to mean cognitive capacities and stored information regarding the context-invariant standing meaning of expressions, whatever that meaning turns out to be. (Of particular import, we do not assume that semantics, in this sense, is knowledge of truth conditions, or that semantics is what gives the "literal" meaning of the *utterance*.) We use 'pragmatics' to mean cognitive capacities and stored information which allow speakers and hearers to exchange linguistically information that extends beyond what semantics assigns to a string. Putting things in terms of the contemporary modular view of the mind, semantics is a component of the Language Faculty, whereas pragmatics involves the interaction of the Language Faculty with other modules and with the Central System. (This cognitivist take on the distinction owes much to Relevance Theorists like Carston 2002 and Sperber & Wilson 1996. Obviously too it bears the hallmarks of the broadly Chomskyan approach to language. See Pietroski 2003 and references cited there for how it contrasts with other traditions in the philosophy of language.)

Given this understanding of 'semantics' and 'pragmatics', there is an obvious connection to the issue of knowledge of language versus knowledge of other kinds. Semantics is part of knowledge of language, i.e. part of the knowledge stored in the Language Faculty. It is on a par with syntax and phonology in that regard. Pragmatics, on

the other hand, is a mishmash of other cognitive abilities and information, including especially, but not only, knowledge of other minds, general purpose knowledge about the physical and social world, and knowledge about the concrete social and physical situation in which a given talk exchange takes place.

We said, about the broader contrast between knowledge of language and knowledge of the world, that the location and even the existence of a boundary is hotly disputed. It should thus come as no surprise that the nature of the semantics/pragmatics boundary and even its existence is equally a matter of dispute. There do seem to be cases of talk exchanges where the contribution of semantics is clear, and cases where the contribution of pragmatics is clear. (As is typical, we illustrate from an interpreter's point of view. Things look rather more complicated from the speaker's point of view. See Elugardo & Stainton 2004 for discussion of the connection.) Suppose some neighbors are trying to decide which pet should be used to guard a house. Alice says 'My dog barks loudly'. That her sentence is about canines rather than felines, and that it is about the degree of sound made by a canine rather than its colour, is a matter of semantics. That she conveys that her dog would be suitable as a sentry is a matter of pragmatics. This much seems clear. Nevertheless, there are harder cases. Consider how much counts as "loudly" in this utterance, and whether, when a hearer finds this, it is contributed by knowledge of standing meaning, or by some other means. Or again, when someone says 'I believe John is the murderer', they convey not only something about their belief state, but also something about John. But is this additional something a contribution from semantics for 'I believe John is the murderer' or is it a joint contribution of semantics and pragmatics? In short, the semantics/pragmatics boundary is itself elusive. Indeed, if we restrict ourselves to evidence about "what we would say" and intuitions about what is asserted versus conveyed, etc., it seems unlikely that the locating the boundary is an intractable project.

There is greater hope, however, if a richer panoply of evidence can be called upon. And this is where the novel methodology of studying deficits comes into play: our hope has been that ASD can provide new insights into which capacities are genuinely pragmatic *in the non-pathological population*. The connection seems natural enough at first. We have a generalization about pragmatic deficits in speakers with certain sub-

varieties of ASD. Following the lead of inferring “normal” functioning from pathology, we arrive at N (for “natural”):

N: If speakers with ASD exhibit linguistic capacity C, then C is semantic and not pragmatic

We can then deploy N as additional evidence when conflicting intuitions leave opposing parties deadlocked. Of course using N requires some obvious caveats. Some people with ASD do not speak at all, while others so intellectually gifted that they can compensate for whatever causes pragmatic deficits in others; thus there is not symptomatic uniformity among all people with ASD. Indeed, there are interferences galore in clinical cases like this. Hence the generalization needs to be hedged. And, of course, N at best provides one piece of evidence that must be balanced off against the rest: it is not a litmus test for whether a capacity is pragmatic or not. Still, if N held true *ceteris paribus*, we would seem to have a novel tool for cracking the tough nut of the semantics/pragmatics boundary *in the non-pathological case*. Looking back at the list of symptoms, for instance, we would have previously untapped evidence that at least the following pertain to the worldly/pragmatic side of the boundary: linguistic social interaction, the asking and answering of questions, ostensive pointing, relevant speech, turn-taking, Grice’s maxims, cohesion and coherence, variety in topic choice, and all of metaphor, sarcasm, irony, indirect speech acts and conversational implicature. Some of these come as no surprise: it would be rare to find a theorist who thought that finding implicatures was a matter of knowledge of language alone. On the other hand, turn-taking, asking questions, Grice’s maxims, rules for coherence and cohesion, metaphor, indirect speech acts and sarcasm have all been claimed to derive from knowledge specifically of language. Given N however, ASD seems to suggest otherwise.

Taking stock, we have noted a familiar method of studying pathology to understanding “normal” function. Few would question its viability. Much more controversial, however, is the hope of drawing on results about pragmatic deficits in ASD to illuminate the knowledge of language/knowledge of non-linguistic facts boundary and the specific sub-case of the semantics/pragmatics boundary. This is the role of N above. To those who feel that this latter debate has been running out of steam of late, N is bracing stuff... if only it held true. But recall what we urged in Section III. Our main point

was precisely that, whereas speakers with ASD have trouble with metaphor, irony, and so forth, our corpus evidence suggests that speakers with ASD are comparatively *strong* with respect to certain pragmatic tasks. Hence there are deep and systematic violations of NA. It isn't even close to true. This is the threat to our previously cherished methodology that we now wish to respond to.

Before we turn to that, however, let us set aside two responses to our empirical findings that we ourselves do not endorse. There are, of course, two obvious ways to save N in the face of our data. First, it may be suggested that the data don't really support the claim that speakers with ASD have these capacities. Second, one may simply insist that the capacities are real enough, but that they are not pragmatic. We take these responses on behalf of N in turn.

The first way to rescue N can be phrased this way. Granted, we have presented examples which appear at first glance like successful deployment of surprising linguistic abilities. But, continues the objection, the "success" is merely superficial. That's because these are merely examples where, the speakers' pragmatic disabilities notwithstanding, the speech episode just happened to be comprehensible. For instance, take (11). Here Participant 2 seems to leave it to the hearer to fill in what he played, what he practiced up for, what he eventually joined, etc. This apparently indicates pragmatic abilities with null complements – specifically, an ability to leave out what will be obvious to the hearer. An alternative description of this example, however, is that the speaker neither recognizes nor is interested in what the hearer can glean from these words, and that it is mere serendipity that, in this case, the hearer managed to sort it out. Or again, consider Participant 1's use of 'mummy'. Maybe this speaker does not realize that this word is ambiguous, hence his success is accidental. This is a very reasonable worry. The key to answering it is to stress that what we present here are not isolated examples: they aren't occasional "successes" in a sea of failures. In fact, any randomly selected page of our corpus contains a rich array of pragmatic determinants of literal speech act content. To give a crude comparison, it's true that one couldn't (successfully) argue that a clock was keeping time comparatively well on the basis of one or two examples in which the time it indicated was the actual time; however, where there is a striking pattern of correspondence, the hypothesis of "accidental success" becomes less and less plausible,

and the claim that the clock is running (albeit sub-optimally) becomes better supported. That said, it would be very useful to know, for instance, what proportion of uses of (i)-(iii) by speakers with ASD succeed, and how that proportion compares to the success rate in a matched control group. We are pursuing such quantitative research already. Still, it is clear enough from our work on ASD texts to date that there is a genuine pattern of success: it is not the *existence* of success, but rather its degree and exact nature that remains to be established.

The second means of rescuing N -- again one which we ourselves do not endorse -- is to insist that the observed capacities are not pragmatic, but are rather semantic. Our reason for disagreement depends heavily upon a terminological clarification. There are two familiar uses of ‘semantics of a sentence’. One pertains to the content of the type, the other pertains to the content of the utterance (roughly, its literal truth conditional content). Keeping these in mind, there are two variants on the “rescue”. The first variant, taking ‘semantics’ to be about types, is that capacities with respect to (so-called) “pragmatic” determinants of literal speech act content are really capacities for assigning type meaning. The second variant, taking ‘semantics’ to pertain to utterances, is that capacities with respect to (so-called) “pragmatic” determinants of literal speech act content are really capacities for assigning literal truth conditions. Let’s take these in turn. The first variant can be dismissed as absurd. Of course knowledge of standing meaning is not sufficient for assigning referents to pronouns and other context-sensitive items; nor for providing an object or property to conjoin with the content of a sub-sentence; nor is it sufficient for disambiguating, etc. Thus whatever capacity is at work that allows speakers with ASD to perform relatively well are not just further capacities for assigning type meaning. Consider then the second variant. Isn’t it plausible that the capacities at work are semantic in the sense of delivering literal truth conditions? Yes, that is plausible. But that is by no means an objection to our view, since it is part of our view!

The reply, in sum, is that on one sense of ‘semantic’ it would be a real rescue of N if the capacities were semantic, but it’s obvious that they are not “semantic” in that sense; and on the other sense of ‘semantic’ it is true that the capacities are “semantic” -- but on that sense, N is abandoned rather than genuinely rescued. Now, this reply may have the air of linguistic sleight-of-hand: isn’t this merely an argument by stipulation of

meanings? In a way, that's a fair complaint. But the stipulation is by no means arbitrary: it is motivated, recall, by our larger question, which is where the boundary lies between knowledge of language and knowledge of non-linguistic facts. Given this question, it should be clear that the sense of 'semantics of a sentence' that is wanted is the one pertaining to types – for that, surely, is what knowledge of language assigns. In addition, it's also non-arbitrary in the sense that (or so we'll urge), this linguistic-knowledge sense of 'semantic' picks out a natural kind. Which takes us to the next response.

The first responses which we reject were about how one might defend N: it seemed that there were ways of saving it that didn't necessitate revisiting the methodology at all. The next response which we reject is about the whole question of knowledge of language versus other sorts of knowledge, and in particular semantics versus pragmatics. It goes like this. There have been plenty of attempts to trace the semantics/pragmatics boundary. They have all foundered. The failure of N is just the latest example. In light of this, continues the worry, we should endorse a pessimistic induction: we will never find any such boundary. And that's presumably because there just is no such boundary to find.

Now, we concede that finding the boundary is hard. We also concede that the supposition that there is no semantics/pragmatics boundary in particular, and no boundary between knowledge of language and knowledge of non-linguistic facts in general, is entirely coherent. Still, we maintain on empirical grounds that there likely is such a boundary. That is, there is a wealth of emerging evidence that knowledge of language is a natural kind: evidence from deficits (both acquired and genetic), from neural localization, from acquisition studies (including studies of language acquisition in the deaf), from comparative linguistics, and so on. If there is such a natural kind, then the question of what does and does not pertain to it is a perfectly sound one. This is not to say that we will inevitably find this out: in some cases, the question may be too hard, and the variation between speakers may create fuzzy boundaries in some cases. But the right attitude is not defeatism, but rather a commitment to undertake the hard work required. These are our grounds for not endorsing this response.

VI. Defending the Methodology

“It ain’t over ‘til it’s over”

Let’s recap before moving on. After rehearsing some background about ASD and pragmatics (including in particular the notion of “pragmatic determinants of literal speech act content”), we provided corpus evidence of surprising pragmatic abilities in some speakers with ASD. We then introduced what seemed to be a promising new empirical tool for understanding the boundary between knowledge of language and knowledge of non-linguistic facts, in particular the boundary between knowledge and abilities specific to standing meanings (semantics) and other sorts of not-specifically-linguistic abilities (pragmatics). The tool was encapsulated in the following *ceteris paribus* inference ticket:

N: If speakers with ASD exhibit linguistic capacity C, then C is semantic and not pragmatic

Next we saw that N really was in conflict with the previously presented empirical results. Our remaining question is this: With N thus under threat, must we abandon evidence from deficits in ASD when searching for the semantics/pragmatics boundary?

Not surprisingly, our answer is ‘No’. Our tentative suggestion, put in a nutshell, is that there are two quite different kinds of pragmatic processes, “primary” and “secondary”. This is an idea that we take over from cognitively oriented contextualists in linguistic pragmatics, such as Robyn Carston, François Récanati and Dan Sperber. Our contribution is the idea that secondary pragmatic processes are severely impaired in ASD, while primary pragmatic processes remain comparatively intact. By this we do not mean, to repeat, that all people with ASD utterly lack secondary pragmatic processes, and all people with ASD have perfectly functioning primary pragmatic processes. Our point is merely that the former are much more severely impaired than the latter. This is why we find superior performance on certain pragmatic abilities as compared to others.

To spell out this proposal, we proceed in several steps. First, we explain the contrast between the two processes, both in terms of the tasks that each performs, and in terms of the nature of the presumed mechanism which performs those tasks. (Among those who posit these two sorts of pragmatic processes, there are in-house disputes about the precise nature of both the tasks and the mechanism. But we abstract away from these: to do otherwise would be to make our proposal unduly speculative.) Next we explain how

exactly positing two processes accounts for our data about pragmatic (dis)abilities in ASD, while leaving the deficit-based methodology safe from the threat seemingly posed by the abilities we claim to have uncovered.

As a first pass at the contrast between primary and secondary pragmatic processes, consider functional characterizations of each. Beginning with secondary processes (simply because they are more familiar), they are always post-propositional. That is to say, secondary pragmatic processes always take propositions as input. More specifically, focusing on the speech act of assertion, they take the proposition literally stated as input, and yield propositions which are non-literally conveyed. In the context of communicative abilities in ASD, it is useful to divide these into two classes: non-ironic cases on the one hand – conversational implicatures, metaphor and indirect speech acts – and irony on the other. (We will see why shortly.) Primary pragmatic processes, in contrast, take the standing meaning of expressions as input (this being assigned by “semantics” in our sense) and yield the literal content of the speech act as output. Again, in the context of ASD, it is useful to divide these into sub-varieties. On the one hand, there are inputs whose content is less than fully propositional. These include expressions which contain overtly context sensitive expressions like pronouns (‘he’, ‘this’), tense markers, and special words like ‘now’, and ‘here’, as well as expressions which have multiple senses. If primary pragmatic processing does not occur in these cases, no truth condition results. For example, the sentence type ‘He lived there until yesterday’ patently has no truth value, even once all the non-linguistic facts are fixed, for there is no specification of who is being spoken about (nor when, or where). This must be settled by what we call ‘slot filling’. Or again, ‘The bank was flooded’, that type, lacks a truth condition because it is ambiguous. (In fact, it is both lexically and structurally ambiguous.) On the other hand, there are inputs to primary pragmatic processes where the standing meaning is a proposition, but where the literally stated proposition is not the semantically encoded one. Thus, in reporting upon a party, someone who says ‘Everyone got drunk’ produces a sentence which (ignoring tense) actually does express a proposition – namely that for every person in the universe, there is some time in the past at which they got drunk – however, this is not what is claimed. In the literature, this is referred to as ‘free enrichment’. In sum, we have:

IV) SUB-VARIETIES OF PRIMARY PRAGMATIC PROCESSES

a) Input is pre-propositional

1) Assignment of referents to context-sensitive items (slot filling)

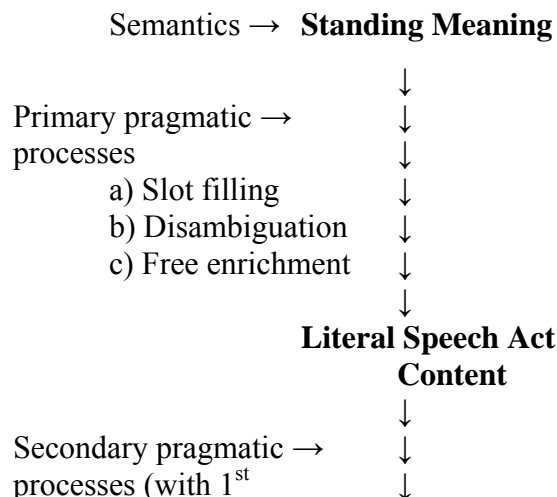
2) Selection of sense (disambiguation)

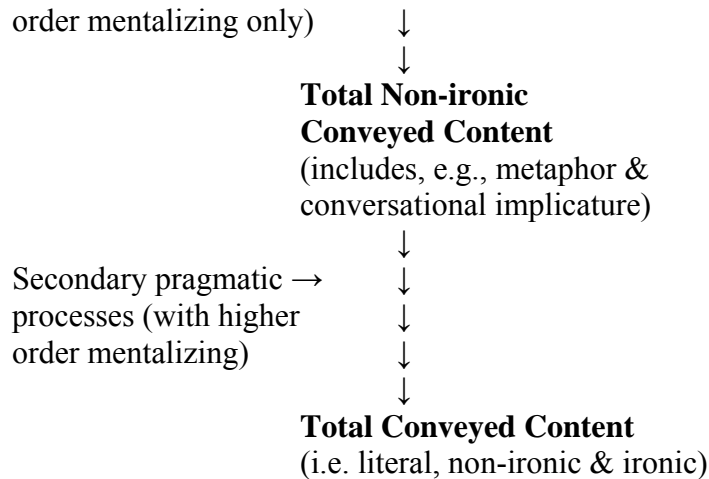
b) Input is propositional (free enrichment)

Now, as this last example already hints, these sub-varieties are not mutually exclusive. Very often more than one applies before the literal speech act content is arrived at. Consider, for instance, typical uses of ‘I’ve had breakfast’ and ‘You’re not going to die’. Slot filling is required for the pronouns and for tense. But even once this happens, the results –namely *that there is some time in the past at which the contextually-fixed speaker breakfasted and there is no time in the future at which the contextually-fixed addressee will be deceased* – are propositions which (typically) are not the ones asserted. (Compare ‘I’ve had lizard’ and ‘You’re not going to climb Mount Everest’, where the result of slot filling would typically be the thing asserted.) So to get what would typically be stated, both (iv a.1) and (iv b) must apply.

One last detail. There is no bar to allowing secondary pragmatic processing that draws only on first-order mentalizing. This is important for understanding pragmatic abilities because, as Happé (1995) has argued, arriving at non-literally conveyed ironical content turns out to require higher-order mentalizing abilities, whereas conversational implicature and metaphor seemingly require only first-order mentalizing. Both, however, are genuinely secondary, not primary.

We may sum up the “dual process” functional architecture with a diagram:





Having explained what gets done in secondary versus primary pragmatic processes, the next issue is the nature of the psychological mechanisms which perform the respective tasks. (As we have already noted, there are disputes about their precise character which we here set aside. See Récanati 2004, Ch. 3 for discussion.) There are three hallmarks of primary pragmatic processing. First, the hearer finds the pragmatically enriched content through direct intuitive grasping. Rather than being full-bloodedly inferential, the mechanism is associative. Second, the processing is sub-personal and is not available to consciousness. Third, the processing is local. It is “bottom up” and is often (but not always) triggered by a feature of the linguistic expression used. There are three contrasting hallmarks of secondary pragmatic processes. First, they are reflective. They involve discursive, fully inferential, ordinary reasoning. Second, they take place at the personal level, and are available to consciousness at least in the sense that the thinker can reconstruct the argument. Third, secondary pragmatic processing is holistic: it is open in principle to information of any kind. (It can be, for this reason, slower and more effortful than primary pragmatic processing.)

An analogy from Récanati may help clarify the contrast. Consider the kind of sophisticated seeing that we do in our everyday lives: we see not (just) colour patches and two dimensional shapes, but rather jets, mini-vans, vegetables, etc. This kind of seeing is an intellectual task that goes beyond mere sensing, whatever the latter might be. It requires lots of worldly knowledge. Yet it is a non-discursive, sub-personal, local process. In contrast, pondering the consequences of what we see is genuine reasoning,

available to consciousness, and holistic: I see some mini-vans parked at Rosa's house, remember that it is her son's birthday today, infer that there is a party going on, recall an invitation to attend, recognize the urgent need to buy a gift, etc. Both are in some very broad sense "inferential". But, not to put too fine a point on it, the former is very far from theory construction on the basis of available evidence, whereas the latter at least approaches that highly refined kind of inferencing. Put in terms of this analogy, then, primary pragmatic processes are like sophisticated seeing, whereas secondary pragmatic processes more closely approach theoretical inquiry.

Consider now how the existence of two kinds of pragmatic processes would explain the novel data from §IV. Our conjecture, on the one hand, is that primary pragmatic processes are relatively intact in our participants. More specifically, disambiguation, since it is carried out by primary pragmatic processing, is comparatively intact – hence our participants are predicted to do reasonably well with (iii a-b), accidental homophony and polysemy. Free enrichment, equally carried out by primary pragmatic processing, will be comparatively intact too – including quantifier domain restriction and fixing a degree on a scale. Thus, our participants are predicted to succeed reasonably well with respect to (ii a-b). Finally, slot filling is a primary pragmatic process *par excellence*, and (i a) and (i c-d), are all three cases of slot filling. Thus, primary pragmatic processing being comparatively intact, our participants are predicted to succeed reasonably well with indexical pronouns and other overtly context sensitive expressions, null complements, and possessives. (We'll return to (i b), sub-sentences, below.) The other half of our conjecture, of course, is that secondary pragmatic processes are severely impaired in ASD. We thus predict much more severe difficulties in higher-order tasks like irony and in first-order tasks such as conversational implicature, metaphor and indirect speech acts. Such difficulties are well substantiated in the literature on communication in ASD.

If our positive speculations about pragmatic abilities in ASD are on the right track, then all the data really require is not an abandonment of deficit-based evidence for the semantics-pragmatics boundary, but merely a retreat from N to S:

S: If speakers with ASD exhibit linguistic capacity C, then either C is semantic or C derives from semantics and primary pragmatic processes only.

(Whereas ‘N’ stood for “natural”, ‘S’ stands for “superior”.) Of course, as before, this can only be taken as suggestive. The usual “for the most part” and *ceteris paribus* warnings still apply, and much work remains to be done. Still, whereas N now strikes us as root-and-branch wrong, S still strikes us as quite possible on the right track.⁶

VII. Concluding Remarks

Our aims, recall, were to introduce some novel data about pragmatic abilities in Autism Spectrum Disorder, and to consider a possible implication of this data for an emerging empirical methodology in philosophy of language and mind. Beginning with the data, our conclusions are these. We are quite confident in our empirical conclusion, on the basis of non-quantitative studies of corpii, that speakers with ASD, despite difficulties with metaphor, irony, conversational implicature, etc., are comparatively successful when it comes to pragmatic determinants of literal speech act content. (This is not to say that further quantitative confirmation is uncalled for: to the contrary, we are pursuing such research now.) We are less confident about our account of where the abilities lie (namely, in primary pragmatic processes) and where the disabilities tend to be found (namely, in secondary pragmatic processes). But this does seem to be very much on the right track. It remains to be seen, however, *why* speakers with ASD should have just this pattern of (dis)abilities: that is, why should the symptoms of ASD described in §II give rise to deficits principally in secondary pragmatic processing? Turning to philosophy, we hope to have shown that a seeming threat to a promising, even exciting, empirical methodology can be forestalled if we are more sophisticated in our understanding of the varieties of pragmatic processes. Then again, to have rescued a methodology from one threat is not yet to have vindicated it entirely. Only much time and much further hard work could support that conclusion.

⁶ Here is a nice example of how S can be applied to the semantics-pragmatics boundary in non-pathological cases. There isn’t anything like a settled view in the literature on how to treat sub-sentential speech. Some think of it as semantic, others as pragmatic. Within the latter camp, turning to issues of processing, some would treat finding the conveyed content as full-blown reasoning, others not. What now seems clear, in light of the manifest capacity by speakers with ASD to use sub-sentences appropriately, together with SA, is that sub-sentential speech is subserved by a primary pragmatic process.

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