Pronouns and procedural meaning:
The relevance of spaghetti code and paranoid delusion*

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This paper concerns the treatment of pronouns in current pragmatic theory. It has two objectives, one immediate and one larger. The immediate one is to explore the idea that pronouns have a 'procedural' dimension in their interpretation, assuming a distinction between procedural and conceptual meaning as drawn within Relevance Theory. The category of procedural meaning was initially introduced to deal with expressions which do not form part of the propositional meaning of an utterance, but serve as a procedural signal as to how the content is to be pragmatically processed. Consider, for example, the ironic reading of the sentence:

(1)   Well, you've been a real help!

The pragmatic particle 'well' is here functioning as an overt marker of how the semantic content of the rest of the sentence is to be understood. What it indicates is that the speaker intends the hearer to understand that she hasnt been a help at all, and that is pretty much all it seems to mean. By contrast with pragmatic particles of this sort, pronouns clearly arent purely procedural, since they occupy NP slots, contribute to reference, and are thus centrally involved in the propositional content of the utterance. But we wish to elaborate the view that an element of procedural meaning plays an integral and essential role in the interpretation of pronouns, and argue that the proper understanding of the procedural/conceptual distinction hinges centrally on the pronoun case.

The second objective of the paper is to attempt a broader assessment of this approach to the pragmatics of pronoun interpretation by finding analogues outside our immediate theoretical framework. There is always the worry that a key theoretical construct such as the procedural/conceptual distinction as formulated here in terms of Relevance Theory will turn out to be 'theory-internal', in the sense that its formulation is a by-product of

the way the model happens to be configured. In order to test the robustness of our relevance-theoretic approach to the interpretation of pronouns, we invite consideration of analogues to procedural processing in two adjacent disciplines.

The first of these is a comparison between pronouns in natural language and GOTO statements in computer programming instructions to 'jump' to a section elsewhere in a program so as to perform a packaged sub-routine, handle an exception, or the like. The introduction of GOTO statements was a milestone in the development of computer programming, but they proved to be hugely controversial: some (following Dijkstra 1968) have held that GOTO statements should be disallowed altogether, so as to avoid 'spaghetti code'; others have argued that GOTO statements are not in themselves dangerous, but can be implemented more safely and elegantly by means of structured programming. However, neither computational nor linguistic theorists seem to have explored the parallel between GOTO statements in computer programming and pronouns in natural languages, both of which target an antecedent in a procedural way. We suggest that this parallel could allow pragmatic theorists to tap computing expertise which would feed into the current debate about the procedural/conceptual distinction.

Our second parallel concerns the over-interpretation of utterances by those suffering from (non-bizarre) paranoid delusion. There has for some years been a mutually useful exchange between pragmatic theorists and clinical practitioners in the understanding of Asperger syndrome and mild autism: it turns out that the range of cognitive deficits involved (failure to appreciate ironic utterances and to track other implicational effects) constitute a natural class as predicted by Relevance Theory (Happé 1993, 1994). We argue here that the linguistic symptoms of paranoid delusion can be viewed as the pragmatic complement of those manifested in Asperger syndrome. Where subjects with Asperger syndrome fail to pick up conversational implicatures and can thus be said to have a pragmatic deficit, subjects with paranoid delusion have pragmatic over-shoot in the sense that they do not stop the search for intended meaning when they reach the locally optimal interpretation of an utterance, but recursively pursue an ulterior intention and meaning. We have dubbed such cases of over-interpretation 'praeter-relevance' on the assumption that the pragmatic mechanisms involved (although improperly checked or balanced) are in principle no different from those posited by Relevance Theory for the non-paranoid jumps to intended meaning (of the sort, for example, that Asperger subjects fail to make). If this assumption is correct, then an account of what is happening in paranoid over-interpretation will, we predict, be a testing ground for ideas about the balance between procedural and conceptual meaning.

Each of these analogues calls up a vast literature of its own, and the present authors cannot claim technical expertise in either domain. But we believe that the parallels are sufficiently intriguing from a theoretical

linguistic point of view to warrant our drawing attention to them. We invite further discussion, and would welcome expert correction of our assumptions, data and arguments.

1 Pronouns and Procedural Meaning

The theoretical notion of procedural meaning has played a central role in the recent development of Relevance Theory, and, for that very reason, is understood in slightly different ways by different theorists. A convenient reference point is the definition of procedural semantics given by Carston:

> The category of linguistic semantics whose domain is those linguistic forms whose encoded meaning does not contribute a concept but rather provides a constraint on, or indication of, the way some aspect of pragmatic inference should proceed. (Carston 2002: 379)

Examples of expressions which are taken as falling within the domain of procedural semantics, other than the sort of pragmatic particle illustrated above, include illocutionary force indicators, presupposition triggers, focusing devices, parentheticals, interjections, and so on. Such expressions 'contribute to other aspects of speaker's meaning than explicit truth-conditional content, or encode aspects of meaning that are not plausibly analysed in conceptual terms' (Sperber & Wilson 2005: 26). On this basis, Relevance Theory assumes a two-stage process of utterance interpretation, which has been characterised as follows:

> a modular decoding phase is seen as providing input to a central inferential phase in which a linguistically encoded logical form is contextually enriched and used to construct a hypothesis about the speakers informative intention. (Wilson & Sperber 1993: 1)

What is important here is the fundamentally different natures of the two types of operation, the first involving mental representations or concepts of some kind, and the second the computational manipulation of those representations. In the former case, the process is recognisable as relating to the sorts of meanings encoded by things like descriptions – what we normally think of as concepts in more cognitive terms. It is difficult to see how this sort of meaning could have a direct effect on an interpretative phase involving computational manipulation, a position which leads to Blakemore's (1987) conclusion that there are two sorts of meaning, relating respectively to these two separate phases. Computational meaning must, however, look rather different from what we are used to in conceptual terms, taking the

form of constraints on the manipulations (inferences) to be performed in the process of utterance interpretation. Such meanings are what Blakemore terms procedures, or procedural meanings.

At one level, this argument would seem to boil down to the relative importance of the decoding and inference phases in utterance interpretation. If the latter only involves cosmetic tweaking of interpretation in context through implicature (as Grice would have it), the pure coding account has little to concern itself with: decoding would presumably result in a reasonably complete meaning ('what is said') in need of little inferential aid. If however, the inferential phase is rather more significant (as claimed by many, relevance theorists among them), and is not only crucial in the derivation of implicit content, but also has a role to play in what is explicit (and even in the meanings of individual words in a sentence), the situation looks rather different. One of the clear advances of the relevance theoretic position on these questions is the growing appreciation of how widespread and deep-rooted semantic underspecification, and thus pragmatic inference, seems to be in human language. Even sentences which seem fully propositional exhibit a significant amount of context sensitivity. Consider the interpretation of the adjectives in the following two sentences:

(2)   Beth is depressed.

(3)   It is green.

In (2), does Beth's depression amount to 'feeling a bit low', is it clinical and being treated by drug therapy, or is it somewhere in between? Such considerations are surely an important part of the interpretation of the sentence, and of what the speaker intended to communicate by uttering that sentence. In (3), the interpretation of the adjective could cover an extremely wide area: for one thing, the shade of green intended will depend on what the pronoun refers to (a fruit, a book, a car, mould, etc.); furthermore, the interpretation will depend on whether all of the visible parts of the object are green or just some of them (a green apple), and whether that green applies to the inside as well as the outside of it (a green book). Carston calls this position 'The Underdeterminacy Thesis' (2002: 19), pointing out that (to use Grice's terminology for a moment) linguistically encoded meaning underdetermines not only 'what is meant' by a speaker in a particular context, (a point few would dispute), but also 'what is said'.[1] Under this view, a decoding phase provides a basic linguistic form (perhaps some sort of logical form), which is then pragmatically enriched to form a fully fleshed-out

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[1]Note that Relevance Theory does not have the same conception of 'what is said', but uses a different notion, that of explicature: 'an ostensively communicated assumption which is inferentially developed from one of the incomplete conceptual representations (logical forms) encoded by the utterance' (Carston 2002: 377). We use Grice's more intuitively accessible notion purely to make the point here.

proposition, and further inferential processing is needed to compute implicit parts of what the hearer is constructing as 'the speaker's meaning'. Under this view, linguistic meaning resembles speaker's meaning in the same way as a skeleton resembles a body (Sperber & Wilson 2005: Conclusion).

At a very basic level, the semantic distinction between conceptual and procedural meaning reflects a particular cognitive opposition – that between representation and computation. Utterance interpretation should arguably be described in terms of the formation and manipulation of conceptual representations. Now, we also want to claim that thoughts are structured strings of concepts (i.e. mental representations), and that human beings can typically be conscious of their thoughts. Native speakers of a particular language generally do have quite particular ideas about the meanings of lexical items in their language, or the concepts invoked by them. However, there are undoubtedly computational processes that occur in the mind to which human beings do not seem to have such direct access: for example, the phonological computations which result in phonetic form, or the syntactic computations used to construct an individual logical form. Blakemore's account predicts that the 'meanings' of linguistic items which encode procedural information should likewise be very difficult to 'bring to consciousness', and this is what we seem to find. It is unclear how speakers conceive of items like discourse connectives, and pinning down the 'meanings' of such words is notoriously difficult.

> If 'now' or 'well' encodes a proposition, why can it not be brought to consciousness? Why is it so hard for non-native speakers of German to grasp the meaning of 'ja' and 'doch'? [...] The procedural account suggests an answer to these questions. Conceptual representations can be brought to consciousness: procedures cannot. We have direct access neither to grammatical computations nor to the inferential computations used in comprehension. (Wilson & Sperber 1993: 16)

This linking of linguistic intuition and introspection is elaborated by Blakemore (2002) in connection with the notion of paraphrasing. Even when a concept is definitionally controversial, it seems that speakers can nevertheless 'bring it to consciousness' (Blakemore 2002: 82). We are able to determine the comparative applicability of two different expressions in encoding a particular concept without having to perform extensive substitutability tests, which would, in theory, need to be undertaken for all contexts. However, such a state of affairs does not obtain for procedural items like 'but' or 'nevertheless'. Questioning native speakers on such expressions standardly results in an example of typical usage of the expression in question, or a description, rather than the sort of simple paraphrase produced

for clearly conceptual expressions.[2]

One of the fundamental questions relating to procedural meaning is what sorts of elements can encode such meanings, and whether there is a natural class of elements that might fall into this category. Blakemore's initial conception of the conceptual/procedural divide was as a cognitive parallel to the truth conditional versus non-truth conditional distinction, the upshot of which would be the relegation of all procedural effects to the side of implicature. Much work has been done on procedural encoding from this perspective, taking items like non truth-conditional discourse connectives as paradigm cases,[3] but further research has shown that the two distinctions seem to cross-cut each other at a fundamental level, and that the actual situation must be rather more complex (Wilson & Sperber 1993, Blakemore 2002). There is growing evidence that there are, on the one hand, linguistic expressions which look as if they encode procedures of some sort, but which also contribute to truth conditional content, and, on the other hand, elements which seem to encode concepts and yet do not contribute to the truth conditional level. As Blakemore herself admits, her initial notions of procedural encoding 'must be broadened to include constraints on all aspects of inferential processing' (2002: 4).

Pronouns are here a key example. The notion of pronominals as encoding procedures is widespread in the relevance theoretic literature, but relatively little explored, unlike the cases of discourse connectives and discourse particles. Few would argue that an account of pronominals is fundamental to any theory of linguistic interpretation, a fact that has both been noted and addressed by many syntacticians,[4] and systematically neglected by many semanticists.[5] Standard accounts often talk of the application of processes of disambiguation and reference assignment, without detailing quite what these processes might involve, and the role of the semantics of the individual elements themselves. Consideration of the nature of procedural semantics in these terms seems to illuminate pronominals as natural exponents of this sort meaning: pronoun meanings are notoriously difficult to describe, and those meanings do not appear in the proposition expressed at all – it is the referents of those pronouns that do that. Adopting such a procedural view of pronominal semantics has an interesting side-effect which predicts that whatever meaning a pronoun has does not appear on the surface: such

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[2]Compare items like 'cat', 'sleep', and 'slowly' with words like 'however', 'so' and sentence initial 'well'.

[3]For analyses of 'but' as encoding an instruction to process the clause that follows as contradicting and eliminating an assumption, see Blakemore (1987, 2002) and Iten (2000); for a slightly revised view see Hall (2004).

[4]Notably Chomsky and the detail of binding theory in GB syntax, where anaphors and pronominals form a central part of the theory.

[5]With some notable exceptions, such as Kaplan (1989) and his distinction between content and character: a striking forerunner of the relevance-theoretic opposition of conceptual and procedural meaning.

meanings are of a different sort, their computational nature making them unsuitable for such surface expression. What is also clear is that pragmatic inference must have a significant role to play, given the importance of contextual entities (whether linguistic or otherwise) as referents for pronouns. We would argue that while research on discourse particles has revealed much about the nature or procedural meaning, it is an account of how pronominals work which should be considered as key to an understanding of procedural meaning in general. While they may not be purely procedural, as many discourse markers are argued to be, pronouns are procedural in a central, fundamental way, and the fact that they (and their interpretations) are often more complex should not distract us from this insight.

The significant question raised by much of this discussion is whether this proposed meaning split is demonstrable outside the relevance theoretic paradigm, or is purely a theory-internal construct with no external motivation. If there is evidence for some sort of natural class of procedural elements from outside the framework of Relevance Theory, as we suggest here that there is, the motivation for the existence of such a meaning split would look distinctly stronger.

2   Pronouns and Programming

One potential analogue for the type of procedural processing that is involved in pronoun interpretation for human speakers is the programming language statement known as GOTO. Essentially, what this statement does is instruct the computer to jump to another point in the program, which is specified by a label or line number. Statements in a program are executed in a strictly linear fashion, in the order in which they are written, known in computer science as sequential flow of control.[6] This has its limitations for many sorts of computational operations. To take the simple example of an iteration, a language that only had the facility for such sequential execution would need to duplicate the code for the individual single operation the required number of times, resulting in very inefficient, long programs. If however, code can be reused with a means of instructing the computer to return to the beginning of a particular section of code and execute it again, or otherwise allow movement within the program, this is much preferable, and not only in terms of the program size. Most programming languages include such control flow statements of one sort or another that allow such management of variation in the sequential ordering of statements, typically of three sorts:

(i) statements may only be obeyed under certain conditions (choice)

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[6]See Bergin & Gibson (1996) for an overview of the history and development of programming languages; on the place of control flow and structured programming, see Knuth (1974, 2003).

(ii) statements may be obeyed repeatedly (loops)

(iii) a group of remote statements may be obeyed (subroutines)

From the perspective of the linguist, rather than the programmer, what we seem to have here are statements which tell the computer running the program what to do with a particular section of code, what sort of process it needs to perform on it. What is also striking is that control flow statements are fundamentally different in nature from the rest of the body of the program: they do not enter into the computations themselves, but merely instruct the machine to follow a certain pattern or operation. (Such statements are typically reserved words, meaning that they cannot be used as variable names or labels.) We seem to have a clear analogue for linguistic procedural meaning here, both in the role that such elements play in directing the computations to be performed, and in their nature, being underlyingly different in an important manner from other elements.

The function of GOTO statements as an exponent of the manipulation of control flow provides an instructive parallel for the function of pronouns in natural language: both can be seen as instructions to jump to an antecedent.[7] A pronoun needs to be linked to some other element in the discourse context (whether that element is linguistic or not) by some process of back-tracking[8] in order to establish its reference. Similarly, one use of GOTO statements is to establish the reference or value of a variable by tracking to another location in the program. As we shall see, the nature of these variables is crucial here, and not only the processes involved in the instantiation of those variables (or pronouns), but in their scope and longevity as well. The idea of a subroutine is particularly interesting in this context: a subroutine, or section of code written for a specific purpose[9] (possibly even one external to the 'body' of the program) can be invoked from within the program by using a GOTO statement, the iterative use of which results in more compact, and possibly more efficient eventual programs. This process has remarkably close resemblances to pronoun resolution – what a hearer needs to do in order to understand a pronoun is precisely to perform the subroutine for pronominal interpretation that is outside the main process of interpreting the sentence, and return the output of that subroutine as the

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[7]GOTO is one of a larger category of statements which trigger a jump to an antecedent. In using GOTO as the focus of the discussion regarding pronominals here, we mean 'GOTO + return', or the equivalent of a subroutine call (implemented directly as GOSUB in Basic, for example). We touch on other uses of GOTO later.

[8]We will not consider the controversial cases of cataphora (forwards anaphora) here.

[9]Given the significant variation amongst different programming languages in terms of labels and conventions for referring to such operations, the concept of a 'subroutine' being considered here is one that is contained within the 'text' of a program, but may fall outside the 'FINISH' or 'END' instruction, being invoked through the use of GOTO statements. What some languages call a 'function' is slightly different, and we will consider this concept below.

referent of the pronoun. The computational expression then acts as a complex variable, combined with an instruction on how it should be processed. In this sense we have an analogue for the linguistic pronoun in programming languages.

If the kinds of uses of GOTO just described are indeed a robust analogue for the role of the pronoun in human language, the question arises whether we can in the same way model the nature of the process of pronoun interpretation in human speakers. The claim that processes of reference resolution require pragmatic processing is an uncontroversial one, but one which points up an immediate problem with trying to model such processes in a simply computational way using GOTO statements. While human speakers have access to a wealth of general knowledge about the world, as well as a keen awareness of context and environment (both linguistic and physical), and given its scope and its fundamentally dynamic nature, such information is extremely difficult to provide for a computer. In addition, we would be obliged in such a model to leave aside the whole area of imputation of intentions and processes of 'mind-reading' (cf Sperber 1994, Sperber & Wilson 2002), which many argue are key to utterance interpretation in general.

For the programmer trying to get to grips with problems of reference assignment, this leads to a situation in which claims of psychological plausibility (if there were any to begin with) are discarded in the search for a robust way of simulating the right sort of output: what many would call a hack. From the perspective of the linguist, the question is the relative significance of that hack, which is not a straightforward thing to assess. If, for example, we accept some version of Carston's view of underdeterminacy, we instantly hit problems with the computational model, as such implementations need to be fully explicit in order to be executable. Having said that, computational models can still be instructive, as by trying to simulate outputs we stand to deepen our understanding of the potential mechanisms that might underlie them.

The conclusion that we should draw from all this is that if GOTO statements are of potential value as a formal analogue, they ought to be problematic in certain ways in the more general context of normal programming. This is indeed what we find. Given their power as a programming tool, and the fact that GOTO addition does not require restructuring of code, widespread and unconstrained use of GOTO statements has led to programmers producing inconsistent, incomplete and generally unmaintainable programs. Such code is often known as 'spaghetti', given its convoluted and tangled control structure. Programmers generally try to avoid GOTO statements at all costs (Dijkstra 1968), replacing their widespread use with structured, procedural programming and the use of structured flow commands (such as loops and if-then statements). Dijkstra argues that unrestricted GOTO statements should be abolished from higher-level languages because they complicate the task of analysing and verifying the correctness

of programs (particularly those involving loops).[10] Theorists such as Donald Knuth (1974) take a more nuanced view, adopting the position that it is not GOTO statements *per se* that hold these dangers, but rather their uninformed misuse (or overuse). He argues that certain sorts of operation (such as exception handling) are actually most efficiently handled by the restricted, controlled use of GOTO statements. Yet again, this situation seems to chime with human linguistic experience of pronominals: overuse results in linguistic spaghetti in terms of reference resolution.

Even in a context which contains a limited number of possible referents, a succession of pronominal uses results in something that, while it is possible given enough time to work out to whom each pronoun refers, is all but uninterpretable in real time speech.[11] Take the passage from the Book of Genesis, chapter 32: vv. 24-27, in the King James Version:

> [24] And Jacob was left alone; and there wrestled a man with him until the breaking of the day. [25] And when he saw that he prevailed not against him, he touched the hollow of his thigh; and the hollow of Jacob's thigh was out of joint, as he wrestled with him. [26] And he said, Let me go, for the day breaketh. And he said, I will not let thee go, except thou bless me. [27] And he said unto him, What is thy name? and he said, Jacob.

Having been introduced to Jacob and the man in v.24, there follow three instances of 'he' and two of 'him' before we are told that it was Jacob's thigh that was out of joint. The first two 'he's are clearly intended to refer one to each individual, but either combination is possible in the context. Similarly, the two 'he's in v.26 could be the same individual (either in fact), or different ones either way round. If we were to apply Dijkstra's anti GOTO dictum here, each use of the pronominal would be replaced by a full NP, resulting not only in repetition, but also in inefficiency. Disallowing the use of such powerful and efficient devices as pronouns in a communicative situation seems a step too far, and languages characteristically make use of such linguistic units. What we seem to need is some version of Knuth's nuanced view:[12] some mechanism to assess and control the formation of

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[10]Note here that Dijkstra's criticism is not based on interpretation of computer code by its intended recipient (a computer), but on human users and maintainers of that code. If the program is 'correct' a proliferation of GOTOs and a tangled control structure is no interpretative problem for the machine itself. This also underlines the notion of intention in language interpretation, a notion which seems critical for humans, but has no analogue in computing. As has been suggested by some, producing spaghetti code is something that everybody else does – it is code generated by minds that think slightly differently from our own.

[11]This is an interesting parallel for the situation Dijkstra describes as the opposition between code that is executable by a machine, but convoluted and unmaintainable by a human reader.

[12]The New International Version tries to tread this middle ground, replacing some pronouns with NPs or proper names, whilst leaving others.

such spaghetti, whether we are talking about pronominals or instances of GOTO.

There is an underlying issue concerning variables in the context of multiple GOTOs: In computer programming variables both persist and have scope. In the case of subroutines, as described above, variables are difficult to constrain, and once assigned will persist over computations. Human language faces a similar problem with the indexical nature of pronominals, and the facility for the same variable to take on different values dependent on the context. At one level, this comes down to questions of locality with which linguists will be familiar, and which programmers also need to address. It is here that computing appeals to the function call (as distinct from the subroutine), which one might see as the logical extension of structured programming and sophisticated control flow statements – modularity. Here, questions of locality and variable scope are forced by the use of separate sub-programs that are called from within the executing code, and therefore allowing some of the variability needed, significantly reducing the probability of spaghetti code being produced.[13] The larger question is the conclusions we should draw from this ongoing comparison. Does this notion of structured programming including function calls constitute a computational programming 'hack' in order to force constraints on variables and control flow,or should we take these measures as being evidence that modularity (whether on a macro or micro scale) is necessary for such constraint in the wider context of language more generally?

In short, what we seem to be seeing are more global effects of pragmatic processing playing out in the field of reference resolution, whose sub-processes need oversight and constraint. In this context then, it seems to make sense to consider such linguistic pragmatic processing as constraining the formation of referential spaghetti, ensuring that the point is not reached where interpretation (by a human speaker) becomes difficult. The problem of untangling spaghetti (of whatever sort) does not then arise, a point of view which seems to mesh well with considerations of efficiency within a general paradigm based on notions of cognitive effort and effect. In fact, the picture that appears from all of this is one on which it is considerations of relevance that are being mimicked by these programming ideas of structure and modularity. It is those generalised, cognitive principles which constrain processes of reference assignment, and for which an analogue would presumably be needed to account computationally for Knuth's nuanced view of GOTO inclusion. On the wider issue of generalised modularity, Relevance Theory does not claim the existence of a pragmatics module within the language abilities of the brain. Rather it suggests a model whereby such general utterance interpretation is performed by a dedicated understanding

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[13]Languages like Perl for example have a concept of 'MYx', where the variable x is restricted to the immediate domain, and does not persist outside it.

module within the central cognitive framework of mind-reading, one use of which relates to utterance interpretation (Sperber & Wilson 2002).

3   Pronouns and Praeter-Relevance

We turn now from a computational analogue to a cognitive one. There is a vast clinical literature dealing with aspects of language pathology that are relevant to pragmatic issues.[14] But it is indicative that a recent textbook should use the term 'pragmatic deficits' as a cover term when surveying a range of clinical groups of various kinds, despite having pointed out the complications involved in the word 'deficit' a page or two earlier (Cummings 2005: 261). The paradigm case of pragmatic deficit that has recently been brought to the attention of linguists arose from the investigation of the linguistic behaviour of individuals with autism and Asperger syndrome.[15] The evidence seems to suggest that there is a striking match between a configuration of symptoms emerging from clinical diagnosis and a set of behaviours that constitute a natural class of phenomena established on quite independent grounds from the viewpoint of pragmatic theory. Thus in a paper published in the early 1990s, Francesca Happé summarised the evidence that individuals with Asperger syndrome typically 'fail to get' a range of intended meanings involving implicatures, sarcasm, metaphor, jokes and the like, and argued that this was, in the words of her sub-title, 'a test of Relevance Theory', which would predict that these phenomena would fall out *en bloc* (Happé 1993). While some aspects of Happé's findings have been called into question, notably a supposed difference between the interpretation of similes and metaphor which the theory arguably predicts (Langdon et al. 2002: 82-86), the larger implications of such clinical evidence for pragmatic theory have been widely recognised. Further evidence from a range of cases involving neurolinguistic impairment provide patterns linguistic behaviour which likewise appear to match the type of deficit that pragmatic theory would predict.

What we would like to focus on, however, is the polar complement to such cases of pragmatic deficit, namely cases of paranoid delusion (and more specifically, non-bizarre paranoid delusion), where an individual overshoots rather than undershoots in the interpretation of an utterance.[16] In cases

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[14]See Crystal & Varley (1998) and Sabbagh (1999) for broad overviews, and Bishop (1997) on developmental aspects. For a summary of findings which are of immediate pertinence for Relevance Theory see Cummings (2003: chapter 9) and Wilson (2005).

[15]On autism and Asperger syndrome see Happé (1994) and Baron-Cohen (1995). For accessible and sympathetic accounts of these conditions, see Happé (1991), and Sacks (1995).

[16]Reber & Reber define the term 'delusional (paranoid) disorder' as follows: 'An umbrella term for the various forms of paranoid disorder characterized primarily by one or more persistent, non-bizarre delusions with a paranoid flavor. Apart from the delusions

of pragmatic deficit, as represented by autism and Asperger syndrome, an individual will systematically fail to get the appropriate intended reading of an ironic utterance. In cases of paranoid interpretation, by contrast, an individual will indeed first arrive at an intended ironic reading, but typically will not stop there: an ulterior intention will be suspected and a further level of implicated meaning will be constructed. We should like to propose the term 'praeter-relevance' as a linguistic (rather than a clinical) identifier for such cases of pragmatic overshoot, on the hypothesis that the overshoot is guided by the same pragmatic principles as apply to the interpretation of utterances elsewhere.

In the history of European psychiatry, the labels 'paranoia' and 'paranoid delusion' have been at times amongst the most hotly debated and controversial terms.[17] This is because, in a psychiatric setting, the analysis of the relevant behavioural symptoms is embedded in a larger clinical context involving higher-level diagnostic categories. In its hey-day in the later nineteenth century, 'paranoia' was taken to subsume a wide range of mental disorders which are now otherwise differentiated, and as a consequence paranoia was vastly over-diagnosed. In the twentieth century the pendulum swung the other way, with paranoia falling into disfavour as a diagnostic term, in competition with categories such as schizophrenia. This evolving reanalysis can be followed in the various editions of the diagnostic manual of the American Psychiatric Association. In early editions, paranoia was excluded as a separate diagnostic category, but the fourth (2000) and subsequent editions saw the treatment of paranoid delusion as a configuration which could be considered separately and independently from schizophrenia.[18]

For present purposes, we wish here to distinguish between *diagnostic categories*, which belong properly in the clinical and psychiatric domain, and *behavioural symptoms*, for which adequate descriptions can be given in strictly linguistic terms.[19] Since historical distance aids this perspective, we start out with a description of pragmatic overshoot which predates many of the controversies just mentioned. In the seventeenth-century, the term

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and their ramifications, the individual's behaviour is not abnormal in any pronounced fashion. The term is used only when there is no evidence of any other mental disorder' (2001: 184-5); cf. Gregory (2004: 688-689). For discussion, see Andreasen (1979), Garety & Hemsley (1994), Kendler (1995) and Munro (1998, 2000). Sims (1991) provides a useful collection of papers from interdisciplinary symposium on the topic.

[17]See the comprehensive surveys by Lewis (1970) and by Dowbiggin (2001), and the brief overview in Gelder et al. (2001: 385-388).

[18]American Psychiatric Association (2000: 323-328; section 291.1); cf. the definition of 'delusional disorder' by the World Health Organization (1993: 70; section F22.0). For discussion, see First & Tasman (2004).

[19]On the distinction between symptomatic versus diagnostic labels from a clinical point of view, see Gelder et al. (2001: 381): 'If we recognise a symptom as paranoid, this is not making a diagnosis, but is a preliminary to doing so.'

'melancholy' served as a general cover-term for mental disorders of a wide variety of sorts. In Robert Burtons *Anatomy of Melancholy* (first published in 1621) we find the following characterisation of paranoid delusion, which those who have had contact with such cases will instantly recognise. In a section on 'symptoms in the minde' Burton says:

> If they speak in jest, he takes it in good earnest. If they be not saluted, invited, consulted with, called to counsel, &c. or that any respect, small complement, or ceremony be omitted, they think themselves neglected and contemned; for a time that tortures them. If two talk together, discourse, whisper, jest, or tell a tale in general, he thinks presently they mean him, applyes all to himself, *de se putat omni dici*. Or if they talk with him, he is ready to misconstrue every word they speak, and interpret it to the worst.[20]

Two aspects of this description are worthy of highlighting. Firstly, the symptoms typically involve a misreading of the type of speech act which an utterance represents, such as mistaking a joke as a serious comment. Secondly, when such an individual hears others talking, he (or she) assumes that what they are saying applies to himself – he thinks everyone is talking about him. In psychiatric terms, Burton's 'melancholic individuals' typically have a (false) perception of being persecuted. In purely communicative terms, however, the mechanism involved reveals itself as a misconstrual of deictic or topic relevance. The two parts of Burton's characterisation can thus be linked in pragmatic terms.

A cluster of delusional symptoms strikingly similar to those described by Burton were analysed in detail by Jean Etienne Dominique Esquirol in the early nineteenth century, under the diagnostic label of 'intellectual monomania'. This is clearly cognate with the sort of topic-misconstrual identified by Burton, and is seen by Esquirol as 'driving' other misconstruals and misunderstandings. Monomania is described as follows:

> [T]he intellectual disorder is confined to a single object, or a limited number of objects. The patients seize upon a false principle, which they pursue without deviating from logical reasonings, and from which they deduce legitimate consequences, which modify their affections, and the acts of their will. Aside from this partial delirium, they think, reason and act like other men. (Esquirol 1965 [1845[1]]: 320)

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[20]See Part 1, Sect. 3, Memb. 1., Subs. 2, '*Symptoms of the Mind*', quoted here from the slightly expanded version in the 1676 edition. Burtons account does not appear to have been noted in the clinical literature on the history of delusional disorders, but see Jackson (1986) on the place of his work in the history of ideas about melancholia and depression.

What is distinctive in Esquirol's account is his emphasis on how surprisingly rational the mechanisms are that appear to malfunctioning and consequently how *partial* this type of mania is: 'Partial delirium is a phenomenon so remarkable, that the more we observe it, the more we are astonished, that a man who feels, reasons and acts like the rest of the world, should feel, reason and act no more like other men, upon a single point' (Esquirol, 1965 [1845[1]]: 321). Monomania as a diagnostic category was subsequently dismantled by other nineteenth-century French psychiatrists (Dowbiggin 1991).

In Germany during this period, 'paranoia' came to replace the traditional term 'Verrücktheit' ('madness') as a cover-term for a wide variety of psychoses.[21] While in the nineteen century paranoia had been over-diagnosed, in the twentieth century it came to be under-diagnosed. The category was almost entirely given up by British psychiatrists (Lewis 1970: 10), although, paradoxically, the term 'paranoia' passed from the lexicon of psychiatry into the everyday language, and was embraced by cultural and literary critics.[22] The primary reason for this decline was undoubtedly a reaction against the previous overuse of the term, and its entanglement in higher level discussions of psychiatric configurations. Freud's classic analysis of paranoia in connection with the case of Dr Daniel Paul Schreber (Freud 1925 [1911[1]]) is a paradigm example where the term to be extrapolated is firmly embedded in a larger matrix of concepts.[23]

The purpose of this historical approach has been to track a configuration of symptoms which is robustly identifiable across changing psychiatric theories, even though submerged in much of the twentieth-century literature. We would like to suggest that paranoid delusion, and more specifically non-bizarre paranoid delusion,[24] can be usefully characterised in terms of linguistic pragmatics, and in this framework emerges as a converse of configurations such as Asperger syndrome. As noted above, were those with

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[21]In the sixth edition of his widely-used textbook of psychiatry, Emil Kraepelin defined paranoia as: 'a chronic progressive psychosis [...] characterized by the gradual development of a stable progressive system of delusions, without marked mental deterioration, clouding of consciousness or involvement of the coherence of thought.' (cited in Dowbiggin 2000: 44). Cf. Kraepelin: lecture XV 'Paranoia, or progressive systematical insanity' (1968 [1904]: 140-150).

[22]On paranoia as a cultural phenomenon characteristic of postmodernist malaise see Farrell (1996) and Trotter (2001).

[23]The case would amply reward a nuanced analysis from the perspective of Relevance Theory. It might also be noted, although tangential to our immediate purposes, that Freud's analysis (1991 [1904[1]]), of the linguistic 'slip' or parapraxis, which by definition expresses more than the speaker consciously intends to convey, raises intriguing questions about 'intended meaning' and 'mind-reading' within current pragmatic theory. The distinction between what is 'shown' versus what is 'communicated' by an utterance (Wharton 2003) might provide a useful framework here.

[24]I.e. those involving situations that occur in real life, as distinct from fantastical ones, a criterion which distinguishes *paranoia* from *paraphrenia*.

Asperger syndrome simply fail to pick up conversational implicatures and the like, those with paranoid delusion do not stop the search for intended meaning when they reach the locally optimal interpretation of an utterance: they continue to pursue an ulterior intention and meaning. There is, however, a major problem for those academically concerned with the topic. As Dowbiggin has pointed out: 'there is little "market" for paranoia, since classically paranoid people rarely seek psychiatric help in the first place' (Dowbiggin 2000: 66). Paranoid people perceive themselves to be sane, and indeed a salient characteristic of their behaviour, as Esquirol and others have emphasised, is it is strikingly rational, one might say unexceptionably so. A consequential problem for the non-clinical academic is that gathering and reporting evidence is fraught with ethical difficulties.

A central area for further investigation lies in the complex of deixis, reference, and associated questions of category identity, concerning which anecdotal evidence must here suffice.[25] Our observations concern an individual who is convinced that he is under surveillance, and that those watching him are driving past his house at regular intervals during the day. He also, of his own accord, volunteers the information that to avoid raising his suspicions, those watching him regularly change the colour and make of the car, and also make regular changes of personnel. These changes do not fool him, since, as he cogently argues, that is what they would do, wouldn't they? This position raises philosophical questions about 'wrong' belief systems and their falsifiability.[26] But for the theoretical linguist, what it immediately brings to mind is Ferdinand de Saussure's analogy between the linguistic sign and the 8.45 Geneva-to-Paris express, which retains its identity despite comprehensive changes to its rolling stock, personnel and passengers (Saussure 1983: 107). Saussure's point is that the identity of the linguistic sign is a matter of 'form' rather than 'substance', but the analogy equally well illustrates the pragmatic principles operating in the identification and tracking of referents. The cognitive mechanisms involved in the identification of the multiple cars supposedly observing the paranoid subject is 'non-bizarre' in precisely the sense that the pragmatic principles are no different from those which underpin deixis and reference in everyday situations, such as identifying the 8.45 Geneva-to-Paris express.[27]

In current pragmatic terms, our broad hypothesis is as follows. In cases where individuals with non-bizarre paranoid delusion are tracking referents,

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[25]For a clinical definition of 'delusion of reference', see the entry in Reber & Reber (2001): 'a delusional conviction that ordinary events, objects, or behaviours of others have an unusual or peculiar meaning specifically for oneself'.

[26]For philosophical discussion of paranoid delusions as 'wrong beliefs', see Berrios (1991), Berrios & Porter (1995), Stone & Young (1997), Bynum et al. (2004), Gillet (2004).

[27]From a pragmatic point of view, the paranoid mis-identification just illustrated is the converse of the mis-identification involved in Capgras syndrome, where an individual is convinced that their family members have been replaced by replicas. On Capgras syndrome, see Ellis (1994, 1998).

they are following a strategy parallel to the comprehension procedure posited by Relevance Theory:

Relevance-theoretic comprehension procedure

(a) Follow a path of least effort in computing cognitive effect. Consider interpretations (disambiguations, contextual assumptions, implicatures, etc.) in order of accessibility.

(b) Stop when your expectation of relevance is satisfied.

(Wilson 2005: 1140)

In exceptional cases, an individual overshoots at stage (b), or applies the strategy recursively, a situation for which we propose the cover term 'praeter-relevance'. This is exemplified by the range of behaviours identified by Burton under 'symptoms in the minde', those described by Esquirol under 'monomania' and those subsumed by the current psychiatric category of 'delusion of reference', defined as 'a delusional conviction that ordinary events, objects, or behaviours of others have an unusual or peculiar meaning specifically for oneself' (Reber & Reber 2001). It is of central importance for pragmatics that these cases cannot be characterized purely in terms of an individual's self-preoccupation.[28] In our paradigm case, where a deluded individual is entertaining the proposition 'They are watching me', the preoccupation with first-person relevance has a consequential effect on reference-tracking with the third-person pronoun 'they'.

4 Conclusion

In a recent publication, the following plea was made for linguists to look to evidence from aphasia in the course of their theoretical investigations of the distinction between conceptual and procedural processing:[29]

> There is [...] scope for more tangible, empirical evidence to support the distinction [between conceptual and procedural meaning], if not the status of individual expressions. Such evidence may be forthcoming from the study of aphasias, processing and acquisition, and is most likely to be procured by methods

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[28] There is however evidence that aspects of schizophrenia may be characterised in terms of failure of first-person deixis, Crow (2000, 2004) and Stamenov (2003).

[29] Cf. Langdon et al. (2002: 79). 'Few studies have directly investigated the co-occurrence of theory-of-mind deficits and pragmatic deficits, or explored in any depth the patterns of relationships between poor mind-reading and poor pragmatics with the same groups of individuals.'

employed by cognitive science, such as various scanning techniques. For, if the distinction between conceptual and procedural meaning exists, one would expect it to have implications for the way in which processing is done. For instance, it seems possible that, in aphasias, expressions with procedural meaning pattern with grammatical features, rather than with conceptual expressions, so that people with non-fluent aphasias might retain the use of conceptual but not procedural expressions. (Iten 2005: 74)

In this paper we have proposed that cases of praeter-relevance, as just defined, are a specific area where evidence concerning the nature of procedural meaning can be gathered. In the longer run, we suggest that such evidence might usefully complement previous insights derived from the investigation of autism and Asperger syndrome.

We do not however anticipate that this evidence will, in itself, provide a simple account of procedural meaning. Although we assume that pragmatic 'mind-reading', is a domain-specific modular system rather than a central, reflective one, we also assume that it is not a unitary process, but may be broken down into a set of specialised sub-modular abilities (Wilson 2005: 1136). Evidence from elsewhere indicates that there are several orders of mind-reading abilities, such as the ability to recognise 'faux pas' (Baron-Cohen et al. 1999) and to distinguish lies from jokes (Winner et al. 1998), with which cases of praeter-relevance have a clear affinity.[30] It may be that a better understanding of procedural meaning will emerge from a combination of the two analogues outlined in this paper: praeter-relevance on the one hand, and the avoidance of spaghetti code on the other.[31]

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[30]Other evidence relevant to procedural meaning derives from the discussion of 'pragmatic intrusion', cf. Huang, forthcoming, chapter 7.

[31]For an exploration of this avenue, see Hedley (forthcoming) and Hedley (in preparation).

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