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Linguistic modularity? A case study of a *'Savant'* linguist*

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We provide a preliminary report on a young man who is institutionalised because he is unable to look after himself, but who has a remarkable talent for acquiring and using foreign languages. After documenting the breadth of his expertise across some sixteen languages, we investigate his command of his native language, English, and the extent to which his linguistic competence is integrated into his general cognitive ability, and we briefly discuss the implications of these results for Fodor's modularity hypothesis. The results of the experiments devised to test these aspects of his linguistic and inferential abilities then provide the basis for a more detailed analysis of his command of one specific language, Modern Greek. We concentrate on properties associated with the pro-drop parameter, in particular *that*-t effects and the possibility of post-verbal subjects, contrasting his performance in Greek, a pro-drop language, with English, a non-pro-drop language. The pattern of results obtained indicate that he is not acquiring a 'first' language several times over, but it remains for future investigation to determine how characteristic of normal second-language learners his acquisition is. We also tentatively interpret his performance in Greek as evidence in favour of the claim that the phenomena associated with the pro-drop parameter do constitute a natural class, and specifically provide support for Rizzi's revision of the parameter in terms of relativised minimality. We emphasize that these results are preliminary and hope to refine and extend our analyses in subsequent contributions.

1. 'Savants'

The psychological literature (e.g. Duckett 1976, Hermelin and O'Connor 1986, 1987, Howe 1989, Miller 1988, O'Connor 1989, O'Connor and Hermlin 1984, 1987, 1989, Treffert 1988, 1989) documents numerous cases of intellectually handicapped people who, despite their disability, have one striking

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talent. Classic examples are provided by people who are too retarded intellectually to look after themselves – or even communicate – but who are superb draftsmen (e.g. O'Connor and Hermelin 1987, Selfe 1978, Wiltshire 1987); by people who are incapable of normal mental or physical activity but who are gifted musicians (e.g. Hermelin and O'Connor 1987, Miller 1988); and most notably by so-called 'calendrical calculators', people who are virtually speechless but can tell you almost instantaneously on which day of the week any date in the last or next century falls (e.g. O'Connor and Hermelin 1984, Hermelin and O'Connor 1986, Treffert 1989). The term traditionally employed to describe such people is *'idiot-savant'*, but the pejorative and inaccurate connotations of the word 'idiot' have led many researchers (cf. Howe 1989: 5–6; Miller 1988: 4; Treffert 1989: xii, 272) to adopt the expression 'savant', a practice we follow here.

2. Christopher

Savants are not infrequently autistic, and usually linguistically handicapped, with minimal command of any language or other communication skills. Indeed, Treffert (1989: 66) writes that savants' skills – 'however many they have, do not include the acquisition of language'; and when they are occasionally described as having the 'gift of tongues' (e.g. Howe 1989: 10; Treffert 1989: 9, 71–72), the context makes it clear that such people are merely good mimics who can repeat passages from various languages 'parrot-fashion' with minimal, if any, understanding.

Recently, however, O'Connor and Hermelin (1991) have investigated a 29-year-old man (Christopher, date of birth: 6 January 1962) whose non-

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verbal IQ averages between 60 and 70, who is institutionalised because he is unable to look after himself; for whom doing up a button, cutting his fingernails or vacuuming the carpet are tasks of major difficulty, yet who – when given a passage written in any of some 15 or 16 languages – simply translates it into English, at about the speed one would normally read aloud a piece written in English.

Details of his medical and educational background, as of his general intellectual ability, can be found in O'Connor and Hermelin's paper. It is sufficient to indicate here his performance on a range of standard psychological tests. On the Matrices test, administered when he was fourteen, he scored at the fifth percentile, which would correspond to an IQ of 75; a Wechsler Scale test (WISC-R, UK) revealed a verbal IQ score of 89, but a performance IQ of 42; and the 'Draw a Man' test, also administered at fourteen, yielded an IQ of about 40. O'Connor and Hermelin go on to describe Christopher as being rare in that 'his tested verbal intelligence level was found to be average and only his performance intelligence was low' (p. 675). Moreover his 'average verbal IQ was accompanied by a talent for acquiring foreign languages' (p. 675). It is with the details of this aspect of his ability that we are concerned.

3. A preliminary overview of Christopher's linguistic prowess: His translation ability

An indication of Christopher's (flawed) talent can be derived from the examples in (1) where we have given a selection of passages (mainly O-level texts) which he read as indicated. Two caveats should be borne in mind in interpreting these examples. First, in nearly all cases the extracts reproduced here have been drawn from much longer passages, which it would be tedious to reproduce in full; second, we should perhaps also point out that C has a slight speech defect, which occasionally makes it difficult to be certain that we have transcribed his utterances correctly. Nonetheless, we are reasonably sure that we have not misrepresented his abilities by our selection.

On the assumption that few readers will be proficient in all the languages concerned, we have also provided a fair translation of the original before Christopher's rendering. It should be noted that when reading these texts he neither sought nor was given any opportunity to look through them before he began to translate them, and except in the case of Hindi (where there are problems because he has only partial knowledge of the Devanagari script) he was given no help. Moreover, on the rare occasions when he did solicit help,

e.g. by asking for the meaning of a particular Polish or Turkish word, we were frequently unable to provide it.

The selection of languages is as far as we know reasonably representative of his knowledge. Though he has a smattering of a few other languages as well, his knowledge of them is probably inadequate to make detailed exemplification worthwhile or even feasible. However, it is not impossible that he has more knowledge than we suspect, as his insight into his own abilities is somewhat partial, and our own polyglot abilities somewhat inadequate. For instance, he claimed to know Hungarian, but was unable to translate an elementary passage from that language. He knows a few words of Arabic, but can neither read it nor sustain a conversation for more than a moment or two. He claimed some knowledge of Russian but on a later occasion seemed not even to understand elementary greetings. At this point he denied knowledge of the language, yet was able to provide a partial translation ((*l*) below) of the opening sentence of a Paustovsky short story (written in Cyrillic script), before reiterating that he didn't know the language. He has begun to learn Hebrew (cf. O'Connor and Hermelin, in press: 1991: 676) but so far is incapable of doing more than pick out the odd word in an O-level passage. Like most linguists he can also identify languages from their written form without being able to speak or translate them, so he immediately, and correctly, identified Bengali, Chinese, Czech, Gujarati, Icelandic, and so on, when presented with examples of them. He has GCE Ordinary level in French, German and Spanish, and is certainly equally proficient in Modern Greek.

(a) Danish

Men Jeg havde hverken onkler eller tenter i København, så jeg kom først dertil, da jeg var så stor, at jeg gik i skole og vidste, at det var Danmarks hovedstad og den største og vigtigste by i landet.

Fair translation: But I had neither uncles nor aunts in Copenhagen, so I didn't get to go there until I was old enough to be at school and learnt that Copenhagen was the capital of Denmark and the biggest and most important city in the country.

C's translation: But I had neither uncles nor niece – nor aunts – in Copenhagen, so I came first there as I was a very big man, when I went to school and knew that it was Denmark's capital and the biggest and importantest – and the most important town in the whole country.

(b) Dutch

'In elk geval,' zegt ze 'ik zal de ketel opzetten voor een kopje thee.' 'Ja graag, en dan moet ik eens opstappen. Ze zal niet weten waar ik blijf.'

Fair translation: 'Anyway,' she says, 'I will put on the kettle for a cup of tea.' 'Yes thanks; and then it will be time for me to go. She'll be wondering when I'm coming.'
C's translation: 'In any case,' he – she says, 'I will put the kettle on for a cup of tea.' 'Yes please, then I must stop. You know, you you you should not – she shall not know where I am.'

(c) Finnish
Mikon veli, kolmetoistavuotias Yrjö, tulee kirjakaupasta kirja kädessään, otsa rypyssä. Muuan herrasmies astuu tiellä häntä kohti. Poika ottaa lakin päästään:
'Hyvää päivää, tohtori!'
'Päivää, päivää, Yrjö ... mikä tuo kirja on?'
Fair translation: Mikko's brother, the thirteen-year-old George, comes from the bookshop with a book in hand, frowning. A gentleman is walking towards him on the road. The boy takes his cap off.
'Good morning, Doctor!'
'Good morning, George ... What is that book?'
C's translation: On the thirty, the thirty-second year of George, the ... a bookshop ... Miss – what's a gentleman.
'Good morning, Doctor.'
'Morning, morning, George. How are you?'

(d) French
Nous faisions pique-nique au bord de la route nationale qui s'étendait devant nous, toute droite et bordée d'arbres.
Fair translation: We were having a picnic beside the main road which stretched away in front of us, dead straight and lined with trees.
C's translation: We had a picnic at the route, at the board of the road, which which ran behind us, straight and full of trees.

(e) German
Wolfgang und seine Schwester machen einen Ausflug mit dem Zug. Sie wohnen in einem Dorf. Heute fahren sie in die Stadt. Sie gehen in ein Warenhaus. Wolfgang kauft ein Radio, Sigrid braucht eine Lampe für ihren Schreibtisch.
Fair translation: Wolfgang and his sister are going on an excursion by train. They live in a village. Today they are going to the city. They go into a shop. Wolfgang buys a radio, Sigrid needs a lamp for her desk.
C's translation: Wolfgang and his sister are on a ... with the train. They live

in a village. Today they go and visit a city. They go in a shop. Wolfgang buys a radio. Sigrid buys a lamp for her writing-table.

(f) Greek (The passage was in Greek script) Otan perase t'amaksi, epsakse ja tis pantufles tis, ala ena paljopedho ihe pari ti mja ki eferje jelontas.
Fair translation: When the car passed, she looked for her slippers, but a naughty (lit: 'old') child had taken one and left laughing.
C's translation: When she passed the car ... when the car passed, she was looking for her slippers but an old child had taken one away and left ... and was laughing.

(g) Hindi
Ek nadi: ke kina:re, ek baṛe se peṛ par, ek bandar rahta: tha: ... Ek din ek magar tairta: hua: kina:re par a:ya:
Fair translation: On the side of a river, on a large tree, lived a monkey ... One day a crocodile came swimming along to the side.
C's translation: On the side of a road, a big something, a man fell down ⟨NS – do you know what 'bandar' is? – C – 'monkey'⟩ ... One day, **but** one day ⟨NS – OK 'magar' is crocodile⟩, the crocodile came to edge ...

(This piece was translated aurally as one of us (NS) read a story from the Panchatantra to him. The interpolations in angled brackets show where Christopher was interrupted.)

(h) Italian
Per caso in quella stessa mattina un'amica era venuta a trovare la signora ed era rimasta a farle compagnia mentre finiva di vestirsi. L'amica aveva notato i cassetti aperti.
Fair translation: By chance, that very morning a woman friend had come to visit the lady and had stayed to keep her company while she finished dressing. Her friend noticed the open drawers.
C's translation: In case, just in case in this morning a friend came to find the lady and she was stayed while she was dressing. Her friend had noted the open cassettes.

(i) Norwegian
'Når kommer Per hjem?' 'Vanligvis til middag, litt over to. Å, Hjørdis – du blir vel en stund? Du kan jo bli til middag hvis du vil. Tenk om du hadde ringt på forhånd – ja for telefon har vi da, på grunn av alle bestillingene.'
Fair translation: 'When does Peter come home?' 'Usually for dinner, just after two. Oh Hjørdis – you will stay for a while I hope? You can stay for

dinner if you like. What if you had phoned beforehand – yes because we do have a phone, because of all the orders.'
C's translation: 'When is Peter coming home?' 'Usually at midday, a little over two. Ah Hjørdis, you are well – an hour. You can stay till midday if you want to. Think that your phone [inaudible] beforehand. Yes on the telephone we have, on the ground of all orders.'

(j) Polish
Musiałem go wrzucić do wozu siłą. Położył się na podłodze i zamknął oczy, nie chcąc widzieć, co go jeszcze czeka.
Fair translation: I had to throw him into the car with force. He lay down on the floor and closed his eyes, not wishing to see what awaited him.
C's translation: 'I had to take him out of the car strongly and put – he put himself on the floor and opened his eyes – and shut his eyes, not wishing to see what was waiting for him.'

(k) Portuguese
O cão estava imóvel no passeio, olhando fixamente a luz vermelha. De súbito luz verde, automóveis a travar – e o cão atravessou para o lado de lá.
Fair translation: The dog was standing still on the pavement, staring at the red light. Suddenly a green light, cars braking – and the dog crossed to the other side.
C's translation: The dog was immovable in the passage, looking the light, of the green light. ⟨IT: What does this ['fixamente'] mean?⟩ Fixed – the green, the red light. All of a sudden a green light, motor-cars crossed, and the dog crossed by by that side.

(l) Russian (The passage was in Cyrillic script) Oktyabr byl na redkost' xolodnyi, nenastnyi. Tesovye kryshi pochernely.
Fair translation: October was unusually cold and wet. The wooden roofs grew black.
C's translation: October was as careless cold and unhappy. The winter days were black.

(m) Spanish
Hablaban todos al tiempo y sus voces se confundian con la del televisor sobre una banqueta minúscula, en el rincón que formaba la pared con la puerta de acceso al vestíbulo.
Fair translation: They were all talking at the same time and their voices merged with that from the television on a small stool in the corner between the wall and the door to the hall.

C's translation: They spoked they spoke once all at a time and their voices were confused with that of the television beneath a blanket, a small blanket, in a corner which won the wall – the wall with the with the access door to the hall.

(n) Swedish
Mia sitter uppkruppen i kökssoffan med knäna uppdragna och fötterna instoppade i den randiga nattskjortan. Katten spinner i hennes knä.
Fair translation: Mia is curled up on the kitchen sofa with her knees drawn up and her feet tucked into her stripey nightie. The cat is purring on her lap.
C's translation: Mia is sitting, crouched down in the kitchen sofa with her knees bent and her feet tied up in the lovely night-shirt. The cat spins in her knee.

(o) Turkish
Tatilde, herkes görmediği yerleri gezmeğe gider. Hem bilgilerini geliştirirler, hem eğlenirler ve hem de yeni yeni yerler görürler.
Fair translation: On holiday everyone goes to visit places they haven't seen. Either they are strengthening their knowledge, or they are enjoying themselves, or they are looking at totally new places.
C's translation: On holiday when I was staying in different places I saw different places. The people were were scientists and some are students and some are new [inaudible] new places.

(p) Welsh
Hylo, Tom. Sut mae? Ga i ddod i mewn? Cei, wrth gwrs. Dere i eistedd ar y fainc 'ma.
Fair translation: Hello Tom. How are you? May I come in? Yes (you may), of course. Come and sit on this bench.
C's translation: Hello Tom. How are you? Can I come in? Of course you can. Come and sit on the bench here.

Several points should be made about these examples. First, his breadth of knowledge is remarkable: very few professional linguists would be able to translate **all** the passages given. As O'Connor and Hermelin point out (1991: 674), there are attested cases of outstanding linguistic ability, but these are usually people whose talents are relatively unrestricted: what one might call *'savants-savants'*. It is also clear that his mastery of the various languages is far from uniform: he is reasonably competent in French, German, Greek and Spanish; his Norwegian, Polish and Portuguese are fair, but his other

languages are impressive more because of their number, variety and speaker than because of his fluency in them.

Second, and most strikingly, Christopher appears sometimes not to care if what he says makes sense: try reading the Norwegian in (*i*), for instance, where (if you don't know Norwegian) you'll have some difficulty working out what is meant, but if you do know the language you will be able to appreciate that he does have an at least rudimentary knowledge of it. Further, although he explicitly claimed to be unable to look through a passage and think about it before translating it: indeed he sat rigid, in obvious distress, when asked to do so, his real knowledge is demonstrably superior to what one might infer from a quick look at the above. We cite just one example. In translating the Italian passage (*h*) above, C entirely omitted the phrase about 'keeping her company'. One of us (IT) then read the Italian with him, and without further help or prompting, he rendered the relevant section as: 'While she was finishing to get dressed, a lady came into the house where she was staying to k – to keep company'. This is still far from perfect, but shows that failure to translate something appropriately is not necessarily evidence of an inability to translate appropriately. Moreover, it is striking that on this second rendering he reordered the material reasonably felicitously. In fact, IT failed to notice the reordering and immediately after he had spoken the above, prompted him with: 'mentre finiva di vestirsi' which she assumed he had left out. Instantly he responded: 'I done that bit first'.

Third, many of his mistakes are linguistically revealing. We will list just a few examples as representative of an almost unlimited range. In Danish (cf. (*a*)) he self-corrected 'niece' to 'aunts'; and 'importantest' to 'most important'. In Hindi (which he translated aurally as he cannot read the script) – cf. (*g*), he translated the ambiguous word 'magar' as the lexically correct but inappropriate 'but' instead of the appropriate 'crocodile' – not the kind of mistake one would expect to be made by someone intent on discovering the meaning of what is said. In Polish (cf. (*j*)) he corrected himself (correctly) on some words ('opened' – 'shut') but was less successful with others, leaving 'lay down' as the unidiomatic 'put himself', and so on.

These phenomena are symptomatic of an apparent alternation between the intelligent and the inept. Christopher's greatest ability appears at this stage to be in word translation, where he often makes very sensible mistakes. We will again give only a few representative examples. In Portuguese many abstract nouns end in *-ação* so, when translating an English passage into Portuguese, he created *examinação*, which doesn't exist, instead of using the correct form *exame*. (He created *examination* in lieu of *examen* in French in exactly the

same way a few months later.) In translating from Spanish to English he rendered the unusual Spanish form *difuminar* quite sensibly as the – sadly non-existent – English 'difuminate'. Finally, when asked to translate into Greek a passage designed to be translated into Hindi and which therefore contained the typical Hindi name *Ramlal*, he rendered it with the quasi-Greek form *'Ramolallis'*.

4. The project: Problems and proposals

Section 3 provides the background to the current project. In this section we enumerate some of the tasks we have set ourselves since we started work in March 1990.

Aims/Tasks:

(a) To discover the extent of Christopher's knowledge: how many languages does he know and how well does he know them?

(b) To discover how well integrated his linguistic knowledge is into his general cognitive activity, both in English and in other languages. In particular to see if his remarkable, but remarkably flawed, prowess in translation gives a fair indication of his knowledge ('competence' in the sense of Chomsky 1965).

(c) To investigate the nature of his language learning: in particular to see if the kind of predictions made by current theories of linguistics (Principles and Parameters) and of first and second language acquisition are confirmed, falsified or irrelevant. We propose to do this on the basis of:

  (i) An investigation of pro-drop and related phenomena, esp. in Modern Greek, but drawing also on Spanish, Italian and other languages.

  (ii) A controlled investigation of his learning of new constructions in languages of which he already has some knowledge, and most importantly an analysis of his learning of a language completely new to him in which we control the content and order of presentation of the entire input. In particular, we plan to see if the predictions of parametric variation theory are borne out. That is, for instance, whether we find what one might call 'parametric cascades' in which the subject comes to know facts to which he has not been exposed. We intend to use Berber for this part of the project, and hope to report on C's progress in a later paper.

(d) To explain how all this is possible.

To start with (d) first, it occurred to O'Connor and Hermelin (cf. 1991: 679) and seemed obvious to us, that Christopher's linguistic ability provides evidence for some form of Fodor's modularity thesis: in particular it is clear that his talent exists in the absence of the normal 'general intelligence' one might expect to find associated with multi-lingualism. Fodor (1983) distinguishes the central system from what he calls the 'input systems', corresponding roughly to each of the sensory modalities – vision, audition, olfaction, etc. – *plus* language. The crucial characteristic of such input systems is that they are modular, where this suggests the constellation of properties in (1):

(1) *Modularity:*
Input systems are domain-specific, informationally encapsulated, fast, mandatory, subserved by specific neural architecture and subject to idiosyncratic pathological breakdown.

Not all these properties are equally important or empirically testable, but the most crucial is generally accepted to be informational encapsulation. A simple example of such informational encapsulation is provided by the visual perception of optical illusions, such as the Müller-Lyer arrows or the Zöllner parallel lines. In the latter example, the illusion that parallel lines, when crossed by short diagonal lines slanting in opposite directions, do not *look* parallel is impervious to our encyclopaedic knowledge that they are indeed parallel. That is our (encapsulated) visual system forces us to perceive the lines as non-parallel, despite the fact that our central cognitive system may know – e.g. as a result of measurement – that they are parallel. In the present context informational encapsulation would mean that Christopher's linguistic ability was independent of his general cognition and could operate in the absence of 'central' control. His method of translating makes this extremely plausible. When asked to translate, he starts instantly and proceeds word by word rather like an automaton. If he is asked to slow down and mull over the meaning of the whole passage in an attempt to improve his performance, he shows visible signs of distress and professes himself incapable of doing any such thing. Moreover his equanimity at producing nonsensical translations indicates either that he is incapable of discerning such nonsense, or that his linguistic (morpho-syntactic) system operates in divorce from any semantic or pragmatic control. One of our initial tasks has been to test the genuineness and extent of this putative encapsulation and to differentiate between such possibilities.

What about the rest? (a) we have begun – cf. the examples in section 2 –

but this is largely anecdotal and good for marvelling at, rather than giving us genuine insight into his abilities. We need to know how well he knows the languages, so we have concentrated on a small subset of them, especially Modern Greek, but including French, German, Italian and Spanish. Similarly, (b) indicates that translation, however superficially impressive, may not fairly reflect his real ability. The really interesting questions begin with (c), but to investigate these factors presupposes that we have answered the first part of (b). Our initial experiments have dealt with this through an analysis of his use of his native language – English.

5. First Experiments: Christopher's syntactic and pragmatic ability in his native language, English.

Informal conversation with Christopher can tend to be monosyllabic. Consider, for instance, the dialogue in (2):

(2)	NS	Do you know how this [tape-recorder] works, Christopher?
	C	Yes
	NS	How do you work it?
	C	Dunno
	NS	You don't know either. Have you got one?
	C	Yes
	NS	What do you use it for?
	C	Music
	NS	Music?
	C	Yes
	NS	Do you use it for languages as well?
	C	Spanish
	NS	Spanish?
	C	Yes
	NS	You've got Spanish cassettes?
	C	Yes
	NS	And what are they like?
	C	They are talking
	NS	What are they talking about?
	C	Food, mainly

and so on. His conversation becomes less laconic whenever he talks about

languages, but even then tends to be mildly repetitive and full of snatches that appear to have been memorised from textbooks. The extract in (3) was recorded a few minutes after that in (2):

(3) IT How did you learn Hindi?
C From book
IT Like Greek
C Yes. Shall we try a bit of um exercises where, where the where you want to go to a girl who doesn't speak Hindi and her mother says: Are you are you permitted to go here because there's a fil on and there and mother says: *a:j, a:j ek film* – you – *a:p* – *tu* um *kiya: baza:r kya: zaba:r* um now – how do I write 'Hindi'? Is it, is it this way to write 'Hindi'?

(The Hindi words mean: 'today, today a film – you – you (polite) – you (informal) um did shop what zaba:r (slip of the tongue for 'baza:r'?) um now ...')

Accordingly we had to test his command of English syntax and pragmatics as a prerequisite to investigating and perhaps understanding the nature of his ability in other languages. As an elementary preliminary we subjected him to a standard test, TROG (The Test for Reception of Grammar – cf. Bishop 1982). The format in this test is to show the subject a set of four pictures, read him a sentence which is an appropriate description of only one of them, and ask him to point to the correct picture. A typical sentence is 'the horse is chased by the man' for which the subject is confronted by: a picture of a man chasing a horse: a picture of a horse chasing a man (that is, the 'reverse' of the correct version); a picture of a man sitting on a horse, and a picture of a dog chasing a horse. The last two are 'lexical distractors' designed to check that the subject knows the meaning of the relevant words. Christopher performed essentially flawlessly.

An indication of the kind of complexity he can cope with in identifying pictures is provided by the examples in (4):

(4) The circle in the star is yellow.
The cat the cow chases is black.
The boy has neither hat nor shoes.

The only mistakes he made were two extremely rushed judgments in which

for J40 'The girl drops the cups', he chose a picture containing only one cup, and for N53 'The boy chasing the horse is fat' he chose a horse chasing a fat boy. Clearly his ability on this test was far from defective and this, allied with his spontaneous speech, persuaded us that his linguistic abilities would repay syntactic as well as morpho-lexical investigation.

It remained to be demonstrated that his pragmatic, inferential ability was comparable to that of normal subjects. Given the apparent encapsulation of his translational ability, the occasional waywardness of his conversation, and the fact that pragmatic inference is crucially a 'central' process, it would not have been surprising to discover that he was pragmatically inept. We therefore devised an experiment to test whether he used the standard forms of conversational inference typical of normal users.

The form of the test, inspired by the work of Sperber and Wilson (1986), (cf. also Smith 1989), was as follows: thirty-five suitably controlled examples, illustrated in (5), were presented to him in typewritten form, to see if he reacted 'normally' to standard examples of conversational inference. He was told to read each mini-dialogue carefully and then answer the question following it. He responded both orally and by ticking the appropriate member of the triplet 'Yes/No/Don't know'. In the examples in (5) his response is indicated by underlining the appropriate category. All the examples that he was given are listed in the Appendix (p. 346).

(5a) John said: 'Would you like some coffee?'
Mary replied: 'Coffee would keep me awake.'
Do you think Mary accepted the coffee? Yes/<u>No</u>/Don't know

(5b) Jack asked: 'Did you have a good summer?'
Alan replied: 'Prison isn't very comfortable.'
Do you think Alan had a good summer? Yes/<u>No</u>/Don't know

(5c) Billy asked: 'Can you drive a Rolls-Royce?'
Anne answered: 'I can drive any car.'
Do you think Anne can drive a Rolls-Royce? <u>Yes</u>/No/Don't know

(5d) Angela said: 'Either Bill stole the bicycle or he was given it.'
Mary said: 'Bill never steals.'
Do you think Bill was given the bicycle? <u>Yes</u>/No/Don't know

(5e) Michael said: 'If George comes I shan't be able to play.'
Fred said: 'George is coming.'
Do you think Michael will be able to play? Yes/<u>No</u>/Don't know

(5f) Michael said: 'If George comes I shan't be able to play.'
Fred said: 'If George comes and Nick comes you *will* be able to play.'
Mary said: 'George is coming and Nick is coming.'
Do you think Michael will be able to play? Yes/No/Don't know

(5g) Bill said: 'Do you speak Portuguese?'
Fred answered: 'I speak all the European languages.'
Do you think Bill can speak Portuguese? Yes/No/Don't know

Again, Christopher performed almost flawlessly: his only mistakes were where he failed to notice tricks in which the relevant names were switched. For instance, in (5g) the sensible question to ask is 'Do you think *Fred* can speak Portuguese?' (this was in fact also one of the test sentences), and Christopher interpreted it in exactly that fashion. Such mistakes strike us in the circumstances as being thoroughly normal and indicate that his pragmatic abilities are extremely good rather than defective. It is also worth emphasizing that his reading speed is remarkable and that he carried out the task extremely rapidly. It took him six and a half minutes to complete the 35 examples: it would have been much quicker, but we forced him to slow down by making him read each example out loud.

We should perhaps spell out that these results imply that Christopher is able to use Modus Ponens (as in 5c, e), the standard logical argument 'P v Q, ~P therefore Q' (as in 5d); he can use implicated assumptions or premises (as in 5g), implicated conclusions (as in 5a), etc. So his English knowledge *is* integrated to some extent at least with his logical and encyclopaedic abilities. Whether this implies that his polyglot talent does not after all provide evidence for modularity remains to be determined.

The second form of 'pragmatic' investigation that we attempted involved the construction of a somewhat harder task designed to see if he could correctly manipulate the 'Blakemore connectives' and the logical argumentation they illustrate. He was given brief stories, illustrated exhaustively in (6), and asked to fill in one of the forms given at the top into each blank. He again gave his responses, indicated in curly brackets, both orally and in writing. Again he performed well, indicating that he has a coherent idea of the overall structure of the passages he is reading and of the differential implications of forms like 'you see' and 'moreover' – not an easy task.

(6) Each of the following passages has one expression missing. Complete the passage by adding whichever one of the following items makes the best sense.

After all / Anyway / Moreover / So / Therefore / You see

(a) John and Bill wanted to catch an elephant. They spent six weeks hunting for one in the jungle, but however hard they looked they couldn't find one, which they thought was very strange. — elephants are very big and should be easy to find.

{You see}

(b) When I was young I wanted to be a pilot. At that time I used to have all sorts of mad ideas. I even hoped to become king. — I decided to learn to fly.

{So}

(c) Jill was waiting for her boyfriend in the park. She was very depressed and miserable. — she'd just lost the pet dog her boyfriend had given her.

{After all}

(d) In America they have lots of sky-scrapers. If you live at the top of one it takes a long time to get home after school. — people who live in them have to leave school early.

{Therefore}

(e) Little children have to be looked after very carefully these days. Traffic in town is extremely fast and even in the country there are all sorts of dangers. — children are more adventurous these days. It's hard looking after kids.

{Moreover}

(f) Last year I planned to study a new language. Alan said that Norwegian was easy to learn, but Fred said Danish was even easier. — I decided to start Danish.

{So}

(g) All European languages are easy. Albanian is a European language. — Albanian is easy.

{Therefore}

We find it significant that Christopher was not only able to do a task as complex as this one, but also that he performed in a reasonably sophisticated fashion. It is true that there are very few examples, that he appears to have interchanged 'after all' and 'you see' in (6a) and (6c), and that at least one of

his responses, (6b), was not the 'anyway' we had hoped for, yet overall he seems to manipulate these connectives in much the same way that normals do.

We duly considered that his initial success in these English-based tasks provides a basis for an investigation of his linguistic (esp. syntactic) knowledge proper, in both English and other languages. It is to this that we turn next.

6. The second phase: The syntax of Modern Greek

6.1. Introduction

Before we discuss specific syntactic phenomena in Christopher's grammar of Greek, we will present in 6.2 the theoretical background assumptions on which the study is based, concentrating in particular on questions addressed with respect to first and second language learning mechanisms.

When we first encountered Christopher, it seemed possible that his talent was explicable on the assumption that he had retained a child's ability to learn a 'first' language again and again, offering the possibility that we could gain access to the initial state of the language faculty in an adult. In fact, the nature of his mistakes, both in the languages he already knows and in Berber, a new language for him in which we control all aspects of the input to which he is exposed (see Ouhalla et al. in preparation), indicate that his genius really is for *second* language learning as traditionally understood.

Accordingly, the basic claim underlying the theoretical presentation is that at least certain aspects of Christopher's linguistic abilities can be accounted for by a theory of 'second' language learning. In other words, the cognitive (linguistic and other) mechanisms involved in adult second language learning are essentially the ones responsible for Christopher's ability to learn a new language. This claim does not exclude the possibility that other aspects of his exceptional linguistic performance, for example his translating abilities, are the result of the interaction of other mechanisms which do not exclusively depend on grammar proper. Processing abilities or linguistic memory capacity which may be exceptional in the sense that they enable him to store vocabulary items from a wide range of languages are possible candidates in this respect.

In section 6.3 we present the tasks Christopher was presented with during our visits. Representative examples of each task are provided, followed by the

judgements or corrections he suggested for each of them. The fourth section includes the relevant theoretical assumptions about the syntactic properties standardly associated with the pro-drop parameter. We concentrate specifically on *that*-t effects and the possibility of allowing postverbal subjects in pro-drop languages. As Modern Greek belongs to this class and is one of the languages that Christopher speaks, we tested him on Greek sentences involving both *that*-t effects and subjects in postverbal position. We then discuss in parallel his judgements and corrections in English (a non-pro-drop language) and Modern Greek. The discussion of the results we have obtained so far and the analysis we propose are largely based on Rizzi's (1990) analysis of the relevant phenomena.

6.2. Theoretical prerequisites

Following the Principles and Parameters framework of GB theory (cf. e.g. Chomsky 1981, 1986), we assume that, as is the case with first language acquisition in general, what underlay Christopher's attainment of competence in English was the process of parameter setting made available by the principles of Universal Grammar (UG).

Our main focus in the syntactic part of the investigation has been to discover the nature and extent of Christopher's knowledge of the syntactic differences and similarities between his second, third and subsequent languages. As is, we hope, uncontroversial, we have assumed that Christopher's intuitions about the grammaticality or ungrammaticality of given sentences in sundry languages, his suggested corrections for these sentences, and even his metalinguistic justification for the corrections provided, are all evidence for the level and the nature of his competence in the languages in question.

As indicated in section 5, we needed first to consider to what extent the knowledge and intuitions that Christopher has about his mother tongue, English, are similar to those of any native speaker of the language. This was a necessary prerequisite to our analysis, as without this information it would not have been possible to tell whether Christopher's other cognitive inadequacies were affecting his linguistic competence. If his linguistic abilities are not impaired, there are implications both for the claim of linguistic modularity in general and for the more specific claim that the process of first language acquisition operates on grammatical principles quite independent of general cognitive learning mechanisms.

There are various possible positions one could take with respect to the learning procedures responsible for Christopher's acquisition of his second,

third and subsequent languages. These positions reflect alternative theories of (adult) second language learning, ranging from those which would regard Christopher's case as unique, in that his language learning is putatively subject to principles and processes distinct from the ones available to other second language learners, to those which would assimilate his case to standard instances of second language learning. Within this second position, to which we subscribe, there are crucial differences revolving around the role, if any, of principles of UG in second language learning.

In Flynn and O'Neil (1988), the predominant theories of L2 acquisition on which much work in the literature has been based are discussed in the light of the current state of linguistic theory. One possibility is to assume that L2 acquisition operates on principles similar to those responsible for L1, such that data from the new language give rise to a parameter-resetting procedure. The theory known as 'Creative Construction', suggested by Dulay and Burt (1974), was based on an assumption of this general kind, though it was not spelled out in terms of parameterisation. The core idea is that processes of L1 and L2 acquisition are based on the same set of innate linguistic principles. More precisely, both the structure of the language to be learned and the principles of UG underlying human competence are the basic factors responsible for second language learning.

An alternative possibility is to assume that second language learning is fundamentally different from first language learning. Contrastive Analysis, a theory suggested by Fries (1947) and Lado (1957), embodies the claim that L2 acquisition is a matter of learning a fixed set of habits over time, the idea being that the already fixed habits of L1 are transferred or changed when the learner is exposed to a new language. Clahsen (1988) also argues that there are two distinct processes involved in L1 and L2 acquisition. He claims that principles of UG and parameter setting are at work in first language acquisition, while general learning mechanisms are operative in second language learning. Principles of UG are assumed to be available only during the critical period and to be subject to biologically determined maturational processes which exclude the possibility of their being at work during second language learning. Thus the core differences between the two frameworks concern the role of the first language and in particular its possible interference with processes of second language acquisition. In other words, are the already fixed parameters affected by exposure to data from a new language? For example, whether a language is + or − pro-drop, where these are choices of a single parameter, would be determined by parameter setting if one is dealing with first language acquisition, but the notion of parametrisa-

tion might or might not have any relevance if what one is dealing with is the acquisition of a second, third or *n*th language.

A third possibility would regard Christopher's language learning abilities as governed exclusively by factors other than purely linguistic ones. More precisely, it might be that Christopher's exceptional talent could be reduced to the ability to memorise new vocabulary items of the languages he is exposed to, with the structural and syntactic properties of these languages being defined and constrained entirely by the properties of his first language. this would suggest that, in Christopher's case at least, knowing more than one language did not necessarily imply knowing the different syntactic options adopted by each one of them, but was purely a matter of memory and vocabulary.

Although this last position would mesh well with the fact that all savants seem to have remarkable memories, it can be excluded on the basis of various kinds of evidence: most notably, his ability to give reliable grammaticality judgements on sentences from languages other than English.

There is a sense in which Christopher's case is indeed exceptional, if we consider the properties which are normally assumed to hold of anyone acquiring a second language. As pointed out by Flynn and O'Neil (1988), it is generally true that the adult learner has already attained a steady state with respect to L1 and that he has reached maturity in terms of his general cognitive development. In Christopher's case, however, this second characteristic is questionable since, in terms of IQ and performance in other cognitive domains, he is markedly below the norm. In view of this fact, and given that Christopher's mastery of his first language is essentially at a level comparable to that attained by any native speaker, the study of his linguistic abilities in other languages provides considerable insight into linguistic theory in general and into theories of second language acquisition in particular. Accordingly, a first major issue addressed here is the extent (if any) to which first language competence, with its battery of antecedently fixed parameters, interferes with second language learning. A second issue, given the contrast in his performance in his first and subsequent languages, is to determine the role (if any) of general cognitive abilities in second language learning. Assuming that the mental processes operative during the 'learning' of language by any adult speaker are restricted on the one hand to properties attributed to the language faculty and, on the other, to those inferential procedures made available by the 'central' cognitive systems, then Christopher provides a test case for the role of cognition in adult language learning. At the very least it

should be possible to set more precise limits to the role of general cognitive development in language learning.

6.3. Description of the tasks

Apart from translation from English into Modern Greek, and *vice versa*, which was basically what Christopher had been tested on once or twice before this project began, we tested him in a number of other ways.

6.3.1.

We presented him with sets of sentences in Greek, some of which were grammatical and some ungrammatical; he was asked to give his judgement on each of them and, if he had any suggestions in this regard, to correct those he considered ungrammatical. Examples (7) and (8) are representative of this task, where the asterisk indicates that the stimulus sentence is ungrammatical, and Christopher's judgements and corrections, if any, are provided separately:

(7) *Kanis apofasise na dhosi lefta ja afto to idhrima.
nobody decided subj give money for this the institution[1]
'Nobody decided to give money for this institution.'
C: *(7)
C's successful correction:
Kanis dhen apofasise na dhosi lefta ja afto to idhrima.
nobody *not* decided ...

(8) Ta agorasa ta vivlia pu mu ipes.
them-bought-I the books that me-told-you
'I bought the books that you told me to.'
C: *(8)
C's correction (the sentence remains grammatical with the same meaning):
Agorasa ta vivlia pu mu ipes.
bought-I the books that me-told-you

The syntactic phenomena that we concentrated on involved word-order,

[1] 'subj' indicates the 'subjunctive' marker *na*. Other abbreviations used in the examples are: '2p' for 'second person plural'; '3s' for 'third person singular'; 'nom' for 'nominative'; and 'acc' for 'accusative'.

cliticisation, negation, wh-movement, control relations, *that*-t effects, and parasitic gap constructions. As a control, we tested him on comparable tasks using data from English, so that, on any one visit, he might be given both Greek examples like those in (7) and (8) and English examples of the kind exemplified by (9) and (10):

(9) Which candidates did you reject before interviewing them?
C: (9) is grammatical; no change suggested.

(10) Susan promised Steven to take her to the theatre.
C: *(10)
C's correction:
Susan promised Steven to take *him* to the theatre.

6.3.2.

He was also given a putatively easier task in which he was presented with sets of sentence-pairs, like those in (11) and (12) for Greek, and (13) and (14) for English, of which one was grammatical, and one ungrammatical. Christopher's task was simply to identify which was which:

(11a) *Dhehtike na apantise tis erotisis.
accepted-3s subj answered the questions
(11b) Dhehtike na apantisi tis erotisis.
accepted-3s subj answer the questions
'He agreed to answer the questions.'
C: *(11a)

(12a) Stus fitites aresi i politiki.
to-the students please-3s the-nom politics
(12b) *Tus fitites aresi i politiki.
the-acc students please-3s the-nom politics
'Politics pleases the students.'
C: *(12a), *(12b)

(13a) What did you go to London to see?
(13b) *What didn't you go to London to see?
C: *(13b)

(14a) *Who did you say that they saw him leaving the station?
(14b) Who did you say that they saw leaving the station?
C: *(14a)

6.3.3.

He was also given sentence-completion tasks, where the missing elements were functional categories: for example determiners, complementisers, clitics, or subjunctive and future markers. Examples illustrating this task are given under (15) and (16), where the italicised elements *mu, pu* and *ta* were omitted in the stimuli:

(15) Mi *mu* paris afti ti fotografia. Ine i teleftea *pu* eho.
not me-take-you this the picture is the last that have-I
'Don't take this picture from me. It's the last one I've got.'
C: Mi *tha* paris afti ti fotografia. Ine i teleftea *tin* eho.
not will take-you this the picture is the last it-have-I

Both Chris's choices, *tha* and *tin*, are wrong.

(16) *Ta* idha ola.
them- saw-I all
'I saw them all.'
C: Ta idha ola.

In this case, Chris's choice was correct.

6.3.4

Finally, he was presented with three or four versions of the same sentence, differing from each other only with respect to the use of functional categories or Case. For example, a sentence including an object relative clause was given in one instance with a full relative pronoun bearing Accusative Case, in another with a complementiser introducing the relative, and in the third with a relative pronoun bearing Nominative Case. All three possibilities are exemplified in (17a,b, and c) respectively:

(17a) *Idha ton fititi, ton opio petihe stis eksetasis.
saw-I the-acc student the-acc who succeeded in-the exams
(17b) Idha ton fititi, pu petihe stis eksetasis.
saw-I the-acc student, that succeeded in-the exams
(17c) *Idha o fititis, o opios petihe stis eksetasis.
saw-I the-nom student the-nom who succeeded in-the exams
'I saw the student who succeeded in the exams.'

C: *(17a)
C. 's successful correction of (17a):
Idha ton fititi, o opios petihe stis eksetasis.
saw-I the-acc student the-nom who succeeded in-the exams
C: *(17b), *(17c). He made no attempt to correct (17c).

For present purposes, we will concentrate on the results we obtained with sentences involving *that*-t effects and the pro-drop parameter. The data to be discussed are from both English and Modern Greek, a null subject language which exhibits a relatively free order in the positioning of the subject and objects in the clause. We first discuss the extent to which the patterning found in the results for *that*-t effects can be analysed in conjunction with an analysis of the pro-drop option in the language, and we then attempt a more explanatory analysis of the facts in the light of Rizzi's theory of *Relativised Minimality*, as presented in his (1990).

6.4. The data

Before discussing the relevant data, we briefly outline the status of the pro-drop parameter in the GB literature. It is a standard assumption that the pro-drop parameter is associated with a cluster of properties which are listed in part under (18) below:

(18a) null subjects
(18b) apparent violations of *that*-t effects
(18c) subject postposing

What is implied by the constellation of properties in (18) is that, in the unmarked case, any language assigned the positive value for the parameter in question will allow phonetically null subjects, which are realised structurally as ('little') pro; it will not exhibit *that*-t effects, in the sense that extraction of a subject out of an embedded clause introduced by an overt complementiser will be possible; and inversion of the subject with the Verb Phrase will be licit.

6.4.1. English

To provide a basis for interpreting the Modern Greek data, consider Christopher's judgements on English sentences involving *that*-t effects. (19) and (20a) are relevant examples:

(19) *Who did you say that arrived yesterday?
C: *(19)
C.'s correction: delete 'that'

(20a) *Which student do you think that could solve the problem?
C: *(20a)
C.'s correction: 1. change 'that' into 'who'
2. delete 'who'

Christopher's judgements on these examples show that he observes the relevant restriction in that, in the first case, he deleted the complementiser to render the sentence grammatical, while in the second he replaced it with a *wh*-pronoun. When he had a second look at (20a), he then deleted the *wh*-pronoun too. The fact that his initial correction involved replacing the complementiser with a *wh*-pronoun may have to do with his interpretation of the sentence, which he originally thought involved a relative clause. In fact, his translation of (20a) into Greek, given in (20b), shows clearly that there is a relative clause as well as a complement clause:

(20b) Pu ine o fititis nomizis tha eline to provlima?
where is the student think-you would solve the problem?
'Where is the student that you think would solve the problem?'

Christopher translated the sentence into Greek before deciding to delete the relative pronoun. When he (mis-)translated it, he was corrected both by being given the correct translation of (20a) into Greek (as in (20c)), and by having us repeat to him the original version of the English sentence.

(20c) Pjos fititis nomizis oti tha eline to provlima?
Which student think-you that would solve the problem?

English sentences involving violations of the *that*-t filter have been presented to Christopher on several occasions so that we can conclude with some confidence that his judgements on this syntactic phenomenon are both consistent and reflect a specific constraint in his grammar of English.

6.4.2. Modern Greek

Examples (21), (22) and (23), all of which are grammatical, instantiate

constructions involving the extraction of a *wh*-subject out of an embedded clause, and with the complementiser phonetically realised.

(21) Pjos ipes oti efige?
who-nom said-you that left-3s
'Who did you say left?'
C: *(21)
C: Pjos ipe oti efige?
who-nom said-3s that left-3s
'Who said that he left?'

(22) Pjos su-ipan oti efige?
who-nom you-told-they that left-3s
'Who did they tell you left?'
C: *(22)
C: Pjos su ipe oti efige?
who-nom you-told-3s that left-3s
'Who told you that he left?'

(23) Pjos ipan oti itan enohos?
who-nom said-they that was-3s guilty?'
C: *(23)
C: Pjos ipe oti itan enohos?
who-nom said-3s that was-3s guilty
'Who said that he was guilty?'

According to Christopher's judgements the above examples are ungrammatical – contrary to fact: thus leading to the conclusion that (21), (22) and (23) involve *that*-t effects as with the comparable English sentences. These sentences become more interesting when we consider the strategy adopted to correct them. This correction involves changing the person agreement on the matrix verb into third person singular, thus rendering the *wh*-word the subject of the matrix clause. The implication of this is that there is no movement across the overt complementiser, and the sentence is thus rendered grammatical. The corrected versions of the examples above are indeed grammatical, though their meaning is different from that intended, as is shown by the English glosses. Notice, also, that in Modern Greek, complementisers are standardly not allowed to delete, a restriction that Christopher seems to be aware of, since the strategy he adopted to correct the Greek sentences did not involve

any such deletion, even though this was the option he used for the English examples in (19) and (20).

To summarise, the pattern of the data discussed so far, both English and Greek, leads us to conclude that, as far as Christopher's grammar is concerned, violations of the *that*-t filter are not allowed in either language. It should be mentioned at this point that, as exemplified in (24), Christopher uses and accepts null subjects in Greek both in his spontaneous speech and in the tasks he has been presented with throughout the course of this study.

(24a) Ti efimeridhes ehete mazi sas?
what newspapers have-2p with you
'What newspapers do you have with you?'

(24b) Dhiavazontas tipota shetiko, tha katalavi perisotera.
reading something relevant, will understand-3s more
'Reading something relevant, he'll understand more.'

The pattern exhibited in the two languages with respect to *that*-t effects, however, seems to indicate that, as suggested by Liceras (1989), the pro-drop parameter should not be associated exclusively with violations of the *that*-t filter, even though the theory predicts some sort of interdependence between the two phenomena. It is this prediction that is apparently disconfirmed by the data provided. However, considering the *that*-t phenomenon more closely, we think that, on the basis of the analysis of *that*-t effects formulated in Rizzi (1990), this is the wrong conclusion to draw.

6.5. The analysis

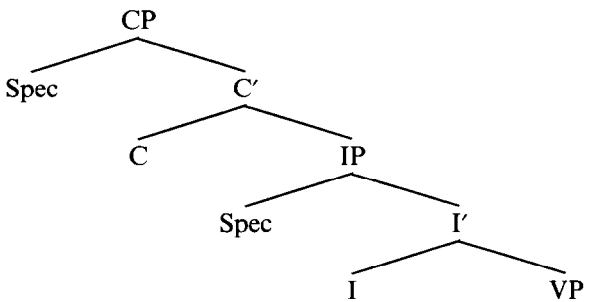
6.5.1. That-*t and post-verbal subjects*

It is a common assumption in the literature (cf. e.g. Chomsky, 1981: 251, for an early statement) that *that*-t effects are the result of an ECP violation, the offending trace being the trace in the embedded subject position. This trace fails to be antecedent-governed due to the presence of an overt complementiser. Rizzi attempts a different analysis for the *that*-t phenomenon, attributing the ECP violation to a violation of the proper head-government requirement. His conjunctive formulation of the ECP requires both proper head-government and antecedent government for a subject trace. The ECP as formulated in Rizzi (1990: 32) is given under (25):

(25) ECP: A non-pronominal empty category must be:
(i) properly head-governed (Formal licensing)
(ii) antecedent-governed or Theta-governed (Identification)

By proper head-government is meant government from a head within its immediate projection, i.e. the single bar projection. The antecedent government requirement is fulfilled in the case of subject extraction, which does not give rise to any violation of Relativised Minimality, but the proper head-government requirement is not, since the trace in the Spec of IP position is not within I′, which is the immediate projection of its Head-governor. The relevant structure is illustrated in (26):

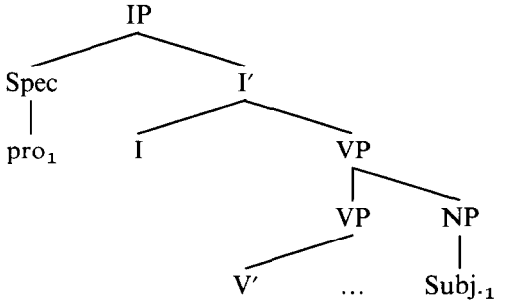
(26)



Given the structure in (26) a trace in (Spec, IP) would be head-governed by the complementiser. That is, the trace is within the immediate projection of C, i.e. C′, so configurationally the head-government requirement could be fulfilled. However, a lexically realised C is assumed to be inert for government (cf. Rizzi 1990: 41), so the trace violates the relevant condition of the ECP.

Rizzi (op. cit.) also argues that languages differ with respect to the strategies for subject extraction they adopt to get around the ECP violation discussed above. One of these strategies, which is assumed to be the option adopted by null subject languages such as Italian, is extraction from postverbal position. Inverted subjects are right-adjoined to VP, so their trace is properly head-governed by Inflection within its immediate projection, as shown in the abstract structure in (27):

(27)



That-t violations are thus shown to be only apparent, as the extraction of the subject does not take place from the Spec of IP position, but rather from a postverbal position. Since postverbal subjects are not allowed to occur in English, the extraction of a subject will always give rise to *that*-t effects in the presence of an overt complementiser.

The reason why extraction of subjects out of a phonetically null Comp is possible in English is the presence of Agr features in Comp, Agr being a governor. Agr-in-Comp (Rizzi 1990: 51f.) is assumed to provide one strategy adopted by some languages (including English when the Comp position is empty) to get around the possibility of an ECP violation in the case of subject extraction. Agr features are licensed in Comp by a variable in the Specifier position of CP.

Turning now to the facts of Greek, the language allows both postverbal subjects and the extraction of a subject out of a *that*-clause. With respect to the data discussed above, the question then arises as to why, for Christopher, both English and Greek are subject to the *that*-t filter despite the relevant parametric difference between them. In the theory as presented, there is a one-to-one correspondence between the occurrence of postverbal subjects and violations of the *that*-t filter, so the facts that need further consideration involve word-order and especially, postverbal subjects in Modern Greek. It is to this phenomenon and Christopher's reaction to it that we now turn.

6.5.2. Reconsidering the Greek data

The examples in (28), (29) and (30), all of which are grammatical, illustrate the possibility of inverted subjects in Modern Greek:

(28) Idha oti efige o Yanis.
saw-I that left the-nom Yanis
'I saw that Yanis left.'

C: *(28)
C: Idha oti o Yanis efige.
saw-I that the-nom Yanis left-3s

(29) Perisotero ap'olus tus filus tis, to Yani simbathi
more from all the friends her the-acc Yani likes
i Maria.
the-nom Maria
'From all her friends, Maria likes Yanis most.'
C: *(29)
C: 1: Is it 'o Yanis'? (in the nominative)
2: Is it 'ti Maria'? (in the accusative)
3: I Maria simbathi to Yani.
the-nom Maria likes the-acc Yani

(30) Tilefonise i Anna.
telephoned-3s the-nom Anna
'Anna telephoned.'
C: *(30)
C: 1: Is it 'tin'-acc (Anna)
2: I Anna tilefonise.

These sentences were presented to Christopher, who was asked to give his judgements and suggest any corrections if such were needed. The results form a quite consistent pattern in that all the sentences were changed by placing the subject in preverbal position regardless of whether it was the subject of a matrix or an embedded clause. Moreover, in (29) for example, where the order is OVS, Christopher found it difficult to identify which NP was the subject and which was the object of the verb despite the Case that each of the NP arguments was bearing, i.e. the postverbal subject is in the nominative and the preverbal object is in the accusative. It must be emphasized that Christopher is aware of Case distinctions and their realisation in Modern Greek. He made a similar response to (30), where there is only one lexical NP following the verb and that NP is assigned Nominative Case. Christopher's question was whether the determiner should be changed into 'ti', i.e. whether it should be in the Accusative so that the NP could be construed as the object of the verb, with the subject being realised as phonetically null.

6.6. Conclusion

In the light of these data, it is possible to conclude that, given the observed

correlation, the impossibility of having postverbal subjects and the presence of *that*-t effects in Christopher's grammar of Greek can be accounted for in a principled way. That is, given that the only strategy apparently available for Greek to violate the *that*-t filter is to extract a subject from a postverbal position and given that subjects cannot occupy this position, then *that*-t effects are expected to be present invariably.

Note that the implicit assumption underlying the analysis of the facts presented here is that the properties associated with the pro-drop phenomenon do indeed cluster together under a single parameter, namely the pro-drop parameter. Moreover, we adopt the idea from Rizzi (1982, 1990) that these properties are interrelated in that the possibility of null subjects is necessary for a language to allow subject postposing.

However, the proposed analysis makes no explicit claim for or against the theory that L2 acquisition involves parameter setting, in the sense that parameters are accessible to the adult language learner in the same way as is standardly suggested for L1 acquisition. In other words, the question of whether parameter (re-)setting takes place in L2 or not cannot be answered on the basis of the data so far discussed. Our discussion of the Greek and English data exemplifying *that*-t effects, postverbal and null subjects, etc. is based on the assumption that all these phenomena derive from a + or − setting of a single parameter. Implicitly this suggests that the data of second language acquisition are dependent on a single specific parametric choice. Thus one might claim with respect to the availability of null subjects in Christopher's grammar of Greek that the pro-drop parameter is reset to the + option. However, the impossibility of subject postposing and apparent violations of *that*-t effects would require an independent explanation, and deprive the claim of much of its explanataory force.

What we need to examine next in this respect is whether Christopher admits the possibility of postverbal subjects in those other languages that he speaks (such as Italian) which, in their standard form, allow subject postposing. If he disallows postverbal subjects, then the analysis suggested in this paper makes the prediction that – as in English – the *that*-t filter cannot be violated. An alternative explanation, however, could be that if Christopher's grammatical competence in pro-drop languages is similar to his competence in Greek, then we may be dealing with a single parametric choice imposed by the first language on all L2 data. To be plausible this suggestion would in turn have to provide a principled account for the possibility of null subjects in the second or subsequent languages, given that the parametric value imposed by the English does not allow for them. A detailed discussion of these alternatives will be presented in future work.

7. Epilogue

Despite the heading of the preceding section, it should be clear that it is still too early to draw genuine conclusions about the details of Christopher's remarkable talent, but we hope to have established a number of points. First, we think it is clear from our documentation that Christopher's talent for learning languages is remarkable, but it is not inexplicable and it is not totally mysterious. Further, we have established that, despite his handicap, his command of English is essentially normal. More surprisingly, it also appears that the integration of his pragmatic (inferential) and linguistic abilities is within normal limits, making the apparent evidence for modularity that he provides somewhat puzzling.

As far as his ability to learn 'second' languages is concerned. we think that the patterning of his mistakes makes it clear that his expertise should be describable, and ultimately explicable, in terms of current theories of second language learning: that is, he is not a prodigy who learns a 'first' language repeatedly. We also believe that the details of his prowess in second and subsequent languages are amenable to description in terms of current linguistic theory, and we have made an initial attempt to account for some of the phenomena we have observed by reference to Rizzi's revision of current Government-Binding theory.

We are very aware that this preliminary article only scratches the surface of Christopher's abilities: we hope to dig a little deeper in forthcoming work.

Appendix

This appendix contains all the questions for the test of pragmatic ability described in section 5 above. C's responses are indicated by underlining the appropriate term.

1.
John said: 'Can I go home now?'
The teacher said: 'Yes, you can.'
Do you think John could go home? Yes/No/Don't know

2.
Mary asked: 'Have you read "St Mark's Gospel"?'
Peter replied: 'I've studied the whole of the New Testament.'
Do you think Peter has read 'St Mark's Gospel'? Yes/No/Don't know

3.
John said: 'Would you like some coffee?'
Mary replied: 'Coffee would keep me awake.'
Do you think Mary accepted the coffee? Yes/No/Don't know

4.
The driver said: 'Can I park here?'
The policeman answered: 'No, this is a main road.'
Do you think the policeman let the driver park? Yes/No/Don't know

5.
Bill said: 'Do you speak Portuguese?'
Fred answered: 'I speak all the European languages.'
Do you think Fred can speak Portuguese? Yes/No/Don't know

6.
Mary said: 'Would you like a beer?'
Peter said: 'No thanks, I don't like beer.'
Do you think Peter accepted the beer? Yes/No/Don't know

7.
Jack asked: 'Did you have a good summer?'
Alan replied: 'Prison isn't very comfortable.'
Do you think Alan had a good summer? Yes/No/Don't know

8.
Mary said: 'Would you like a beer?'
Mike replied: 'I am very thirsty.'
Do you think Mike accepted the beer? Yes/No/Don't know

9.
John asked: 'Are you going to weed the garden?'
Ted said: 'I have a terrible headache.'
Do you think Ted weeded the garden? Yes/No/Don't know

10.
Peter said: 'Have another piece of cake'
Barbara replied: 'No thanks, cake is fattening.'
Do you think Barbara accepted the cake? Yes/No/Don't know

11.
Mary asked: 'Would you like a beer?
Jill replied: 'I'm driving.'
Do you think Jill accepted the beer? Yes/No/Don't know

12.
James said: 'Can I play in the garden, please?'
Mother answered: 'It's raining.'
Do you think James could play in the garden? Yes/No/Don't know

13.
Mary said: 'Would you like to go to a Mozart concert?'
Peter answered: 'I don't like classical music.'
Do you think Peter went to the concert? Yes/No/Don't know

14.
Clive asked: 'Where did you get that watch?'
Jimmy said: 'My first wife gave it to me.'
Do you think Jimmy had been married more than once? Yes/No/Don't know

15.
Billy asked: 'Can you drive a Rolls-Royce?'
Anne answered: 'I can drive any car.'
Do you think Anne can drive a Rolls-Royce? Yes/No/Don't know

16.
Anne asked: 'Can you drive a Rolls-Royce?'
Billy answered: 'I don't drive big cars.'
Do you think Billy can drive a Rolls-Royce? Yes/No/Don't know

17.
Bill said: 'If Peter comes the party will be a success.'
Angela said: 'Peter is coming.'
Do you think the party will be a success? Yes/No/Don't know

18.
Michael said: 'If George comes I shan't be able to play.'
Fred said: 'George is coming.'
Do you think Michael will be able to play? Yes/No/Don't know

19.
Michael said: 'If George comes I shan't be able to play.'
Fred said: 'If George comes and Nick comes you *will* be able to play.'
Mary said: 'George is coming and Nick is coming.'
Do you think Michael will be able to play? Yes/No/Don't know

20.
Angela said: 'Either Bill stole the bicycle or he was given it.'
Mary said: 'Bill never steals.'
Do you think Bill was given the bicycle? Yes/No/Don't know

21.
Colin said: 'Jane speaks either Spanish or Portuguese.'
Alan said: 'Jane doesn't speak Portuguese.'
Do you think Jane speaks Spanish? Yes/No/Don't know

22.
Dick said: 'Harry speaks either Greek or Russian.'
Tom said: 'Harry doesn't speak Greek.'
Do you think Harry speaks Greek? Yes/No/Don't know

23.
Charles said: 'I speak French or German – guess which.'
Diane said: 'I think you speak German.'
Charles said: 'You're wrong.'
Do you think Charles speaks French? Yes/No/Don't know

24.
Bill said: 'Do you speak Portuguese?'
Fred answered: 'I speak all the European languages.'
Do you think Bill can speak Portuguese? Yes/No/Don't know

25.
Mary asked: 'Have you read 'St John's Gospel'?'
Peter replied: 'I've studied the whole of the Bible.'
Do you think Mary has read 'St John's Gospel'? Yes/No/Don't know

26.
Jack asked: 'Did you have a good summer?'
Alan replied: 'My sister was very ill.'
Do you think Alan had a good summer? Yes/No/Don't know

27.
Jack asked: 'Did you have a good summer?'
Alan replied: 'It rained every day.'
Do you think Jack had a good summer? Yes/No/Don't know

28.
John asked: 'Are you going to weed the garden?'
Ted said: 'I have a terrible headache.'
Do you think John weeded the garden? Yes/No/Don't know

29.
Mary said: 'Would you like to go to a Pop concert?'
Peter answered: 'I don't like pop music.'
Do you think Mary went to the concert? Yes/No/Don't know

30.
Mary asked: 'Where did you get that watch?'
Jimmy said: 'My first wife gave it to me.'
Do you think Mary had been married more than once? Yes/No/Don't know

31.
Billy asked: 'Can you drive a Rolls-Royce?'
Anne answered: 'I can drive any car.'
Do you think Anne can drive a Mercedes? Yes/No/Don't know

32.
Anne asked: 'Can you drive a Rolls-Royce?'
Billy answered: 'I don't drive big cars.'
Do you think Anne can drive a Mercedes? Yes/No/Don't know

33.
Angela said: 'Either Bill stole the bicycle or he was given it.'
Mary said: 'Bill never steals.'
Do you think Bill stole the bicycle? Yes/No/Don't know

34.
Charles said: 'I speak French or German – guess which.'
Diane said: 'I think you speak German.'
Charles said: 'You're wrong.'
Do you think Charles speaks German? Yes/No/Don't know

35.
Jack asked: 'Did you have a good summer?'
Alan replied: 'My sister was very ill.'
Do you think Jack had a good summer? Yes/No/Don't know

References

Bishop, D.V.M., 1982. TROG: Test for reception of grammar. Abingdon: Thomas Leach (on behalf of the MRC).

Blakemore, D., 1987. Semantic constraints on relevance. Oxford: Blackwell.

Chomsky, N., 1965. Aspects of the theory of syntax. Cambridge, MA: MIT Press.

Chomsky, N., 1981. Lectures on government and binding. Dordrecht: Foris.

Chomsky, N., 1986. Knowledge of language: Its nature, origin and use. New York: Praeger.

Clahsen, H., 1988. Parameterised grammatical theory and language acquisition: A study of the acquisition of verb placement and inflection by children and adults. In: S. Flynn, W. O'Neil (eds.), Linguistic theory in second language acquisition. Dordrecht: Kluwer Academic Publishers.

Duckett, J., 1976. Idiot savants: Super-specialization in mentally retarded persons. Unpublished doctoral dissertation, University of Texas at Austin.

Dulay, H. and M. Burt, 1974. Natural sequences in child second language acquisition. Language Learning 24, 37–53.

Flynn, S. and W. O'Neil (eds.), 1988. Linguistic theory in second language acquisition. Dordrecht: Kluwer Academic Publishers.

Fodor, J., 1983. The modularity of mind. Cambridge, MA: MIT Press.

Fries, C.C., 1947. Teaching and learning English as a foreign language. Ann Arbor, MI: University of Michigan Press.

Hermelin, B. and N. O'Connor, 1986. Idiot savant calendrical calculators: Rules and regularities. Psychological Medicine 16, 885–893.

Hermelin, B. and N. O'Connor, 1987. Musical inventiveness of five idiots-savants. Psychological Medicine 17, 685–694.

Howe, M.J.A., 1989. Fragments of genius. London: Routledge.

Lado, R., 1957. Linguistics across cultures. Ann Arbor, MI: University of Michigan Press.

Liceras, J., 1989. On some properties of the pro-drop parameter: Looking for missing subjects in non-native Spanish. In: S. Gass, J. Schachter (eds.), Linguistic perspectives on second language acquisition. Cambridge University Press.

Miller, L.K., 1988. Musical savants: Exceptional skill in the mentally retarded. Hillsdale, NJ: Lawrence Erlbaum.

O'Connor, N., 1989. The performance of the 'idiot-savant': Implicit and explicit. British Journal of Disorders of Communication 24, 1–20.

O'Connor, N. and B. Hermelin, 1984. Idiot savant calendrical calculators: Maths or memory? Psychological Medicine 14, 801–806.

O'Connor, N. and B. Hermelin, 1987. Visual memory and motor programmes: Their use by idiot-savant artists and controls. British Journal of Psychology 78, 307–323.

O'Connor, N. and B. Hermelin, 1989. The memory structure of autistic idiot-savant mnemonists. British Journal of Psychology 80, 97–111.

O'Connor, N. and B. Hermelin, 1991. A specific linguistic ability. American Journal of Mental Retardation 95, 673–680.

Ouhalla, J., I. Tsimpli and N. Smith, in prep.

Rizzi, L., 1982. Isues in Italian syntax. Dordrecht: Foris.

Rizzi, L., 1990. Relativised minimality. Cambridge, MA: MIT Press.

Selfe, L., 1978. Nadia: A case of extraordinary drawing ability in an autistic child. London: Academic Press.

Smith, N.V., 1989. The twitter machine. Oxford: Blackwell.

Sperber, D. and D. Wilson, 1986. Relevance: Communication and cognition. Oxford: Blackwell.

Treffert, D.A., 1988. The idiot savant: A review of the syndrome. American Journal of Psychiatry 145, 563–72.

Treffert, D.A., 1989. Extraordinary people. London: Black Swan.

Wiltshire, S., 1987. Drawings.