

Learning the impossible: The acquisition of possible and impossible languages by a polyglot savant

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We report on the case of a polyglot *savant* (Christopher) who has a remarkable talent for learning and translating languages. Building on previous work which had established both the range of languages at Christopher's command and the extent to which his linguistic knowledge was integrated into his cognitive ability, we taught him two new languages for which we controlled the input. We had two main aims: the first was to test the hypothesis (within one version of the Principles and Parameters framework) that parameter resetting is not an option available to the second language learner; the second was to accrue further evidence for or against Fodor's modularity hypothesis and cast light on the possible range of interactions between linguistic and 'central' cognitive processes. The languages chosen were Berber, an Afro-Asiatic language spoken in North Africa, and Epun, an invented language deliberately devised to contain constructions which violated universal grammatical principles. In Christopher's acquisition of Berber we gleaned evidence from a variety of phenomena, including word order, null subjects, *that*-trace effects, wh-island violations and cliticisation, that his learning was conditioned by a combination of transfer effects from English and principles of UG, rather than by the effect of parameter resetting. In Christopher's acquisition of Epun we began with a core of 'normal' constructions, designed to make him feel at home in the new language, and then proceeded to investigate a range of impossible constructions, both structure-dependent and structure-independent. In the former case, we concentrated on negative sentences, constructed with no overt negative morpheme, and past-tense sentences which involve unattested and putatively impossible word-order differences. In the latter case, we concentrated on a rule of emphasis that involved counting words, and a form of agreement which again violated putatively universal generalisations. In each case we compared Christopher's performance with that of a small group of controls. The results were complex, but we think we can justify an interpretation which lends support to both the main hypotheses being tested.

'Similarly, knowing something about UG, we can readily design languages that will be unattainable by the language faculty.' (Chomsky 1991a: 40)

1. Background

In earlier work (Smith and Tsimpli 1991, Tsimpli and Smith 1991; see also O'Connor and Hermelin 1991) we have reported on the apparently unique case of a polyglot savant, Christopher, who, despite being institutionalised because he is unable to look after himself, has a remarkable talent for learning and translating languages.¹ Given a previously unseen passage in any of some sixteen or so languages, Christopher reads it - fluently but not flawlessly - in English.

Christopher is 31 years old (date of birth: 6 January, 1962); tests of his non-verbal IQ give the following results: Raven's Matrices - 75; Wisc-R, UK - 42, 67, 52 (test administered on three different occasions; 'Draw a Man' - 40; Columbia Greystone Mental Maturity Scale - Score 68, Mental age 9.2, IQ 56 (test administered at age 29.2). Tests of his verbal IQ on the other hand give results in the normal range: Wisc-R, UK - 89, 102, 98; in the Gapadol Reading Comprehension Test he scored at the maximum level, indicating a reading comprehension age of 16.10; in the Peabody Picture Vocabulary Test his scores for different languages were: English - 121, German - 114, French - 110, Spanish - 89. Full details of these and other tests can be found in the references cited above and in Tsimpli and Smith (in prep.), but this rough_outline is sufficient indication of the gross disparity between his different abilities.

Our previous work has documented the range of languages at Christopher's command, has established that his knowledge of English is essentially normal, and has apparently shown that this knowledge is integrated into his general cognitive abilities. Despite this integration, we have also argued (Smith and Tsimpli 1991) that the case of Christopher provides some support for Fodor's (1983) modularity hypothesis in that he constitutes an example of someone with a preserved, or enhanced, language module in combination with an impaired central system. Further, in Tsimpli and Smith (1991) we have demonstrated that the patterning of his mistakes in second language learning is remarkably similar to that of normal adult second language learners, and hence that his talent should be explicable in terms of current theories of second language learning, just as his prowess in general is amenable to description in terms of current linguistic theory.

2. Rationale

In order to gain deeper insight into the way Christopher learns² new languages, one part of our current research is devoted to teaching him languages with which he is unfamiliar, while controlling the nature and order of presentation of the input data. In the most general terms the idea motivating this exercise was that we could simultaneously investigate the kind of relationships obtaining between different aspects of his knowledge, and test the predictions made by the Principles and Parameters framework of current linguistic theory. Specifically, in a framework where there are no construction specific rules, (cf. Chomsky 1981a, 1986a) one might expect that acquiring knowledge of one (type of) construction should bring with it 'unlearned' knowledge of a range of other, parametrically related, constructions without overt exposure to the relevant data. However, our earlier work (Tsimplici and Smith 1991) has suggested that parameter (re-)setting is an inappropriate characterisation of Christopher's acquisition process, but that there are nonetheless interesting relationships among the rules he has acquired. We here extend these results to account for the controlled-input acquisition of Berber and for the acquisition (or non-acquisition) of an invented language (Epun) whose general conformity to principles of UG is combined with the possession of a number of 'impossible' constructions.

3. L2 acquisition

Before formulating our predictions concerning Christopher's learning of Berber and Epun, we outline the theory of L2 acquisition we are assuming. Pre-theoretically there are two major differences between the acquisition of first and subsequent languages: first language acquisition is deterministic (see Borer and Wexler 1987), whereas second language acquisition is non-deterministic; and in L1 acquisition the steady state achieved is relatively uniform across the population, whereas L2 learning is characterised by considerable individual differences. In Tsimplici and Smith (1991; see also Tsimplici 1992) we proposed a theory of L2 acquisition embodying the claims in (I):

- (1a) Principles of UG underlie any language acquisition process.
- (1b) Second language learners cannot learn or re-set the values of parameters.

That is, we dissociate parameters from the principles of UG, which are not themselves parametrised. Moreover, parameters are associated exclusively with functional categories (Chomsky 1991b) which constitute an independent component called the Functional Module (Tsimplici and Ouhalla 1990). The import of claim (1b) is then that the Functional Module of UG is inaccessible to the second language learner and hence that no parameter re-setting is possible. This in turn implies that the mature 'steady state' attained by the L2 learner will never be fully comparable with that of the L1 learner. Given Christopher's unique status we do not in fact know whether he is able to provide evidence for the mature state or not (for discussion, see Tsimplici and Smith 1992), and while we still suspect that the claim in (1b) is correct, it is not directly supported by the current evidence, and recent results by Birdsong (1992) cast further doubt on it.

The implication of these claims is that if there are differences in the parametric values of the first and second languages, then the second language learner will have to resort to one of the options in (2):

- (2a) He or she may impose the parametric value of the first language on the data of the second language, giving rise to 'transfer errors', of the kind exemplified by French learners of English who claim to 'speak very well English'.³ It is important to note that we are using 'transfer' in a more restricted sense than the traditional usage, as exemplified by Klein (1986) or Melsel (1983), in that we limit transfer effects to the domain of parametric variation. Although we do not share her views on the possibility of parameter re-setting, our position is thus close to that of Haegeman, who writes (1992: 164) that 'la notion de transfert semble plutôt pertinente pour la variation paramétrique'.
- (2b) He or she may implement in the L2 a strategy allowed directly by UG, in the way claimed by Tsimplici and Roussou (1991) in their analysis of the acquisition of pro-drop phenomena in second language acquisition, where learners' performance appeared to reflect a condition of UG on the identification of pro.⁴
- (2c) He or she may derive the correct surface configuration with the help of language-specific inductive learning strategies. Such strategies are typically characteristic of morphological rather than syntactic processes, as exemplified by Christopher's generalisation of an 'impossible' resolution rule in Epun verb agreement (cf. section 5.3 below), and are typically inferentially driven.

There is also a fourth possibility, independent of the theory of parametric variation, given in (2d):

- (2d) He or she may impose non-parametrised (peripheral) values of the first language on the data of the second language, giving rise to superficial transfer errors. A typical example is provided by the Greek learner of English who produced the ungrammatical (3a), presumably on the model of its (grammatical) Greek equivalent in (3b):

- (3a) *I will illustrate that this sentence is an example of raising
(3b) Tha apodhikso oti afti i protasi ine paradhigma anipsosis

(where, unlike 'show' or 'apodhikso', the English verb 'illustrate' subcategorises for an NP and not a CP).

Our hypothesis was that if Christopher made mistakes in acquiring Berber these would in the first instance be due to the different choices made by Berber and English in the selection of particular parametric values. This hypothesis seemed plausible on the basis of his performance in other languages. For instance, when describing a picture in German, Christopher produced sentences such as that in (4):

- (4) Und bei dem Zeitungskiosk ist ein Mann, wer wer kauft Melonen
And by the newspaper kiosk is a man who who is buying melons

in which, apart from the putative transfer error of using the interrogative form *wer* ('who?') instead of the relative form *der*, Christopher appears to have carried over the head-initial word-order of English to the German subordinate clause. It is of course possible that some mistakes, especially those involving peripheral rather than core elements of the grammar, might be attributable to the operation of inductive learning strategies, or to the direct accessing of principles of UG, but in the present example the parametric difference between German and his native English is by far the most likely cause of his error.

By contrast, we predicted that Christopher should find it impossible or extremely difficult to master those parts of Epun which, *ex hypothesi*, contravened universal generalizations and were not describable in terms of parametric variation. If his status as a polyglot savant is accurately characterised - to a first approximation - in terms of his having an intact, or enhanced, language module in association with some impairment of his central, cognitive faculties (cf. Fodor 1983), it should follow that humanly possible (sets of) constructions provide no insuperable difficulties, whereas linguistically impossible constructions or combinations of properties, even if conceptually simple and transparent, should occasion him severe problems. However, it is plausible to assume that even the linguistically impossible could be learned via inductive reasoning - a 'central' process - provided only that his central system is not too impaired to cope. In such a situation the order in which he mastered different 'impossible' rules should be a joint function of their inherent complexity and their superficial similarity to constructions in languages that Christopher already knows.

It is obviously problematic to describe some conceivable phenomenon as 'impossible'. We are aware that what is deemed to be impossible today may well turn out to be not only possible, but commonplace, tomorrow. A striking example is provided by the debate over the existence of object-initial languages in the seventies (for brief discussion, see Smith 1989), but we take it as axiomatic that (im)possibility is defined in terms of current theory. Accordingly, those constructions treated here as impossible are so described for two reasons: first, because neither we nor our colleagues know of valid counter-examples to the claim, second, because they are incompatible with some principle, or combination of principles, of current linguistic theory.

As a control we also attempted to teach a small group of four normal subjects Epun, including the impossible constructions we tested Christopher with. Our expectation was that normal subjects would be more easily able to perceive the regularities in a linguistically impossible system and learn it by using their 'general intelligence' as a compensatory device for the inadequate, because irrelevant, language module. These predictions were partially confirmed, but the controls' performance was itself sufficiently complex to make any definitive explanation of the results difficult.

4. The possible: Berber

Berber is an Afro-Asiatic language spoken in Morocco and adjacent countries. It is characterised by a rich morphology, VSO word-order, null subjects, *that*-t effect violations, etc. (see Ouhalla 1988). Christopher was exposed to Berber, specifically the Tarifit dialect, in both written and spoken form. Before his meetings with a native speaker, Jamal Ouhalla, we prepared written material consisting of sentences, accompanied by a word-by-word gloss and a free translation, as illustrated in (5):

- (5) Yesha Mohand tafirast
ate Mohand pear
'Mohand has eaten the pear'

In addition, we provided such information as that 'Mohand' is a boy's name and we appended a brief paradigm of 'subject markers' as given in Appendix A (see p. 318, below), where further details of the material used can be found.

3ms-saw Mohand Munat
'Mohand saw Munat'

(9b) Mohand y-zra Munat (SVO)

(9c) Nna-n iharmoshen qa y-zra Mohand Munat (VSO)
said-3p children that 3ms-saw Mohand Munat
'The children said that Mohand saw Munat'

(9d) Nna-n lharmoshen qa Mohand y-zra Munat (SVO)

Contrary to the situation in Arabic and the Celtic languages, the subject agrees with the verb in both orders, as can be seen in (9a) and (9c). Moreover, presumably because it is a pro-drop language (see Rizzi 1986, 1990), Berber also allows the order V(XP)S, as can be seen in (9e):

(9e) y-zra Munat Mohand (VOS)
'Mohand saw Munat'

Christopher performed well on the VSO and SVO orders, but somewhat inconsistently on the V(XP)S order. Thus, as already seen in (8a), Christopher typically translated English sentences into Berber using the (English) word-order SVO, despite the fact that virtually all the Berber sentences he was initially exposed to were given in the canonical VSO word-order. Indeed, of the first twenty sentences he had to translate, he gave only one with the verb initial, viz. (10):

(10) Mohand bought her the djellaba from York
'Yesgha Mohand i jellaba zi York'

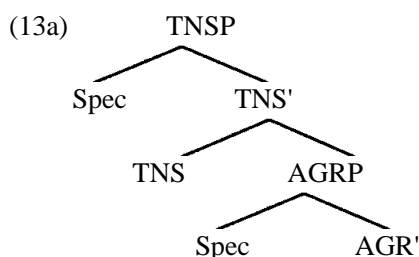
Moreover, when asked to translate new Berber sentences into English, and simultaneously to correct any mistakes these sentences might contain, he carried out the first part of the task reasonably efficiently, but systematically neglected to offer any corrections. For instance, when we gave him the examples in (11):

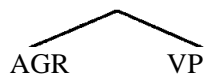
(11a) Tedwer idnnat Munat - Munat returned yesterday
(11b) Yelqa Munat Mohand idnnat - Mohand met Munat yesterday
(11c) Yufa Mohand amshish - Mohand found a cat

we had expected him to change (11a,b) to (12a,b), while leaving (11c) unchanged.

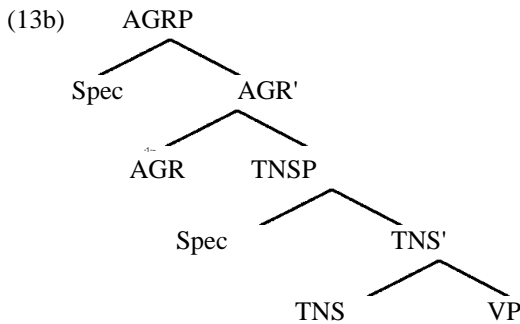
(12a) Tedwer Munat idnnat
(12b) Yelqa Mohand Munat idnnat

In fact he changed none of them: indicating that he noticed nothing wrong either with the initial position of the verb or with a structure in which XP intervened between the verb and the subject. That he consistently produces Berber sentences with SVO word-order and did not correct VSO Berber test sentences may be taken to imply that as far as Christopher is concerned, Berber allows both word-orders, as is in fact the case. (We return to the V(XP)S order below.) His preference for the SVO order in production is presumably a reflection of his L1. Indeed, it may be that despite speaking many languages, Christopher has really only one grammar, and the fact that he *accepts* VSO order is simply a consequence of his exposure to VSO sentences in Berber - the form taken by the overwhelming majority of the sentences he had heard and read in the language - rather than a direct reflection of his competence. Moreover, if one accepts Ouhalla's (1991) position, the representation of VSO order does not necessarily imply any change in the hierarchical order of the inflectional categories TNS and AGR, as VSO order is only one of a cluster of properties characteristic of languages which have a clause structure with TNS higher than AGR, as in (13a) (see also Pollock 1989):





In other words VSO word-order can be instantiated in languages which have a clause structure with AGR higher than TNS as in (13b):



In particular, the order VSO can be accommodated even in an SVO language like Italian.

In Tsimpli and Smith (1991) we suggested that, for subjects like Christopher who are speakers of a non-pro-drop L1 learning a pro-drop L2, the Spec of **AGRP** is not really filled by pro in the L2 grammar. Rather, morphological agreement is treated as a clitic which occupies the (Spec, AGRP) position. As with French subject clitics, this element then cliticises onto the verb. If this analysis is valid, we can assume that a similar situation holds for Christopher's grammar of Berber. Accordingly, an overt subject in postverbal position (VSO) is not in the Spec of AGRP but remains inside VP as suggested by Koopman and Sportiche (1991).

As we observed above, Christopher was happy to allow SVO order even though the initial input contained virtually no examples of this sequence, but he was less consistent with V(XP)S order. He accepted a few such examples, as exemplified in (11a,b) above, but when he came across sentences where the subject was not adjacent to the verb, his usual strategy was to bring the subject next to the verb, either pre-verbal or post-verbal. Typical examples are given in (14a,b), with Christopher's unnecessary corrections' in (15a,b):

- (14a) T-arzem tawwart Munat
 3fs-opened door Munat
 'Munat opened a door'
- (14b) T-emmut ithyaden tamghart tawessart
 mfs-died last year woman old
 'The old woman died last year'

(The written version of the sentences given to Christopher contained no morpheme boundaries.)

- (15a) Tarzem Munat tawwart
 (15b) Temmut tamghart tawessart ithyaden

Christopher's preference for avoiding the V(XP)S order, in contrast to his ready acceptance of the possibility of SVO order, can be explained as follows. SVO order follows naturally both from the assumption that he assigns Berber sentences the structure in (13b), i.e. the canonical structure for SVO languages, and from the fact that his L1 is an SVO language. In terms of the theory we are assuming, the subject occupies the Spec AGRP position, while the agreement morpheme occupies the AGR position. This is licit if we allow for the possibility that the agreement morpheme can be analysed either as an incorporating subject clitic or as an AGR category. In principle, the derivation of the V(XP)S order, however, depends on there being available a process of subject-postposing which, in turn, depends on the ability of AGR to license a null subject, realised as pro, in the canonical subject position (see Rizzi 1982; Chomsky 1986b). The problem with the suggestion is that there is independent evidence from Christopher's usual rejection of constructions involving dislocated elements and resumptive pronouns, even in English (see Tsimpli and Smith 1992) that a dislocation analysis is implausible, as our analysis excludes VOS as well as VSO order. In other words it appears that Christopher's grammar of Berber can accommodate only the SVO order. This is consistent with his regular production of SVO Berber sentences and the absence from his output of sentences with VSO or VOS order. The acceptability of the VSO order is probably a result of his conscious awareness, given the input, that this order is possible; but this awareness is an example of encyclopaedic or meta-linguistic knowledge and is not strictly speaking to be taken as part of his linguistic competence in the technical sense.

We turn next to the issue of null subjects. As illustrated in (16), Berber allows null subjects in both matrix and embedded clauses:

- (16a) Y-za Munat
 3ms-saw Munat
 'He saw Munat'
- (16b) T-enna qa ad t-uggur zich
 3fs-said that will 3fs-leave early
 'She said that she will leave early'

The initial input to Christopher contained virtually no examples of null subject sentences yet, as hinted above, he accepted and produced such sentences freely. For instance, he showed no hesitation in accepting (17a) (while mistranslating it as 'He left yesterday') and producing (17b,c) as translations from the English:

- (17a) Y-effegh ithyaden
 3ms-left last year
 'He left last year'
- (17b) You gave the fig to Mohand
 Tewsht tazet i Mohand
- (17c) They saw him in London
 Yzirin t gi London
 Correct version: 'Zrl-n t gi London'

This could be taken to imply that, given the rich morphology of Berber, Christopher concluded that the language allows null subjects.⁶ In that case it would be possible to say that Christopher had reset the pro-drop parameter to its positive value, hence that AGR in Berber licenses a pro subject. However, we have argued elsewhere (Tsimplici and Smith 1991) with regard to other pro-drop languages which Christopher knows (namely, Modern Greek, Spanish and Italian), that of the properties associated with the pro-drop parameter, it is only the null subject property that Christopher seems to have mastered. He does not accept either constructions with inverted subjects or those which involve a violation of the *that-t* effect. It has been suggested by a number of authors that the pro-drop parameter is not a unitary property and should be split into two or more independent parameters. Thus Chao (1980) and Abangma (1992) cite Portuguese and Denya allowing null subjects but disallowing inversion, and Brandi and Cordin (1989) cite the Trentino and Florentine dialects of Italian its allowing inversion but disallowing null subjects. Even if this separation is correct, and even if it is therefore possible that Christopher has indeed reset the (strict) null-subject parameter, it still leaves unanswered the question of why he should not have reset the parameters responsible for the other sub-parts of the original pro-drop parameter. In the light of these considerations, we continue for exegetical simplicity to assume Rizzi's (1986) analysis of the phenomenon, and hold by our suggestion that the subject position is not filled by a pro subject but rather that agreement is treated, as in standard French, as a subject clitic.

Thus, Christopher's partial rejection of the V(XP)S order, derived by subject-postposing, tends to confirm our earlier findings in Modern Greek, Spanish and Italian, and in the next section we will see that Christopher also rejects Berber sentences which involve *that-t* effect violations. Given that the availability of subject-postposing is indeed a function of the ability of AGR to license a pro in the canonical subject position, Christopher's judgements imply a failure to re-set the pro-drop parameter to the positive value. If this is indeed the case, it is unlikely that Christopher's representation of (17a-c) involves a pro. An analysis which is consistent with all these findings is one where the agreement morpheme in (17a-c) is analysed as a subject clitic which incorporates into the verbal complex from the subject position. Notice, however, that this predicts that dislocation constructions with a clitic subject should in principle be possible, contrary to our most recent findings. Our account of this problem (Tsimplici and Smith 1992) subsumes these particular phenomena under a general treatment of Christopher's word-order structures other than SVO (especially topicalisation and dislocation structures) in terms of a systematic difference in the availability of LF' (in the sense of Chomsky 1981b; Pesetsky, in preparation) as opposed to LF.

4.2. Berber - That-t effects and Wh-island violations

Like null-subject languages in general Berber allows violations of the *that-t* effect, as illustrated in the ambiguous examples in (18) (FM = 'focus marker'):

- (18a) U ay t-nna Munat qa y-zra Mohand?
 who FM 3fs-said Munat that 3ms-saw Mohand
 'Who did Munat say saw Mohand?' OR

'Who did Munat say (that) Mohand saw?'

(18b) Mi ay t-nni-t qa y-arez
 what FM 2s-said-2s that 3ms-broke
 'What did you say has broken?' OR
 'What did you say (that) he has broken?'

Because of his eagerness to translate any material he is presented with, it was difficult to elicit judgments from Christopher about sentences such as (18). Accordingly, to discover the status for him of such examples, we had to seek evidence from his translation. Presented with the sentence in (19a), Christopher translated it as in (19c) instead of the correct (19b):

(19a) U ay t-nni-t qa y-ssen Munat?
 who FM 2s-said-2s that 3ms-know Munat
 (19b) 'Who did you say knows Munat?'
 (19c) 'Whom did you say that Munat knows?'

That is, his version presupposes movement of the object rather than the subject, with 'Munat' being incorrectly construed as the subject, despite the fact that it does not agree with the embedded verb. This behaviour is consonant with his treatment of ambiguous examples such as (18a), which he invariably translated as though the extracted Wh-phrase was the object rather than the subject. Likewise, with sentences such as (18b) containing verbs which can have either a transitive or an intransitive/ergative reading ('break'/'arz' in this case), Christopher's translations invariably conveyed the transitive reading, implying that the category extracted is the object not the subject.

These observations argue against the parameter re-setting hypothesis in two different, but related, ways. The ability of null subject VSO languages such as Berber to violate the *that*-trace effect can be a function either of their having the structure given in (13a) above, or the ability of their AGR to license a pro. Assuming Rizzi's (1990) definition of the ECP, where proper government is defined as government by a head within the single-bar domain, the subject position in (13a) (Spec AGRP) is properly head-governed by T. The trace of an extracted subject will therefore always satisfy the ECP. The fact that Christopher rejects sentences containing *that*-trace violations implies, as concluded above, that he has not re-set the parameter responsible for the order of T and AGR.

On the assumption that Christopher assigns Berber sentences such as (9c) the structure in (13b), Spec AGRP is not properly head governed. The only potential proper head-governor is the complementiser *qa*, but this is inert for government (see Rizzi 1990).⁷ The only legitimate way of extracting the subject is from postverbal position. That is, wh-extraction of the subject has to be preceded by subject-postposing to a properly head-governed position, as in Standard Italian. However, this is an unlikely strategy for Christopher as he tends to reject sentences with postposed subjects, a fact which we examined above in terms of his failure to re-set the pro-drop parameter.

Corroborative evidence of the claim in Tsimpli and Smith (1991) that Christopher's errors are due not to parameter resetting but are a joint function of transfer mistakes and the exploitation of principles of UG comes from his reaction to wh-island violations.

Like a number of null subject languages - and, significantly, only null-subject languages - Berber allows violations of wh-islands of the type illustrated in (20), where the embedded subject has been extracted across a wh-word in the Spec of CP:

(20a) U ay ur t-ssn-t magha y-ukwta aqzin?
 who FM NEG 2s-know-2s why 3ms-hit dog
 '*Who don't you know why hit the dog?'

(20b) Mohand ay ur ssn-gh magha y-ukwta aqzin Mohand
 FM NEG know-1s why 3ms-hit dog
 '*It's Mohand that I don't know why hit the dog'

In his treatment of comparable examples in Italian, Rizzi (1982) concluded that these constructions do not involve extraction, but are instances of the resumptive pronoun strategy, where the resumptive pronoun is a pro licensed by the embedded AGRS element. Later (Rizzi 1990) he suggests that the analysis of examples parallel to (18a,b) can be assimilated to that of sentences such as (19a), which exhibit *that*-trace effect violations, in that they both involve extraction from postverbal position. On either account the preverbal subject position is filled with a pro licensed by AGR.

Christopher's performance on these constructions was prone to error: typically, his strategy in translating sentences such as (20a) was to turn them into yes/no questions, ignoring the *wh*-word entirely. For example, he translated (21a) as (21c) rather than the ungrammatical (21b) (his mistranslation of the verb is irrelevant):

- (21a) U ay ur t-ssn-t magha y-uggur?
 who FM NEG 2s-know-2s why 3ms-left
 (21b) '* Who don't you know why left?'
 (21c) 'Don't you know why he came back?'

On a different occasion he translated the same sentence as in (22), where the form ('whom') of the extracted *wh*-word shows that it is construed as the object rather than the subject:

- (22) 'Whom did you not know why he left?'

(22) is not a possible translation of (21a), as the Berber *uggur*, unlike its English counterpart 'leave', does not allow a transitive reading. However, while it is not easy to interpret his first attempt, as Christopher could perhaps not be expected to produce appropriate ungrammatical sentences to order, it is clear from his second attempt that he was avoiding translations which would involve a strong violation of the *wh*-island/ECP. In this regard, it is important to recall that, in English, the extraction of a subject (or an adjunct) out of a *wh*-island yields a significantly worse result than the extraction of an object (see Huang (1984) and Rizzi (1990), among others).

This conclusion is confirmed by the results of a different test in which Christopher was asked to translate English sentences, some of which were ungrammatical, into Berber. When faced with (23a), for example, his initial reaction was to translate it, correctly (and grammatically) as in (23b). However, he subsequently corrected his translation by crossing out the *wh*-word, thus turning the sentence into the yes-no question (23c):

- (23a) *Who are you wondering when he arrived?
 (23b) U t-xemmame-t melmi v-exdel?
 (23c) t-xemmame-t melmi y-exdel? (Do you wonder when he arrived?)

When pronounced with a rising intonation (23c) is a well-formed yes-no question in the Tarifit dialect of Berber to which Christopher was exposed (in other dialects yes/no questions are invariably preceded by a clause-initial marker).

In the same exercise Christopher translated the English sentence in (24a) as (24b), whose status in Berber is considerably worse than that of its English counterpart. In this situation Berber strongly prefers the resumptive pronoun strategy, as illustrated in (24c), where the resumptive pronoun is the *t* immediately following the embedded verb.⁸

- (24a) ??Which book don't you know when Munat bought?
 (24b) Men lechtab ur t-ssne-t shem melmi t-esgha Munat?
 which book not 2s-know-2s you when 3fs-bought Munat
 (24c) Men lechtab ay ur t-ssnet-t (shem) melmi t-shgi t Munat?

Christopher's assumption that (24b) has the same status as its English counterpart is presumably an instance of a transfer error.

As pointed out above, sentences such as (21a) and (23b) can be analysed as involving either a resumptive pronoun strategy, or movement from postverbal position. The facts of object-extraction, where the resumptive pronoun strategy is strongly preferred, suggest the former, with the resumptive pronoun being a *pro* licensed and identified by AGR. One could then argue that Christopher's rejection of these sentences implies that *pro* is unavailable, suggesting in turn that the *pro*-drop parameter has not been reset. The same conclusion can be reached if (21a) and (23b) are analysed as involving extraction from postverbal position, as subject-postposing is determined by the ability of AGR to license a *pro*.

However, we have argued above that Christopher has the option of reanalysing the AGR morpheme as a subject clitic, which in the sentences under discussion could legitimately act as a resumptive pronoun, just as object clitic pronouns do. This may seem problematic, until one recalls that resumptive pronouns are excluded from the English counterparts of these sentences and, more generally, from (long) extraction sentences (nesting effects apart). Thus, whatever is responsible for the exclusion of resumptive pronouns in the relevant environments in English can legitimately be said to be responsible for Christopher's rejection of the Berber constructions under discussion. In other words, this is another instance of transfer.⁹

From the possible we turn to the putatively impossible and consider Christopher's acquisition of Epun.

5. The impossible: Epun

5.1. The 'possible' background

The most crucial test of Christopher's 'modular' ability was his exposure to an 'impossible' language - 'Epun', where we juxtaposed linguistically regular and linguistically impossible constructions in an attempt to see if his residual cognitive ability was sufficient to enable him to master intuitively simple but linguistically impossible structures, or if his language faculty is indeed a (unique) 'fragment of genius' (in Howe's (1989) felicitous phrase), so that only linguistically possible structures are within his capacity. Even in his reaction to the linguistically possible, we expected him to provide further evidence for or against our predictions about the possibility of parameter resetting.

We subjected both Christopher and the controls to a variety of different structures (see Appendix B for full details of the material and methodology used), both possible and impossible, with results (to be discussed in detail below) which fell into three different categories. Structure-independent operations proved impossible for everyone; structure-dependent, but linguistically impossible, operations were within the abilities of the control group but proved beyond Christopher in the initial stages, though he made some progress after prolonged exposure, structure-dependent, and linguistically possible, operations were within the capabilities of everyone, though Christopher made a range of 'unprovoked' mistakes which were distinct from anything produced by the controls, and which revealed something of his linguistic abilities.

The first data set, illustrated in (25), was restricted to simple intransitive sentences consisting of S(subject) V(erb) and optional temporal ADV(erb).

(25a) the (male) cat came-	-	f imni-din ha- panib-u the cat Nom Past come 3MS
(25b) a man will come-	-	zaddil-in chu-panib-u man Nom Fut come 3MS
(25c) the king returned	-	fa mideb-in ha- binap- u the king Nom Past return 3MS
(25d) the girl returns today-	-	afa zena-din binap- gu indid the girl Nom return 3FS today
(25e) we returned	-	ni-sa ha- binap- nis we Past return IPI

The data were further characterised by the following properties:

- Verbs inflect for Past, Present and Future - specifically. the verb stem is prefixed by *ha-*, zero or *chu-*.
- The Verb agrees with the subject in Person, Number and Gender, where agreement takes the form of suffixes to the verb stem: *-u* for masculine singular, *-gu* for feminine singular, *-nis* for first person plural, and so on.
- The subject consists of a proper noun, or a common noun optionally preceded by either a determiner or a demonstrative.
- Demonstratives are invariable; the definite determiner (there is no indefinite determiner) agrees with the noun in number and gender, and also varies according to phonological context (cf. *fifa* and *afa* in examples (25a,c,d) above).
- The subject noun (proper or common) is marked with a Nominative suffix (*-in* or *-din* depending on the preceding phonological context).
- Pronouns show no case differences (i.e. have no nominative suffix).

The vocabulary introduced included:

Nouns:

(Masc., Fem., Proper and Common). There is a tendency, which is not exceptionless, for feminine nouns to be derivable from their masculine congeners by the loss of the final consonant: e.g. 'king' = *mideb*, 'queen' *mide*.

Verbs:

(Intransitive; Transitive, and Clausal: only intransitive verbs were illustrated in the first lesson).

Pronouns:

(These are all bi-morphemic, where the first element is phonologically similar or identical to the corresponding agreement marker on the verb: cf. e.g. *nisa/nis* in example (25e).

Adverbs:

(Deictic temporal adverbs - 'yesterday', 'today' and 'tomorrow' - only).

Demonstratives:

('this' and 'that')

Definite article:

(fa, etc.)

Adjectives:

(none illustrated in the first lesson).

Complementiser:

(none illustrated in the first lesson).

All the above properties are 'possible', indeed normal; the idea being to initiate Christopher painlessly into a new, but ordinary, language. Christopher's responses were correct except for the following:

- (i) He consistently omitted the definite article in Epun and, concomitantly:
- (ii) He used 'the' instead of the correct 'a' to translate the absence of an article in Epun.
- (iii) He consistently omitted the nominative case ending.
- (iv) He made random mistakes in:
 - (a) vocabulary - either by omission (esp. of adverbs) or by use of the wrong verb. The pair of verbs that caused the most trouble was 'return/come' (Epun *binap/panib*) which are orthographic inverses. This may well be a function of Christopher's ability to read (and write) either forwards or backwards with approximately equal facility.
 - (b) choice of tense prefix, or translation of that prefix.
 - (c) choice of number (one mistake in the English - he had in fact not been introduced to the plural in Epun).

In the second data set and exercises, Christopher was given:

- Overt paradigms for the past, present and future tenses of the verb (cf. Appendix B, Block 2).
- Explicit information about the article and about the case requirement of subject nouns.
- Simple sentences as before, with the addition of:
 - Plurals (represented by a suffix, *-iz*, occurring as the last element of the NP); Transitive sentences: only in the Epun to English translation and only in the present and future tenses,
 - Direct Objects, marked with an accusative suffix, which varies according to the preceding phonological context.

Everything is still 'possible'. The second lesson and exercises were designed to consolidate what Christopher had already been exposed to. His responses were much better. Everything was correct except:

- (i) He made one error with the definite article (using a non-elided form) and once mistranslated zero by 'the'.
 - (ii) He twice omitted the nominative ending: both times with a proper noun, the only times that a proper noun was used. That is, he treated proper nouns like pronouns, not like common nouns.
 - (iii) He made one error of agreement in a verb ending.
 - (iv) He made a few vocabulary errors: 'this/that' were inverted; 'return' was used for 'go'.
- It is clear that C has mastered the system as developed so far.

5.2. *The impossible: Structure dependent operations*

The third data set and exercises Christopher was given included more examples of the same kind as before, but also the first 'impossible' structures (with 'impossible' to be interpreted with the caveats expressed in section 3 above). The specific additions were:

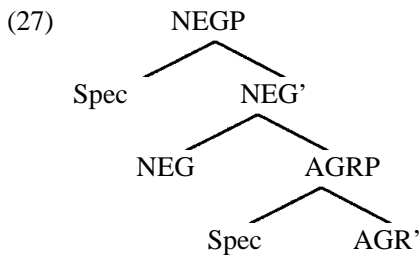
- Negative sentences, characterised by the Verb preceding the Subject, but with no negative morpheme.
- Transitive sentences in all three tenses. The past tense is characterised by the Object being moved to initial position, as well as by an overt prefix.

That is we now have the word-order patterns given in (26):

(26)S V (O)	Positive (Present and Future)
V S (O)	Negative (Present and Future)
(O) S V	Positive (Past)
(O) V S	Negative (Past)

The morphology is (so far) constant: i.e. subject and object are marked consistently as before, and the verb agrees with the subject as before. To make his task somewhat less difficult, Christopher was given the explicit information at the beginning of the third translation exercise that: 'if the verb precedes the subject, the sentence is negative; if the object precedes the subject the sentence is past'.

A formal account of the peculiar negation described above presumably has to have recourse to obligatory Verb-raising in negative sentences. That is, there is a NEGP projection immediately dominating AGRP, as illustrated in (27):



For reasons of recoverability, it is standardly assumed (see e.g. Ouhalla 1990) that in a configuration of this type either the Spec of NEGP or the head NEG must be overt. Assuming further that NEG in Epun is a phonetically null affixal head, the verb has to raise to NEG at S-structure in order to satisfy Lasnik's Filter: a condition of UG. On the assumption that UG regulates the options available in second language acquisition, a representation with both the head and the specifier empty should not in principle be available. As negatives in Epun involve a violation of UG in this way, the construction is considered to be 'impossible'.

The correlation between tense and word-order similarly gives rise to a problematic configuration in terms of UG. For positive sentences the 'usual' SVO order in the present and future is accounted for by locating TNS higher than AGR, as in (13a) above. Overt confirmation for the necessity of this configuration appeared a little later in the treatment of questions, in which the subject agreement marker usually found suffixed to the verb is prefixed to the auxiliary, but still occurs after the tense marker. For instance, compare the statement in (28a) with the congeneric question in (28b):

(28a) ha-hochik-u
past-read-3ms

(28b) h-u-pat hochik
past-3ms-Aux read

(Past is normally represented by *h-* before a vowel)

To account for past tense transitive sentences, with positive OSV and negative OVS word-order, it is necessary to provide some motivation for the movement of the object to initial position, and also to specify where precisely it moves to. There are in principle two possibilities: the movement could either be an example of topicalisation, in which the object is adjoined to CP; or it could be an example of focussing, or operator-movement with the moved phrase substituting into Spec CP. In neither case is there any theoretical justification for the movement being obligatory, nor for the observed correlation with choice of tense. Notice moreover that focussing with the use of an emphatic marker occurs in the language (see section 5.3 below), though Christopher had not as yet been exposed to such examples.

Although there are documented cases in which, for instance word order differences correlate with differences of aspect or 'perfect'-ness,¹⁰ there are to our knowledge no cases in which word-order is dependent on a choice of past vs. present or future.

Christopher's responses to the above data were interesting. He had considerable difficulty with both the anomalous negative and the abnormal word-order of the past.

In the translation from English into Epun there were seven past tenses (six transitive and one intransitive) illustrated in (29) with the correct translation and a morpheme by morpheme gloss:

(29a) The queen looked at the king
fa mideb-op afa mide -din ha- hielo -gu
the king Obl the queen Nom past look at 3Fs

(29b) The boy read the book yesterday
fa tiktab-op fa makoh-in ha- hochik-u guv
the book Obl the boy Nom Past read 3Ms yesterday

(29c) A tortoise looked at the cat
af imni -p pelik -in ha- hielo- u
the cat Obl tortoise Nom Past look at 3MS

Christopher produced the wrong word-order with all and only the six transitives, usually using SVO instead of the 'correct' object-initial order, as illustrated in (30), his translations of the examples in (29). (The remaining examples are listed with the negatives below.)

(30a) Afa mide-din ha-hielo-gu mideb-op

- (30b) Fa makoh-in ha-hochik-u tiktab-op guv
 (30c) pelik ha-hielo-gu fa imnik-in

It is clear that the regular SVO pattern established for the present and future has become fixed for all tenses for Christopher. One past tense, an intransitive negative given in (31), was correct:

- (31) This man didn't come yesterday
 ha- panib-u gub zaddil-in guv
 past come 3MS this man Nom past

but Christopher's general performance on negatives was by no means perfect. There were altogether eight negative sentences, five of which Christopher got wrong. In some cases it looked as if the subject incorrectly preceded the verb (e.g. 32a-c) but the nature of his mistakes makes it hard to be sure; in one he omitted the subject entirely (as though the language were pro-drop (32d); one was wrong because of a mistake with the past tense (32e), and one was wrong because of morphological mistakes only (32f). Two sentences were correct, one transitive (32g) and one intransitive (31). In the examples in (32), Christopher's version, when incorrect, is given last.

- (32a) Cats don't look at tortoises
 hielo -gus imni-din -iz pelik -op -iz
 look at 3Pl cat Nom Pl tortoise Obl Pl
 imnik-in-iz hielo-us peli-din-iz

(It is not clear which NP Christopher intended to be subject: the word-order is wrong whichever is chosen.)

- (32b) That boy won't come today
 chu-panib-u heop makoh-in indid
 Fut come 3MS that boy Nom today
 heop makoh-in chu-panib-u ffi indid

(Christopher explained that the underlining in his version of this sentence indicated that *chu-panib-u* should be in initial position, i.e. only the excrescent *fa* was incorrect.)

- (32c) We won't see the walrus tomorrow
 chu-kakol-nis ni-sa fa vakvel-op pa
 Fut see 1 Pl we the walrus Obl tomorrow
 Nisa chu-kakol-nis fa vakvel-op pa

(Underlining as in example 32b)

- (32d) We didn't see the walrus yesterday
 va vakvel-op -iz ha- kakol-nis ni-sa guv
 the walrus Obl Pl Past see 1 Pl we yesterday
 ha-kakol-nis fa vakvel-op-iz guv
 (32e) This woman didn't read the letter
 fa vlet -op ha- hochlk-gu gub horu -din
 the letter Obl Past read 317S this woman Nom
 ha-hochik-gu gub horu-din fa viet-op
 (32f) The cat didn't look at the tortoise
 fa pelik -op ha- hielo -gu af imni-din
 the tortoise Obj Past look at Fern the cat Subj
 pelik ha-hielo-gu fa imnik-in

(Note that the agreement on the verb is also incorrect, as Christopher has used *imnik* - a male cat, rather than *imni - a* female cat.)

- (32g) Lodon doesn't love Lodo
 aveti- u Lodon-in Lodo -p
 love 3ms Lodon Nom Lodo Obl

Christopher also made a few non-systematic errors with articles, case markers, and lexical items. It was clear, however, that he has mastered the rest of the system so far, and that these were errors of an unsurprising kind. Two points are worth emphasizing at this stage: first, he failed to master the putatively impossible parts of the grammar, being totally wrong in his use of past tense transitive sentences (100% mistakes), and frequently wrong in his use of the negative (over 50% mistakes); second, he was markedly worse in one of these areas (past tense) than the other (negation).

The translation from Epun into English was much better, with most of the word-order (10 out of 14 sentences) correctly interpreted and some sentences completely correct. There were nonetheless some interesting mistakes: in three cases (out of eight) he failed to identify the negative word-order, and in two cases he translated the Epun with an English passive, thereby reversing the role of subject and object. Examples of the last two phenomena are given in (33):

- (33a) fa mong-op ha- hielu -gu fa bozu- din
 the paper Obl Past look at 3FS the teacher Nom
 The teacher didn't look at the paper
 'The teacher looked at the paper'
- (33b) miga-din imnik-in ch- osoze-gu makoh-op
 big Nom cat Nom Fut catch 3FS boy Obl
 A big cat will catch a boy
 'Big cat will be caught by the boy'

The fact that his translation from Epun into English was markedly superior to his translation in the other direction indicates that his comprehension, with the possibility of exploiting semantic and pragmatic information contained in the rest of the sentence, is in advance of his production ability. While a common enough phenomenon, this is interesting in the case of Christopher because of its implications for the integration of his syntactic and his nongrammatical knowledge.

The results obtained to this point were suggestive but hardly conclusive. The fourth set of data accordingly embodied two aims. First, we wished to see if further exposure to negative and past tense sentences similar to those he had already seen were sufficient to allow Christopher to master the system, as he had clearly begun to master the article and inflectional system. Second, we wished to introduce him to questions, both yes/no and WH, and to embedded (complement) sentences.

In addition to the previous patterns we now introduced Christopher to positive and negative auxiliaries (*pat* and *nat* respectively). In a yes/no question there is an initial auxiliary which inflects - like a main verb - for tense (past, present, future), and agrees with the subject in person, number and gender. The affixes marking these patterns are the same as before but, as indicated above, both tense and agreement markers are *pre*-fixed to the auxiliary - in that order - and the main verb is bare. (Recall that with main verbs the tense marker is prefixed and the agreement marker suffixed to the stem.) Apart from the presence of this initial auxiliary the word-order properties of the rest of the sentence are identical to those of statements: i.e. differing according to tense and negation. In simple WH questions, the WH word is sentence initial, this is followed by the auxiliary, and the rest of the sentence (minus the extracted WH subject or object) conforms to normal word-order. That is, we have the surface patterns given in (34):

- (34) WH(Subj) Aux(pos) V O [pres/fut]
 WH(Subj) Aux(neg) V O [pres/fut]
- WH(Obj) Aux(pos) S V [pres/fut]
 WH(Obj) Aux(neg) V S [pres/fut]
- WH(Subj) Aux(pos) O V [past]
 WH(Subj) Aux(neg) O V [past]
- WH(Obj) Aux(pos) S V [past]
 WH(Obj) Aux(neg) V S [past]

Complement sentences introduced by the complementisers *ef* - 'that' or *vem* - 'whether', following e.g. *dum* - 'think' and *jan* - 'know' respectively, were designed to reinforce the same patterns and give rise to further experimentation. In particular, an interesting corollary of the grammar as devised so far is that, where there is no overt case marking (i.e. on pronouns), there is the possibility of ambiguity with e.g. 'what saw him?' and 'what did he see?' being translated identically. This allowed us to test whether Christopher would carry over patterns from Greek as well as English into his foreign language learning.

Illustrative examples of the data presented to Christopher at this stage are given in (35):

- (35a) tik pelik-in h-u-pat ho-za kakol?
 which tortoise saw you?
- (35b) tik pelik-op h-oh-pat ho-za kakol?

- which tortoise did you see?
 (35c) tak h-u-pat u-za kakol?
 what did he see?
 (35d) tak h-u-pat u-za kakol?
 what saw him?
 (35e) fa makoh-in lokan-u vem ha-gu-pat pelik-op Lodo-din kakol
 the boy wonders whether Lodo saw a tortoise
 (35f) fa makoh-in lokan-u vem chu-gu-pat Lodo-din kakol pelik-op
 the boy wonders whether Lodo will see a tortoise
 (35g) fa makoh-in chu-lokan-u vem ch-u-pat fa pelik-in kakol Lodo-p
 the boy will wonder whether the tortoise will see Lodo

As previously, Christopher was then given sets of sentences to translate from and into Epun, with somewhat mixed results. Interestingly, he still systematically failed correctly to translate sentences in the past tense - where the object should be initial. Instead he typically rendered them as SVO, i.e. like the Epun present/future, or indeed like English. Thus, in the twenty sentences he had to translate into Epun, there were seven past tense sentences, *none* of which he got right. Typical examples are given in (36):

- (36a) The teacher read the book
 fa tiktab-op fa bozud -in ha -hochik-u
 the book Obl the teacher Nom Past read 3MS
 'fa bozu-din ha-hochik-u tiktab-op'
 (36b) The teacher didn't read a book
 tiktab-op ha -hochik-u fa bozud -in
 book Obl Past read 3MS the teacher Norn
 'ha-hochik-u fa bozu-din tiktab-op'

In (36b) the verb correctly precedes the subject to indicate negation, but the object is incorrectly left at the end of the sentence, as would be correct in the other tenses. There were in all eight negative sentences; of which Christopher got four correct in the relevant respects, cf. (36b,c); two were incorrect, one for simple reasons of word-order, one because of the use of the wrong auxiliary, cf. (37b), and two were uninterpretable, for reasons we shall come to shortly.

- (36c) Queens don't kiss tortoises
 smin-gus mide- din -iz peli -p -iz
 kiss 3FP1 queen Norn P1 tortoise Obl P1

(Christopher's only mistake was to use masculine agreement (-*us*) instead of the correct feminine plural ending (-*gus*)).

- (37a) Teachers don't read books
 hochik-us bozud -in -iz tiktab-op -iz
 read 3MPI teacher Nom PI book Obl P1
 'bozud-in-iz hochik-us tiktab-op-iz'

- (37b) Won't she go?
 chu-gu -nat bol gu-za?
 Fut 3FS Neg go she
 'chu-bol-pat?'

Interpreting these data is not straightforward, but it would appear that, despite their putative impossibility and after some (considerable) difficulty, Christopher was mastering the peculiarities of the Epun negative. An explanation for this can perhaps be derived from one of the options (see (2c) above) made available by the theory of second language acquisition we have adopted: namely, the second language learner may make use of inductive learning strategies. In other words, when faced with linguistic data that cannot be accommodated under UG, the learner formulates a hypothesis, using general learning mechanisms, on the basis of his observation of the data. To account for the negatives in Epun, the relevant (linear) rule should look something like (38):

- (38) To construct a Negative Clause in Epun move the verb to a pre-subject position.

Some evidence that this is the correct explanation is provided by the fact that the controls made no errors with negation at all, presumably because of their superior ability to deploy central system mechanisms to solve linguistic problems. If this is correct, the same kind of observation should carry over to Christopher's and the controls' reactions to the past tense examples.

The correlation between the position of the object and the tense feature, [+ /- past], on the verb is clearly anomalous. Accordingly, we have to assume that mastery of the phenomenon by the controls (only one of whom made a significant number of mistakes) is due to the use of some inductive strategy. A rule that could account for object movement in past tense sentences would need to include the information in (39):

(39) To construct a transitive sentence in the past tense mark the verb with *ha-* and move the object to initial position.

This rule is more complex than the one suggested for the formation of negative sentences in that it requires both morphological marking and movement. However, the movement part of both rules seems intuitively to be equivalent which, given Christopher's expertise with morphology, predict that he should be able to master either rule with roughly equal facility. This, however, was not the case: object preposing in past tense sentences appeared to be much more difficult for him to learn than negative formation. One possible explanation could be semantic in nature. Specifically, negation has direct implications for the semantic, truth-conditional, properties of a sentence, and we have independent evidence that Christopher's semantics, both lexical and structural, is intact. We would accordingly expect him to be sensitive to the distinction between positive and negative structures. On the other hand, the phenomenon of preposing in past tense sentences has no effect on semantic interpretation. That is, given that the [+/-past] contrast is morphologically marked (by the presence of the prefix *ha-*), the semantic interpretation of the tense value of the sentence is already determined irrespective of the position of the object. The performance of the controls, who mastered both phenomena with comparable facility, indicates that the syntactic complexity of the rule is roughly the same and that their strategy is different from Christopher's. Specifically, we assume that the surface simplicity of the generalisations underlying both negative formation and past-tense formation was such that the controls could solve the problems they presented by non-linguistic (central) means, whereas Christopher's impoverished central system precluded his doing the same.

The semantic explanation suggested above might be complemented by morphological considerations having to do with properties of the other languages that Christopher knows. The language to which Christopher has devoted most time and attention over the period of the investigation is Greek, and in this language negation occurs in initial position in clause structure, as a head category that attracts the verbal complex. None of the languages that Christopher speaks, however, shows anything remotely similar to the movement of the object to initial position when the verb is in the past tense, which is characteristic of Epun. It seems therefore as if he might be exploiting an inductive learning strategy based on a model which is already available. It should be emphasized that this would be an example of the kind of option mentioned in (2c) above, and not an example of a transfer error: a category we restrict to the effect of differences in parameter setting. Some indirect evidence for this conclusion comes from Christopher's translation of certain ambiguous sentences.

At first, Christopher failed to translate a number of these sentences, in particular those specifically designed to see what he would do with ambiguous examples such as (40):

- (40a) tik h -u -pat u-za aveti?
 which Past 3MS Pos he love
 Which did he love?/Which loved him?
- (40b) mi-za lokan -1m tak h -u -pat u-za kakol
 I wonder 1S what Past 3MS Pos he see
 I wonder what he saw/what saw him

Later, he provided unambiguous translations in which the object, not the subject had moved: i.e. 'Which did he love?' and 'I wonder what he saw', confirming the tendency that we had earlier observed in both Berber and Greek. Again, his pattern of behaviour is consistent across languages, even where those languages allow for different interpretative possibilities, indicating that his L2 learning involves predominantly transfer effects.

Christopher's partial failure to master the structure of negative and past tense sentences illustrates the difficulty presented by 'impossible' configurations. Another aspect of his language learning at this stage was revealing for something like the opposite reason. That is, Christopher appeared to produce spontaneously configurations which are allowed by UG even though there was no direct evidence for them in the input.

Epun has neither subject nor object clitics, but when asked to translate English subject pronouns into Epun, Christopher frequently dropped the pronoun and left just the subject agreement on the verb (cf. example (32d) above). This apparently indicates that he considers Epun to be a null subject language. Indeed, of the 11 sentences with subject pronouns, Christopher only included that subject in one sentence. Notice, however, that the omission of pronouns is not restricted to subjects. Seven sentences contained both subject and object pronouns, none of which Christopher included. However, in

five of these seven, the verb ending which should have shown agreement with the subject, appeared to be showing agreement with the object. For instance, in (41), Christopher gave the translations indicated in inverted commas, with the verb inflected correctly for tense and apparently marked for the gender of the object, but showing no subject agreement:

- (41 a) He loves her -u-za aveti-u gu-za
 he love 3MS
 she 'aveti-gu' love-3FS
- (41b) He loved her -gu-za u-za h- aveti- u
 she he Past love 3MS
 'h-aveti-gu'
 Past-love-3FS
- (41c) She won't love him - ch -aveti-gu gu-za u-za
 Fut love 3FS she he
 Fut-love-3MS
- (41d) He didn't love her - gu-za h- aveti- u u-za
 she Past love 3MS he
 'ha-aveti-gu'
 Past-love-3FS

We think this provides evidence for the claim that Christopher treated agreement marking as a clitic-like element, along the lines suggested above for Berber and the other pro-drop languages that he speaks. There was sufficient evidence to confirm that Christopher's performance was reasonably consistent, but we cannot be conclusive about the status of the object clitic/agreement in these cases. One possibility is to assume that the verb is marked for tense but, in the absence of subject agreement, the subject is a PRO. In a later grammaticality judgment task, when Christopher had become significantly more proficient in Epun, he correctly identified one example comparable to those in (41) as being ungrammatical (cf. Exercise 5C in Appendix B, Block 5), replacing *ha-smin-gu* with *u-za ha-smin-gu gu-za*, but he left three others uncorrected. It is hard to interpret these additional data as there was evidence that he was tired when doing the exercise: e.g. he failed to notice an ungrammatical English sentence and mis-corrected an Epun construction he otherwise habitually got right.

Impossible, but structure-dependent, operations caused Christopher, but not the controls, considerable difficulty, structure-independent operations proved even more recalcitrant.

5.3. The impossible: Structure independent operations

The archetypal example of impossible constructions is provided by structure independent operations (see Chomsky (1972) for an early statement). We avoided these in the early stages of the experiment in case they made Christopher suspicious or caused him to give up trying, but after some nine months exposure to the language, we thought that he was sufficiently accustomed to it not to be put off. Accordingly we confronted him with examples of emphatic sentences of the kind illustrated in (42), where the form and position of the emphatic element (*nog(in)*) are arithmetically rather than structurally determined:

- (42a) Fa zaddil-in ha -bol-u -**nog** guv
 The man Nom Past go 3MS Emph
 The man did go yesterday
- (42b) Lodon-in ha -bol-u guv -**nog**
 Lodon Nom Past go 3MS yesterday Emph
 Lodon did go yesterday
- (42c) Chi h -u -pat Lodo-p -**nog** to mi-za kakol?
 Who Past 3MS Pos Lodo Obl Emph and I see
 Who did see Lodo and me?
- (42d) Mideb-in ha -panib-u **nogin**
 King Nom Past come 3MS Emph
 A king did come

The emphatic marker always appears suffixed to the third orthographic word of the sentence - matrix or constituent - of which it is part. If there are fewer than three words (as in example (42d)), the form **nogin** occurs in final position. Christopher had no idea what to do with **nog(in)**: his usual strategy appeared to be to attach it to the verb, or to omit it, as illustrated in (43):

- (43a) I wonder who did come

Mi-za lokan -im [chi h -u -pat panib **-nog**]
 1 wonder 1S who Past 3MS Pos come Emph
 'M i-za lokan-im chi ha-panib-u-nog'

Note that in the correct version of this sentence the emphatic element is suffixed to the third word of the [bracketed] constituent clause.¹¹ Christopher's version exhibits not only a problem with **nog**, but a consistent difficulty he had with the auxiliary system, even though it is perfectly possible, and indeed modelled in relevant respects on the English system.

(43b) Lodo did return
 Lodo-din ha -binap- gu **nogin**
 Lodo Nom Past return 3FS Emph
 'Lodo ha-binap-gu-nog'

(43c) This dog **doesn't** catch them
 Osoze- u gub chegod-in **-nog** a-sa
 catch 3MS this dog Nom Emph them
 'Osoze-us-nog gub chegod-in a-sa'

(The ending *-us* is the plural congener of the correct *-u*.)

(43d) Which letter did Lodon and I write?
 Tik vlet -op h -oh-pat **-nog** Lodon- in to mi-za
 Which letter Obl Past 2S Pos Emph Lodon Nom and I
 erehel?
 write
 'Tik vlet-op h-erehel-us-nog Lodon to mi-za?'

(The anomalous form of the agreement marker will be discussed below.)

(43c) The boy wonders whether Lodo did see a cat
 Fa makoh-in lokan -u vem ha -gu -pat imni-p
 The boy Nom wonder 3MS whether Past 3FS Pos cat Obl
 -nog Lodo-din kakol
 Emph Lodo Nom see

Christopher's expected failure to master this structure-independent construction was confirmed in subsequent tests. First, he failed to correct 'ungrammatical' examples such as that in (44), which should have contained *nogin*:

(44) Kov-in chu-panib-gu **-nog**
 Girl Nom Fut come 3FS Emph
 A girl **will** come

even though he translated it adequately as: 'The girl will return (come)'. Second, he clearly associated the emphatic marker with the element it was suffixed to rather than with the clause as a whole, as witness his translation of (45):

(45) U-za aveti-u gu-za-nog
 He love 3MS her Emph
 He does love her
 'He loves her'

where his underlining shows that he realises the emphatic nature of the suffix, even if its scope is incorrect.

Like Christopher, the controls had no success in unravelling the mystery of *nog(in)*. Typical examples of their efforts are provided in (46a) and (46b), corresponding to the examples in (43d) and (43e) respectively:

(46a) Tik vlet-op ha-nis-pat Lodon-in to-nog mi-za erehel?
 (46b) Fa makoh-in lokan-u vem ha-gu-pat-nog imni-p Lodo-din kakol

They all admitted to being baffled by the distribution of the emphatic marker and to having tried numerous (linguistically sensible) hypotheses as to what class or classes of constituent it attached to; to no avail. It may be that controls who were linguistically more naive might have had greater success, as they might have been more prepared to try 'logical' hypotheses.

It is appropriate to mention here a further form of 'impossibility' to which we subjected Christopher, even though it involves a modicum of structure dependence. This consisted in testing his reaction to simple violations of principles of UG, such as (subjacency) violations of Ross's (1967) coordinate structure constraint, as exemplified in (47). His instruction was to 'read the following Epun sentences and correct any that you think are wrong, then translate the corrected version into English':

- (47a) Tik chegod-op h -oh-pat to pelik -op ho-za kakol?
 Which dog Obl Past 2S Pos and tortoise Obl you see
 Which dog did you see and a tortoise?
- (47b) Tik chegod-op ch -u -pat u-za kakol pelik -op to
 Which dog Obl Fut 3MS Pos he see tortoise Obl and
 Which dog will he see a tortoise and?

(As usual, Christopher was given only the Epun, including the hyphens, but with no other information.) He left (47a) uncorrected, but translated it grammatically as 'Which dog and tortoise did you see'. He 'corrected' (47b) by indicating that the sequence *pelik-op to* should be placed immediately before *u-za*. This does associate the sequence with another noun phrase, though not the correct one, as is clear from the case marking and from Christopher's translation: 'Which dog and tortoise will he see?' Unlike the purely structure-independent 'emphatic' examples, these sentences exhibit partial violations of structure, and seemed to occasion Christopher less difficulty, though we have too few examples to be sure of his ability in this direction. Moreover, his reaction to these exercises as being 'too difficult' indicates that it may be counter-productive to continue with them.

The controls had no difficulty with these examples at all, both correcting the Epun and providing appropriate English translations.

As a last example of a linguistically impossible phenomenon, we constructed sentences illustrating unattested and putatively impossible morphological agreement 'resolution rules' (Corbett 1991). Typically, the coordination of a first person singular noun phrase with a third person singular noun phrase results in first person plural agreement on the verb. More specifically, Corbett gives the following generalisations: 'If the conjuncts include a first person, first person agreement forms will be used' (1991: 262); 'provided there is at least one non-plural conjunct, plural agreement forms will be used' (1991: 263), and 'If all conjuncts are feminine, then the feminine form is used, otherwise the masculine is used' (1991: 281). Accordingly we tested Christopher with Epun examples in which the coordination of the first person singular with a third person singular feminine NP resulted in third person feminine plural agreement on the verb, and the coordination of a first person singular with the third person singular masculine NP resulted in second person singular agreement on the verb. Both possibilities are exhibited in (48):

- (48a) She and I love tortoises
 Gu-za to mi-za aveti-**gus** pelik -op -iz
 She and I love 3FP tortoise Obl Pl
- (48b) He and I love walruses
 U-za to mi-za aveti-**oh** vakvel-op -iz
 He and I love 2S walrus Obl Pl

Christopher translated (48a) perfectly, and with the comparable example in (49):

- (49) Which letter did Lodo and I read?
 Tik vlet -op ha -**gus**-pat Lodo-din to mi-za hochik?
 Which letter Obl Past 3FP Pos Lodo Nom and I read
 'Tik vlet-op ha-hochik-**gus** Lodo to mi-za'

his translation was correct in the relevant respect. That is, although he made his usual mistakes of omitting the auxiliary and the Nominative marker on the proper name, the agreement marker was correct. With (48b) and similar examples, he interestingly generalised the 'impossible' pattern of (48a) in the obvious way, using the third person masculine plural marker on the verb, as illustrated in (50):

- (50a) 'U-za to mi-za aveti-*us* vakvel-op-iz' (cf. 51 b)
 (50b) Which letter **did** Lodon and I write?

Tik vlet -op h -oh-pat- nog Lodon-in to mi-za
 Which letter Obl Past 2S Pos Emph Lodon Nom and I
 erehel?
 write
 'Tik vlet-op h-erehel-us-nog Lodon to mi-za'

Of the controls, one got the agreement (impossibly) correct; the others regularised it as in extant languages and as illustrated in (51):

- (51a) Gu-za to mi-za aveti-**nis** pelik-op-iz (cf. 48a)
 (51b) U-za to mi-za aveti-**nis** vakvel-op-iz (cf. 48b, 50a)
 (51c) Tik vlet-op ha-**nis**-pat Lodo-din to mi-za hochik? (cf. 49)
 (51d) Tik vlet-op ha-**nis**-pat Lodon-in to-nog mi-za erehel? (cf. 50b)

It is striking that Christopher and the controls differed in their reaction to these constructions. Analogical overgeneralisation is commonplace in morphology but is rare in syntax, perhaps being restricted to the periphery. However, it is clear that Christopher is unusually sensitive to properties of the morphological system, and that L2 acquisition for him is closely based on them, with overt evidence of a morphological nature being essentially unignorable. This is in marked contrast to the usual situation in L2 learning where morphological properties are frequently ignored entirely by beginning students.

6. Conclusion

The literature now contains a number of case studies of individuals such as Genie (Curtiss 1981), Laura (Yamada 1990; cf. Smith 1991), and Clive (Smith 1989) whose linguistic and cognitive abilities are incommensurable. Christopher seems to us to be an important addition to the genre, with a huge amount to offer the (psycho-)linguistic community. In the current study we have used his unique talent to cast light on the processes of second language acquisition and on questions of the representation of language more generally. There are many phenomena for which we still have no explanation: why the Epun auxiliary system, modeled on English, should be so hard for him; what the precise role of the input in his L2 acquisition is, and so on. However, some results seem clear-cut: his learning of Berber provides clear support for the claim (Tsimpli and Smith 1991) that parameter resetting is not an available option for second language learners, but that L2 acquisition is a joint function of transfer effects from the L1 and principles of UG. His learning of Epun provided further evidence of the same kind, while simultaneously demonstrating that current linguistic theory makes plausible predictions about what constitutes a possible human language. Indirectly it also provided support for claims about the modularity of language in the sense of Fodor (1983), and, in his different treatment of syntax and morphology, for instance, for the modular structure of the grammar in the sense of Chomsky (1986a). Finally, it gives us new information about 'individual differences' in psychology: Christopher's genius, as manifest for instance in his huge linguistic and especially morphological talent, sets new standards of 'savant' achievement.

Appendix A: Representative Berber data

Christopher's first Berber lesson included the sentences in (1) and the additional morphological information in (2). Each of the sentences in (1) was read in Berber by Jamal Ouhalla and in English by Neil Smith. We left a cassette recording of the sentences with Christopher so that he could listen to them again at his leisure if he so wished. Subsequent lessons were comparable in form, except that for some of them the input was exclusively written.

1. Subject markers

Singular:	Plural:
1. ---gh	1. n ---
2. t --- t	2. t --- m (masc.) t --- mt (fem.)
3. y --- (masc.) t --- (fern.)	3. ---n (masc.) --- nt (fem.)

2. Berber lesson: 1

- (1) Yesha Mohand tafirast

- ate Mohand pear (Mohand is a boy's name)
'Mohand has eaten the pear.'
- (2) Tesgha Munat iharkusen (Munat is a girl's name)
bought Munat shoes
'Munat has bought shoes.'
- (3) Ad yugur Mohand dudsha
will go Mohand tomorrow
'Mohand will leave tomorrow.'
- (4) Dewren iharmoshen idennat
return children yesterday
'The children came back yesterday.'
- (5) Lqigh nesh Munat idennat
met I Munat yesterday
'I met Munat yesterday.'
- (6) Ssnen inebjiwen abrid
know guests way
'The guests know the way.'
- (7) Nexdel neshnin zich
arrived we early
'we arrived early.'
- (8) Ur tessnet shek Munat
not know you Munat
'You don't know Munat.'
- (9) Much tegget shek?
how doing you (masc.)
'How are you (doing)?'
- (10) Much ggin iharmoshen?
how doing children
'How are the children?'
- (11) Tenna Munat qa yufa Mohand taddart
said Munat that found Mohand house
'Munat said that Mohand has found the house.'
- (12) Magha tazzem kenniw?
why running you (masc. plur.)
'Why are you running?'
- (13) Qqim shem!
sit down you (fem.)
'Sit down you!'
- (14) Melmi teswa Munat aman?
when drank Munat water
'When did Munat drink water?'
- (15) Ttfen Ipulis axewwan
caught police thief
'The police caught the thief.'
- (16) U ay tezrit shek idnnat?
who that saw you yesterday
'Who did you see yesterday?'
- (17) Yehlek amshish a
is ill cat this
'This cat is ill.'
- (18) Yehma lhal nhar a
is hot atmosphere day this
'It is hot today.'
- (19) Ur tett Munat achsum
not eat Munat meat
'Munat does not eat meat.'
- (20) Ila ybedd Mohand atchmi texdel Munat
was standing Mohand when arrived Munat

'Mohand was standing when Munat arrived.'

3. Exercise 1

Translate the following English sentences into Berber. If you come across words you are not familiar with check the list of new vocabulary words on page 1.

- (1) Mohand ate the pear in the house
(Mohand) y-sha (Mohand) tatirast gi taddart
3ms-ate pear in house
'Mohand yesha tatirast gi -'
- (2) Munat arrived from London
(Munat) t-xdel ((Munat) zi London
3fs-arrived from
'Munat texdel zi London'
- (3) She met Mohand with Munat
t-lqa Mohand ag Munat
'Telqa Mohand ag Munat'
- (4) Mohand's house is big
Taddart n Mohand tamqqrant
house of Mohand big
'Taddart Mohand tamqqrant'
- (5) Mohand opened the door with a knife
(Mohand) y-arzem (Mohand) tawwart s Ixudmi
3ms-opened door with knife
'Mohand yarez tawwart s lxudmi'
- (6) Munat sat on the shoes
(Munat) t-qqim (Munat) x iharkusen
3fs-sat on shoes
'Munat t--iharkusen'
- (7) The boy hit the dog near the house
(Aharmosh) y-wktha acqzin zdat n taddart
3ms-hit dog near of house
Iharmosh yekthz acqzin zdat taddart'
- (8) Munat hit Mohand with a shoe
(Munat) t-wktha (Munat) Mohand s uharkus
3fs-hit with shoe
'Munat tekthi Mohand s- iharkus'
- (9) You gave the fig to Mohand
t-wshi-t tazat i Mohand
2ms-gave-2ms fig to
'Tewsht tazet i Mohand'
- (10) They saw him in London
zri -n t gi-London
saw-3pl him in
'Yzrin t gi London'

4. Exercise 4

Translate the following sentences into English. If you come across a word you are not familiar with check the list of vocabulary words.

- (1) Tarzem tawwart Munat
3fs-opened door Munat
Munat opened the door
'Munat opened a door'
- (2) Munat ay yenna Mohand qa ur tessent taddart
Munat FM 3ms-said Mohand that not 3fs-know house

It was Munat that Mohand said does not know the house
'Mohand does not say that Munat knows the house'

- (3) Yesha uharמוש tafirast
3ms-ate boy pear
The boy ate the pear
'The boy ate the pear'
- (4) U ay tennit shek qa tezra Mohand?
who FM 2ms-said-2ms you that 3fs-saw Mohand
Who did you say saw Mohand?
'Did you say that Mohand saw me?'
- (5) Munat ur tessan abrid.
Munat not 3fs-know way
Munat does not know the way
'Munat does not know the way'
- (6) U ay ur tessnt shem melmi yeffegh?
who FM not 2ms-know-2ms you when 3ms-left
*Who don't you know when left?
'Who does not know when he left?'
- (7) Yelqa Munat Mohand idennat
3ms-met Munat Mohand yesterday
Mohand met Munat yesterday
'Mohand met Munat yesterday'
- (8) Taddart ay tenna Munat qa yufa Mohand.
house FM 3fs-said Munat that 3ms-found Mohand
It was the house that Munat said Mohand found
'Mohand finds the house which Munat said'
- (9) U ay txemmamet shek mani yuggur?
who FM 2ms-wonder-2ms you where 3ms-went
*Who do you wonder where went?
'Who do you think where he has gone?'
- (10) Mohand ur yssqad tabrat.
Mohand not 3ms-sent letter
Mohand did not send the letter
'Mohand did not send a letter'

Appendix B: The Epun data

This appendix contains all the data of Epun to which Christopher and the Controls were exposed, including explicit corrections to the exercises Christopher did, and his reactions to them. Each block contains a set of sample sentences and/or other explicit grammatical material, on the basis of which the subjects had to work out sufficient of the grammar to be able to answer the questions in the exercises: mainly translations from Epun into English and vice versa. We have given the blocks in exactly the form the subjects received them (including, therefore, the false information about where the language is spoken¹²), except that - to save space - we have included both Christopher's answers (in inverted commas) and the correct answers to the exercises as they are presented. If no separate version is given for Christopher, his translation was identical to the one given.

Although the example sentences were read aloud to Christopher, and there were a few desultory conversational exchanges, his exposure to Epun was essentially restricted to the written mode. In the absence of native speakers this was inevitable, but Christopher has learnt several of his languages on the sole basis of a written input, and although it makes comparability with his command of spoken languages difficult, we do not believe it vitiates the exercise. After going through the examples with him to ensure that he understood the tasks involved, we left the lesson and exercises with him to return to us at his leisure by post. In the circumstances, we obviously cannot specify precisely how long he spent on the tasks, but his own, probably reliable, estimate was 'about an hour' for each exercise. We are certain that he received no help on any of them, and it is striking that his knowledge of the language appeared to be maintained at the end of nine months of approximately monthly sessions, as evidenced by his ability to translate arbitrary sentences from and into the language. Indeed, he embarrassed us on one occasion by insisting on speaking Epun and asking for the translation of words (such as 'beer') that had not yet been invented.

The controls were four first-year undergraduate students of linguistics (two native speakers of English, one of Italian and one of French). All have considerable knowledge of at least one language other than their native language. The paucity of

controls makes it impossible to provide statistically significant comparisons, but the qualitative differences between them and Christopher reassures us that the results are nonetheless meaningful.

Block 1

EPUN - Example sentences and Exercise 1

The following sentences are from the Epun language, spoken by a few people in Nigeria.

the (male) cat came	- f imni-din ha-panib-u
a (male) cat came	- imni-din ha-panib-u
the (male) cats came	- v imni-din-iz ha-panib-us
Lodo came	- Lodo-din ha-panib-gu
a man will come	- zaddil-in chu-panib-u
a man went	- zaddil-in ha-bol-u
a woman went	- horu-din ha-bol-gu
a woman will return tomorrow	- horu-din chu-binap-gu pa
Lodo comes	- Lodo-din panib-gu
you (fem.sing.) went	- hoza ha-bol-oh
you (masc. plur.) wen	- hesa ha-bol-hes
the king returned	- fa mideb-in ha-binap-u
the king will return	- fa mideb-in chu-binap-u
the queen returned	- afa mide-din ha-binap-gu
the queen returns today	- afa mide-din binap-gu indid
a (female) cat returned	- imnik-in ha-binap-gu
the dog returned	- fa chegod-in ha-binap-u
that dog returned	- heop chegod-in ha-binap-u
that queen came	- heop mide-din ha-panib-gu
this queen will come	- gub mide-din chu-panib-gu
this woman went	- gub horu-din ha-bol-gu
the (female) cats returned	- av imnik-in-iz ha-binap-gus
that walrus went	- heop vakvel-in ha-bol-u
Lodon went yesterday	- Lodon-in ha-bol-u guv
the woman came	- afa horu-din ha-panib-gu
the king came	- fa mideb-in ha-panib-u
the king came yesterday	- fa mideb-in ha-panib-u guv
the king will come tomorrow	- fa mideb-in chu-panib-u pa
the queen returned yesterday	- afa mide-din ha-binap-gu guv
the girl returns today	- afa zena-din binap-gu indid
you (fem. plur.) came	- hesa ha-panib-hes
we returned	- nisa ha-binap-nis
a bitch came	- chego-din ha-panib-gu
a dog came	- chegod-in ha-panib-u

Exercise 1: Translate the following sentences into Epun:

the king returns today	- fa mideb-in binap-u indid 'mideb binap indid'
a queen will come tomorrow	- mide-din chu-panib-gu pa 'mide chu-panib-gu pa'
the dog went	- fa chegod-in ha-bol-u

the bitch went	'chegod ha-bol-u' - afa chego-din ha-bol-gu
I came yesterday	'chego ha-bol-gu' - miza ha-panib-im guv 'mi-za panib guv'
We will return tomorrow	- nisa chu-binap-rlis pa . ni-sa chu-panib-nis'
this (male) walrus comes today	- gub vakvel-in panib-u indid 'gub vakvel panib-u'
that (female) walrus returned	- heop vakve-din ha-binap-gu 'heop vakve ha-binap-gu'
you (masc. plur.) come today	- hesa panib-hes indid 'he-sa panib-hes'
you (fem. sing.) will go	- hoza chu-bol-oh 'ho-za chu-panib-gu'

Translate the following sentences into English:

pelik-in ha-panib-u guv	- a tortoise came yesterday 'The tortoise came yesterday'
pelik-in chu-binap-u pa	- a tortoise will return tomorrow 'The tortoise will return tomorrow'
mide-din bol-gu indid	- a queen goes today 'The queen went yesterday'
heop mideb-in ha-panib-u	- that king came
gub makoh-in chu-bol-u pa	- this boy will go tomorrow
afa chego-din bol-gu indid	- the bitch goes today 'The bitch went yesterday'
av imni-din-iz ha-panib-gus	- the cats came 'The cats returned'
[As noticed by the controls, but not by Christopher or us, there was a mistake in this sentence, which should have been: <i>av imnik-in-iz ha-panib-gus</i>]	
afa mide-din binap-gu indid	- the queen returns today 'The queen came'
miza panib-im	- I come 'I returned'
fa chegod-in ha-panib-u	- the dog came 'the dogs returned'

As will be deducible from some of Christopher's responses, he was also given a vocabulary list (English-Epun only). He was later given an updated list, both English-Epun and Epun-English, which is reproduced in Block 4 below.

Block 2

Paradigms for Past, Present and Future tense of bol ('to go')

Past

mi-za ha-bol-im	- I went
ho-za ha-bol-oh	- You (singular) went
u-za ha-bol-u	- He went
gu-za ha-bol-gu	- She went
ni-sa ha-bol-nis	- We went
he-sa ha-bol-hes	- You (plural) went
a-sa ha-bol-us	- They (masculine) went
a-sa ha-bol-gus	- They (feminine) went

Present

mi-za bol-im	- I go
ho-za bol-oh	- You (singular) go
u-za bol-u	- He goes
gu-za bol-gu	- She goes
ni-sa bol-nis	- We go
he-sa bol-hes	- You (plural) go
a-sa bol-us	- They (masculine) go
a-sa bol-gus	- They (feminine) go

Future

mi-za chu-bol-im	- I shall go
ho-za chu-bol-oh	-You (singular) will go
u-za chu-bol-u	- He will go
gu-za chu-bol-gu	- She will go
ni-sa chu-bol-nis	- We shall go
he-sa chu-bol-hes	- You (plural) will go
a-sa chu-bol-us	- They (masculine) will go
a-sa chu-bol-gus	- They (feminine) will go

NB: The definite article ('the') has different forms (*fa, f, af,* etc. depending on the number and gender of the following noun and also on whether it begins with a vowel or a consonant. There is no indefinite article.

Nouns in subject position must have the ending *-in* or *-din*:

The king came	- fa mideb-in ha-panib-u
A king came	- mideb-in ha-panib-u
The queen came	- afa mide-din ha-panib-u
A queen came	- mide-din ha-panib-gu
The kings came	- va mideb-in-iz ha-panib-us
Kings came	- mideb-in-iz ha-panib-us
The queens came	- ava mide-din-iz ha-panib-gus
Queens came	- mide-din-iz ha-panib-gus

Exercise 2: Translate the following English sentences into Epun:

The (male) cat will return	- f imni-din chu-binap-u 'Fa imni-din chu-binap-u'
A (female) cat returns today	- imnik-in binap-gu indid
Lodo will go tomorrow	- Lodo-din chu-bol-gu pa 'Lodo chu-bol-gu pa'
I came yesterday	- mi-za ha-panib-im guv
She will come tomorrow	- gu-za chu-panib-gu pa
The tortoises (f) came yesterday	- ava peli-din-iz ha-panib-gus guv
This tortoise (m) will come tomorrow	- gub pelik-in chu-panib-u pa 'Heop pelik-in chu-panib-u pa'
Lodon went	- Lodon-in ha-bol-u 'Lodon ha-bol-u'
They (f) return today	- a-sa binap-gus indid
You (plural) went yesterday	- he-sa ha-bol-hes guv
The man returns today	- fa zaddil-in binap-u indid
The men will return tomorrow	- va zaddil-in-iz chu-binap-us pa 'Va zaddil-in-iz chu-binap-gu pa'

Translate the following Epun sentences into English:

heop pelik-in chu-bol-u pa	- that (male) tortoise will go tomorrow 'This tortoise will go tomorrow'
gub peli-din ha-bol-gu guv	- this (female) tortoise went yesterday

ava peli-din-iz bol-gus indid	'that tortoise returned yesterday' - the (female) tortoises go today
ko-din ha-binap-u	'the tortoises return today' - a (male) child returned
fa ko-din-iz chu-binap-us	'A child returned' - the children will return
afa mide-din chu-kakol-gu pelik-op	- the queen will see a tortoise 'The queen will see the tortoise'
fa pelik-in chu-kakol-u afa mide-p	- the tortoise will see the queen
afa horu-din erehel-gu vlet-op	- the woman writes a letter
ava horu-din-iz ch-erehel-gus vlet-op	- the women will write a letter
horu-din-iz ch-erehel-gus fa vlet-op	- women will write the letter
afa chego-din chu-kakol-gu fa mideb- op	- the bitch will see the king
ava kov-in erehel-gus tiktab-op-iz	- the children write books

Block 3

More example sentences and Exercise 3

ho-za ha-panib-oh guv	- you came yesterday
ha-panib-oh ho-za guv	- you didn't come yesterday
ho-za chu-kakol-oh afa horu-p	- you will see the woman
fa zaddil-in smin-u ava horu-p-iz	- the man kisses the women
pelik-op afa mide-din ha-kakol-gu	- the queen saw a tortoise
afa mide-din chu-kakol-gu fa pelik-op	- the queen will see the tortoise
vlet-op fa makoh-in h-erehel-u	- the boy wrote a letter
zena-din-iz erehel-gus vlet-op-iz	- girls write letters
mi-za ch-erehel-im fa vlet-op	- I shall write the letter
fa mideb-op afa chego-din ha-kakol-gu	- the bitch saw the king
afa mide-p fa chegod-in ha-kakol-u	- the dog saw the queen
heop zena-p fa makoh-in ha-smin-u	- the boy kissed that girl
heop zena-din chu-smin-gu fa makoh-op	- that girl will kiss the boy
heop zena-p ha-smin-u fa makoh-in	- the boy didn't kiss that girl
chu-smin-gu heop zena-din makoh-op-iz	- the girl won't kiss boys
vakvel-op makoh-in ha-kakol-u guv	- a boy saw a walrus yesterday
vakvel-op ha-kakol-u makoh-in	- a boy didn't see a walrus
ha-panib-im mi-za guv	- I didn't come yesterday
chu-binap-u fa pelik-in	- the tortoise won't return
erehel-gus zena-din-iz vlet-op-iz	- girls don't write letters
mong-op fa bozu-din ha-hochik-gu	- the teacher read a paper
bozu-din-iz hochik-gus mong-op-iz (indid)	- teachers read papers (today)
mong-op-iz bozu-din-iz ha-hochik-gus (guv)	- teachers read papers (yesterday)
hochik-gus bozu-din-iz mong-op-iz	- teachers don't read papers
mong-op-iz ha-hochik-gus bozu-din-iz	- teachers didn't read papers
chu-binap-gu heop zena-din	- that girl won't return
ha-panib-u fa mideb-in	- the king didn't come
chu-kakol-gu afa mide-din fa pelik-op	- the queen won't see the tortoise
chu-bol-gu Lodo-din pa	- Lodo won't go tomorrow
ha-bol-u Lodon-in	- Lodon didn't go

chu-binap-us va zaddil-in-iz pa	- the men won't return tomorrow
gub vlet-op fa mideb-in h-erehel-u	- the king wrote this letter
gub vlet-op h-erehel-u fa mideb-in	- the king didn't write this letter
ni-sa chu-hielo-nis heop tiktab-op pa	- we shall look at that book tomorrow
heop tiktab-op ni-sa ha-hielo-nis guv	- we looked at that book yesterday

chu-hielo-im mi-za gub tiktab-op	- I shan't look at this book
gub tiktab-op ha-hielo-gu gu-za	- she didn't look at this book
afa chego-p ha-kakol-u fa chegod-in	- the dog didn't see the bitch
chu-panib-u pelik-in pa	- a tortoise won't come tomorrow
Lodo-din aveti-gu Lodon-op	- Lodo loves Lodon

Exercise 3: Translate the following English sentences into Epun

Take special care with the word-order in Epun, as it changes according to tense and negation: if the verb precedes the subject, the sentence is negative; if the object precedes the subject the sentence is past.¹³

The queen looked at the king	- fa mideb-op afa mide-din ha-hielo-gu 'aFa mide-din ha-hielo-gu mideb-op' ¹⁴
The king will look at the queen	- fa mideb-in chu-hielo-u afa mide-p 'Fa mideb-in ch-aveti-u afa mide-p'
The boy read the book yesterday	- fa tiktab-op makoh-in ha-hochik-u guv 'Fa makoh-in ha-hochik-u tiktab-op guv'
This girl reads books	- gub zena-din hochik-gu tiktab-op-iz
A tortoise looked at the cat	- af imni-p pelik-in ha-hielo-u 'Pelik ha-hielo-u fa imnik afa peli-din
The cat didn't look at the tortoise	- fa pelik-op ha-hielo-gu af imni-din 'ha-hielo-u fa imnik afa peli-din'
Cats don't look at tortoises	- hiel-gus imni-din-iz pelik-op-iz 'imnik-in-iz hielo-us peli-din iz'
Lodon doesn't love Lodo	- aveti-u Lodon-in Lodo-p
This woman didn't read the letter	- fa vlet-op ha-hockik-gu gub horu-din 'Ha hockik-gu gub horu-din fa vlet-op'
This man didn't come yesterday	ha-panib-u gub zaddil-in guv
That boy won't come today	- chu-panib-u heop makoh-in fa indid 'chu-panib-u Heop makoh-in fa indid' ¹⁵
We won't see the walrus tomorrow	- chu-kakol-nis ni-sa fa vakvel-op pa
We didn't see the walruses yesterday	- va vakvel-op-iz ha-kakol-nis ni-sa guv 'Ha-kakol-nis fa vakvel-op-iz guv'

Translate the following Epun sentences into English:

ho-za aveti-oh pelik-op-iz	- you love tortoises
aveti-im mi-za pelik-op-iz	- I don't love tortoises
zena-din-iz ch-aveti-gus mi-za	- girls will love me 'The girls will love me'
aveti-gus zena-din-iz mi-za	- girls don't love me 'The girls won't love me'
rni-za zena-din-iz h-aveti-gus	-girls loved me 'The girls loved me'
mi-za h-aveti-gus zena-din-iz	-girls didn't love me 'The girls didn't love me
imni-p fa makoh-in h-osoze-u	- the boy caught a cat 'The boy caught a cat'
imni-p h-osoze-u ¹⁶ va makoh-in-iz	- the boys didn't catch a cat 'The boys caught the cat'
miga-din imnik-in ch-osoze-gu makoh-op	- a big cat will catch a boy 'Big cat will be caught by the boy'

ch-osoze-gu heop immik-in miga-p makoh- op pa	- that cat won't catch a big boy tomorrow
ch-aveti-hes he-sa gub bogum-op zena-p	'This cat will be caught by the big boy' - you won't love this pretty girl
f ako-din chegod-in chu-hielo-u heop risp-op mong-op	'you will look at this pretty girl' - the red dog will look at that blue paper
chu-hielo-u fa risp-in chegod-in gub ako-p mong-op	- the blue dog won't look at the paper
fa mong-op ha-hielo-gu fa bozu-din	- the teacher didn't look at the paper 'The teacher looked at the paper'

Block 4

In addition to the previous patterns we here introduce positive and negative auxiliaries (*pat* and *nat* respectively). In a yes/no question there is an initial auxiliary which inflects - like a main verb - for tense (past, present, future), and agrees with the subject in person, number and gender. The affixes marking these patterns are the same as before, but both tense and agreement markers are pre-fixed to the auxiliary - in that order - and the main verb is bare. (Recall that with main verbs the tense marker is prefixed and the agreement marker suffixed to the stem.) Apart from the presence of this initial auxiliary the word-order properties of the rest of the sentence are identical to those of statements: i.e. differing according to tense and negation.

In simple WH questions, the WH word is sentence initial, this is followed by the auxiliary, and the rest of the sentence conforms to normal word-order.

Complement sentences introduced by *ef* - 'that' or *vem* - 'whether', following e.g. *dum* - 'think' and *jan* - 'know' respectively, show the same patterns.

fa zaddil-in ha-bol-u guv	- the man went yesterday
ha-bol-u fa zaddil-in guv	- the man didn't go yesterday
ha-u-pat ¹⁷ fa zaddil-in bol guv?	- did the man go yesterday?
ha-u-nat bol fa zaddil-in guv?	- didn't the man go yesterday?
ho-za erehel-oh vlet-op	- you are writing a letter

tak oh-pat ho-za erehel?	- what are you writing?
tak ch-oh-pat ho-za erehel?	- what will you write?
tak h-oh-pat ho-za erehel?	- what did you write?
tak h-oh-pat ho-za kakol?	- what did you see?
tak h-u-pat ho-za kakol?	- what saw you?

tik pelik-in h-u-pat ho-za kakol?	- which tortoise saw you?
tik pelik-op h-oh-pat ho-za kakol?	- which tortoise did you see?
tak h-u-pat u-za kakol?	- what did he see?
tak h-u-pat u-za kakol?	- what saw him?
pelik-op ni-sa ha-kakol-nis	- we saw a tortoise

ni-sa pelik-in ha-kakol-u	- a tortoise saw us
tik pelik-in h-u-pat ni-sa kakol?	- which tortoise saw us?
tik pelik-in ch-u-pat kakol ni-sa?	- which tortoise will see us?
tik pelik-in u-pat kakol ni-sa?	- which tortoise sees us?
tik pelik-in h-u-nat ni-sa kakol?	- which tortoise didn't see us?

tik pelik-in ch-u-nat kakol ni-sa?	- which tortoise won't see us?
chi h-u-pat panib?	- who came?
chi ha-gu-pat panib?	- who came?
chi h-us-pat panib?	- who came?
chi ha-gus-pat panib?	- who came?

afa zena-din ha-ruchut-gu ef fa zaddil-in ha-bol-u guv	- the girl said that the man went yesterday
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afa zena-din ha-hafes-gu vem ch-u-pat - the girl asked whether the man will go
 fa zaddil-in bol pa tomorrow
 tik pelik-op chu-gu-pat afa zena-din - which tortoise will the girl see?
 kakol?
 tik zena-din chu-gu-pat kakol fa pelik - which girl will see the tortoise?
 op?
 afa zena-din ha-lokan-gu vem ha-gu-pat - the girl wondered whether Lodo went
 Lodo-din bol

fa makoh-in lokan-u vem ha-gu-pat - the boy wonders whether Lodo saw a
 pelik-op Lodo-din kakol tortoise
 fa makoh-in lokan-u vem chu-gu-pat - the boy wonders whether Lodo will see a
 Lodo-din kakol pelik-op tortoise
 fa makoh-in chu-lokan-u vem ch-u-pat - the boy will wonder whether the tortoise
 fa pelik-in kakol Lodo-p will see Lodo

Exercise 4. Translate the following English sentences into Epun:

The teacher read the book -fa tiktab-op fa bozud-in ha-hochik-u
 'Fa bozu-din ha-hochik-u tiktab-op'
 The teacher didn't read a book -tiktab-op ha-hochik-u fa bozud-in
 'ha-hochik-u fa bozu-din tiktab-op'
 Teachers don't read books hochik-us bozud-in-iz tiktab-op-iz
 'bozud-in-iz hochik-us tiktab-op-iz'
 The teacher will read a small book - gub bozud-in chu-hochik-u vuli-p tiktab-op
 'Gub bozu-din chu-hochik-gu tiktab-op'
 I shall not look at the child -chu-hielo-im mi-za afa kov-op
 'chu-hielo-im miza kov-in'
 She did not look at the child - afa kov-op ha-hielo-gu gu-za
 'ha-hielo-gu fa kov-op'
 The child kissed the queen yesterday - afa mide-p afa kov-in ha-smin-gu guv
 'Fa mideb-in chu-smin-us fa kov-op-iz pa'
 Queens don't kiss tortoises - smin-gus mide-din-iz peli-p-iz
 'Smin-us mide-din-iz peli-p-iz'
 He loves her -u-za aveti-u gu-za
 'Aveti-gu'
 He loved her - guza u-za h-aveti-u
 'h-aveti-gu'
 She won't love him -ch-aveti-gu gu-za u-za
 'ch-aveti-u'
 He didn't love her - gu-za h-aveti-u u-za
 'Ha-aveti gu'
 Does he love her? U-pat u-za aveti gu-za?
 'U-pat aveti?'
 Did he love her? - h-u-pat gu-za u-za aveti?
 'h-u-pat aveti?'
 Will she love me? -chu-gu-pat gu-za aveti mi-za?
 'Ch-u-pat aveti-im?'
 Won't she go? -chu-gu-pat heop pelik-in bol pa?
 'Chu-bol-u heop pelik-in pa?'
 *Will that tortoise go tomorrow?¹⁸ - ch-u-pat heop pelik-in bol pa?
 'Chu-bol-u heop pelik-in pa?'
 *Didn't that tortoise go? - h-u-nat bol heop pelik-in?
 'ha-bol-gu geop peli-din guv?'
 I wonder whether this tortoise will re- - mi-za lokan-im vem ch-u-pat gub pelik
 turn tomorrow in binap pa

'Lokan-im vem gub peli-din chu-binap
gu pa?

Translate the following Epun sentences into English:

chi chu-gus-pat binap pa?	- who will return tomorrow?
chi ch-u-pat smin afa zena-p?	- who will kiss the girl?
chi u-pat aveti Lodo-p?	- who loves Lodo?
chi gu-pat Lodo-din aveti?	- who does Lodo love? 'Who loves Lodo?'
chi ha-gu-pat Lodo-din aveti?	- who did Lodo love? 'Did anyone love Lodo?'
chi h-u-pat bol guv?	- who went yesterday?
tik pelik-in ch-u-pat kakol afa bogum- op zena-p?	- which tortoise will see the pretty girl? 'which tortoise will look at the pretty girl?'
chi h-u-pat fa tiktab-op hochik indid?	- who read the book today? 'Who reads the book today?'
tik tiktab-op ch-oh-pat ho-za hochik?	- which book will you read? 'what book will you read?'
tik zena-din chu-gu-nat panib?	- which girl won't come? 'Which girl will not come back?'
mi-za dum-im ef fa mideb-op afa mide- din ha-hielo-gu	- I think that the queen looked at the king 'I think that this queen looked at the king'
gu-za chu-jan-gu ef fa vlet-op ho-za h- erehel-oh	- she will know that you wrote the letter 'She will know that you wrote this letter'
ni-sa jan-nis ef ho-za ch-erehel-oh nunu- p vlet-op-iz	- we know that you will write many letters 'We know you will write letters'
*afa horu-din lokan-gu vem ch-us-pat fa ko-din-iz binap	- the woman wonders whether the chil- dren will return
*mi-za lokan-im tak h-u-pat u-za kakol	- I wonder what he saw/I wonder what saw him 'I wonder what he saw'
*tik horu-din ha-gu-pat fa vakvel-op kakol?	- which woman saw the walrus?
*ha-gu-pat fa vakvel-op afa horu-din kakol?	- did the woman see the walrus?
*tik horu-p h-us-pat va vakvel-in-iz ka- kol?	- which woman did the walruses see? 'Did the woman see the walrus?'
*tik h-u-pat u-za aveti?	- which did he love?/which loved him? 'Who did he love?'
*tik h-u-nat u-za kakol?	- which didn't see him? 'Did he not see him?'
*tik h-u-nat kakol u-za?	- which didn't he see?

At this stage Christopher was also provided with a (virtually) complete glossary of Epun vocabulary, presented as Epun/English and English/Epun lists. Only the former is reproduced here.

Epun - English Vocabulary

a(sa)	- they, them	af	- the
afa	- the	ako	- red
av	- the	ava	- the

aveti	- love	binap	- return
bogum	- pretty	bol	- go
bozu	- teacher (female)	bozud	- teacher (male)
chego	- bitch	chegod	- dog
chi	- who, whom	-chich	-self
dum	- think	ef	- that (comp)
erehel	- write	f	- the
fa	- the	gu(za)	- she, her
gub	- this	guv	- yesterday
hafes	- ask	he(sa)	- you (plural)
heop	- that (det)	hielo	- look at
ho(za)	- you (singular)	hochik	- read
horu	- woman	imni	- cat (male)
imnik	- cat (female)	indid	- today
jan	- know	kakol	- see
ko	- child (male)	kov	- child (female)
Lodo	- girl's name	Lodon	- boy's name
lokan	- wonder	makoh	- boy
mi(za)	- me	mide	- queen
mideb	- king	miga	- big
mong	- paper	nat	- Negative auxiliary
ngeft	- ride	ni(sa)	- we, us
nu	- some	nunu	- many
osoze	- catch	pa	- tomorrow
panib	- come	pat	- Positive auxiliary
pele	- tortoise (female)	pelik	- tortoise (male)
risp	- blue	ruchut	- say
smin	- kiss	tak	- what
tik	- which	u(za)	- he, him
v	- the	va	- the
vakve	- walrus (female)	vakvel	- walrus (male)
vem	- whether	vlet	- letter
vuli	- small	zaddil	- man
zena	- girl		

Block 5

Here are some more Epun sentences with their translations into English. Make sure you understand them before doing the next exercise.

afa horu-p mi-za ha-kakol-im	- I saw the woman
mi-za chu-kakol-im afa horu-p	- I shall see the woman
mi-za aveti-im ava horu-p-iz	- I love the women
aveti-im mi-za ava horu-p-iz	- I don't love the women
ava horu-p-iz h-aveti-im mi-za	- I didn't love the women
u-za chu-kakol-u zena-p	- He will see a girl
zena-p u-za ha-kakol-u	- He saw a girl
zena-p ha-kakol-u u-za	- He didn't see a girl
afa miga-p zena-p mi-za ha-kakol-im	- I saw the big girl
mi-za chu-kakol-im afa zena-p	- I shall see the girl
mi-za ha-kakol-gu afa zena-din	- The girl did not see me

chu-kakol-oh ho-za afa zena-p	- You won't see the girl
ho-za chu-kakol-oh afa zena-p	- You will see the girl
chu-kakol-gu afa zena-din ho-za	- The girl won't see you
mi-za lokan-im vem ch-oh-pat ho-za kakol afa zena-p	- I wonder whether you will see the girl
mi-za lokan-im vem h-oh-pat afa zena-p ho-za kakol	- I wonder whether you saw the girl
gu-za lokan-gu vem ch-im-pat mi-za kakol fa makoh-op	- She wonders whether I will see the boy
mi-za lokan-im vem h-u-pat afa zena-p fa makoh-in kakol	- I wonder whether the boy saw the girl
mi-za lokan-im vem ha-gu-nat panib afa zena-din	- I wonder whether the girl didn't come
oh-pat ho-za jan vem ha-gu-pat afa zena-din panib	- Do you know whether the girl came?
oh-pat ho-za dum ef afa zena-din ha- panib-gu	- Do you think that the girl came?
u-pat u-za jan ef afa zena-din ha-panib- gu	- Does he know that the girl came?
h-us-nat dum a-sa ef fa mideb-op afa - mide-din ha-smin-gu	- Didn't they think that the queen kissed the king?
oh-nat jan ho-za vem chu-gu-pat afa - mide-din smin fa mideb-op	- Don't you know whether the queen will kiss the king?

Exercise 5A. Translate the following sentences into English:

Ni-sa chu-bol-nis	- we will go
Chu-bol-nis ni-sa	- we won't go
Ni-sa dum-nis ef f imni-din ch-osoze-u chegod-op	'will we go?' - We think that the cat will catch a dog
Ni-sa dum-nis ef chegod-op h-osoze-u f imni-din	'we think that the dog was caught by the cat' - We think that the cat didn't catch a dog
A-sa jan-gus ef fa chegod-op h-osoze-u f imni-din	'We think that the cat caught the dog' - They know that the cat didn't catch the dog
h-us-pat a-sa dum ef imni-din-iz osoze- us chegod-op-iz?	'They know that the cat caught the dog' - Did they think that cats catch dogs? 'Did they think that the cats chase dogs?'
Oh-pat ho-za jan ef chu-smin-gu afa zena-din fa makoh-op?	- Do you know that the girl will not kiss the boy? 'Do you know that the girl will kiss the boy?'
Oh-pat ho-za dum ef afa zena-p fa makoh-in ha-smin-u?	-Do you think that the boy kissed the girl?
Gu-za lokan-gu vem chu-gu-nat bol afa zena-din	-She wonders whether the girl won't go 'She wonders whether the woman will go'
Ni-sa lokan-nis chi h-u-pat u-za kakol	-We wonder who he saw/who saw him 'we wonder who looked at him'

Exercise 5B. Translate following sentences into Epun:

I saw the dog	-fa chegod-op mi-za ha-kakol-im 'ha-kakol-im mi-za fa chegod-op'
I did not see the dog	-fa chegod-op ha-kakol-im mi-za 'Mi-za ha-kakol-im fa chegod-op'
I will see the dog	-mi-za chu-kakol-im fa chegod-op
I will not see the dog	-chu-kakol-im mi-za fa chegod-op
I wonder who saw the dog	-mi-za lokan-im chi h-u-pat fa chegod-op kakol
I wonder who did not see the dog	-mi-za lokan-im chi h-u-nat fa chegod-op Kakol
I think he saw the dog	- mi-za dum-im ef fa chegod-op u-za hahakol-u 'miza dum-im ha-kakol-u fa chegod op'
I know which dog he saw	- mi-za jan-im tik chegod-op h-u-pat u-za kakol 'miza jan-im tik chegod-op ha-kakol-u'
I know which dog saw him	- mi-za jan-im tik chegod-in h-u-pat u-za kakol 'miza jan-im tik chegod-op ha-hakol-u u-za,
Do you know which dog he saw?	Oh-pat ho-za jan tik chegod-op h-u-pat u-za kakol'? 'Ho-za jan-oh tik chegod-op ha-kakol?'

Exercise 5C. Ianthi's sister is also learning Epun. She recently produced the following Epun sentences with the English translations given. Could you correct the Epun if it is wrong and also provide a better English translation if that is necessary. [Christopher's version is as usual enclosed in inverted commas. Square brackets enclose our judgments.]

Tiktab-op afa mide-din ha-hochik-gu The queen read a book	[correct]
'Ha-hochik-gu afa mide-din tiktab-op'	[*]
Mi-za lokan-im vem chu-gu-nat bol mide-din I wonder whether the queen won't go	[Given the English translation, the Epun should be <i>afa mide-din</i>]
'OK'	
Ha-smin-gu He kissed her	[* - cf. (41b) above]
'U-za ha-smin-gu gu-za'	[This is the Epun for 'she didn't kiss him', 'he kissed her' would be: <i>gu-za u-za ha-smin-u</i>]
Tik pelik-in ch-u-pat kakol ho-za Which tortoise will see you?	[correct]
'Tik pelik-in chu-kakol-u hoza'	[* - as usual Christopher has problems with the auxiliary]
Mi-za lokan-im tik pelik-in ch-u-pat kakol ho-za I wonder which tortoise will see you	[correct] [sentence omitted in Christopher's reply]
Mi-za lokan-im tik pelik-op h-oh-pat ho-za za kakol I wonder which tortoise you saw	[correct]
'Miza lokanim tik pelik-op hoza h-oh-pat kakol'	[* - because the auxiliary always immediately follows the extracted wh-word]
Lokan-im chi ch-u pat bol I wonder who will go	[* - Epun is not pro-drop]
'Miza lokanim chi ch-u-pat bol?'	[correct]

Lokan-im chi ha-gu-pat afa zena-din kakol I wonder who the girl saw 'Miza lokanim chi ha-gu-pat kakol afa zenap?'	[* - as above] [* - wrong word-order]
Lokan-im chi h-u-pat afa zena-p kakol I wonder who saw the girl 'Lokan-im h-upat chi kakol afa zena-p?'	[* - as above] [* - for several reasons]
Lokan-im mi-za chi h-u-pat fa ko-p kakol I wonder who saw the boy 'Miza lokan-im chi hupat fa kop kakol'	[* - <i>mi-za lokan-im...</i>] [correct]
Lokan-im mi-za chi h-u-pat fa ko-din kakol I wonder who the boy saw 'Miza lokanim chi h-u-pat fa ko-din kakol'	[* - as above] [correct]
Mi-za dum-im ef aveti-u	[* - cf (41a) above - Given the English translation, the Epun should be <i>mi-za dum-im ef gu-za aveti-gu u-za</i>]
I think that she loves him 'Dum-im miza ef aveti-u?'	[* - perseveration?]
Gu-za jan-gu ef h-aveti-gu She knows that he loved her 'Copied exactly'	[* - cf (41b) above - Given the English translation, the Epun should be <i>gu-za jan-gu ef gu-za h-aveti-u</i>]
U-za dum-u ef ch-aveti-u He thinks that she will love himself (sic) 'Copied exactly'	[* - cf. (41)] [Christopher did not even correct the English]
Oh-pat ho-za jan vem ch-oh-pat ho-za bol pa? Do you know whether you'll go tomorrow? 'Copied with the omission of <i>bol</i> '	[correct]
Mi-za jan-im ef gu-za ha-smin-u u-za I know that he didn't kiss her 'Miza janim ef u-za ha-smin-u guza'	[correct] [* - wrong word order]
U-za jan-u ef h-u-nat gu-za smin u-za He knows that he didn't kiss her 'Copied exactly'	[* - no auxiliary needed]

Block 6

Here are some more example sentences from Epun, together with some more exercises. Note that the word for 'and' is *to*, the Epun *nog(in)* indicates emphasis, and that the verb always agrees with the subject.

- | | |
|---|---|
| (1) Fa chegod-op to afa zena-p mi-za ha-kakol-im | -I saw the dog and the girl |
| (2) Ni-sa dum-nis ef afa mide-din to fa mideb-in ch-erehel-us vlet-op to tik-tab-op | -We think the king and the queen will write a letter and a book |
| (3) Fa zaddil-in ha-bol-u-nog guv | - The man did go yesterday |
| (4) Lodon-in ha-bol-u guv-nog | - Lodon did go yesterday |
| (5) Afa zena-din to mi-za binap-gus indid | - The girl and I return today |
| (6) A-sa lokan-us vem chu-gus-pat afa zena-din to mi-za erehel vlet-op | - They wonder whether the girl and I will write a letter |
| (7) Chi chu-gus-pat binap-nog pa? | - Who will return tomorrow? |
| (8) Chi h-u-pat Lodo-p to mi-za kakol? | - Who saw Lodo and me? |
| (9) Chi h-u-pat Lodo-p-nog to mi-za kakol? | - Who did see Lodo and me? |
| (10) Chi h-oh-pat Lodo-din to mi-za kakol? | - Whom did Lodo and I see? |
| (11) Tik pelik-op to vakvel-op chu-gu-pat afa zena-din kakol? | - Which tortoise and walrus will the girl see? |
| (12) Tik zena-p ch-oh-nat hielo mi-za to Lodon-in? | - Which girl won't Lodon and I look at? |
| (13) Mi-za lokan-im tik bozud-in ch-u-pat osoze imni-p to fa chegod-op | - I wonder which teacher will catch a cat and the dog |
| (14) Gu-za to mi-za jan-gus ef Lodon-op ho-za h-aveti-oh | - She and I know that you loved Lodon |
| (15) Afa mide-p fa ko-din ha-smin-u guv | -The child kissed the queen yesterday |
| (16) Afa mide-p fa-nog kod-in ha-smin-u guv | -The child did kiss the queen yesterday |
| (17) Fa ko-din chu-smin-u afa mide-p pa | -The child will kiss the queen tomorrow |
| (18) Fa ko-din chu-smin-u-nog afa mide-p pa | -The child will kiss the queen tomorrow |
| (19) Chu-smin-u fa kod-in afa mide-p pa | -The child won't kiss the queen tomorrow |
| (20) Chu-smin-u fa ko-din-nog afa mide-p pa | -The child will not kiss the queen tomorrow |
| (21) Afa mide-p ha-smin-u fa ko-din guv | -The child didn't kiss the queen yesterday |
| (22) Afa mide-p ha-smin-u-nog fa ko-din guv | -The child did not kiss the queen yesterday |
| (23) Mideb-in ha-panib-u | -A king came |
| (24) Mideb-in ha-panib-u nogin | -A king did come |
| (25) Afa zena-din ha-ruchut-gu-nog ef fa zaddil-in ha-bol-u guv | -The girl did say that the man went yesterday |
| (26) Afa zena-din ha-ruchut-gu ef fa zad dil-in-nog ha-bol-u guv | -The girl said that the man did go yesterday |
| (27) Tak oh-pat ho-za erehel indid? | -What are you writing today? |
| (28) Tak oh-pat ho-za-nog erehel? | -What are you writing? |
| (29) Tik tiktab-op oh-pat ho-za hochik? | -Which book are you reading? |
| (30) Tik tiktab-op oh-pat-nog ho-za hochik? | -Which book are you reading? |
| (31) Tik vlet-op ch-us-pat afa zena-din to fa makoh-in hochik? | -Which letter will the girl and the boy read? |
| (32) Tik tiktab-op chu-nis-pat ni-sa erehel? | -Which book shall we write? |
| (33) Tik tiktab-op chu-gus-pat Lodo-din to mi-za hochik? | -Which book shall Lodo and I read? |
| (34) Tik tiktab-op ch-oh-pat Lodon-in to mi-za hochik? | -Which book shall Lodon and I read? |
| (35) Chu-hochik-oh u-za to-nog mi-za fa vlet-op | -He and I will not write the letter |

Exercise 6A. Translate the following Epun sentences into English:

- (1) Fa chegod-op to mi-za afa zena-din ha-hielo-gu

- The girl looked at the dog and me
'The girl looked at the dog and I'
- (2) Fa chegod-op to-nog mi-za afa zena-din ha-hielo-gu
The girl did look at the dog and me
'The girl did look at the dog and I'
- (3) Afa horu-din to mi-za bol-gus indid
The woman and I go today
- (4) Mi-za lokan-im vem ch-oh-pat ho-za aveti afa vuli-p zena-p
I wonder whether you will love the little girl
'I wonder if you will love the small girl'
- (5) Chi h-oh-nat fa-nog mideb-in to mi-za kakol?
- Who **didn't** the king and I see?
'Who didn't see the queen and I?'
- (6) Gu-za to mi-za jan-gus ef chegod-op ho-za h-osoze-oh
She and I know that you caught a dog
'She and I know that you caught the dog'
- (7) Afa mide-din chu-smin-gu-nog fa ko-p pa
The queen **will** kiss the child tomorrow
'The queen will *kiss* the child tomorrow'
- (8) Mide-din-iz ha-panib-gus nogin
- Queens **did** come
'Queens did return'
- (9) Ha-panib-us mideb-in-iz nogin
- Kings **didn't** come
'Queens did not return'
- (10) Afa mide-din ha-ruchut-gu-nog ef ha-bol-im mi-za-nog
The queen **did** say that I **didn't** go
'The queen did say that I did go'

Exercise 6B. Translate the following English sentences into Epun:

- (1) She and I love tortoises
- Gu-za to mi-za aveti-gus pelik-op-iz
- (2) He and I love walruses
- U-za to rni-za aveti-oh vakvel-op-iz
'U-za to mi-za aveti-us vakvel-op-iz'
- (3) I wonder who **did** come
- Mi-za lokan-im chi h-u-pat panib-nog
'Mi-za lokan-im chi ha-panib-u-nog'
- (4) Which girl will the king and the queen see?
Tik zena-p ch-us-pat fa mideb-in to afa mide-din kakol?
'Tik zena-p chu-kakol-us fa mideb-in to afa mide-din?'
- (5) Lodo **did** return
- Lodo-din ha-binap-gu nogin
'Lodo ha-binap-gu-nog'
- (6) That dog catches tortoises
-Heop chegod-in osoze-u pelik-op-iz
'Heop chegod-in osoze-u peli-op-iz'
- (7) This dog **doesn't** catch them
- Osoze-u gub chegod-in-nog a-sa
'Osoze-u-nog gub chegod-in a-sa'
- (8) Which letter did Lodo and I read?
-Tik vlet-op ha-gus-pat Lodo-din to mi-za hochik?
'Tik vlet-op ha-hochik-gus Lodo to mi-za?'
- (9) Which letter **did** Lodon and I write?
Tik vlet-op h-oh-pat-nog Lodon-in to mi-za erehel?
'Tik vlet-op h-erehel-us-nog Lodon to mi-za'
- (10) The boy wonders whether Lodo **did** see a cat

Fa makoh-in lokan-u vem ha-gu-pat imni-p-nog Lodo-din kakol
'Fa makoh-in lokan-u vem ha-kakol-gu Lodo imni-p'

Exercise 6C. Read the following Epun sentences and correct any that you think are wrong, then translate the corrected version into English:

(1) Tik chegod-op h-oh-pat to pelik-op ho-za kakol? [CSC violation]

Which dog did you see and a tortoise?

Christopher marked the Epun 'correct' and translated it:

'Which dog and tortoise did you see?'

(2) Tik chegod-op ch-u-pat u-za kakol pelik-op to [CSC violation]

Which dog will he see a tortoise and?

'Tik chegod-op ch-u-pat to pelik-op u-za Kakol?'

'Which dog and tortoise will he see?'

(3) Gu-za to mi-za chu-panib-nis [Wrong (logical) agreement]

She and I will come

(Christopher marked this and all subsequent Epun sentences correct and gave the correct translation for this one.)

(4) U-za to mi-za aveti-nis pelik-op-iz [Wrong (logical) agreement]

He and I love tortoises

(Translated correctly)

(5) A-sa lokan-us vem-nog ch-oh-pat ho-za erehel [correct]

vlet-op

They do wonder whether you will write a letter

'They wonder if you will write a letter'

(6) U-za aveti-u gu-za-nog [correct]

He does love her

'He loves her'

(7) Tik horu-p chu-nis-nat hielo mi-za to Lodo-din [Wrong (logical) agreement]

Which woman won't Lodo and I look at?

'Lodo and I won't look at this woman'

(8) Ko-din ha-binap-u nogin [correct]

A child **did** return

'The child did return'

(9) Kov-in chu-panib-gu-nog [Wrong form of emphasis]

A child **will** return

'The girl will return (come)'

(10) Ni-sa ha-dum-nis ef fa makoh-in to mi-za [correct]

chu-bol-oh pa

We thought that the boy and I will go tomorrow

(Translated correctly)

Notes

¹ Parts of this work have been presented at the Boston University Language Development Colloquium; the Linguistics Association of Great Britain; Birkbeck College, London; Essex University; University College London; and several other venues. We are grateful to all those present who have helped by making suggestions, providing corrections and saving us from egregious error. For comments, conversation and other forms of help we are also indebted to Liliana Barbero, Annabel Cormack, Vincent Dautry, Phil Harrison, Rita Manzini, Dick Nosworthy, Amahl Smith, Ivan Smith and Deirdre Wilson. All remaining errors are our responsibility. We owe a special debt to Chris for his unfailing cooperativeness and enthusiasm, and to his family for their advice, help and understanding. We would particularly like to thank Beate Hermelin and Neil O'Connor, who first introduced us to Christopher and who have given us the benefit of their vast experience and insight ever since; John Carlile and his family, whose humane tolerance and concern have been an inspiration to us; and, finally, the Leverhulme Trust whose generous support, under grant number F.134AS has made the research possible.

² Following Bley-Vroman (1989: 43), we use the terms 'learn' and 'acquire' interchangeably. It is likely that some aspects of Christopher's performance, especially parts of his (conscious) command of morphology, are due to 'learning' in the sense of Krashen (1981). It is, however, clear that other aspects of his performance, especially parts of his (unconscious) command of syntax, are 'acquired'.

³ We do not, of course, wish to claim that other theories of L2 acquisition (e.g. White 1989) could not accommodate transfer errors; nor indeed that any of the individual claims in (2) is peculiar to us. It is the combination of (2a-d) that defines our theory. For background discussion, see Flynn (1988).

⁴ For relevant discussion, see White (1985), Liceras (1989).

⁵ So, for example, assuming that [1 + pro-drop] is the unmarked value (cf. Hyams 1986), it follows that it could not qualify as default for L2 learning where the L1 is [- pro-drop], whatever the value of the L2.

⁶Although note that according to Rizzi's (1986) analysis, rich morphology satisfies only the Identification condition on pro, Licensing being an independent condition. That is, AGR is or is not a licensing head independently of its morphological realisation.

⁷There is no indication that the Berber complementiser *qa* incorporates an AGR element of the type responsible for the *que/qui* alternation in French and the proper head-government of the trace in the subject position. The wh-complementiser *ay*, which might be argued to incorporate an AGR element, like its Irish counterpart (Chung and McCloskey 1987, and Rizzi 1990). does not occur in embedded contexts which do not involve local wh-movement.

⁸The resumptive pronoun strategy is generally available in the language even in situations involving extraction out of a *that*-clause:

- (i) Man lechtab ay t-nni-t qa y- sghi t Mohand
which book comp 2s-said-2s that 3ms-bought it Mohand
'Which book did you say that Mohand bought?'

However, while the resumptive pronoun strategy is strongly preferred in the Tarifit dialect in situations involving extraction out of a wh-island, it is the movement strategy which is preferred in sentences such as (i).

⁹This conclusion also applies to Christopher's rejection of *that*-trace effect violations. Here too he has the option of treating the AGR element as a subject clitic, in which case the sentences could be said to involve the resumptive pronoun strategy, instead of the movement strategy. As pointed out in note 8, the presence of resumptive pronouns at one level of embedding, where the embedded clause is a *that*-clause, although not preferred, is a possible option in the language.

¹⁰For instance, in Nupe (cf. Smith 1967) sentences show SVO word-order, as in (i), in all 'tenses' except the perfect, in which the object precedes the verb, as in (ii):

- (ia) mi bā evo
I break calabash
'I broke the calabash'
(ib) mi à bā evo
I Fut break calabash
'I shall break the calabash'
(ic) mi à evo bā
I Perf calabash break
'I have broken the calabash'

The reader may have noticed, as did Christopher, that 'Epun' is Nupe spelt backwards. The languages have little else typologically in common, and Christopher knows no Nupe.

¹¹Jean Aitchison has pointed out to us that the position of the emphatic marker is partly structure-dependent, as it takes account of the distinction between main and subordinate clauses. While true, this does not alter the fact that its position within any clause is structure-independent.

¹²We considered at some length the ethical problem of deceiving Christopher about the status of Epun, and concluded that our actions were justifiable. Christopher has mastered fragments of many languages, several of which he has never had the opportunity of speaking, and which, in the absence of specific stimulus, he shows no particular interest in pursuing. In these circumstances, we did not think that he would be harmed in any way by learning bits of a (twentieth) language, of which he will never encounter speakers other than us.

¹³This heading giving explicit information about the implications of the word-order was omitted from the version of the exercise given to the controls. When this exercise was returned to Christopher, it was annotated with remarks such as (for the first example) 'In the past tense the object comes first' and 'remember the definite article'. We have omitted that feedback here.

¹⁴From the sequence, 'aFa' it looks as if Christopher first wrote 'Fa' and then corrected it by adding the initial 'a'.

¹⁵In this and the following example, Christopher originally wrote 'Heop makoh-in chu-panib-u fa indid', and then indicated that the verb should be initial. The excrescent *fa* is unexplained.

¹⁶As pointed out by the controls, this was a mistake. It should have been *h-osoze-us*.

¹⁷The reduction of *ha-* to *h-* in this context is optional.

¹⁸In this and the following sentences marked with an asterisk, Christopher failed to provide a translation on the first time of asking, but later posted the translations given (after some considerable prompting).

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