Optimality Theory, markedness and second language syntax: the case of resumptive pronouns in relative clauses

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Eckman, Fred R. 2004. Optimality Theory, markedness and second language syntax: the case of resumptive pronouns in relative clauses. *Studies in Phonetics, Phonology and Morphology* 10.1. 89–110. This paper proposes a constraint-based analysis for what is arguably the most interesting phenomenon in second language (L2) syntax, the occurrence of an L2 error pattern where the regularity cannot be explained in terms of either transfer from the learner's native language or input from the target language. The case in point for this paper involves the occurrence of resumptive pronouns in the relative clauses of learners of Swedish as a second language. It is argued that the systematicity of the learners' errors can be explained by independently-motivated assumptions of Optimality Theory. **(University of Wisconsin–Milwaukee)**

Keywords: Optimality Theory, the emergence of the unmarked (TETU), second language syntax, interlanguage syntax, relative clauses, markedness, Accessibility Hierarchy, resumptive pronouns, constraints, typology, Swedish as a second language

1. Introduction

One of the most interesting phenomena in second language acquisition (SLA) is a pattern of learner utterances—often, though not always, errors—in which the regularity is not explainable either in terms of the native language (NL) or the target language (TL), but is nevertheless an attested pattern found in other human languages. This type of systematicity appears to be a result of the learner's construction of a separate grammatical system termed an interlanguage (IL). What is particularly intriguing about this kind second language (L2) pattern is that it suggests that IL grammars obey the same constraints as native language grammars. Such L2 utterances are important, then, because they stand to give insight into the kinds of processes that must be involved in L2 acquisition, and over the years this type of phenomenon has been cited by numerous investigators to support various claims about SLA.

An example of such an L2 pattern, one that forms the focus of this paper, is from a study by Hyltenstam (1984) in which he analyzed the occurrence of resumptive pronouns in relative clauses produced by L2 learners of Swedish, where such pronouns are not allowed in any relative

clause positions in some of the native languages, and are disallowed completely in the TL.

The purpose of this paper is to propose that the above example of an L2 pattern that is novel in the sense of being neither NL-related nor TL-derived represents a phenomenon termed "the emergence of the unmarked" (TETU) within the constraint-based framework of Optimality Theory (OT: Prince & Smolensky 1993, McCarthy 2002), which is the only theory of grammar to this point which explicitly, and intrinsically, incorporates structural markedness relations. If the TETU proposal can be maintained for IL grammars, there are two interesting conclusions that follow. The first is that an account of the above facts within a markedness framework such as incorporated into OT would mean that IL grammars are characterized using the same mechanism as L1 grammars, namely, constraint ranking and re-ranking. IL grammars and L1 grammars, in other words, would have to be viewed as the same kinds of systems, obeying the same general laws. This would mean that IL grammars differ systematically from L1 grammars in the same way that L1 grammars differ from each other.[1] The second consequence is that it would be possible within this framework to explain the source of novel IL utterance types. Under the markedness assumptions of OT, the above-mentioned IL pattern, which seems not to be related to either the NL or TL, would be shown to arise from the nature of the constraint interaction and from independently-needed assumptions about the architecture of the theory. And if this position could be defended for one such IL pattern, it would suggest that the same kind of explanation could be sought for other, similar L2 data sets.

The structure of the remainder of the paper is as follows. Section 2 describes the assumptions underlying the characterization of IL grammars within the OT framework. This is followed in section 3 by an illustration of how the case study alluded to above can be analyzed as TETU, the emergence of the unmarked, within OT or other theories which make explicit markedness assumptions. Section 4 considers the implications of this analysis, and section 5 concludes. We begin by laying out the assumptions for describing IL grammars in the now familiar OT model.

[1] This is interesting, of course, only if it can be shown only natural languages, and not simply any kind of system, can be characterized using the principles of OT. I am indebted to Edith Moravcsik for this point.

2. Optimality Theory and SLA

The goal of this paper is to argue that the kind of L2 pattern mentioned in the previous section can be insightfully accounted for within a constraint-based framework as an instance of the emergence of the unmarked. To make this point, it is necessary to invoke three independently-motivated assumptions. The first is that the constraints within OT form a universal inventory of well-formedness conditions on linguistic representations. Since no linguistic representation can satisfy all of these constraints, they need to be ranked within the grammars of individual languages. The second assumption is that some language universals are characterized by constraint hierarchies which consist of a set of sub-constraints whose ranking is invariant across languages. These constraint hierarchies therefore differ from the rankings of other constraints within OT, whereby the constraint rankings typically vary across grammars of different languages. The ranking of the sub-constraints constituting a constraint hierarchy, on the other hand, does not differ from language to language. The third assumption is that in the initial stages of interlanguage grammars, there exists a family of markedness constraints that is undominated. In fact it is this assumption that allows the L2 utterances in question to be characterized as the emergence of the unmarked. These L2 patterns "emerge" because the higher ranked constraints that are typically decisive in characterizing well-formedness are not determinant in these instances; instead, the optimal candidate is decided by markedness constraints which under other circumstances are lower ranked.

In the remainder of this section, each of these assumptions will be laid out explicitly, and where necessary, motivated.

We begin with the question of constraint universality. According to Legendre (2001), OT is an approach to the characterization of grammaticality, or well-formedness, and as such is not a substantive theory of syntax, phonology or any other phenomenon. Within virtually all other linguistic frameworks, grammaticality is described in terms of rules or principles, whereby a representation's deviance is characterized in terms of one or more violations of the grammar. If the formal description of a given representation can be shown to violate some aspect of the grammar, the form is predicted to be ungrammatical; conversely, if the representation does not violate any of the statements of the grammar, it is claimed to be grammatical. OT, on the other hand, is a formal theory of constraint interaction, and the basis for ungrammaticality is comparative; a representation is not necessarily deviant because it violates a constraint (McCarthy 2002). Within this framework, grammars are characterized as a ranked set of violable constraints, and well-formedness is defined by a

process of optimization, whereby the representation that satisfies the highest ranked constraint is predicted to be grammatical, even though that representation may violate lower ranked constraints.

Because the constraints are assumed to be part of a universal inventory, grammars of languages do not differ from each other in terms of which constraints they have; rather, grammars can differ from each other only in the particular ranking of the constraints. In other words, as Legendre (2001: 4) points out, languages cannot differ in their well-formedness criteria, but only in which criteria have priority in cases of conflict.

This tenet of OT leads to one of the key predictions of the theory, namely, that the universal constraints and language-particular rankings yield a factorial typology of language types (Prince & Smolensky 1993). With minor qualifications, every possible permutation of the constraints is predicted to characterize a human language, and the grammar of every human language is predicted to be one of the possible rankings of the constraints.

The qualifications surrounding the factorial typology involve two situations. The first is where two constraints do not conflict with each other, in which case alternate rankings will have no empirical consequence. And the second qualification arises when the constraints constitute a universally-fixed constraint hierarchy, which leads us to the second assumption on which our explanation for Hyltenstam's (1984) resumptive pronoun facts rests.

An example of such a constraint hierarchy is based on the Accessibility Hierarchy (Keenan & Comrie 1977), shown in (1).

(1) Accessibility Hierarchy (AH)
Su > DO > IO > Oblique > Gen > Ocomp

Because the generalization represented by the AH is an important part of one of the facts to be addressed below, and given that relative clauses have received a significant amount of attention in the typological literature, it is worthwhile to consider this hierarchy in a little more detail.

The study by Keenan and Comrie argued that the variation in relative clauses exhibited by the world's languages could be characterized in terms of the above hierarchy. The symbol ">" means "is more accessible than", and Su, DO, IO, etc. refer respectively to the grammatical functions subject, direct object, indirect object, oblique, genitive and object of a comparative. English examples of the relative clause types depicted on the AH in (1) are shown, respectively, in (2), where the relative clause is italicized and the relative pronoun representing the position being relativized is in bold.

(2) a. There is the woman ***who*** *is my sister.*
b. There is the woman ***who(m)*** *I registered.*
c. There is the woman whom I sent an application to.
d. There is the woman whom I read about in the newspaper.
e. There is the woman whose sister graduated last year.
f. There is the woman who I am older than.

Keenan and Comrie's intuition behind the AH was that the positions on the hierarchy represent the degree of difficulty in forming relative clauses, with easier positions being at the top (to the left) of the hierarchy, and more difficult positions being at the bottom (to the right). Because of a few exceptions, this intuition could not be completely captured by the AH, leaving the authors to state the constraints on accessibility in relative clauses as in (3).

(3) a. All languages can relativize subjects.
b. If a language can relativize any position on the AH with a primary strategy (i.e. one used to relativize subjects), then it can relativize all higher positions with that strategy.
c. For each position on the AH, there are possible languages which can relativize that position with a primary strategy.

The hierarchy in (1) and the generalizations in (3) characterize the fact that not all languages can form all kinds of relative clauses; in fact, some languages can form relative clauses only by relativizing the subject, and no other position (e.g. Malagasy, Toba Batak). Other languages, such as English, can form relative clauses by relativizing all six positions on the AH, as shown in (2). And some languages can relativize more positions than just the subject, but they cannot relativize all of the positions (e.g. Kinyarwanda).

Some work on relative clauses since the Keenan & Comrie study has taken into account a wider set of languages, and has attempted to address some of the recalcitrant cases by using a broader classification of relative clause types, both in terms of the strategies for forming such clauses (Kuteva & Comrie, forthcoming), and also in terms of whether a verb or a noun is the basis for the relative clause (Lehmann 1986). The hierarchy that seems to have distilled out of this discussion is as shown in (4).

(4) Accessibility Hierarchy (revised) (Lehmann 1989; Croft 1990)
Su/absolutive > DO/ergative > Indirect object > Oblique

And finally, it is entirely plausible, even likely, that the AH as depicted

in (4) is simply a shorthand notation for the accessibility of an NP represented in terms of constituent bracketing, rather than grammatical relations, as has been argued in O'Grady & Lee (2001, [cited in O'Grady 2001]) and Wolf-Quintero (1992). Whatever formulation of the AH ultimately turns out to be defensible, the two important conclusions that we can draw from the revised hierarchy in (4) are that (a) it is predictably systematic how languages can vary from each other with respect to relative clause constructions, and (b) it follows from (3b) above that the various positions on the AH are in a markedness relationship with respect to each other.

Returning to the main theme, we see that the AH in (4) would be represented as a constraint hierarchy such as that in (5), which would be invariant across all languages.

(5) *Obl gap >> *IO gap >> *DO gap >> *Su gap

The representation "*Obl gap" penalizes constructions in which there is a gap in the object of a preposition (adposition), as there is after the word *about* in (2d) above; "*IO gap" penalizes structures with a gap in an indirect object position, that is, after the word *to* in (2c) above, and so on. One of the relativization strategies used by some languages is to have a resumptive pronoun occur in the gap left by the process of relativization. Standard English does not allow such resumptive pronouns, but if it did, the sentences in (6) would be examples.

(6) a. There is the woman *who she is my sister*.
b. There is the woman who(m) I registered her.
c. There is the woman to whom I sent her an application.
d. There is the woman whom I read about her in the newspaper.
e. There is the woman who her sister graduated last year.
f. There is the woman who I am older than her.

Thus, if the constraint hierarchy in (5) were ranked high in the grammar of a language, the relative clauses of that language could satisfy the constraints by not having a gap in relative clauses by employing a relative clause strategy that put resumptive pronouns in the gaps.

What characterizes a constraint hierarchy such as the one in (5), then, is that the ranking of the various sub-constraints on the hierarchy is the same across all languages. Whereas other constraints within OT, those which do not constitute a constraint hierarchy, can occur with different rankings in different grammars, the order of the constraints within a constraint hierarchy never changes. One clarification is worth emphasiz-

ing here: though the ordering of the sub-constraints in a constraint hierarchy never varies, it may be the case that other constraints within the grammar are interpolated within the hierarchy itself. It is the fact that other constraints can be ranked within the constraint hierarchy in (5) that accounts for the fact that some languages require resumptive pronouns in some relative clause types, but disallow them in others. Thus, for example, another constraint of the grammar of some language, (e.g. the constraint Dep—to be discussed below), may intervene between *IO gap and *DO gap. Dep penalizes candidates which contain structural representations or lexical items that are not contained in the input. Interpolating this constraint between, say, the *IO gap and *DO gap sub-constraints in (5), such that Dep is ranked higher than *IO gap but lower than *DO gap, would account for the fact that such a grammar licenses resumptive pronouns in IO and Obl relative clauses, but excludes such resumptive pronouns from direct object and subject gaps in relative clauses. This constraint ranking would characterize Greek. However, it will always be the case, despite such interpolation of other constraints, that the relative order of the sub-constraints on a constraint hierarchy is maintained.

To sum up this section so far, OT postulates that natural language grammars draw on the same set of universal constraints, and that particular grammars are the result of different rankings of these constraints. The major exceptions to this are constraint hierarchies, where the ranking of the sub-constraints is invariant across all languages. Grammaticality within OT is predicted on the basis of an optimization process, which selects as optimal the candidate that satisfies the highest ranked constraint.

We now turn to the third assumption underlying our account of the above L2 resumptive pronoun facts, namely, how OT would characterize the initial state of an L2 grammar, or equivalently, what the initial ranking of the constraints is in the learner's IL.

Within OT, the constraints are divided into two classes according to their function: faithfulness constraints, which penalize candidates that deviate from the input, and markedness constraints, which penalize candidates that are relatively marked. This division of constraints essentially depicts, respectively, two opposing pressures in natural languages, contrast and simplification (Aissen 2001). In first language acquisition, the general consensus among OT practitioners is that the initial ranking of the constraints is such that the set of markedness constraints is ranked higher than the set of faithfulness constraints. Under this view, the process of language acquisition is seen as one of promoting faithfulness constraints and demoting markedness constraints, as the child

learner acquires the various contrasts of the ambient language, and overcomes the simplification tendencies that typify child speech.

The situation is a little different when one considers the initial ranking of the constraints in the IL of the L2 learner, as in this case, the learner can bring the L1 grammar to the acquisition task, and there is the possibility that the initial constraint ranking in the IL will reflect the L1 ranking. In fact, this is what has been assumed in the L2 studies that have been done within the OT framework to date (Broselow et al. 1998, Hancin-Bhatt & Bhat 1997). This assumption reflects the general view held by SLA linguists that L2 acquisition does not recapitulate L1 acquisition, and that the initial stages of L2 acquisition are different from those of L1 acquisition. The thinking is that, unlike the child, the adult L2 learner does not approach language learning by ranking all markedness constraints above faithfulness constraints, but instead initially draws on the NL grammar in the task of L2 acquisition. This view gains some support from the fact that the errors of adult L2 learners can, at least in part, be attributed to L1 transfer, and are in some respects different from those of child learners.

This proposal for the initial state of IL grammars notwithstanding, I wish to suggest a slightly different approach to the initial ranking of the constraints in the IL, one which draws both on the assumptions regarding the ranking in child grammars, and preserves some of the assumptions with respect to the initial ranking of constraints in L2 acquisition. Instead of postulating that all markedness constraints are ranked higher than faithfulness constraints, and instead of assuming that the initial IL ranking is the same as the one in the NL, let us assume instead that in the initial stages of L2 learning, a family of markedness constraints is undominated in the IL. Under this proposal, the family of constraints in question would penalize constructions that contain non-adjacent dependency relations, such as those resulting from, among others, the formation of a relative clause, the reordering of constituents, or the establishment of coreferential elements in a binding relation. We abbreviate this family of constraints as in (7).

(7) *Non-Adjacent Dependencies (*NAD): penalize structures with non-adjacent dependency relations

We posit further that, in the initial stages, ranked below this family of markedness constraints, is the intact, or perhaps nearly intact, ranking of the constraints in the learner's NL grammar, as shown in (8).

(8) Proposal for constraint ranking in the initial state of the IL
*NAD >> NL ranking

The proposal in (8) is motivated by the facts that, on the one hand, L2 learners evidence at least some transfer, and on the other hand, by the fact that L2 learners also experience difficulty with certain TL structures, even though those constructions may be part of the learner's NL. The claim embodied in (8) is that such constructions involve non-adjacent dependencies. Under this view, L2 acquisition would be seen as a process of promoting constraints that will enable more faithfulness between the input and the optimal candidate, and of demoting both the markedness constraints and those NL constraints that do not agree with the TL ranking. A good example of a member of this family of markedness constraints represented in (7) would be the constraint hierarchy of accessibility in (5), which, as was discussed above, contains a set of subconstraints each of which penalizes a structure according to the "distance" between the relative pronoun and its gap. In the discussion that follows in subsequent sections, we will consider other examples of the constraints that are abbreviated in (7).

Now, since any explanation is only as sound as the assumptions that underlie it, we turn in the remainder of this section to providing motivation for (8). In what follows, it will be argued that the assumptions underlying this proposal accord well with a number of insights that have been put forth over the last few decades in SLA research in at least three areas: (a) that L2 learners often have difficulty with structures that do not differ between the NL and TL; (b) that structural markedness is necessary to characterize some of the initial stages of IL development; and (c) that there is a role for processing constraints in shaping the IL grammar. We will discuss each of these in turn.

That L2 learners experience difficulty with TL structures, even though such structures may not differ from those present in the NL, has been discussed in the literature for both phonology and syntax. Altenberg & Vago (1983) reported that Hungarian-speaking learners of English devoiced word-final obstruents in the IL, showing that their subjects had difficulty with word-final voice contrasts in English obstruents, despite the fact that Hungarian also has such a contrast. A similar phenomenon has been reported for syntax involving canonical word order in L2 German. A recent study by Hakansson et al. (2002) showed that Swedish-speaking learners of German had difficulties learning certain aspects of German word order. Both Swedish and German are known as V2 languages, which means that, in main clauses, the finite verb must occur as the second constituent in the sentence. In many declarative sentences,

this fact manifests itself as subject-verb-object order. However, if some constituent other than the subject of the sentence occurs initially, as in the case of topicalization or focus, the verb, and not the subject, must immediately follow this initial constituent. Hakansson et al. showed that their Swedish-speaking learners of German experienced difficulty with V2 constructions, despite the fact that both Swedish and German are similar in this respect. And finally, Tarrallo & Myhill (1983) showed that English-speaking learners of a number of TLs produced resumptive pronouns in TL relative clauses, where the TL did not differ from English in relative clause structure.

Turning now to the question of typological markedness, we note that Hyltenstam (1984) proposed that all IL grammars are characterized by unmarked structures in the initial stages. What was particularly intriguing about Hyltenstam's proposal was that he claimed that the IL was typified by unmarked constructions even though both the NL and TL may contain the corresponding marked structure. More recently, Major (2002), in the Ontogeny Model (OM), has claimed that the relative frequency of NL transfer effects and developmental processes changes over time, where Major's term "developmental processes" corresponds roughly, in our framework, to structural markedness principles.[2] The OM predicts that NL influence over time decreases, and that markedness constraints over time increase initially and then decrease. While our assumptions about the initial state of the IL constraint ranking and the OM do not match perfectly, they both postulate an increasing, and then decreasing, effect of markedness and a decreasing effect of NL influence.

The proposal in (8) also accords well with insights into SLA, which, over the years and up to the present, have postulated a significant role for processing in explaining IL development. This is seen clearly in the work of Clahsen (1984), Pienemann (1989) and O'Grady (2001). For example, Clahsen (1984) proposed three processing mechanisms to explain, among other facts, the L2 stages of acquisition of question formation. These mechanisms, or strategies, Canonical Order, Initialization-Finalization and Subordinate Clause, characterize in terms of derivational movement an increasing capacity of the L2 learner to deal with structural complexity as measured in terms of constituency and dependency relations. Similarly, Pienemann (1989), building on Clahsen's processing strategies, has proposed that the stages of L2 acquisition of German word order can be explained in terms of the relative complexity associated with learners' ability to process the relevant structures. The L2 learners' progression

[2] Although the Otogeny Model was originally proposed to account for L2 phonology, its domain has recently been extended to other areas of SLA (Major 2002).

from an initial stage of Subject-Verb-Object (SVO) canonical order, through the various stages in which verbal elements must occur clause-finally or clause-second, can be predicted on the basis of the relative size of the structure that must be processed, that is, on the size of the structure over which certain dependency relations must be computed.

And more recently, O'Grady (2001) has argued for a determinant role of processing constraints, not just within second language acquisition, but within the much larger context of the language faculty and the computations necessary to produce and understand utterances. O'Grady's proposal is that most, if not all, of the various syntactic principles that have been proposed over the last few decades can be made to follow from a few constraints that are independently needed to explain how humans process utterances in real time. His fundamental premise is that this processing mechanism combines the elements of a sentence in a linear fashion, "left to right", and that lexical dependency relations must be resolved at the earliest possible time. The principle governing this resolution of dependencies he terms the Efficiency Requirement, which he suggests is motivated by pressure to ease the burden on a speaker's working memory. O'Grady extends these principles to the domain of second language acquisition, where he argues that certain facts about IL patterns can be explained if one assumes that dependency relations in the L2 arena have to be resolved immediately, rather than simply as early as possible.

To sum up this section, the explanation of the L2 resumptive pronoun facts in Hyltenstam (1984) as a TETU phenomenon is based on three crucial assumptions, all of which are independently motivated. The first is that grammars of natural languages do not differ from each other in their inventory of constraints, but only in the ranking of these constraints; the second is that the relative ranking of the sub-constraints on a constraint hierarchy is universal across all languages, and the third is that the initial state of IL grammars is characterized by a set of undominated markedness constraints, as in (7), which penalize non-adjacent dependency relations, such as those involved in some relative clause types, binding relations, inter-phrasal agreement, and movement operations. We also take it as given that the NL ranking of the constraints, or an order close to that ranking, is ordered below these markedness constraints in the initial stages of the IL.

In the next section we consider the consequences of these assumptions with respect to resumptive pronouns in Hyltenstam's (1984) study.

3. The emergence of the unmarked in SLA: the case of resumptive pronouns

In this section we will show how a constraint-based account can, within the set of assumptions laid out so far, offer an explanation for the IL pattern of resumptive pronouns discussed in Hyltenstam (1984). The author used a picture-naming task to elicit Swedish relative clauses from 45 L2 learners from four NL backgrounds.

Here are the relevant facts. Swedish, the TL, has post-nominal relative clauses, as shown in (9), and allows no resumptive pronouns in any of the AH positions.

(9) a. Bollen som jag gav till pojken…
ball-def that I gave to boy-def
"The ball that I gave to the boy…"
b. *Bollen som jag gav den till pojken …
ball-def that I gave it to boy-def
c. Pojken som jag gav bollen till …
Boy-def who I gave ball-def to …
"The boy who I gave a ball to …"
d. *Pojken som jag gav bollen till honom…
Boy-def who I gaveball-def to him…

Of the four NLs of the subjects, Finnish and Spanish allow no resumptive pronouns in relative clauses in any of the positions on the AH, while the other two, Greek and Persian allow, or require, resumptive pronouns in a number of positions. Both Greek and Persian must have resumptive pronouns in IO through OComp relative clauses, and Persian allows such pronouns in DO relative clauses. Using a picture-description task, Hyltenstam elicited five tokens of each relative clause type on the AH.

The results were as follows. Subjects from all of the NL backgrounds in the study produced resumptive pronouns in at least some of the Swedish relative clauses. For the speakers whose NLs allowed no resumptive pronouns in relative clauses, the production of resumptive pronouns in IL relative clauses was much more systematic and extensive for the Spanish speakers than for the Finnish speakers. Eleven of the twelve Spanish subjects systematically produced resumptive pronouns in at least one relative clause type, and the majority of these subjects produced them in several types. The results were similar for the subjects whose NL allowed resumptive pronouns in some relative clauses. Eleven of the twelve Greek-speaking subjects, and eleven of the twelve Persian subjects widely and systematically produced resumptive pronouns in IL

relative clauses in the positions required in their respective NLs, and some subjects produced them in relative clause types where they either were not allowed, or not required, in the NL. Moreover, all of the subjects tended to produce these resumptive pronouns in the more marked relative clause types, and in a pattern that generally corresponded to that predicted by the AH.

We represent the results of some of these subjects in Table 1, where "+" indicates that the learner systematically produced a resumptive pronoun in the TL in that relative clause type, and "-" indicates no such systematic production of resumptive pronouns in TL relative clauses in that position.

Table 1. Results on resumptive pronouns for some of Hyltenstam's subjects

		Su	DO	IO	Obl
Subject ID	NL				
19	Spanish	-	-	+	+
24, 35	Spanish	-	+	+	+
10,11,22,27,40,42	Greek	-	+	+	+
15,17,18,28,29,30,34	Persian	-	+	+	+

Within the constraint-based framework outlined in this paper, the phenomenon whereby L2 learners systematically produced structures which are not explainable on the basis of the NL or the TL would be characterized as the emergence of the unmarked. Specifically, these L2 results would be seen as a consequence of the proposed initial IL ranking schematised in (8), whereby the constraint hierarchy in (5) above would be undominated in the respective IL grammars of the L2 Swedish learners. This constraint hierarchy is one member of the family of constraints abbreviated as *NAD in (7); the hierarchy penalizes the formation of relative clause structures with dependency relations, i.e. gaps, in certain positions, thereby allowing the relative clause candidates without such gaps, namely, those with resumptive pronouns, to emerge as the winners of the evaluation process.

To show this explicitly, we need in addition to the constraint hierarchy in (5), the constraints shown in (10), which have been proposed elsewhere in the literature.

(10) a. Op Spec: wh-operators must be in a specifier position c-commanding the entire extended projection
b. Stay: Categories dominate their extended heads
c. Dep: Every element in the output stands in correspondence with the input

The constraints in (10 a & b) have been motivated independently in the work of Grimshaw (1997) and Bresnan (2000) to account for the fronting of wh-words and for subject-auxiliary inversion in English questions. Op Spec penalizes a structure in which a wh-word is not fronted, and Stay penalizes structures that contain traces, i.e. that contain moved elements. The constraint Dep in (10c) has been discussed in McCarthy (2002), and is a member of the family of constraints abbreviated by *Structure, which penalizes candidates that contain representations or lexical items not present in the input. In this analysis these constraints are being invoked in the case of relative clauses: Op Spec assigns a violation mark to a relative clause in which the relative pronoun is *in situ*, Stay penalizes a relative clause structure in which the wh-word has been moved, and Dep is violated by relative clause structures containing "extra" elements, such as pronouns. In languages which lack resumptive pronouns in relative clauses, Dep is ranked higher than the subconstraints of the hierarchy in (5), and for languages which have resumptive pronouns, this constraint is ranked below at least some of these subconstraints.

The tableau for characterizing relative clauses in the TL, Swedish, which has no resumptive pronouns, is shown in (11).

(11) Tableau for TL Swedish IO relative clause
Input
Poijken som jag gav bollen till

	Op Spec	Stay	Dep	*IO gap thru *Obl gap	*DO gap	*Su gap
a. Poijken jag gav bollen till som	*!					
☞ b. Poijken som jag gav bollen till		*			*	
c. Poijken som jag gav bollen till honom		*	*!			

Candidate (b) in (11) is optimal. It is more harmonic than (a), which violates Op Spec, because the relative pronoun is not fronted, and is optimal relative to (c), which violates Dep because of the resumptive pronoun.

A grammar that has Dep ranked above the constraint hierarchy, as shown in (11) for Swedish, rules out relative clause candidates with resumptive pronouns. This is true because any relative clause candidate with such a pronoun will violate the higher-ranked Dep, while any relative clause without such a pronoun will violate one of the lower-

ranked subconstraints, making the relative clause without the resumptive pronoun more harmonic.

The NL rankings for the constraints in (10) along with the constraint hierarchy are shown in (12). The ranking for Spanish and Finnish, which do not allow resumptive pronouns in any relative clause type, and is therefore identical to that of Swedish, is shown in (12a). The rankings for the other two NLs, Greek and Persian, both of which require resumptive pronouns in some relative clauses, are shown in (12 b & c), respectively.

(12) Constraint rankings for Spanish & Finnish (a) Greek (b) and Persian (c)
   a. Op Spec >> Stay >> Dep >> *Obl gap >> *IO gap >> *DO gap >> *Su gap
   b. *Obl gap >> *IO gap >> Op Spec >> Stay >> Dep >> *DO gap >> *Su gap
   c. *Obl gap >> *IO gap >> *DO gap >> Op Spec >> Stay >> Dep >> *Su gap

Now, given the constraints in (10), along with the assumptions about the initial state of the IL, as depicted in (8), the initial IL ranking for Hyltenstam's subjects would be that in (13).

(13) Initial IL ranking
   ***Obl gap >> *IO gap >> *DO gap >> *Su gap** >> *Op Spec >> Stay >> Dep*

This ranking represents, using only the constraints relevant to this case study, the family of markedness constraints in (7) (shown in bold face) dominating the intact NL ranking (represented in italics). With these assumptions in place, we are now in a position to explain why these subjects produced IL relative clauses with a pattern of resumptive pronouns that is not evident in either the NL or TL, but which typifies the relative clauses of a number of the world's languages.

Consider once again the results shown in Table 1, and let us look first at the Spanish-speaking subjects. We can summarize Table 1 by stating that three Spanish subjects systematically produced resumptive pronouns in a number of relative clause types, even though their NL allows no such pronouns in relative clauses, six Greek subjects systematically extended the production of resumptive pronouns to a relative clause type (viz., DO) where their NL does not allow such pronouns in this kind of relative clause, and seven of the Persian subjects systematically produced TL relative clauses with resumptive pronouns in the positions in which the

NL requires such a pronoun (i.e. IO and Obl), and also regularly produced TL relative clauses with resumptive pronouns in the position in which the NL allows such a pronoun to occur, but does not require it (i.e. the DO position).

Consider first the results from subject 14 (Spanish NL), the tableau for which is shown in (14)[3].

(14) Tableau showing IL for Hyltenstam's Spanish-speaking subject 19

Input
Poijken som jag gav bollen till

	*Obl gap	*IO gap	Op Spec	Stay	Dep	*DO gap	*Su gap
a. Poijken jag gav bollen till som			*!				
b. Poijken som jag gav bollen till		*!		*			
☞ c. Poijken som jag gav bollen till honom				*	*		

In line with our assumptions about the initial ranking of the constraints in the learner's IL, we expect the initial IL ranking to be as in (13). However, Hyltenstam's subjects were described as being more advanced, and consequently the tableau in (14) represents a stage in which the learner has been able to demote two of the sub-constraints on the constraint hierarchy. Thus, the optimal output for subject 19 in this case is candidate (c), because wile (c) violates the lower ranked Dep and Stay, (a) and (b) violate, respectively, the higher ranked Op Spec and *IO gap.

We consider next the example of a DO relative clause type for Spanish-speaking subjects 24 and 35, the tableau for which is shown in (15) below.

[3] For the purposes of this paper, I will assume that the input is the TL structure in question.

(15) Tableau showing IL for Hyltenstam's Spanish subjects 24 and 35
Input
Bollen som jag gav till pojken

	*Obl gap	*IO gap	*DO gap	Op Spec	Stay	Dep	*Su gap
a. Bollen jag gav som till pojken				*!			
b. Bollen som jag gav till pojken			*!		*		
☞ c. Bollen som jag gav den till pojken					*	*	

The reasoning here is similar to that used to account for the IO relative clause type for subject 19, except that subjects 24 and 35 have been able to demote only the *Su gap sub-constraint, and thus the remainder of the constraint hierarchy in (5) is undominated in their IL. Therefore, for these subjects, candidate (c) is optimal in that (a) fatally violates Op spec, and (b) violates the markedness subconstraint *DO gap. Note, too, that an IO relative clause would also be produced by these subjects with a resumptive pronoun, because *IO gap is ranked higher than Dep, allowing the relative clause with the resumptive pronoun to be optimal. On the other hand, for subject 19, the DO relative clause type would be produced target-like, without a resumptive pronoun, because as tableau (14) shows, the IL grammar for subject 19 has demoted *DO gap so that it ranks below Dep.

Having shown how we would account for the Spanish-speaking subjects whose NL allows no resumptive pronouns in relative clauses, we turn now to the Greek and Persian subjects, both of whose NLs require resumptive pronouns in relative clauses in the IO through Obl positions, as shown in (12 a & b) above. Table 1 indicates, however, that these subjects systematically produced resumptive pronouns in their IL relative clauses, not only in the IO and Obl positions, but also in the DO position. Thus, in line with our assumptions represented in (8), we assume that the IL ranking would look like that shown in tableau (16). The fact that the sub-constraints *IO gap and *Obl gap are ranked higher than Dep could be due either to our assumptions about the initial state or to the transfer of the NL ranking. That *DO gap is ranked higher than Dep in the IL is clearly due to the assumptions in (8), because this ranking cannot be accounted for in terms of the NL ranking. In the cases at hand, the

subjects have been able to demote only *Su gap below Dep. The tableaux that depict the evaluation of DO and IO relative clause types in the ILs of the Greek and Persian subjects are shown in (16).

(16a) Tableau for IO relative clause for Hyltenstam's Greek and Persian subjects
Input
Poijken som jag gav bollen till

	*Obl gap	*IO gap	Op Spec	Stay	Dep	*DO gap	*Su gap
a. Poijken jag gav bollen till som			*!				
b. Poijken som jag gav bollen till		*!		*			
☞ c. Poijken som jag gav bollen till honom				*	*		

(16b) Tableau for DO relative clause for Hyltenstam's Greek and Persian subjects
Input
Bollen som jag gav till pojken

	*Obl gap	*IO gap	*DO gap	Op Spec	Stay	Dep	*Su gap
a. Bollen jag gav som till pojken				*!			
b. Bollen som jag gav till pojken			*!		*		
☞ c. Bollen som jag gav den till pojken					*	*	

Thus, the fact that L2 learners whose NL contains no resumptive pronouns in relative clauses systematically produce such clauses with resumptive pronouns in a TL like Swedish, which also allows no resumptive pronouns, follows from two assumptions. The first is the independently-motivated assumption within OT that all grammars contain all constraints; this means that the constraint hierarchy in (5) is necessarily part of the IL grammar. And the second is the claim that a family of markedness constraints penalizing non-adjacent dependencies, in the case at hand, the constraint hierarchy in (5), is undominated in

early stages of the IL grammar; this in turn leads to the licensing of resumptive pronouns in a number of relative clause types. This phenomenon whereby otherwise low-ranked constraints which are usually not determinant in the grammar become decisive in an evaluation is known in OT as "the emergence of the unmarked".

4. Discussion

The fact that we were able to explain the results of Hyltenstam's (1984) study as an instance of the emergence of the unmarked is significant for two reasons. The first is that this suggests that a constraint-based approach can offer an explanation for why the L2 learners produced the IL utterances that they did. And the second reason is that an OT account of this phenomenon suggests that IL grammars obey the same the same principles and constraints as native language grammars. We will take up each of these points in turn.

The most interesting fact about the facts in Hyltenstam's (1984) study is that the L2 pattern of resumptive pronouns in relative clauses is found in neither the NL nor the TL, but is represented in the grammars of a number of other languages throughout the world. How could these learners have concocted this IL structure, and furthermore, done so in a way that conforms to what occurs in other languages?

The explanation can be found in the architecture of OT. In fact, it follows from the assumption that grammars do not differ in their inventory of constraints, but can vary only in the language-particular ranking of these constraints. From this it follows that only the structures that are possible in the world's languages, as determined by the permutations of the universal inventory of constraints, can be found in interlanguages. If these claims of OT are defensible, then we should expect that IL patterns should always reflect the same regularities found in the rest of the world's languages, because IL grammars would be one of the possible rankings of the set of constraints.

This brings us to the second point. If it can be supported that one can adequately characterize the set of interlanguage grammars using constraint rankings and re-rankings, as prescribed within OT, then it follows that interlanguage grammars must be included in the set defined by the theory of grammar. In other words, this puts in concrete terms the statement by Adjemian (1976) that interlanguages are "natural languages". Adjemian did not define what he means by "natural language", but he seems to have used this as a technical term to signify a language (a grammar) that is describable within whatever approach to grammatical theory turns out to be defensible.

Something similar to Adjemian's claim is clearly the aim of the Structural Conformity Hypothesis (Eckman et al. 1989), in which it is hypothesized that interlanguage grammars will obey primary language universals. The claim is that interlanguages and primary languages are similar in at least one important respect, namely, they both obey the same set of universal principles. The universals that have been invoked under this approach have been drawn largely from the typological school of thought, in which generalizations are stated about the occurrence, co-occurrence and absence of various structures across a relatively large set of languages.

5. Conclusion

This paper has argued the case that a constraint-based analysis of interlanguage data stands to provide insight into L2 error patterns that have heretofore not been explained. It particular, it has been argued that the phenomenon, the emergence of the unmarked, one of the hallmarks of Optimality Theory, offers a straightforward explanation for at least one such interlanguage pattern. This, in turn, suggests that an OT account of IL grammars unites both L1 and L2 grammars in the same set of natural language systems.

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received: December 5, 2003
accepted: January 9, 2004