



## **Cognitive approaches to L3 acquisition**

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### **ABSTRACT**

Multilingualism has established itself as an area of systematic research in linguistic studies over the last two decades. The multilingual phenomenon can be approached from different perspectives: educational, formal linguistic, neurolinguistic, psycholinguistic and sociolinguistic, among others. This article presents an overview of cognitive (psychological and formal linguistic) approaches to third language (L3) acquisition where the assumption is that language acquisition is a complex multi-faceted process. After identifying what is meant by L3, the article briefly reviews the major issues addressed from both the psycholinguistic strand and the emerging L3 linguistic strand and concentrates on those aspects that are in need of further research in both.

**KEYWORDS:** formal linguistics, generative, L3, multilingualism, psycholinguistics, transfer

### **RESUMEN**

El plurilingüismo se ha ganado su propia área de investigación dentro de los estudios de lingüística en las últimas dos décadas. El fenómeno se puede abordar desde perspectivas diferentes: educativa, lingüística de carácter formal, neurolingüística, psicolingüística y sociolingüística, entre otras. Este artículo presenta una visión general de dos perspectivas cognitivas, la psicológica y la procedente de la lingüística formal, al tema de la adquisición de la tercera lengua (L3). Ambas perspectivas comparten la asunción de que la adquisición del lenguaje es un proceso complejo y con varias vertientes. Después de identificar lo que entendemos por L3, el artículo revisa de forma sucinta los principales temas que se han tratado tanto desde la perspectiva psicolingüística como desde la más emergente perspectiva lingüística en materia de L3 y se concentra en aquellos aspectos que consideramos que necesitan mayor investigación en ambas.

**PALABRAS CLAVE:** lingüística formal, generativo, L3, plurilingüismo, psicolingüística, transferencia

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## 1. INTRODUCTION

The study of how individuals can use and master (to different degrees) several languages has always been an issue of interest (Weinreich, 1953; Vildomec, 1963). However, the phenomenon of multilingualism has only established itself as an area of systematic research in language and linguistic studies over the last two decades (Franceschini, 2009: 9), mainly because of an increased awareness of the sociological reality present in most parts of the world, where over 50% of the population is bi- or multilingual and massive immigration has an immediate impact on the number of languages spoken. In fact, there is a recognition that multilingualism is the default state of language competence, which in turn has important consequences for the development of an adequate theory of language acquisition and use (Hammarberg, 2010). As pointed out by Aronin and Hufeisen (2009), consolidation of work on multilingualism occurred in the late 80s and early 90s because it was at that time when researchers working from different theoretical perspectives reconsidered perennial questions in the second language (L2) using both oral and written data from multilinguals.

The multilingual phenomenon can be approached from different perspectives: educational (Cenoz, 2009; Rivers & Golonka, 2009), formal linguistic (García Mayo & Rothman, 2012; Leung, 2009; Rothman, Iverson & Judy, 2011), neurolinguistic (Bardel & Falk, 2012; Franceschini, Zappatore & Nitsch, 2003), psycholinguistic (De Angelis, 2007) and sociolinguistic (Hoffman & Ytsma, 2004), among others. This article will focus on the study of third language (L3) acquisition from both psychological and formal perspectives, where the assumption is that language acquisition is a complex multi-faceted cognitive process.

Before providing an overview of the main lines of research that have been developed on L3 acquisition from these two perspectives, we should identify what exactly is meant by L3. According to Cenoz (2003: 71) “[...] third language acquisition refers to the acquisition of a non-native language by learners who have previously acquired or are acquiring two other languages. The acquisition of the first two languages can be simultaneous (as in early bilingualism) or consecutive”. There have been criticisms about the use of L3 as a term to define the field of study. For example, De Angelis (2007: 11) considers that it is not a suitable one as it places emphasis on the L3 and it seems to exclude other languages also present in the mind of the multilingual speaker. She proposes the term ‘third or additional language acquisition’, which obviously refers to all languages beyond the second (L2), although the author herself admits that it is long and impractical.<sup>1</sup> More recently, Hammarberg (2010) argues against the untenable practice of labelling the multilingual speaker’s languages in a linear chronological scale and favors the practice of characterizing them according to the differential cognitive roles they play for their user. As solving these terminological and conceptual issues is beyond the scope of this paper, we refer the reader to Kemp (2009) and Hammarberg (2010) for recent discussions and to Hoffman (2001) and De

Angelis (2007) for arguments supporting the uniqueness of research on L3. For the sake of simplicity, this article will use the term L3 acquisition.

A cognitive perspective in the study of L3 acquisition should provide information relevant to a better and, hopefully, more precise understanding of the processes multilingual individuals go through when they comprehend and produce their L3. That information will allow researchers to develop theories about how the multilingual mind stores and organizes incoming information, what the relationship is between the different language systems in the mind and what constraints are at work when languages are retrieved, among other issues.

The main difference between the psycholinguistic and the formal linguistic L3 studies carried out so far is the issue of modularity: whereas psycholinguistic accounts claim that the processes of language acquisition are the same as those used in the acquisition of any other cognitive skill (mathematical abilities, for example), where cognitive factors such as memory, attention/perception, intelligence etc., are at work, formal linguistic accounts claim that the language faculty is a module independent from other cognitive modules (although interacting with them) and ruled by linguistic mechanisms.

This paper briefly presents the major issues addressed from the psychological and the generative strands and then focuses on aspects that both should consider in more depth, thus moving the L3 field forward.

## 2. THE PSYCHOLOGICAL STRAND

One of the topics that pervades all the L3 acquisition literature written from a psycholinguistic perspective is that of cross-linguistic influence (CLI)<sup>2</sup>. From the very beginning of the study of how an L2 is learned, there has been an interest in how the first language (L1) could influence it (Gass & Selinker, 1983; Odlin, 1989). That interest could only be heightened when the researcher studies populations having two languages and learning an L3. Whereas in the case of L2 acquisition the source of potential transfer could only be the L1, in L3 acquisition the candidates for transfer could be the two languages the individual already has. CLI had negative connotations (interference) at the outset of L2 research but its study was rehabilitated in the late 80s when researchers considered its positive and facilitatory effects (see Gass, 1988 for a review).

Although there are numerous studies on CLI, there is no clear understanding of the influence of previously learned languages on the acquisition of an L3 or, one should rather say, it is very difficult to identify one single factor determining CLI in L3 acquisition. On the basis of different studies using various research methods and language constellations, researchers have arrived at a number of factors that can potentially affect a learner's reliance on his or her previous languages. Among others we could mention the following: language distance, metalinguistic awareness, proficiency in the source and target language(s), recency

of use (i.e. the use of the most recently acquired language as the source of transfer) and length of residence in a non-native language environment. Most of the studies researching one of these topics or a combination of some of them have been carried out from a descriptive applied psycholinguistic perspective and they are mainly concerned with how CLI affects the learning process. In what follows, we refer to a selection of studies focusing on just two of these factors, namely, language distance and metalinguistic awareness.

Language distance, also referred to as typological distance<sup>3</sup>, is defined by De Angelis (2007: 22) as “[...] the distance that a linguist can objectively and formally define and identify between languages and language families”. One of the most cited studies dealing with language distance at the lexical level is Williams and Hammarberg (1998), the case study of Sarah Williams’ (the first author) oral production in L3 Swedish. Williams was a native speaker of English with high proficiency in German as an L2 and it was precisely this latter language that she relied on most extensively when learning Swedish. As language distance could not be used as an explanation because both English and German belong to the Germanic family, the authors observed that the two languages were used in different ways in the learner’s oral production in Swedish: English, her L1, was mainly used for eliciting words from the interlocutor in a conscious and strategic way whereas her German L2 was used more consciously. Williams and Hammarberg (1998) proposed that the two languages played two different roles: L1 English had an *instrumental role*, it was used for metalinguistic comments and asides, and L2 German a *supplier role*, it was used for L3 lexical construction attempts (other than Swedish itself). These different roles were validated in more recent work by Hammarberg (2006) when comparing Sarah Williams’ case with another learner of Swedish who this time was a native speaker of German and had a very high proficiency in English, his L2. In both case studies, the learners activate different languages for each of the two roles identified (instrumental and supplier) but there was a clear L2 role at the lexical level<sup>4</sup>. Williams and Hammarberg (1998) illustrates a case study of a learner with knowledge of languages of the same language family. A different scenario is reported in Cenoz (2001) where the languages involved are Basque, Spanish and English. Basque, unlike Spanish and English, does not have an Indoeuropean origin. The learners in her study relied more on Spanish than on Basque when learning English lexical items.

A more recent study of the role of previously learned languages in L3 production is Lindqvist (2009), where the author considers the degree to which L1 Swedish and L2 English influence spoken L3 French. Lindqvist examines the cross-linguistic lexemes produced by 30 Swedish learners divided into three proficiency groups according to their exposure to French. As mentioned above, it is very difficult to establish exactly which of the several factors identified as affecting CLI would have an impact on L3 production. It will normally depend on several of them. In Lindqvist’s study, proficiency in the L3 was crucial to determine the number of cross-linguistic lexemes used: the least advanced learners produced the highest number, whereas the most advanced produced the lowest number. Furthermore, the lower the

proficiency level of the learners, the more background languages were used and viceversa. Lidqvist also found a clear L1 influence. In a study of a sample of her participants ( $n = 6$ ), she reports that the mutual comprehension between the learners and their interlocutor seemed to outweigh other factors in the use of the background languages for the production of lexical items. That is, there was clearly an instrumental use of the background languages (Swedish and English), not depending on their role as L1 or L2.

Work on linguistic distance at the morphosyntactic and phonological level has been scarcer up to this date within the psycholinguistic strand. One of Ó Laoire and Singleton's (2009) two-part study focuses on CLI at the morphosyntactic level in learners of L3 German with L1 English and L2 Irish. They examined word order in non-finite purpose clauses and morphological inflection in noun phrases following prepositions. German and Irish work similarly in these features so knowledge of Irish should in principle facilitate production in L3 German. The results of the study revealed no facilitation from Irish regarding morphological inflection in nouns following prepositions in German but the authors did find facilitation from Irish regarding German non-finite clauses.

There is a clear need for work on L3 phonology, although some examples should be noted here. Thus, Gallardo del Puerto (2007) considers the issue of the effect of level of bilingualism on the acquisition of L3 English phonology by primary and secondary school Spanish-Basque bilinguals. The participants ( $n = 60$ ) were divided in two groups on the basis of their level of bilingualism. An auditory discrimination test was administered in order to collect data on the perception of English phonemes. Results showed that the level of bilingual proficiency did not exert any influence on the participants' L3 phonological performance, a fact that Gallardo del Puerto explains on the basis of interlinguistic distance because Basque and Spanish are very similar with respect to segmental phonology.

The special issue on L3 phonology published in the *International Journal of Multilingualism* (2010) speaks about a new interest in this area. Thus, Gut (2010) presents data from four trilingual speakers, two of which had German as their L2 and English as an L3, whereas the other two speakers had English as an L2 and German as an L3. The focus of her study is on vowel reduction and speech rhythm in L3 English and L3 German. Her findings were mixed regarding L2-L3 CLI because, according to the author, the effects of phonological properties of the L3 are stronger than factors such as language distance. Llama, Cardoso and Collins (2010) also conclude that linguistic distance is not a factor that could explain their data from two groups of learners with English L1 and French L2, and French L1 and English L2 studying Spanish as an L3. For these researchers, the L2 status is the determining factor in the selection of the source language. Wrembel (2010) reports that the participants in her study use both their L1 Polish and their L2 German in the development of their L3 English interphonology but that the strength of the influence depended on the stage of the participants' proficiency in the L3.

Metalinguistic awareness in L3 learners is another important research topic addressed from a psycholinguistic perspective. The concept has had several definitions in the literature but it generally refers to the learner's ability to reflect on language. De Angelis and Dewaele (2009) point out that metalinguistic awareness began to be discussed during the 1980s. In general, research has seen the greater flexibility and enhanced metalinguistic awareness of the bilingual mind as factors that contribute to facilitating the acquisition of an L3. Thomas (1988) is usually referred to as the first study to establish a connection between metalinguistic awareness and multilingualism. Thomas' study compared L1 English with L1 English/L2 Spanish learning L2/L3 French, respectively, and concluded that the trilinguals had a heightened metalinguistic awareness. Lasagabaster (1997) reports more metalinguistic awareness in Basque-Spanish bilinguals, compared to Spanish monolinguals when learning L3 English. Work by Jessner (2006, 2009) claims that the multilingual mind is a dynamic system and emphasizes that it is the interaction of multiple pieces of information in the mind that brings about the enhanced metalinguistic awareness found in L3 learners, an idea that could be related to earlier work by Zobl (1992) who claimed that multilinguals formulate wider grammars (cf. García Mayo, 1999). Recent work by Bono (2011) examining the L3 Spanish speech production of French speakers with English as L2 reinforces the idea that multilingual learners have high levels of metalinguistic awareness.

Without any doubt, most research carried out so far from the psycholinguistic perspective has focused on the acquisition of the lexicon broadly from two main lines: on the one hand we find descriptive studies focusing on CLI and psychotypology (see Ó Laoire & Singleton 2009, as an example) or the influence of some of the factors referred to above and their influence on CLI at the lexical level (see Cenoz et al., 2001 for several examples). On the other hand, we find more theoretically-oriented papers trying to build models that could account for the structure and workings of the lexicon, i.e., how words are represented, selected and accessed in the multilingual lexicon. Thus, production models proposed during the 1980s (Dell, 1986; Green, 1986; Levelt, 1989) were extended to discussions of the multilingual lexicon (de Bot, 2004). From the initial interest on the issue of lexical storage (are words from different languages housed in a single memory store or in separate memory stores for each language?) researchers have moved to more general discussions on the so-called integration-separation debate: that is, whether the multilingual lexicon features linguistic information from all the languages a speaker knows or whether there are several separate lexicons for each of those languages. Evidence has been found for both positions: there seem to be powerful arguments for integration of the basis of how knowledge of different languages is exploited in processing terms and on the linguistic sophistication that is behind the choice of a closely-related language (Singleton, 2003, 2012). However, results from neuroimaging studies on multilingual aphasic patients point to the hypothesis that the different languages are represented in different brain regions (Paradis, 1995). A related issue is whether, when confronted with a lexical decision task, words are accessed individually,



language by language - selective access (Gerard & Scarborough 1989) - or they are accessed in parallel in all languages the speaker knows (Dijkstra, 2003). In a recent elaboration of issues on multilingual lexical processing, de Bot (2012) concludes that the psycholinguistic models that have been used to understand multilingual processing will have to be revised taking into account new perspectives on cognition that consider language as a dynamic system and multilingualism as a dynamic process. Elements such as time and change should be crucial in the model(s) to be developed. De Bot also calls for more studies where individual differences are considered in detail and where time plays a role (i.e. longitudinal studies).

Overall, most studies on L3 acquisition from a psychological perspective have focused on CLI at the lexical level and the different factors affecting it. Other linguistic areas such as phonology and morphosyntax have been barely considered.

### 3. THE GENERATIVE STRAND

Generative linguistics is a theory about the mental representation of language in the mind/brain and about language acquisition as creating these mental representations in the mind of the learner (Chomsky, 2007). The theory claims that language acquisition is a biologically determined process constrained by a number of universal principles and language-specific functional and lexical categories provided by Universal Grammar (UG). The Principles and Parameters framework (Chomsky, 1981, 1986) provided the theoretical apparatus needed to establish precise predictions about L1 acquisition and to attempt an understanding of how speakers arrive at the ultimate state of grammatical knowledge on the basis of the impoverished input they are exposed to.

Research carried out from this perspective aims at a mutual feedback between the theoretical apparatus and the experimental and/or spontaneous data coming from L1 and L2 learners. However, there is an obvious difference between research on L1 and L2 acquisition from this formal perspective: the role of UG in L1 acquisition is uncontroversial, whereas it is a topic that dominates research on adult L2 acquisition (see White, 2003 for a summary of that research and Hawkins, 2001, 2008; Schwartz 1986, 1998, for the role UG in L2 acquisition). Some researchers claim that there is a fundamental difference (Bley-Vroman, 1990, 2009) between child and adult acquisition because the latter is constrained by general (statistical/domain general) cognitive yet non-linguistic mechanisms. Others, based on evidence from so-called poverty-of-stimulus phenomena (knowledge about language properties that cannot arise from the input received and require the postulation of innate linguistic principles) maintain the L2 adult learners have full access to UG (Epstein, Flynn & Martohardjono, 1996; Schwartz, 1998) whereas a third group contends that L2 adult grammars are UG-constrained but access in the L2 process is limited and impaired (Hawkins

& Hattori, 2006). Although the different theoretical positions provide evidence to support their claims, no definite conclusion has been arrived at yet.

As mentioned above, there is a dearth of studies on L3 morphosyntax from the psychological perspective, as the lexicon is the overriding theme. Until the turn of the millennium there was also a dearth of studies on L3 morphosyntax from the generative perspective (but see Zobl, 1992; Klein, 1995 and García Mayo, 1999). The main reason for this lack of studies is that L3 was treated as another case of L2 acquisition, thus dismissing the role of other languages in the acquisition process. A reasonable question would be whether it is at all necessary to distinguish between L2 and L3 acquisition (see García Mayo & Rothman 2012 for discussion). Some arguments that are provided in the literature are the following:

a. A distinction between L2 and L3 learners should be done on the basis of methodological rigor (De Angelis, 2007; García Mayo & Rothman, 2012) as not doing so will have all kinds of obscuring effects that will affect the results of experimental studies. L3 learners comprise a heterogeneous group but it is clear that, from the perspective of UG-constrained grammars, they all have access to the underlying representations of at least two languages when they start learning a third or subsequent one<sup>5</sup>.

b. As several researchers maintain (Leung, 2007a; Cabrelli, Iverson & Judy, 2009; Iverson, 2010), a distinction between L2 and L3 acquisition should be established for reasons relating to sources of transfer. L3 learners have in principle more potential for transfer at the L3 initial state and studying it should provide evidence coming to bear on theoretical proposals for the L2 steady state. For example, studies focusing on the L3 initial state should serve as a test case for the involvement (if any) of UG in adult L2 acquisition. Partial and full access approaches to L2 acquisition indirectly make predictions for the initial state of L3 acquisition, so well-designed L3 studies could help disentangle evidence for the different models. Thus, partial access models claim that, after a critical period, L3 learners would only allow transfer from syntactic features available in their L1 never in their L2. On the contrary, full access models claim that L2 learners can acquire new features and thus predict that the L3 initial state may allow transfer from both the L1 or the L2.

c. Leung (2007a) also claims that studying L3 acquisition will provide test cases of less studied natural languages, extend the range of languages considered and further explore the nature of the language faculty. In short, L3 data will provide new insights for theory building.

Research carried out so far on L3 acquisition from the generative perspective has also focused on CLI and studies have tried to determine what the underlying L3 grammatical representation is. Understanding the initial state of learner language is of utmost importance if one wants to clearly describe the grammar attested in later developmental stages and the ultimate attainment reached. Currently two L3 initial state models claim that features and functional categories can be transferred from both the L1 and the L2: the Cumulative



Enhancement Model (CEM) by Flynn, Foley and Vinnitskaya (2004) and the Typological Primacy Model (TPM) by Rothman (2010, 2011).

On the basis of results of an elicited imitation task dealing with three types of restrictive relative clauses and performed by L1 Kazakh/L2Russian and L3 English child and adult learners, Flynn et al. (2004) argue that language acquisition is accumulative, i.e. the prior language(s) can be neutral or enhance subsequent language acquisition and the L1 does not play a privileged role in the process. In their view, previous linguistic knowledge is predicted to transfer to the L3 initial state only when such knowledge has a positive effect. Otherwise, transfer will not obtain. As García Mayo and Rothman (2012) point out, one shortcoming of this model is that it does not seem to spell out which elements would be facilitative to motivate transfer and which ones would block the process. Nevertheless, Flynn et al.'s study was crucial to determine that other languages besides the L1 could influence morphosyntactic transfer. More recently, Flynn (2009) further argues for the value of the CEM model and explores the relationship between the study of L3 and UG. Regarding this latter point, she explores how L3 findings could inform us about the nature of the initial state for language learning. Flynn entertains two possible models for language acquisition: the 'at birth' model, in which UG matures and changes in the course of the language acquisition process and ultimately evolves into the target language, and the 'constant' model, in which UG remains unchanged throughout the language acquisition process. She concludes that her findings on L3 support both the CEM and the 'constant' UG model.

Like the CEM, the TPM argues that transfer in the L3 initial state can come from any previously acquired language but, unlike the CEM, it hypothesizes that the process will be constrained by either actual typological proximity or perceived typological proximity (psychotypology) between the three systems. The model is based on initial findings by Rothman and Cabrelli Amaro's (2010) work investigating properties of the null-subject parameter in L3 French and Italian in L1 English and L2 Spanish learners. The findings pointed to the deterministic role of L2 Spanish but typology and L2 influence were confounded in their study. However, more recent work by Rothman (2010, 2011) favors a strong role for typological proximity as the crucial variable.

Although absolute L1 transfer at the L3 initial state is a logical working hypothesis, there is no study that has clearly argued for such a position in the recent literature on the L3 initial state (but see Na Ranong & Leung 2009 for developmental stages, although the authors themselves warn about shortcomings in the methodology used). Another logical possibility that has been formalized as an initial state model is the so-called L2 status factor. Bardel and Falk (2007) and Falk and Bardel (2011) claim that the L2 acts as a filter to the L1 grammar, that is, the L2 will be the strongest source of transfer. In their 2007 work they examined two groups: a first group whose L1 was a verb-second (V2) language and their L2 a non-V2 language, a second group whose L1 was a non-V2 language and their L2 was a V2 language and who were learning Swedish as an L3 – Swedish being a V2 language too-. The syntactic

point studied was the placement of negation. Bardel and Falk conclude that their findings support the role of the L2 as the strongest predictor of initial transfer in L3. In more recent work, Falk and Bardel (2011) examine object pronoun placement by two groups of learners with intermediate proficiency in L3 German: one group had L1 English, L2 French and the other L1 French and L2 English. The authors maintain that their findings seem to confirm the L2 status.

The three models of the L3-initial state briefly commented on above—the CEM, the TPM and the L2-status model—try to provide answers to the question of how previous linguistic knowledge constrains (either by facilitating or by complicating) subsequent language acquisition. The economy of linguistic representations in L3 acquisition is also an issue for the three models: the CEM and the TPM argue that the L3 learner uses any previous linguistic knowledge at his/her disposal to facilitate the task whereas for the L2-status model the idea would be that the L2 is more accessible as it is the last language acquired and, in a sense, it would be more amenable to the building of the L3 system.

In the recent L3 literature there has been a number of studies that have focused on L3 interlanguage beyond the initial state (see García Mayo & Rothman, 2012 for details). These studies cannot focus on answering just the underlying general question of the potential role UG might or might not have in the L3 acquisition process but, rather, they usually focus on unique morphosyntactic domains and address specific research questions that arise from the characteristics of the different language pairings. Thus, work on L3 Romance has been carried out by Lozano (2002), on the acquisition of pronominal constraints by L1 Greek/L2 English/L3 Spanish learners, Leung (2007b) on the acquisition of articles and related functional properties by L1 Cantonese/L2 English/L3 French learners, Foote (2009), on the acquisition of aspectual meaning by English speakers learning a Romance L3 and Montrul, Dias and Santos (2011) on the acquisition of object expression in L3 Brazilian Portuguese by L1 English and L1 Spanish learners. Research on L3 Chinese has been conducted by Na Ranong and Leung (2009), who focused on the acquisition and interpretation of null objects, and by Tsang (2009) on the interpretation of the binding conditions of reflexives. L3 German has been the focus of work by Jaensch (2008, 2009), who has studied features of the German Determiner Phrase (DP) and by Martínez Adrián (2010) on word order issues.

A body of research has been carried out on the L3 English spontaneous oral interlanguage of simultaneous Basque-Spanish bilinguals. This research focuses on several morphosyntactic domains: inflection (García Mayo, Lázaro Ibarrola & Licerias, 2005; García Mayo & Villarreal Olaizola, 2011), pronominal development and inflection (García Mayo, Lázaro Ibarrola & Licerias, 2006), synthetic compounding (García Mayo, 2006), long-distance *wh*-questions (Gutierrez Mangado & García Mayo, 2008) and sentential negation (Perales, García Mayo & Licerias, 2009). The overall finding is that these bilingual L3 English learners use both Basque and Spanish as a source of transfer to the L3 at different (more or less abstract) levels. Their L3 interlanguage does not seem to be impaired but, rather, it seems to

fall back on their L1s to realize finite morphology or to express negation, among other properties.

There is clearly a need for much more research on L3 acquisition adopting the generative perspective, both focusing on the initial state and the developmental and ultimate attainment stages. The theory that serves to frame these studies affords very detailed hypotheses about specific language properties that should be tested on the L3 production of learners with language pairings that allow the researcher to probe into the nature of linguistic representation.

#### 4. FINAL COMMENTS AND LINES FOR FUTURE RESEARCH

This article has reviewed research on L3 acquisition carried out from the psycholinguistic and the generative perspectives, both featuring cognitive approaches to the interlanguage of the multilingual individual. The main motivation behind both strands is to find explanations for the complex cognitive nature of the multilingual mind and, specifically, for transfer/CLI phenomena and the various factors that can influence it. Their main focus of interest has not been exactly the same: whereas most research carried out from a psycholinguistic strand has dealt with the acquisition of the lexicon, whether from a descriptive perspective or from a more theoretical model-building perspective, and L3 phonology and morphosyntax have not been studied in such a depth, the emergent L3 generative strand deals mainly with morphosyntactic issues trying to explain, among others, the role of UG in the L3 initial state and the different roles the L1 and the L2 play.

There is clearly a need for more research from both strands and an encompassing perspective should probably be aimed at. In fact, as already pointed out by Leung (2007a:109), Chomsky's (1995 *et passim*) Minimalist Program places a key role in the lexicon and acknowledges the interaction between the lexical and the syntactic levels. More work needs to be done on the representation and processing of lexical items (Ecke, 2009; González Alonso, 2012), the role of control processes in the multilingual mind along the lines of work done in bilingualism (Linck, Hoshino & Kroll, 2008) and on the psycholinguistic and neurolinguistic changes in the L3 speaker. Furthermore, there is a need to design studies that will tease apart the different L3 initial state models. Also, if we want to move the field forward, several factors should be carefully controlled for in the experimental studies carried out from both perspectives. First of all, individual differences such as the participants' proficiency level in each of the languages involved, their language dominance (Rah, 2010), working memory capacity and metalinguistic awareness in different linguistic areas. Thus, regarding proficiency, appropriate measures should be used to control the proficiency learners have in previous languages (cf. Jaensch, 2011). Although most studies seem to point to the idea that CLI is less likely at higher level of L3 proficiency, the relationship between the two

constructs (CLI and proficiency) is not so clear. Secondly, the study of different learner groups such as simultaneous bilinguals and heritage language learners (Montrul, 2010) will illuminate issues having to do not only with transfer effects but also with the age factor. Focusing on transfer, more work is clearly needed on interface phenomena (White, 2009) to determine whether there are differences between external (syntax-pragmatics) and internal (syntax-semantics, syntax-morphology) interfaces, in the line of the recent work on L2 acquisition illustrated in Ionin and Zubizarreta (2010), and between the acquisition of syntax-discourse properties compared to morphosyntactic properties (Slabakova & García Mayo, 2012).

From a methodological perspective, several issues should be considered as well: (i) more language pairings should be studied if one really wants to inform the debate about L1/L2 influence in L3 acquisition. Studies with typologically unrelated languages need to be carried out in order to tease apart the L2 factor from psychotypological issues, (ii) longitudinal studies: as in all language-related research, there is a need for longitudinal studies of the same group of learners, although it is not always easy to find learners with language pairings crucial to answer specific theoretical questions and who can be followed throughout a certain length of time, and (iii) use of neuroimaging techniques: as suggested by Bardel and Falk (2012), one way to make progress in the study of L3 acquisition is to adopt a neurolinguistic framework along the lines proposed in Paradis (2004, 2009). Different neuroimaging techniques could be used to determine if the L1, the L2 and the L3 are represented in the different brain areas or whether they share some of those areas. We should take advantage of recent technological advances that would allow us to design more fine-grained studies.

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## NOTES

1. For more information see her discussion about terminological inconsistencies (pp. 8-12).
2. The term cross-linguistic influence was introduced in the 80s (Kellerman, 1984; Sharwood-Smith, 1983). According to De Angelis (2007: 19) "The term [...] was introduced as a theory-neutral term for the various types of influences that are possible on the target language, such as transfer, interference, avoidance, borrowing and L2 related aspects of language loss' (Sharwood-Smith & Kellerman 1986:1)". See Singleton (1987) and De Angelis and Dewaele (2009) for an historical review of CLI and De Angelis and Dewaele (2011) for recent work on the topic.
3. Research has also been carried out on psychotypology (Kellerman, 1983), which is understood as the learners' perception of the distance between two languages. Originally, the term was thought

- of to account for CLI between two languages. See chapter 6 in Hammarberg (2009) for the distinction between linguistic similarities and perception of similarities by the learner.
4. But see Singleton (2011) where he argues that, considering the proximity of German and Swedish at the lexical level, one could think of a psychotypological explanation.
  5. Representational Deficit theories (cf. Hawkins & Hattori, 2006) would not predict that learners have access to the full underlying (grammatical) representations of at least two languages unless those were acquired before the critical period or the same features are present in both languages.

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