



A Critical Review of the Morpheme Order Studies: The State of the Art

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Abstract

The purpose of this paper is to make a critical review of the history of the so-called morpheme order studies. First of all, a brief contextualisation of the morpheme order studies is presented at the time when the linguistic field shifted from behaviourist to innatist theories; put differently, from Structural Linguistics to Generative Linguistics. The morpheme order studies not only contributed as evidence in favour of innatist theories but also had an impact on the formulation of the Natural Order Hypothesis, which was proposed by Krashen in the late 70's and the early 80's. Thereafter, the paper sheds some light on the morpheme order studies, which are divided into two sections. On the one hand, the early stages of the morpheme order studies in which the papers of three pioneer researchers in the area of the first language (L1) are commented; Roger Brown, de Villiers and de Villiers. A more detailed examination on second language (L2) acquisition research follows this section in which relevant researchers such as Dulay and Burt proposed a "universal" order among L2 learners of English. On the other hand, as some investigations claimed that not all L2 learners follow the same consistent order, the paper takes into consideration some factors, also known as the multiple-determinant approach, that influence the order of L2 English morphemes. Furthermore, this research discusses the criticisms that the morpheme order studies have been subjected to and the influence they have had in the construction of teaching materials. The paper concludes with a revision of the factors that affect the acquisition order in L2, which show how there are many factors which influence the acquisition of L2 English morpheme order.

Keywords: morpheme order studies; developmental sequence; first language (L1) acquisition; second language (L2) acquisition

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1. Introduction

There have been many theories regarding the acquisition processes of language learning in the last centuries related to both L1 and L2 acquisition. More precisely, the acquisition of morphemes has been studied since the 1970's because it has been evidenced that the order in which learners attain those morphemes may have an influence on the acquisition process itself. Therefore, this research aims at making a critical review of the morpheme order studies in order to get a general idea about how complex it is to define the processes which involve language acquisition.

This paper is divided into two main sections: the theoretical foundations which include both a description of the approaches to language acquisition and learning and an analysis of the morpheme order studies, and the study of the factors which may influence the order of morpheme acquisition, together with the discussion and the conclusions that can be gathered. The background of the theoretical foundations will consist of the shift from behaviourist to the innatist theories and the Natural Order Hypothesis. It should be mentioned that the morpheme order studies gave support to innatist theories since they claimed that human beings are “designed” to acquire language whereas behaviourists stated that language learning is based on habit formation. The morpheme order studies triggered the formulation of the Natural Order Hypothesis which proposed an acquisition order for the L2 and thus, contributing to these studies.

The next section reviews the line of the morpheme order studies from the early stages. The studies which try to explain how learners acquire the order of morphemes when learning a language are grouped within the morpheme order studies. The first acquisition order regarding L1 was proposed by Brown in the early 1970's and henceforth many studies have tried to discover a consistent order among L2 English morphemes. This paper will review the most relevant investigations, such as the study carried out by Dulay and Burt, who claimed that there was a common order for the acquisition of English morphemes among L2 learners. It has been argued that there is not a common order for L2 attainment (Hakuta, 1976) and that learners' L1 background should be taken into account as a fundamental factor. This idea leads to the next section

in which further investigations have tried to explain this consistent order from a multiple-determinant approach (Gass & Selinker, 2001; Goldschneider & DeKeyser, 2001; Kwon, 2005). This perspective consists of the explanation of some possible factors for the explanation of the L2 acquisition order.

Notwithstanding, the morpheme order studies were harshly criticised as the third section will analyse. In this part, some critical studies regarding the common order for L2 acquisition will be discussed. One criticism is related to the importance of L1 transfer as a fundamental factor in L2 developmental sequences (Gass & Selinker, 2001; Luk & Shirai, 2009). Thus, some comments regarding the Natural Order Hypothesis follow since Krashen did not take this issue into account for the formulation of his hypothesis. The other criticism involves the usage of the Bilingual Syntax Measure (BSM) method by L2 researchers (Gass & Selinker, 2001) because it was thought to bias L2 research.

The paper concludes with the idea that despite the criticism of the morpheme order studies, there is still a strong interest in the explanation of L2 developmental sequences (Ellis, 2006; Hulstijn, 2015; Hulstijn, Ellis & Eskildsen, 2015). Some recent papers have tried to point out the fact that language learning is more complex than it was expected since there are many factors interacting with each other. This research has commented upon some factors such as perceptual salience, semantic complexity, morphophonological regularity, syntactic category, frequency and L1 transfer. Nonetheless, these factors are not the only ones that condition the L2 developmental sequence as recent papers have discussed (Ellis, 2006; Hulstijn, 2015; Hulstijn et al., 2015).

2. Theoretical Foundations

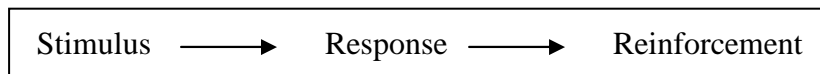
As mentioned above, the morpheme order studies began in the early 1970's when Roger Brown found a consistent order for English morphemes by native speakers of the language. Thenceforth, many studies have been conducted in an attempt to discover a similar order in L2 acquisition. Before going into further analysis, the

background for the morpheme order studies is commented below. Indeed, the contextualisation will ease the understanding and the importance of these studies. This section comments upon the shift the linguistic field went through in the second half of the 20th century: from behaviourist to innatist theories. Before analysing the change in more depth, behaviour theories are examined so as to understand the reaction proposed by the innatists.

2.1. Approaches to Language Learning: from Behaviourism to Innatist Theories

During the first half of the 20th century, the principal theory that dominated the applied linguistic field was the view that language was based on structures; this belief is also known as “structural linguistics”. According to *oxforddictionary.com*, the term “structural linguistics” refers to “the branch of linguistics that deals with language as a system of interrelated structures (...), emphasizing the accurate identification of syntactic and lexical form as opposed to meaning and historical development”. With regard to the definition, it could be said that behaviourists belonged to this branch of linguistics. One of the most famous behaviourists was Skinner who wrote a paper in 1957 called *Verbal Behavior* which helped to construct a behaviourist view of language learning together with the psychological works of the time.

Behaviourists claimed that learning consists in habit formation. These habits are formed from a stimulus and response process in which certain stimuli bring out a certain response. They believed that reinforcing a specific response creates the habit and claimed that if in a communication breakdown the outcome is not a response, then reinforcement would not happen. In other words, in a communicative situation if there is a stimulus but no response, then there is no room for reinforcement.



According to behaviourists, the learning processes involving a first and a second language differed significantly. They claimed that the process of the L1 is easier since it is rooted in the learning of a set of new habits. The problem appears when learning an L2: the fact of having previously learnt a set of habits makes it more difficult when it

comes to learning the set of habits of an L2. Behaviourists proposed that when the two languages are relatively similar the learning of the second set of new habits is easier. However, when the two languages are relatively different, learners make more errors due to the fact of being influenced by the first one. Put differently, learners make errors in the L2 due to the interference of the first language¹.

Throughout the 1950's, it was believed that learning was based on imitating the same kind of response; hence teachers began concentrating on language structures. They also looked at learners' errors to reinforce the structures students had more problems with. In doing so, researchers started paying attention to language differences so as to create a more effective teaching method which is known as Contrastive Analysis. As defined by Gast (2013:1):

Contrastive analysis investigates the differences between pairs (or small sets) of languages against the background of similarities and with the purpose of providing input to applied disciplines such as foreign language teaching and translation studies.

While structural linguists tried to describe language by extracting the structures of it, in the late 1950's, some researchers moved away from these concepts towards more language internal mechanisms (Chomsky, 1959). Some of the papers that influenced the reaction against the behaviourist perspective were, on the one hand, the research conducted by Berko (1958) and on the other hand, the review of Skinner's work by Chomsky (1959).

Berko (1958:150) carried out research in which she demonstrated that children do not make a mere imitation of the language, as she stated that "we are all able to say what we have not practiced and what we have never before heard". In her work, she took an elementary level vocabulary test and looked at morphological features of English. The subjects of her research were 61 first grade students (5-7) from which 26 were boys and 35 girls and child subjects (4-5) from Harvard Preschool. All of them had to answer 28 questions related to inflectional and irregular forms. In order to

¹ The term "child language" is also known as "first language" (L1) or "mother tongue"; all those terms are used interchangeably in this paper.

compare the answers, the same questions were used with 12 adults who were graduated and native speakers of English.

Berko (1958) aimed at proving whether children possess inflectional rules or if they just repeat what they hear. She created the Wug Test which consists in inventing words to investigate how children develop morphological rules. Children were asked to provide English plurals, verb tenses, possessives as well as derivations and the compounds of those words. Berko concluded that children do not merely imitate what they hear but that they extract morphological rules from what they hear. She supported this statement by empirical means since children were able to give correct answers to nonsense words when morphological features were required. Regarding gender issues, the research remarked that statistically there are no significant differences between boys and girls; and with respect to age, it was suggested that both groups, the preschoolers and the first graders, used the same regular and simplified morphological rules.

As mentioned above, the other work that influenced the way behaviourism was seen was Chomsky's review (1959) of Skinner's work on *Verbal Behavior*. He criticised Skinner for not making any contribution to develop new theoretical aspects of language; as Chomsky put forward (1959:26) "in each case, if we take his terms in their literal meaning, the description covers almost no aspect of verbal behaviour, and if we take them metaphorically, the description offers no improvement over various traditional formulations".

As a matter of fact, Chomsky (1959:32) argued that Skinner was not only unable to describe human behaviour in a more specific way but also that "stimuli and responses, so defined, have not been shown to figure very widely in ordinary human behavior". Skinner's statement about verbal behaviour was not supported by experiments; that is, he described its framework from a general point of view. An example of Skinner's vague description found by Chomsky (1959:38) was that the use of the term reinforcement "has no clear content, functioning only as a cover term for any factor, detectable or not, related to acquisition or maintenance of verbal behavior". Moreover, Chomsky suggested that only by the fact of describing sentences structurally did not mean the actual behaviour of them was explained. He also claimed that although

it was difficult to admit that children are able to make up complex sentences, the fact that they do so, would suggest that human beings are “designed” to create such phrases. This would mean that human beings somehow have the ability of extracting rules or hypotheses from language structures.

Berko (1958) and Chomsky (1959) contributed to the linguistic field by giving another perspective which did not coincide with the behaviourist view. Berko refuted by empirical means the basic behaviourist idea that human beings learn language through repetition and imitation. In other words, children do not imitate language as parrots but they rather extract rules from it. Furthermore, the innatist theory claimed that humans have a biological endowment that makes language learning possible. This is known as the Language Acquisition Device (LAD) according to Krashen or what later Chomsky called Universal Grammar (UG) which is universal to all languages. This theory was closely associated with Chomsky’s work since he claimed that children seemed to have the ability to elaborate hypotheses about language in their minds.

The next section will delve deeper into this linguistic change by analysing what is called the morpheme order studies which evidenced that language is innate in humans. Nonetheless, before examining these studies in more detail, the following section deals with the influence those studies had in the formulation of the Natural Order Hypothesis.

2.2. The Natural Order Hypothesis

Before analysing the morpheme order studies, it is necessary to mention that, in the late 1970’s and the beginning of the 1980’s, Krashen proposed a model for L2 learning called the Monitor Model. The model was based on five hypotheses from which the Natural Order Hypothesis played an important role in the morpheme order studies. According to this hypothesis, learners of an L2 acquire language elements in a “predictable” way regardless of instruction. To put it another way, L2 learners acquire the second language in a hierarchical manner without even being instructed in it. Krashen suggested an acquisition hierarchy for the order of morphemes. He divided language forms into four stages and claimed that L2 learners acquire the morphemes of

a stage before acquiring the morphemes of the next stage (see Figure 1 adapted from Krashen, 2009). For instance, what Krashen stated was that the progressive (*-ing*) together with the plural (*-s*) and the copula (*be*) are acquired before any morpheme of the next stage, that is to say, before the auxiliary (*be*) or the articles (*a/the*).

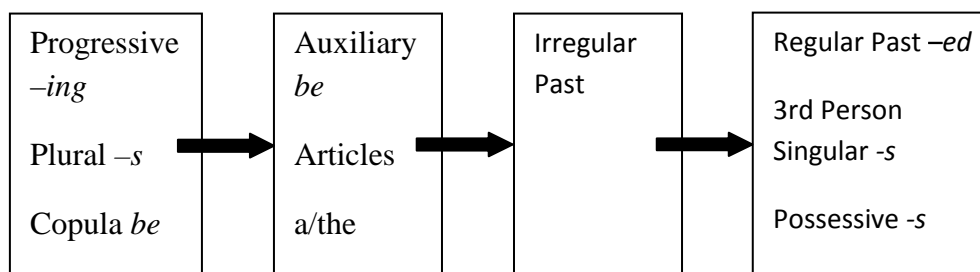


Figure 1 Acquisition Hierarchy from Krashen (1977) in Krashen (2009)

The Monitor Model was one of the most important theories of the late 1970's. Since then, the Natural Order Hypothesis together with the rest of Krashen's hypotheses, have been put into question, but at the time they were pivotal to understand the changes that were taking place in linguistic research. They also influenced the formulation of the morpheme order studies, as we will see in the next section.

3. The Morpheme Order Studies

The morpheme order studies were taken as evidence against the behaviourist theories since they supported that children do not learn the L1 through the formation of a habit but rather that they acquire language through developmental stages. This section examines some of the studies that fall within the morpheme order studies and which discovered a consistent order for L1 and L2 morpheme acquisition. It is worth noticing that this section is divided into two parts. On the one hand, the early stages of the morpheme order studies are reviewed. This includes the research conducted by Roger Brown (Brown, 1973) who proposed a consistent order for L1 acquisition which later on was supported by de Villiers and de Villiers (de Villiers & de Villiers, 1973). These investigations encouraged other researcher in L2 acquisition. On the other hand, a more recent perspective towards the explanation of L2 English morphemes is commented (Goldschneider & DeKeyser, 2001; Kwon, 2005; Ellis, 2006; Hulstijn, 2015; Hulstijn, Ellis & Eskildsen, 2015).

3.1. The Early Approaches to the Morpheme Order Studies

The next section, which examines the early stages of these studies, has been divided into two parts. Firstly, the most influential studies concerning L1 acquisition are discussed, since they became the background for the morpheme order studies (Brown, 1973; de Villiers & de Villiers, 1973). Secondly, research regarding L2 acquisition (Dulay & Burt, 1973, 1974a, 1974b, 1975; Bailey, Madden & Krashen, 1974; Hakuta, 1976) is described.

3.1.1. The Morpheme Order Studies in First Language Acquisition

As it has been previously stated, this section comprises L1 studies as being the background for what is known as the morpheme order studies. Roger Brown was the first researcher who found that L1 learners follow a certain order when learning their native language. Brown (1973) carried out a longitudinal study² in which the subjects were three children. He measured children's speech by calculating the mean length of utterance (MLU). Through this measurement device, it could be appreciated how any new knowledge increased the length of utterances. In order to know that children had acquired the morphemes they have encountered, Brown (1973:398) considered that those morphemes had to appear "in 90 percent of all obligatory contexts for three successive two-hour samples" (see Table 1 for the order of the 14 morphemes). This method for scoring data is also known as suppliance in obligatory context (SOC). He looked at grammatical morphemes, since they are obligatorily required in certain contexts and because they can be identified and quantified. As defined by Brown (1973:255):

[G]rammatical morphemes are obligatory in certain contexts, and so one can set an acquisition criterion not simply in terms of output but in terms of output-where-required. Each obligatory context can be regarded as a kind of test item which the child passes by supplying the required morpheme or fails by supplying none or one that is not correct. This performance measure, the percentage of morphemes supplied in obligatory

² Longitudinal studies consist in observing the development of linguistic performance in which data is collected at periodic intervals over a span of time, whereas in cross-sectional studies data is collected at only stage of development.

contexts, should not be dependent on the topic of conversation or the character of the interaction.

The order of L1 acquisition of the longitudinal evaluation was as follows:

RANK	MORPHEME
1	Present progressive inflection (<i>-ing</i>)
2/3	In, on
4	Plural (<i>-s</i>)
5	Past irregular
6	Possessive (<i>-'s</i>)
7	Uncontractible copula (<i>is, am, are</i>)
8	Articles (<i>a, the</i>)
9	Past regular (<i>-ed</i>)
10	Third person singular (<i>-s</i>)
11	Third person irregular
12	Uncontractible auxiliary (<i>is, am, are</i>)
13	Contractible copula
14	Contractible auxiliary

Table 1 Order of L1 Acquisition of English Morphemes in Brown's study (1973)

The acquisition of the morphemes among the three children was divided into five stages. In Stage I children pronounced 'content words'; that is to say, children pronounced meaningful words omitting the inflection as well as the articles which accompanied them. Thus, they lacked what Brown called grammatical morphemes³. He discovered that from Stage II to Stage V the fourteen morphemes were acquired in a certain order but each child needed an amount of time which differed among the others. In other words, although each child may have been instantiated with a specific functor, all the children acquired the grammatical morphemes in a similar order. Brown (1973) reached the conclusion that the acquisition of the fourteen morphemes was determined by the relative semantic and grammatical complexity. He further (1973:257) claimed

³ Although Brown (1973) used the term "grammatical morphemes" some authors such as Goldschneider and DeKeyser (2001) used the term 'functor' because the latter term does not distinguish grammatical units. In this paper both terms are used interchangeably.

that children go through developmental stages; that is, children acquire such grammatical morphemes progressively rather than abruptly:

It is true of all the grammatical morphemes in all three children that performance does not abruptly pass from total absence to reliable presence (...) This is a fact that does not accord well with the notion that acquisition of grammar is a matter of the acquisition of rules, since the rules in a generative grammar either apply or do not apply. One would expect rule acquisition to be sudden.

Brown (1973) was one of the pioneers in the field of describing language internally but his work became very influential for studies concerning the acquisition of L2 English morphemes. De Villiers and de Villiers (1973) conducted another study concerning the acquisition of L1 morphemes. They carried out a cross-sectional study where they used the fourteen morphemes proposed by Brown in obligatory context. Nevertheless, they combined MLU and age for a better predictor of the morphemes.

In this study, the subjects were twenty-one English speaking children aged between 16 and 40 months. The grammatical morphemes were taken into account when they appeared in obligatory context and also when they were absent. De Villiers and de Villiers (1973) ordered the morphemes using two different procedures. Firstly, the researchers ordered the morpheme according to Brown's study (1973); that is, the morphemes had to occur in at least 90 percent of the obligatory context to be ordered from the lowest MLU sample. Secondly, the morphemes were ordered by summing the time each of them was used. Calculating its mean, they created a new ranking method which depended on the accuracy of use (see Table 2 from de Villiers and de Villiers, 1973).

De Villiers and de Villiers (1973) drew the conclusion that there was a high degree of similitude between the orders of their study and the one conducted by Brown (1973). Although both studies agreed on the order, de Villiers and de Villiers concluded that there are three possible determinants to explain this order: the frequency of the morphemes, grammatical complexity and semantic complexity. However, Brown (1973:255) did not include frequency as he stated "the order of acquisition is dependent upon relative complexity, grammatical and/or semantic".

The 14 grammatical morphemes	Average rank-ordering for the three children studied longitudinally (Brown, in press)	Rank-ordering for the children in the present study	
		by Method I	by Method II
Present progressive	1	2	4
on	2.5	2	2
in	2.5	4	1
Plural	4	2	3
Past irregular	5	5	5
Possessive	6	7	11
Uncontractible copula	7	12	10
Articles	8	6	8
Past regular	9	10.5	7
3rd Person regular	10	10.5	12
3rd Person irregular	11	8.5	6
Uncontractible auxiliary	12	14	14
Contractible copula	13	8.5	9
Contractible auxiliary	14	13	13

Table 2 Order of Acquisition of the 14 Morphemes from Brown's Longitudinal Study and in Terms of the Two Ordering Procedures used in de Villiers and de Villiers (1973)

The two studies were of great relevance for two reasons. First, Brown (1973) was the first one to claim that there is a consistent order when children acquire L1 English morphemes. Second, the fact that that consistent order was supported by de Villiers and de Villiers' (1973) cross-sectional study gave more support to Brown's study. The next section focuses on the analysis of the morpheme order studies in L2 acquisition.

3.1.2. The Morpheme Order Studies in Second Language Acquisition

Soon after Brown's study (1973), the first researchers to investigate L2 acquisition were Dulay and Burt (1973, 1974a, 1974b). As Kwon (2005:2) points out "[t]he idea was to demonstrate that second language acquisition (SLA) was not just a matter of learned response but that individuals developed second language competence according to a predictable series of benchmarks". In 1973, Dulay and Burt carried out a study to see whether L2 English students follow a consistent order when acquiring the L2. They used eight of Brown's functors:

- Present progressive *-ing*
- Plural *-s*
- Past irregular
- Possessive *-s*
- Articles *the, a*⁴
- Third person singular *-s*
- Contractible copula *be*
- Contractible auxiliary *be*

The subjects were 151 Spanish speaking children, aged between 5 and 8, learning English as a second language (ESL) and who received different type and amount of exposure to English. These children were divided into three groups:

- 95 children belonged to the first group who were from Sacramento (California) and attended a monolingual school where they received formal instructions in English.
- In the second group, there were 26 children from San Ysidro (California), who attended an English school but spoke Spanish at home.
- The third group was made up of 26 children from East Harlem (New York City) who attended a bilingual school where English and Spanish were spoken; although, they did not receive formal instruction in English.

Children's oral production was collected by the Bilingual Syntax Measure (also known as the BSM) method which was made up with basic syntactic structures, 7 cartoon pictures and 33 questions, eliciting natural speech. Each obligatory context for a

⁴ Brown did not differentiate definite and indefinite articles in his study and neither did Dulay and Burt (1973) since they took what Brown (1973) did and applied it to second language acquisition. The distinction will be made later on (Hakuta, 1976).

functor was scored according to the following schema (from Dulay and Burt, 1973:254):

No functor supplied: = 0 (She's dance__)
Misformed functor supplied: = 0.5 (She's dances)
Correct functor supplied: = 1.0 (She's dancing)

The accuracy score for each functor was then as a ratio of the sum of the scores for each obligatory context for that factor across the whole group. (The examples mentioned above would have a ratio of $1.5/3 = 50\%$). Dulay and Burt (1973:252) noted that “the older L2 learner need not struggle with the same kind of semantic notions already acquired in earlier childhood”. Furthermore, Dulay and Burt (1973:256) found a consistent order among L2 English learners who had Spanish as their mother tongue as they claimed that “there seems to be a common order of acquisition for certain structures in L2”. This consistent order was similar to L1 acquisition order (see Table 3).

	L1 Brown (1973)	L2 Dulay and Burt (1973)
1	Present Progressive <i>-ing</i>	Articles <i>the/a</i>
2	Plural <i>-s</i>	Present Progressive <i>-ing</i>
3	Irregular Past	Plural <i>-s</i>
4	Possessive <i>'s</i>	Regular Past <i>-ed</i>
5	Articles <i>the/a</i>	Irregular Past
6	Regular Past <i>-ed</i>	Possessive <i>'s</i>
7	Third Person Plural <i>-s</i>	Third Person Plural <i>-s</i>

Table 3 Acquisition Order for 7 Functors in L1 and L2

As Table 3 shows, the acquisition order for L1 and L2 is consistent because both of them follow a similar order. The present progressive *-ing* and the plural *-s* are acquired, precisely, in 1st and 2nd ranking positions whereas in the L2 they are acquired in the 2nd and the 3rd positions, respectively.

In the following study, Dulay and Burt (1974a) focused on learners' outcome to corroborate that L2 learners acquire English through developmental stages as it was shown in L1 acquisition research. Therefore, they administered the BSM method to 179 Spanish speaking children, aged 5-6, to see whether learners' errors are due to developmental cognitive strategies or errors resulting from the interference of the L1.

Dulay and Burt's research (1974a) showed that children learning English as L2 and children with English as L1, made similar errors. Although it was true that children made use of a negative transfer⁵ in 4.7% of the errors; the results given by Dulay and Burt supported that they did not use the set of habits of the L1 to learn the L2. In fact, 87.1% of the errors were due to developmental structures accounting for language acquisition, as Brown (1973) reported for child language. The work by Dulay and Burt (1974a) promoted the creative construction process which states that children learn an L2 not through habit formation as behaviourists claimed but through a progressive active construction of L2 structures.

Following the same path of discovering a consistent order among L2 learners, Dulay and Burt (1974b) conducted another study in which they compared 11 English functors with Chinese and Spanish (two typologically distant languages) speaking children learning English, 60 and 55 respectively. They divided the subjects into two groups depending on their L1 background. The study showed that students learning an L2 still follow a consistent order, regardless of their first language.

A year after Brown's pioneer study (1973) on the consistent order in the acquisition of child language, Dulay and Burt not only concluded that L2 learners also follow a regular order regardless of their L1 background (Dulay & Burt, 1974b) but also that L2 learners' errors are due to developmental stages (Dulay & Burt, 1974a), as it was the case of children acquiring the L1 (Brown, 1973).

In 1974, Bailey, Madden and Krashen conducted a study to see whether the same order was followed by adults learning English as L2. They administered the BSM

⁵ Negative transfer happens when the learner wants to translate a structure from his/her L1 which results as incorrect due to the differences between the two languages. When the outcome of transferring a L1 structure to a second language is correct it is called positive transfer.

method to 73 adults, aged between 17 and 55. The focus of the research was to observe if adults follow the same order when acquiring L2 English morphemes. Bailey et al. divided adults into two groups regarding their L1 background. On the one hand, the Spanish speaking group was composed by 33 native speakers. On the other hand, there were 40 adults from different L1 backgrounds: Greek, Persian, Italian, Turkish, Japanese, Chinese, Thai, Afghani, Hebrew, Arabic and Vietnamese. They compared their results to the studies carried out by Dulay and Burt and concluded that there were similarities between them. In other words, Bailey et al. demonstrated that children and adults follow a similar order, regarding the same set of English functors, and that they use similar strategies when it comes to learning the L2.

Looking at the conclusion drawn by L2 research, it seemed that L1-L2 child learners together with adults learning English as L2 acquire language in a similar way (Dulay & Burt, 1973, 1974b; Bailey, Madden & Krashen, 1974). The next question seemed to call for a universal strategy among second language learners for the acquisition of an L2. This issue was answered by Dulay and Burt (1975) who focused on child learners, since it was claimed that age did not alter the order in which L2 morphemes are acquired (Bailey et al., 1974).

Dulay and Burt (1975) used three different methods to obtain L2 sequences and compared L1 (Brown, 1973; de Villiers & de Villiers, 1973) and L2 rank orders. As Table 4 shows, the rank orders for L1 research are very similar, whereas the order differs when it is compared to the L2 rank orders. It should be noted that the L2 rank order shows a consistent order among the three methods. Therefore, Dulay and Burt decided to take a bigger sample of L2 learners and collect the data by using an expanded version of the BSM method. The total number of subjects was then 536 children, aged 6 to 8, who had either Chinese or Spanish as L1.

	L1 Rank Order			L2 Rank Order		
	Brown	de Villiers Method I	de Villiers Method II	Group score	Group means	SAI
-ing	1	1.5	2	3	2.5	2.5
Plural	2	1.5	1	4	4	5
Past-irreg	3	3	3	7	7.5	7.5
Possessive	4	5	6	8	7.5	6.5
Article	5	4	5	1	1	2.5
Past-reg	6	7.5	4	6	6	8.5
3rd Person	7	7.5	8	9	9	8.5
Copula	8	6	7	2	2.5	1
Auxiliary	9	9	9	5	5	4

Table 4 L1 and L2 rank orders for 9 functors (from Dulay & Burt, 1975)

Dulay and Burt (1975) decided that each child had to score at least 90 percent of the obligatory context to consider that the functors had been acquired. They ordered the morphemes depending on the order they were acquired which was also referred to as “acquisition hierarchy” (see Figure 5). They divided the morphemes into four different groups and found that children learning English as L2 acquired those morphemes in a fixed order. Dulay and Burt concluded that there was a “universal order”⁶ for L2 morpheme acquisition and they suggested that the characterization of each group would allow researchers to obtain syntactic structures from other languages rather than English.

⁶ Although Dulay and Burt (1973, 1974b, 1975) discovered a consistent order for morpheme acquisition in L2 students to which they called “universal order”, Ellis (1985), as cited in Kwon (2005:2), claimed that “the sequence they identified is not universal since not all learners acquired every item in exactly the same order.” As Kwon (2005) pointed out the term “universal” may be confusing.

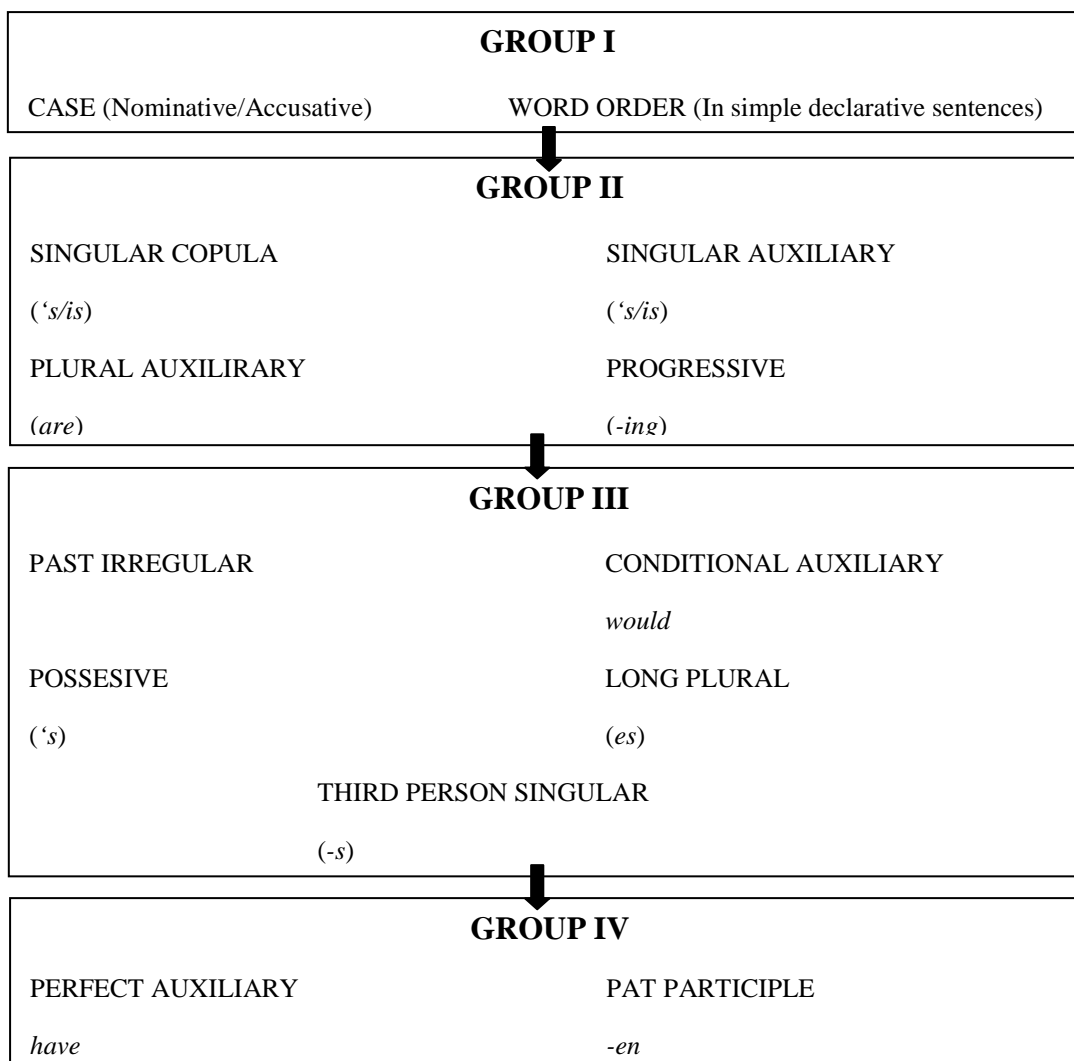


Table 5 Acquisition hierarchy (adapted from Dulay & Burt, 1975)

After the proposal of a universal hierarchy among L2 learners, it was shown that not all learners follow the same common order when acquiring an L2. Clear evidence against this universal order was shown in the longitudinal study conducted by Hakuta (1976) who looked at the acquisition order of a five year old Japanese girl named Uguisu who was learning English as L2.

Hakuta (1976) concluded that, despite the fact that the plural particle and the articles are more salient in English than the possessive, Uguisu acquired the possessive morpheme before the plural and the articles. Hakuta suggested that this acquisition order may be related to the fact that Japanese has not a particle to mark plurality and neither articles. Furthermore, Uguisu had to acquire the articles but she also had to learn the appropriate discrimination of them. Hakuta drew the conclusion that the absence of

that kind of morphemes in the learners L1 may influence the order in which L2 English morphemes are acquired. Put differently, what he claimed was that not all L2 English learners followed the same consistent order. Moreover, he suggested that L1 background should be taken into consideration since it may influence the order in which L2 morphemes are acquired.

In sum, the investigations regarding L1 and L2 studies have shown that the order of acquisition of English morphemes among learners is not identical but similar. The last part of this section has shown that the order in which morphemes are acquired may vary depending on learners' L1 background. Thus, there seems to be some variance in the acquisition of L2 morphemes. The next section will try to explain that variance according to the multiple-determinant approach.

3.2. Factors Conditioning the Morpheme Order Studies

At the end of the 1970's it was claimed that second language learners use universal strategies for the acquisition of the L2. Furthermore, Krashen formulated the Natural Order Hypothesis for L2 acquisition, which stated that L2 learners attain morphemes in a natural order. Nevertheless, some evidence was presented showing that there seems to be some variance in the acquisition of morphemes among L2 learners (Hakuta, 1976).

This section focuses on a more recent perspective, the multiple-determinant approach, which accounts for a better prediction regarding learners' variance of the L2 acquisition (Goldschneider & DeKeyser, 2001; Kwon, 2005). What other investigations have claimed about the relationship between factors and the acquisition of L2 morphemes is also mentioned in order to contrast different views (Ellis, 2006; Hulstijn, 2015).

Gass and Selinker (2001) suggested that the consistent order of the morphemes could be due to some factors, also known as “putative”⁷ determinants by Kwon (2005),

⁷ Kwon (2005:10) defined the term “putative” as “the [established] causal relationship between these factors and the observed orders”.

rather than only one. They proposed a multiple-determinant approach affecting the order of morpheme acquisition which was later on supported by Goldschneider and DeKeyser (2001). As pointed out by Kwon, who conducted a historical survey in favour of the multiple-determinant approach, many factors were investigated in L2 morpheme acquisition: perceptual salience, morphophonological regularity, syntactic complexity, frequency, semantic complexity, native language transfer, individual variance and levels of morpheme activation.

As mentioned above, Goldschneider and DeKeyser (2001) supported the multiple-determinant approach by carrying out a study based on a meta-analysis method which consists of taking other studies as subjects of research. Despite the fact that, the total number of studies was 25, they eventually restricted their analysis to only 12 due to some factors that will be clarified later on. Goldschneider and DeKeyser wanted to know to what extent a multiple-determinant approach accounts for the variance of the L2 acquisition order.

They decided to focus on studies which had English as L2 and which were oriented to oral production. Besides, that research could gather either adult or children data, since it had been demonstrated that both adults and children follow a similar developmental order (Bailey, Madden & Krashen, 1974). Furthermore, all the studies had to use the suppliance in obligatory context (SOC) method, which consisted of ordering the morphemes depending on the frequency of their correct suppliance. The number of functors common to the L2 studies were six out of the fourteen in Brown's study (1973): progressive *-ing*, plural *-s*, possessive *-s*, articles *a*, *an*, *the*, third person singular *-s*, and regular past *-ed*. The proposed determinants were:

- Perceptual salience
- Semantic complexity
- Morphophonological regularity
- Syntactic category
- Frequency

They assume that the L2 acquisition order was related to the property each functor carries. Thus, they combined those determinants to look at the features of the functors; as Goldschneider and DeKeyser (2001:13) put it, “the possibility that the order of acquisition of grammatical morphemes is determined to a large extent by properties of the functors themselves forms the foundation for the present meta-analysis”.

Perceptual salience

Gass and Selinker (2001) advanced that the reason why L1 English morphemes are acquired in a consistent order could be due to the salience of each morpheme, that is it depends on how noticeable it is. Many studies have taken perceptual salience as one of the predictors for the acquisition hierarchy in L2 English morphemes such as Goldschneider and DeKeyser (2001:22) who defined perceptual salience as “how easy it is to hear or perceive a given structure”. Apart from this determinant, three subfactors are also considered: number of phones, sonority and syllabicity. In fact, the idea was that the more phones and the more sonorous (according to the sonority hierarchy, see Table 6) a functor is, the more salient it is and thus, the faster it is acquired. They also claim that the presence of a vowel (syllabicity) in a functor ease the acquisition of it.

Range	Points	Description
Most sonorous	9	low vowels
	8	mid vowels
	7	high vowels
	6	glides
	5	liquids
	4	nasals
	3	fricatives
	2	affricates
	Least sonorous	1

Table 6 Sonority hierarchy (from Goldschneider & DeKeyser, 2001)

Perceptual salience was challenged by some researchers such as Hakuta (1976) who claimed that although articles are very salient in English, in his study the

⁸ Although this determinant was not considered by Goldschneider and DeKeyser (2001) as it will be explained in this section; it is worth mentioning since is it discussed later on (Kwon, 2005).

acquisition of such functor was relatively late. Apart from this fact, it should be noted that Kwon (2005) did not include this determinant as a possible factor conditioning the L2 acquisition hierarchy.

Semantic complexity

As Brown (1973) claimed, children first acquire content words. He suggested that these content words follow an acquisition order depending on the meaning they carry. The more meaning the word has, the more difficult it is to acquire. Goldschneider and DeKeyser (2001:24) gave a clear example of semantic complexity with the third person singular present *-s* and the plural morpheme *-s*. The latter morpheme “expresses number whereas the third person singular *-s* expresses person, number and present tense”. According to Goldschneider and DeKeyser, the plural morpheme *-s* should be acquired faster than the third person singular *-s* because it is semantically simpler. They also tried to explain the order of the functors through “cumulative complexity”, which refers to the forms that are acquired later due to the added meanings those forms have. The concept of “cumulative complexity” was also present in Brown who ordered the functors according to their complexity (also known as hierarchical complexity). Goldschneider and DeKeyser assigned one point to each added meaning in the complex form. It is worth mentioning the fact that it is not said which functor is first acquired when there are two grammatical morphemes with the same amount of semantic complexity.

What seems to be clear is that semantic complexity explains some differences between L1 and L2 learners. For example, Dulay and Burt (1973) claimed that L2 learners, who are usually older than L1 learners, acquire similar semantic notions faster than L1 learners because “those” functors have been acquired in the L2 learners’ mother tongue. Kwon (2005) argued that the differences in the acquisition hierarchy may be explained due to the cognitive awareness adults have towards linguistic forms. This may explain the early acquisition of the articles *the/a* by L2 learners who may have learnt the appropriate distinction between definite and indefinite articles in their L1.

It is necessary to mention the case of the regular past *-ed*, which is acquired later by L1 learners. Kwon (2005:12) explained that the late acquisition of the morpheme *-ed* is due to the “higher level of conceptual development” whereas the morpheme *-ing* is

acquired earlier for its simpler notion of the form. Put differently, L1 learners of English acquire the past regular morpheme later than the present progressive (as it can be seen in Table 3) because they do not have a clear notion of the past time.

Morphophonological regularity

The papers examined so far do not mention morphophonological regularity, except for Goldschneider and DeKeyser (2001:26) who defined it as it follows: “morphophonological regularity refers to the degree to which the functors are (or are not) affected by their phonological environment”. Thus, the prediction is that the less phonologically affected and the more regular the functor is the earlier it should be acquired.

Within phonological regularity Goldschneider and DeKeyser (2001) took into account the number of phonological alternations and homophony with other grammatical functors. They claimed that the more alternations the functor suffered the later it should be acquired. With regard to homophony, the functors which were not homophonous were acquired earlier than those which were homophonous. A clear example for homophony would be:

plural –s	possessive ‘s	third person plural –s
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According to Goldschneider and DeKeyser (2001) their homophony makes more difficult the acquisition of such morphemes. Redundancy was considered a possible subfactor for this determinant although it was the least defined one since Goldschneider and DeKeyser (2001:27) could not “determine where redundancy did or did not exist in the learner’s speech, because the original utterances (...) are not available in the published studies”.

Syntactic category

Brown (1973) took into account this as a significant determinant for the consistent order among L1 learners. It is worth noticing that there have been advances in the field of syntactic theory by the hand of Zobl and Liceras (1994) who, as cited by Goldschneider and DeKeyser (2001:28):

[O]bserved that by grouping the functors by syntactic category (lexical/functional), and then further subdividing them according to the free/bound distinction, a pattern emerged in which lexical items appear to be acquired before functional items, and within each of these groups, free morphemes are acquired before bound ones.

Goldschneider and DeKeyser (2001) created a scoring method from one to four depending on the acquisition hierarchy. The forms that were expected to be acquired first were assigned with the number four and the forms that were predicted to be the last ones in the acquisition hierarchy received the lowest ranking; one.

Frequency

Although Brown (1973) did not consider frequency as a possible determinant for the order of acquisition of the morphemes, Goldschneider and DeKeyser (2001) did consider it. They pointed out that the grammatical item that appeared more times in the input of the learner was expected to be acquired earlier than those items which appeared less times. In the next section, this assumption is challenged by researchers such as Luk and Shirai (2009) who stated that this was not always the case of L2 learners of English.

L1 Transfer

This determinant was not included in Goldschneider and DeKeyser (2001) because the studies that were under revision did not consider it. L1 transfer was first proposed by behaviourists in their habit formation theory about language learning. So, it could be concluded that those studies did not consider it because L1 transfer was related to the habit formation theory and researchers regarding the morpheme order studies carried out research from an innatist perspective, where the influence of the L1 is secondary.

Goldschneider and DeKeyser (2001) showed that a multiple-determinant approach can explain a large percentage of the total variance of the order of English morphemes (multiple regression analysis $R = .84$; $R^2 = .71 < 0.01$). Although Goldschneider and DeKeyser (2001:33) stated that it was difficult to determine “which of the five variables is the most important ‘causal factor’ ”, they found out that the five factors were somehow related to the aspects of salience at various levels, form and meaning. Kwon (2005), who was as well in favour of a multiple-determinant approach,

conducted a historical survey regarding the “natural order” of morpheme acquisition. She aimed at showing that a multiple-determinant approach could give a better picture for the variance in the acquisition order of grammatical morphemes of English.

Kwon (2005) centred the survey on three determinants: semantic complexity, input frequency and native language transfer. She claimed that those determinants were important because, apart from being frequently mentioned in other literatures, the first two gave account of the relationship between L1 and L2 acquisition whereas frequency and L1 transfer could be related to the change that the morpheme order studies have been subjected to. Kwon (2005:17) claimed that “an incomplete and inaccurate picture would emerge if we were to insist on a priority among these factors or to attempt to explain ‘natural order’ on the basis of any single determinant”.

Other investigations

The issue of learners’ variance is currently under revision. The factors affecting both first and second acquisition order were clarified by Ellis (2006), who explained that there are some factors which influence both L1 and L2 acquisition, while others are special to L2 acquisition. He claimed that the common factors to both acquisition orders are contingency, competition and salience, which produce a similar order when the language is acquired. Contingency refers to the relationship between cues and the outcome in the learner’s mind. Firstly, learners focus on a cue and then start introducing more cues so that these end up being mixed and combined (cues end up competing among themselves). The factor of salience, which has been explained in the previous section, is very similar when applied to cues. Ellis claimed that the more salient a cue is, the faster it will be acquired and the more important the outcome will be.

With regard to the factors special to L2 acquisition, we can find the following: interference (between new and old memory), overshadowing and blocking, perceptual learning and transfer from learners’ L1. Interference happens in both directions; the acquisition of new learning makes the learner forget the old one (*retroactive inhibition*) and the other way around, what has been learnt inhibits new knowledge (*proactive inhibition*). The terms “overshadow” and “blocking” are connected, since Ellis (2006) explained that when two cues are about to be learnt but one of them is more salient, it is

said that the more salient cue has overshadowed the other, that is, the latter cue has been blocked. Perceptual learning refers to the relevancy given to the stimuli in which the perceptual system becomes more sensitive due to usage. The last factor which is special to L2 acquisition is transfer from L1 to the L2 which induces to errors that later on are overgeneralized.

Ellis (2006:188) concluded that “first language usage induces interference, overshadowing and blocking, and perceptual learning, all biasing the ways in which learners selectively attend to their second language”. He further added that “*(i)n all cases*, the functors have to be perceived as cues before they can partake in acquisition” (2006:189). Nevertheless the picture for variance in L2 acquisition order seems to be more complex.

Since 2006 a large amount of research has been conducted and new theories have been proposed. It is true that investigations regarding the morpheme order studies have decayed but still nowadays, there are some research trying to find or explain the orders of L2 morphemes (Hulstijn, 2015; Hulstijn, Ellis & Eskildsen, 2015).

Unfortunately, the most recent investigations related to the morpheme order studies have suggested different theories for L2 developmental sequences. These sequences have been explained through the interaction of different factors (Hulstijn, 2015; Hulstijn, Ellis & Eskildsen, 2015). The focal point of new investigations is to define those factors as much as possible to predict L2 developmental sequences. Therefore, many theories have been proposed which in fact have diminished the focal point of investigation, as Hulstijn (2015:217) pointed out, “*(n)ot all theories are equally explicit on what their positions are on some fundamental issues related to L2 development*”.

In summary, this review suggests that when researchers stopped trying to explain the acquisition of L2 English morphemes by only one determinant, they gave rise to a new perspective that could adjust the explanation of the variance of L2 morphemes. Some researchers such as Goldschneider and DeKeyser (2001) or Kwon (2005) tried to explain such variance by a multiple-determinant approach. Nowadays,

the picture of explaining L2 morpheme acquisition through a multiple-determinant approach has developed, with a new focus of research.

4. The Morpheme Order Studies under review

The morpheme order studies have influenced teaching methods and have been taken as the background for teaching materials. Thank to these studies teachers have been more prepared to deal with L2 learners' errors; thus, they have been very helpful in L2 didactics: for instance, to know those morphemes that had to be included in the curriculum before others. Nevertheless, the studies which have tried to explain first, the acquisition order among L1 learners and afterwards among L2 learners, had to face criticism. In this section, some of these criticisms will be briefly discussed.

Regarding the L1 background and the importance of transfer for the acquisition order, Gass and Selinker (2001:113) claimed that "there was some evidence even within these studies [the morpheme order studies] of the role of the NL [Native Language]". One of the first investigations against this universal order was carried out by Hakuta (1976) who claimed that it was worth considering learners' L1 background. He suggested that the fact that the morphemes were absent or present in learners' L1 may be considered as a reason for the variance in the order of L2 learners.

This view was also supported by Luk and Shirai (2009) who reviewed previous studies concerning this issue. They showed that the L1 has a strong impact upon L2 learners. Contrary to Hakuta (1976) who looked at 17 grammatical morphemes, they were interested in only three morphemes (plural *-s*, articles *a/the* and possessive *'s*) since they were somehow absent or present in their subjects' L1. They reviewed 17 studies, which used subjects from different L1 backgrounds: Japanese, Chinese, Korean and Spanish.

These researchers stated that Japanese, Chinese and Korean are similar languages because articles and the plural marker are not present in these languages, except for Korean which has a particle that denotes plurality but it has an optional use. Furthermore, regarding the genitive marker, the three languages do have such marker

which in fact has a very similar structure to the English one. Concerning the Spanish language, it was considered different from the rest since it contains articles and a particle which denotes plurality⁹. Although it has a genitive marker as the English language, the structure in both languages differs from one another.

Luk and Shirai (2009) drew the conclusion that learners' first language has an effect when students learn an L2. The absence or presence of the morphemes in learners' L1 may predict the order in which L2 morphemes will be acquired. In sum, they concluded that learners' L1 background has an impact on the acquisition of the L2.

The criticisms mentioned so far are related to the importance of L1 transfer in the acquisition of L2 morphemes. Thus, the Natural Order Hypothesis which was proposed by Krashen was also criticised. This hypothesis which did not consider L1 transfer was not accepted by some researchers; since they could not agree with the idea that all learners acquire L2 morphemes in the same order (Hakuta, 1976; Luk & Shirai, 2009). These researchers' general statement was that the Natural Order Hypothesis could not explain the variance of L2 morphemes because it did not take into account individual variance (anxiety, L1 background etc.).

Gass and Selinker (2001) also criticised the fact that it was impossible to see any variance in the acquisition order of some investigations because the variety of L1 background was very large as in Bailey, Madden and Krashen's research (1974), who used 40 non-Spanish speakers from 11 different L1 backgrounds. Put it differently, Bailey et al. could not account for any variance in L2 morpheme acquisition, regarding L1 background, because if any difference had occurred the sample may have been insignificant.

Another criticism involves the usage of the BSM method in the morpheme order studies. According to Goldschneider and DeKeyser (2001:9) this method "was not specifically designed to test order of acquisition. It is a test of L2 proficiency designed

⁹ It is worth noticing that the Spanish language apart from having a particle which denotes plurality, the marker of plurality is also reflected in the article; as it can be seen in the following example: *la casa* (the house) and *las casas* (the houses).

for young children”. Moreover, some researchers claimed that the BSM method bias learners’ results. As stated by Gass and Selinker (2009:113) “the results obtained may be an artifact of the Bilingual Syntax Measure. In other words, the test itself may have biased the results; any group of learners given this test would produce similar results.”

Notwithstanding, Krashen (1978) unfounded the idea that the BSM method biased the results of the investigations by revising the work conducted by Porter; who claimed that more natural speech was needed from students in order to compare it to the L1 order. Krashen (1978:190) claimed that “(t)he similarity between Porter’s L1 order and BSM L2 orders is not consistent with previous results. This strongly suggests that the BSM morpheme order obtained by several investigations is not an artifact to the test”.

All in all, those criticisms which challenged the claim the morpheme order studies posited, were not supported. It is true that at the beginning the morpheme order studies did not consider L1 transfer as a possible factor for the variance in L2 developmental sequences, but nowadays L1 transfer plays an important role as a factor for the acquisition of L2 morphemes. This has been evidenced in different papers (Hakuta, 1976; Kwon, 2005; Luk & Shirai, 2009). The last section, will overview what has been examined so far and will include the conclusions that could be drawn from recent investigations.

5. Conclusions

This paper has aimed at analysing critically the morpheme order studies. Although these studies started as evidence against the behaviourist view which stated that communication was rooted in habit formation, researchers soon realised their importance in L2 research to corroborate whether learners follow a consistent order in L2 as they do in their L1. Dulay and Burt (1973, 1974b) were among the first to propose an acquisition order for L2 learning. Thereafter, many studies have been carried out, some supporting a “universal” order (Bailey, Madden & Krashen, 1974; Goldschneider & DeKeyser, 2001; Kwon, 2005), others against it or at least giving some evidence for a variance in that consistent order (Hakuta, 1976; Luk & Shirai, 2009).

As seen in this study, the morpheme order studies were very influential in the 1970's and 1980's. Since Krashen formulated his theory on the Natural Order Hypothesis rooted in those studies, some evidence has been presented both in favour and against the morpheme order studies (Hakuta, 1976; Gass & Selinker, 2001, Luk & Shirai, 2009). Partly due to the criticism these studies were subjected to, researchers began considering different determinants to account for the variance in L2 English learners. The multiple-determinant approach explains to a certain extent the variance in L2 learners (Goldschneider & DeKeyser, 2001; Kwon 2005). New research offers another perspective to this variance relying in the interaction of different sections such as individual variance, abstract grammatical knowledge, language reception and production, variability from one stage to another, explicit grammatical knowledge, social factors, psychological factors and crosslinguistic influence (in Hulstijn, 2015).

In sum, since the early 1970's there has been great development in L2 acquisition research. These advancements have helped understand L2 developmental sequences. Nonetheless, there is still the need to clarify how some factors affect the variance of the acquisition of L2 functors. What can be concluded is that nowadays, after 40 years since the last studies were carried out, they still have the same relevance. After all, language learning is more complex than anyone would have expected, which is the reason why many factors need to be considered in order to account for the developmental sequences in L2. It is not as simple as suggesting some factors for the variance of L2 morphemes. As stated by Hulstijn (2015:211):

Their analyses [Goldschneider and DeKeyser, 2001] suggested that acquisition orders are determined, to a large extent, by five input factors: perceptual salience, semantic complexity, morphophonological regularity, syntactic category, and frequency. Currently, however, the picture is no longer, as clear as, say, in 2001. SLA [Second Language Acquisition] has now entered the academically exciting stage where matters become really complicated.

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