The L2 Production of English Comparative Structures: More Support for L2 Developmental Changes

Bilal Kırkıcı

Middle East Technical University

ÖZET Bu çalışma, anadilleri Türkçe olan deneklerle İngilizce karşılaştırma sıfatları konusunda gerçekleştirilen bir söyletimli üretim deneyinin sonuçlarını sunmaktadır. Elde edilen sonuçlar gerek anadil ve ikinci dil konuşucuları, gerekse ikinci dil seviyeleri nispeten düşük ve yüksek olan ikinci dil konuşucuları arasında işlemleme farklılıklarına işaret etmişlerdir. Bu sonuçların, ikinci dil öğrenicilerinin biçimbilimsel açıdan karmaşık yapıları işlemlerken, kurallı süreçler uygulamaktan ziyade bunları sözcüksel bellekte depoladıkları yönündeki görüşleri destekler nitelikte oldukları iddia edilmektedir. İkinci olarak, ikinci dilde biçimbilimsel işlemlemenin artan ikinci dil yeterliliğiyle değiştiği ve gittikçe daha az sözcüksel belleğe dayandığı iddia edilmektedir.

ANAHTAR KELİMELER ikinci dil, İngilizce karşılaştırma sıfatları, biçimbilimsel işlemleme

ABSTRACT This study presents the results of an elicited production task on English comparative adjectives conducted with L1 Turkish learners of L2 English. The obtained results indicated processing differences both between the L2 participants and the L1 controls and between the higher and lower proficiency L2 participants. It is claimed that these results provide further support for the view that L2 learners tend to rely more on lexical storage and less on computational processes in the processing of morphologically complex word forms. Secondly, it is argued that the findings lend further support to the view that the processing of L2 morphology changes with increasing proficiency.

KEYWORDS second language, English comparatives, morphological processing

INTRODUCTION

A longstanding source of debate in the field of second language (L2) acquisition relates to the nature of L2 morphological processing, which has been found to pose difficulties particularly to late L2 learners. Ever since the 1970s, when Dulay and Burt tried to understand whether it would be possible to uncover general developmental patterns in the L2 acquisition of English grammatical morphemes, the interest in understanding the workings of L2 morphological processing and learning has been continuing in the field.[1] A common point that has often been highlighted in studies of L2 morphological acquisition and processing is that L2 learners, notably adult L2 learners who start learning the target language after childhood, have continual problems

---

1. H.S. Dulay and M.K. Burt, "Natural Sequences in Child Second Language Acquisition," *Language Learning*, 24 (1974), pp.37-53.

with morphological structures and tend to omit morphemes and/or use them in rather unsystematic and unstable ways.[2]

There have recently been a number of theoretical and experimental attempts to explain the reason why L2 learners fail to perform at a level comparable to adult speakers of the target language, which have led to distinct accounts of the mechanisms involved in L1/L2 processing.[3] On the one hand, there is the view that L1 and L2 processing are fundamentally based upon the same processing system and that observed L1-L2 differences do not stem from specific domains of grammar or language. Instead, it is argued that such observed differences result from the influence of the participants' native languages or from the fact that L2 processing is more demanding in terms of basic cognitive processes such as speed of processing and working memory limitations.[4] Results obtained from various studies have indeed indicated that L1 transfer has an effect on L2 processing[5] and that L2 processing is less automatic and slower when compared to L1 processing.[6]

The alternative view, on the other hand, does not reject the findings pertaining to the probable effects of L1 transfer and less efficient cognitive resources on L2 processing, but questions whether such variables can actually explain attested processing differences between L1 and L2 populations across diverse domains of language.[7] Supporters of this latter view maintain the argument that (especially adult) L2 processing is fundamentally different from L1 processing in particular domains of grammar, even for L2 learners at higher levels of L2 proficiency. In relation to sentence processing, for instance, Clahsen and Felser have proposed that adult L2 learners' ability to make use of grammatically-based parsing is reduced relative to their sensitivity to lexical-semantic and other non-structural information cues.[8] Clahsen and Felser believe that the difference between L1 and L2 processing is

2. L. White, *Second Language Acquisition and Universal Grammar* (Cambridge University Press: Cambridge, 2003);H. Clahsen, C. Felser, K. Neubauer, M. Sato and R. Silva, "Morphological Structure in Native and Nonnative Language Processing," *Language Learning, 60* (2010), pp.21-43.

3. H. Clahsen and C. Felser, "Grammatical Processing in Language Learners," *Applied Psycholinguistics, 27* (2006), pp.3-42; H. Clahsen and C. Felser, "How Native-like is Non-native Language Processing?" *Trends in Cognitive Science, 10* (2006), pp.564-570.

4. J. McDonald, "Beyond the Critical Period: Processing-based Explanations for Poor Grammaticality Judgment Performance by Late Second Language Learners," *Journal of Memory and Language*, *55* (2006), pp.381-401.

5. A. Hernandez, P. Li and B. MacWhinney, "The Emergence of Competing Modules in Bilingualism," *Trends in Cognitive Sciences*, *9* (2005), pp.220-225.

6. J. Mueller, "Electrophysiological Correlates of Second Language Processing," *Second Language Research*, *21* (2005), pp.121-151.

7. H. Clahsen, C. Felser, K. Neubauer, M. Sato and R. Silva, "Morphological Structure in Native and Nonnative Language Processing," pp.21-43.

8. H. Clahsen and C. Felser, "Grammatical Processing in Language Learners," pp.3-42.

that adult L2 learners rely more on shallow parsing than native speakers and that the representations adult L2 learners compute for processing purposes rely less on the combinatorial structure of sentences and morphologically complex words than L1 processing.

A proposal that is directly relevant to the latter view is that by Ullman and colleagues.[9] Ullman and his colleagues essentially claim that L1/L2 differences in morphological processing stem from differences in the way that L1 and L2 speakers employ rule-based and memory-based mechanisms in the processing of linguistic information. According to this view, compared to L1 speakers, L2 learners are more reliant upon the lexical storage of morphologically complex lexical items and make less use of rule-based generalizations that take into account the internal structure of a complex word form. Ullman and colleagues tie this distinction to the difference between the declarative and procedural memory systems in the brain, claiming that "complex word forms that depend largely on rule-governed compositional mechanisms in the L1 rely on different mechanisms at lower levels of L2 exposure: in particular, declarative memory, which also underlies lexical memory."[10] From this perspective, adult L2 learners, and especially those at lower levels of exposure or proficiency, would be expected to rely predominantly on lexical/semantic memory for morphologically complex word forms, independent of their regularity status.[11]

Emprical studies investigating the processing of L2 morphology have so far failed to provide a conclusive overall empirical picture. On the one hand, there are some studies[12] that have obtained findings supportive of the view that L2 learners do not process

9. M.T. Ullman, "The Declarative/Procedural Model of Lexicon and Grammar," *Journal of Psycholinguistic Research, 30* (2001), pp.37-69; M.T. Ullman, "The Neural Basis of Lexicon and Grammar in First and Second Language: The Declarative/Procedural Model," *Bilingualism, 4* (2001), pp.105-122; M.T. Ullman, "A Cognitive Neuroscience Perspective on Second Language Acquisition: The Declarative/Procedural Model," in C. Sanz (ed.), *Mind and Context in Adult Second Language Acquisition: Methods, Theory and Practice* (Washington, DC: Georgetown University Press, 2005), pp.141–178; L. Babcock, J.C. Stowe, C.J. Maloof, C. Brovetto and M.T. Ullman, "The Storage and Composition of Inflected Forms in Adult-learned Second Language," pp.820-840.

10. L. Babcock, J.C. Stowe, C.J. Maloof, C. Brovetto and M.T. Ullman, "The Storage and Composition of Inflected Forms in Adult-learned Second Language," pp.820-840.

11. H. Clahsen and C. Felser, "Grammatical Processing in Language Learners," pp.3-42; H. Clahsen and C. Felser, "How Native-like is Non-native Language Processing?" pp.564-570; M.T. Ullman, "A Cognitive Neuroscience Perspective on Second Language Acquisition," pp.141–178.

12. M.-L. Beck, "Regular Verbs, Past Tense and Frequency: Tracking Down a Potential Source of NS/NNS Competence Differences," *Second Language Research, 13* (1997), pp.93-115; D.M. Basnight-Brown, L. Chen, S. Hua, A. Kostiç and L. Feldmann, "Monolingual and Bilingual Recognition of Regular and Irregular English Verbs: Sensitivity to Form Similarity Varies With First Language Experience," *Journal of Memory and Language*, 57 (2007), pp.65-80.

morphologically complex word forms differently from native speakers. Beck, for example, tested L1 and L2 speakers of English in a past tense production task and found that both groups displayed comparable patterns on regular forms – either no frequency effect or an anti-frequency effect, suggesting decomposition for regulars for both L1 and L2 participants.[13] Similarly, Basnight-Brown et al., in a cross-modal priming study with late L2 learners, found very close amounts of facilitation for English regular past tense primes for L1 and L2 participants.[14]

Other studies, on the other hand, have reported results which speak for clear differences between L1 and L2 processing, much in the line with the proposal by Ullman and colleagues.[15] In Kırkıcı, L1 Turkish learners of L2 English with classroom L2 exposure and two different levels of L2 proficiency participated in a simple lexical decision task on the English past tense.[16] Particularly the results obtained from low-proficiency L2 learners confirmed the proposal of Ullman and colleagues that L2 learners with less exposure to the target language tend to rely more on memorization rather than on the decomposition of complex word forms since frequency effects were attested for both regular and irregular word forms. The L1 controls (just like the L1 participants in Beck),[17] in contrast, displayed no frequency effects for regular stimuli, which indicated that regular forms were decomposed rather than stored as wholes by native English speakers. Silva and Clahsen, in a series of masked priming tasks, found morphological priming effects for English regular past tense forms with L1 speakers but no or reduced priming for L2 learners from various L1 backgrounds.[18] Silva and Clahsen took these results as evidence for the view that L2 learners rely less on combinatorial processes and, hence, for L1-L2 differences in morphological processing consistent with the views of Ullman. A further study that reported clear L1-L2 processing differences is that by Neubauer and Clahsen,[19] who tested L1 Polish learners of L2 German using lexical decision

13. M. L. Beck, "Regular Verbs, Past Tense and Frequency," pp.93-115.
14. D.M. Basnight-Brown, L. Chen, S. Hua, A. Kostiç and L. Feldmann, "Monolingual and Bilingual Recognition of Regular and Irregular English Verbs," pp.65-80.
15. B. Kırkıcı, Ankara, Words and Rules in L2 Processing: An Analysis of the Dual-mechanism Model. (PhD dissertation, Middle East Technical University, 2005); R. Silva and H. Clahsen, "Morphologically Complex Words in L1 and L2 Processing: Evidence From Masked Priming Experiments in English," *Bilingualism: Language and Cognition, 11* (2008), pp.245-260; K. Neubauer and H. Clahsen, "Decomposition of Inflected Words in a Second Language: An Experimental Study of German Participles," *Studies in Second Language Acquisition, 31* (2009), pp.403-435.
16. B. Kırkıcı, Ankara, *Words and Rules in L2 Processing*.
17. M.-L. Beck, "Regular Verbs, Past Tense and Frequency," pp.93-115.
18. R. Silva and H. Clahsen, "Morphologically Complex Words in L1 and L2 Processing," pp.245-260.
19. K. Neubauer and H. Clahsen, "Decomposition of Inflected Words in a Second language," pp.403-435.

and masked priming experiments. In the lexical decision experiment, the L2 participants displayed a frequency effect for both regulars and irregulars whereas the L1 group only showed a frequency effect for irregulars, suggesting that L2 processing relies more on lexical memory storage when compared to L1 processing. Parallel results were also obtained in the masked priming experiment. While similar priming patterns were obtained for the L1 and the L2 group on irregulars, distinct priming patterns were found for the regular items.

Against this background, the present study presents an investigation of the use of English comparative adjectives by English L1 speakers and adult L2 learners of English at two different proficiency levels by means of an elicited production task with the aim of answering the following questions:

1. Do L1 and L2 users of English process English comparative adjectives in the same manner?

2. Does the level of L2 proficiency affect the way in which English comparative adjectives are processed by L2 users?

BACKGROUND

In English, comparatives can be formed by attaching the *–er* suffix to gradable adjectives (*long-longer*) or through the use of a periphrastic form with *more* (*interesting – more interesting*). In addition, there are a few highly frequent adjectives that have suppletive comparative forms (*bad-worse)*. The nature of the distribution of suffixed and periphrastic forms is rather complex. While the suffixed and the periphrastic comparative are in complementary distribution for most English adjectives, some adjectives can form their comparative forms in both ways.[20] Traditionally, it has been claimed that the comparative forms of monosyllabic adjectives and disyllabic adjectives ending in *y* (*silly-sillier*) are formed by attaching the *–er* suffix, while both forms are possible for disyllabic adjectives ending in-*ly* (*costly - costlier / more costly*).[21] The comparative of most other adjectives containing more than one syllable, on the other hand, is formed through the use of the periphrastic form.[22]

20. M. Aronoff, *Word Formation in Generative Grammar* (Cambridge: MIT Press, 1976.); J. Graziano-King and H.S. Cairns, "Acquisition of English Comparative Adjectives," *Journal of Child Language, 32* (2005), pp.345-373.
21. M. Frank, *Modern English: A Practical Reference Guide* (Prentice-Hall: Englewood Cliffs, 1972).
22. H. Clahsen, M. Ring and C. Temple, "Lexical and Morphological Skills in English-speaking Children With Williams Syndrome," in S. Bartke and J. Siegmueller (eds.), *Williams Syndrome Across Languages* (Benjamins: Amsterdam, 2004), pp.221-244.

It should be noted, though, that there many exceptions to the above-mentioned general distribution such as *apter,* a monosyllabic adjective that is nevertheless not formed through the addition of the –*er* suffix.[23] Borrowed monosyllabic adjectives, such as *chicer**, are further exceptions to this rule. Graziano-King and Cairns evaluate comparative formation as "a complex matter" and add that the only way to resolve such complexities is the use of the periphrastic form.[24] Sentence (1) from Frank is offered as an example to illustrate conditions under which the periphrastic form is actually preferred despite the fact that the –*er* alternative exists.[25]

(1) *The more rich we are, the more wise we seem.*

Crucially, Graziano-King and Cairns point out that the reverse is never possible; that is, for adjectives that clearly form their comparative forms periphrastically, the option to form the comparative through the additon of the –*er* suffix does not exist (**interestinger*, **satisfyinger*).[26]

Graziano-King maintains that the linguistic analysis of the periphrastic forms entails the insertion of *more* for adjectives for which no morphologically formed comparative is available as *a last resort*.[27] Thus, if a suffixed (or suppletive) form is available, *more* insertion is blocked. In relation to –*er* comparatives, Graziano-King[28] notes the many exceptions that resist –er suffixation (see above), all of which she classifies as low-frequency adjectives.[29] On the basis of these observations regarding the adult grammar, the authors claim that *more* qualifies as the default form for English comparative adjectives while –*er* forms are lexically listed. This view is also supported by Mondorf, who claims that the periphrastic is both more explicit and easier to parse as it "disentangles a complex lexeme consisting of a base plus inflectional suffix by assigning each function a separate form."[30]

In Graziano-King it is reported that children acquiring L1 English start producing both –*er* comparatives and periphrastic comparatives at a very early age.[31] In her analysis

23. M. Aronoff, *Word Formation in Generative Grammar* (MIT Press: Cambridge, Mass., 1976.)
24. J. Graziano-King and H.S. Cairns, "Acquisition of English Comparative Adjectives," pp.345-373.
25. M. Frank, *Modern English: A Practical Reference Guide* (Englewood Cliffs: Prentice-Hall, 1972).
26. J. Graziano-King and H.S. Cairns, "Acquisition of English Comparative Adjectives," pp.345-373.
27. J. Graziano-King, Acquisition of Comparative Forms in English *(*PhD. dissertation. CUNY Graduate Center, 1999).
28. J. Graziano-King, "Acquisition of Comparative Forms in English."
29. H. Clahsen and C. Temple, "Words and Rules in Williams Syndrome," in Y. Levy and J. Schaeffer (eds.), *Language Competence Across Populations* (Erlbaum, 2003), pp.323-352.
30. B. Mondorf, *More Support for More-Support* (Amsterdam: John Benjamins Publishing, 2009).
31. J. Graziano-King, Acquisition of Comparative Forms in English.

of the corpora of two children from the CHILDES database, Graziano-King found 220 instances of *–er* comparatives and 22 instances of the periphrastic form at the age range of 0;7-8;0.[32] Elicited production experiments with children yielded similar results; the children investigated produced both *–er* and periphrastic *more* adjectives at all studies age levels.[33] In the same vein, Gathercole elicited comparative adjectives from young children in the age range 2;6-5;0.[34] She also found that both forms of comparative adjectives were produced by the children at all age levels studied, though *–er* comparatives were found to precede *more* comparatives.

Clahsen and Temple and Clahsen et al. compared the production of comparative adjectives by children with Williams Syndrome and unimpaired children on an elicited production task.[35] The children with Williams Syndrome were found to overapply *–er* suffixation, forming comparative forms almost exclusively with *–er* and also producing deviant forms such as **expensiver* and **dangerouser*. The children in the control group, on the other hand, were reported to produce *–er*, suppletive and periphrastic comparative forms, thus yielding results comparable to those obtained in earlier studies (see above). Speculating on how these results could fit into the general framework of approaches regarding the representation of English comparative adjectives, Clahsen and Temple do not commit themselves to any of the offered accounts but state that under normal circumstances periphrastic comparatives apply when no *–er* or suppletive form is available, thus also evaluating the periphrastic as some kind of default rule for adult speakers.[36] For children with Williams Syndrome, however, the transparency of-*er* comparative forms, which makes them easily decomposable, most likely leads these children to develop an *–er* suffixation rule instead. This suffixation rule is probably applied by these children productively to any adjective encountered.[37]

The processing of comparative adjectives by L2 learners of English has, to our knowledge, not been investigated empirically so far. However, judging from earlier L2

32. B. MacWhinney, *The CHILDES Project: Tools for Analyzing Talk* (London: Lawrence Erlbaum Associates Publishers, 1995).
33. J. Graziano-King, "Acquisition of Comparative Forms in English"*;* J. Graziano-King and H.S. Cairns, "Acquisition of English Comparative Adjectives," pp.345-373.
34. V.V. Gathercole, "More and More and More About More," *Journal of Experimental Child Psychology, 40* (1985), pp.73-104.
35. H. Clahsen and C. Temple, "Words and Rules in Williams Syndrome," pp.323-352; H. Clahsen, M. Ring and C. Temple, "Lexical and Morphological Skills in English-speaking Children With Williams Syndrome," in S. Bartke and J. Siegmueller (eds.), *Williams Syndrome Across Languages*, (Amsterdam: Benjamins, 2004), pp.221-244.
36. H. Clahsen and C. Temple, "Words and Rules in Williams Syndrome," pp.323-352.
37. H. Clahsen and C. Temple, "Words and Rules in Williams Syndrome," pp.323-352.

studies on other morphological skills,[38] it was predicted that the present study would yield results that are indicative of a pattern in which L2 learners deviate from the way L1 speakers process comparative adjectives in English and which points to a comparatively higher use of the lexical memory in line with the proposals of Ullman and colleagues. It was further expected that L2 groups at different levels of proficiency would behave differently, in line with previous L2 studies of morphological processing that compared participants with distinct L2 proficiency levels.[39]

METHOD

PARTICIPANTS

This study tested 20 low proficiency (8 females; mean age: 18, SD: 0.79) and 20 high proficiency (16 females; mean age: 20, SD: 1.31) adult L1 Turkish learners of L2 English and 16 native speakers of English (11 females; mean age: 22, SD: 2.33). All L2 participants were current university students and had all first been exposed to English in a classroom setting in Turkey. None of the L1 participants reported to have learned English before the age of 10 or considered themselves native in English. The L2 participants were placed into the respective proficiency-level groups on the basis of the scores they received on the Oxford Quick Placement Test (mean scores for higher and lower proficiency L2 groups: 54.8 and 38.4 out of 60, respectively).

MATERIALS AND PROCEDURE

The elicited production task that was employed for the present study was adopted from Dalalakis, Clahsen and Temple and Clahsen et al.[40] The task included 19 pairs of pictures in which two objects were shown that were different from each other in terms of gradable properties, such as size or shape. Under the pictures were two sentences, which

---

38. B. Kırkıcı, "Words and Rules in L2 Processing."

39. B. Kırkıcı, "Words and Rules in L2 processing"; B. Kırkıcı, "Distinct Mechanisms in the Processing of English Past Tense Morphology: A View From L2 Processing" in M, Pütz, and L. Sicola, (eds.), *Inside the Learner's Mind: Cognitive Processing and Second Language Acquisition,* (Amsterdam: John Benjamins, 2010), pp.67-84.

40. J. Dalalakis, "English Adjectival Comparatives and Familial Language Impairment," in: J. Matthews (ed.), *Linguistic Aspects of Familial Language Impairment*, (Montreal: McGill University, 1994); H. Clahsen and C. Temple, "Words and Rules in Williams Syndrome." pp.323-352; H. Clahsen, M. Ring and C. Temple, "Lexical and Morphological Skills in English-speaking Children With Williams Syndrome," pp.221-244.

were read aloud to the participants and which the participants were required to complete using a comparative form of the adjective provided. See (2) below for an example. Each participant was tested individually.

(2) *This circle is big. This is even _____?*

The task included five types of targets:

(3) a) *-er adjectives*:   big, funny, sad, young
    b) *more adjectives*:   dangerous, expensive, modern, unusual, open
    c) *either*:   round, straight, tasty, bitter
    d) *irregulars*:   good, bad
    e) *nonce*:   weff, kell, bimmy, toshal

Based on the explanations provided in Dalalakis and Clahsen and Temple, the adjectives under 3a) require comparative forms produced through the addition of the *–er suffix*, those under 3b) require periphrastic comparatives, those under 3c) can take either form and the adjectives under 3d) form suppletive comparatives.[41] For the nonce adjectives under 3e), it was expected that *weff, kell* and *bimmy* would elicit *–er* comparatives (*weffer, keller, bimmier*) because of the fact that the first two were monosyllabic and bimmy ended in *–y*. For toshal, the expectation was that it would elicit a periphrastic comparative (*more toshal*).

RESULTS

The results of the elicited production task are presented in Table 1 for all participant groups. All of the stimuli were answered with one of the possible comparative forms, in contrast to earlier studies conducted with children in which child participants were reported to occasionally provide the stem forms of adjectives as answers.

Overall, the results in Table 1 reveal not only L1-L2 differences but also developmental differences within the L2 groups. For *–er* adjectives, both L2 groups produced erroneous comparative forms, using the periphrastic form at relatively high levels (lower proficiency L2 subjects: 22.5% and higher proficiency L2 subjects: 17.5% of instances, $t(38)=.831$, $p > .05$), while for the L1 controls periphrastic comparative forms of *–er*

41. J. Dalalakis, "English Adjectival Comparatives and Familial Language Impairment"; H. Clahsen and C. Temple, "Words and Rules in Williams Syndrome," pp.323-352.

TABLO 1—Elicited Production of Comparative Adjectives by Participant Group and Adjective Type

	Low Proficiency L2		High Proficiency L2		L1 Controls	
	means in %	(SD)	means in %	(SD)	means in %	(SD)
-er adjectives						
-er	77.5	(17.9)	82.5	(20.0)	98.4	(6.3)
more	22.5		17.5		1.6	
more adjectives						
-er	18	(6.15)	6	(9.40)	-	-
more	82		94		100	
either adjectives						
-er	47.5	(17.9)	42.5	(25.8)	73.4	(17.0)
more	52.5		57.5		26.6	
irregular adjectives						
suppletive	100	-	100	-	100	-
nonce adjectives						
-er	82.5	(16.4)	72.5	(7.7)	59.4	(12.5)
more	17.5		27.5		40.6	

adjectives were almost non-existent (1.6%). With *more* adjectives, the L1 controls behaved exactly as predicted and exclusively produce periphrastically formed comparatives. For the L2 groups, however, a clear developmental pattern is visible, with lower proficiency L2 learners producing significantly less periphrastic forms than higher proficiency L2 learners (82% vs. 94%, respectively, t(38)=4.775, p<.0001). Crucially, there were no significant differences between the rates of errors produced in response to *–er* and *more* adjectives for any of the three subject groups.

With *either* adjectives, which in theory can take both comparative forms, the native controls predominantly chose to make use of the –er comparative (73.4%), whereas the L2 groups preferred the periphrastic comparative form to similar extents (lower proficiency L2 subjects: 52.5% and higher proficiency L2 subjects: 57.5% of instances, t(38)=.712, p > .05). With irregular adjectives, all three subject groups made use of the correct suppletive form in 100% of instances.

Nonce adjectives predominantly elicited *–er* comparatives from all three groups. However, a developmental pattern was visible for this adjective type, with higher proficiency L2 learners producing significantly more periphrastic comparative forms than the lower proficiency L2 group (27.5% vs. 17.5%, t(38)=2.466, p < .05). The nonce-adjective *weff* elicited exclusively *–er* comparatives (*weffer*) from all three subject groups. Similarly, *kell*

elicited only *–er* comparatives (*keller*) from the L2 groups, whereas the L1 controls formed the periphrastic comparative (*more kell*) in 25% of instances. While the comparative form of *bimmy* was predominantly formed using *–er* suffixation (*bimmier*) by the L2 learners (90% *-er* for both L2 groups), the L1 controls chose to form *more* comparatives in 37.5% of instances. Finally, for *toshal*, the higher proficiency L2 learners and the L1 controls made exclusively use of *more* comparatives (*more toshal*); however, the lower proficiency L2 learners used the *–er* comparative in 40% of instances (*toshaler*).

These results showed that the L2 groups investigated were able to make use of both *–er* comparatives and *more* comparatives but made use of these structures in qualitatively and quantitatively different ways, indicating developmental changes in the way comparatives were used. In order to arrive at a more fine-grained picture of how the stimuli were processed by the L2 participants, the responses were further examined by taking into consideration the relative frequencies of the forms. Table 2 presents a breakdown of the erroneous responses (*more* responses to *–er* adjectives and *–er* responses to *more* adjectives) by frequency.

TABLO 2— Error Rates in the Elicited Production of Comparative Adjectives by Participant Group, Adjective Type and Relative Frequency.

	Low Proficiency L2 Error means in %	High Proficiency L2 Error means in %
-er adjectives:		
High Frequency	5%	5%
Low Frequency	40%	30%
more adjectives		
High Frequency	45%	15%
Low Frequency	0%	0%

The breakdown of responses by frequency in Table 2 reveals that for L2 learners at both proficiency levels, the rates of errors increase for low frequency *–er* adjectives (from 5% to 40% for low proficiency and from 5% to 30% for high proficiency L2 groups). In other words, the L2 learners probably tended to make use of *more* as a last resort when they were unsure about the correct answer. This frequency effect is indicative of the influence of memory-storage. For the *more* adjectives, on the other hand, an anti-frequency effect was observed as both L2 groups produced a considerable amount of errors for high frequency

stimuli (45% for low proficiency and 15% for high proficiency L2 groups), but none for low frequency stimuli. A more detailed look at the responses revealed that the rather inflated rate of errors for low proficiency L2 learners on high frequency *more* adjectives stemmed from the answers provided to the stimulus *open*, which elicited *opener* in 90% of cases.

DISCUSSION AND CONCLUSION

The results of the present study point to differences in the processing of comparative adjective forms between L1 and L2 users of English. First of all, the L2 learners in the present study clearly produced more errors than the L1 controls on all adjective types except for irregular adjectives, where all three groups made correct use of the suppletive forms of the stimuli in all instances. Even the high proficiency L2 learners, who obtained comparatively high scores on the Oxford Placement Test, produced markedly more errors than the L1 controls.

A closer analysis of the responses provided to *–er* and *more* adjectives, in which the relative frequencies of the adjectives were taken into consideration, revealed frequency effects for *–er* comparatives, but not for *more* comparatives. As frequency effects are taken as indicators of memory effects, it can be speculated that *–er* comparatives are probably lexically listed by L2 learners. *More* comparatives, on the other hand, are probably not listed. Instead, the *more* comparative form is probably used as a last resort backup as suggested by Graziano-King for L1 English speakers.[42] Such an analysis would not only explain the high number of low-frequency *–er* adjectives that resisted *–er* suffixation, but also the relatively higher tendency to make use of the *more* comparative form with *either* adjectives, which can take either the *–er* suffix or *more*. Note that the L1 controls opted for *–er* suffixation with *either* adjectives instead.

In relation to the question whether proficiency affects the way comparative adjectives are processed by L2 learners, it can be said that the obtained results point to developmental changes. As was pointed out beforehand, there were no significant differences between the two L2 groups on *–er* adjectives, *either* adjectives and *irregular* adjectives. Differences were found, however, on *more* adjectives and *nonce* adjectives, with the high proficiency L2 learners producing significantly more periphrastic comparative forms than the lower proficiency learners. Considering that frequency effects were obtained for *–er* comparatives,

---

42. J. Graziano-King, "Acquisition of comparative forms in English."

which led to the conclusion that –er comparatives are probably stored as full forms in memory whereas *more* comparatives are not stored but used as part of a default last resort rule, the differences in the use of the periphrastic *more* suggest that the lower proficiency L2 participants tend to resort more to the storage of comparative adjectives in the memory. The results obtained from the higher proficiency L2 participants, on the other hand, made it clear that these participants were able to make more productive use of *more* support when compared to the lower proficiency L2 participants.

As such, these findings show similarities to those obtained in studies employing other experimental methodologies and investigating L2 learners from different L1 backgrounds, which also arrived at the conclusion that L2 processing relies less on morphological parsing processes.[43] Taken together, then, further support emerges for the proposal of Ullman and colleagues that L2 processing shows comparatively higher dependence on the lexical memory system and entails less computation than L1 processing. Note, however, that this does not mean that L2 learners make use of entirely different mechanisms as those employed by L1 speakers, as was evident from the production patterns (see Table 1). The difference rather appeared to be a graded one that, among other factors, depended on the nature of the stimuli.

The above results also parallel those obtained in previous studies with L1 Turkish learners of L2 English morphology,[44] in which it was found that low proficiency L2 learners display a comparatively higher reliance on the associative memory than on (de)compositional rules in the morphological system under investigation and, thus, tend to store complex word forms as wholes. The results hence provide further support for developmental changes in the way morphologically complex word forms are processed by L2 learners. In fact, both Clahsen and Ullman have put forward that certain morphological substructures (e.g., regular forms) should depend on lexical/semantic memory at lower proficiency (or exposure) levels, whereas there is a higher likelihood that such forms are composed by the grammatical system at higher levels.[45]

43. K. Neubauer and H. Clahsen, "Decomposition of Inflected Words in a Second Language," pp.403-435; R. Silva and H. Clahsen, "Morphologically Complex Words in L1 and L2 Processing," pp.245-260.

44. B. Kırkıcı, "Words and Rules in L2 Processing"*;* Y B. Kırkıcı, "The Mental Processing of L2 English Lexical Compounds: a Developmental Dual-mechanism Account," *EUROSLA Yearbook,* 7 (2007), pp.7-25.; B. Kırkıcı, "Distinct Mechanisms in the Processing of English Past Tense Morphology," pp.67-84.

45. H. Clahsen and C. Felser, "Grammatical Processing in Language Learners," pp.3-42.; H. Clahsen and C. Felser, "How Native-like is Non-native Language Processing?" pp.564-570.; M.T. Ullman, "The Neural Basis of Lexicon and Grammar in First and Second Language," pp.105-122.; M.T. Ullman, "A cognitive Neuroscience Perspective on Second Language Acquisition," pp.141–178.

In sum, then, the conclusion drawn by Babcock et al.[46] that morphologically complex word forms in the L2 do neither always depend on the same mechanisms as in L1 nor do they always rely on different mechanisms than in L1 processing will be embraced. "Rather, inflected forms in L2 […] depend either on the same or on different mechanisms as in L1, and, crucially, this dependence varies as a function of multiple item- and subject-level factors".[47] However, it goes without saying that more research on the effects of L2 proficiency on L2 morphological processing that draws upon various L2 populations and various experimental measures is needed before definitive conclusion can be drawn.

REFERENCES

Aronoff, M. (1976). *Word Formation in Generative Grammar*. (MIT Press: Cambridge, Mass.).

Babcock, L., J.C. Stowe, C.J. Maloof, C. Brovetto and M.T. Ullman. (2012). "The Storage and Composition of Inflected Forms in Adult-learned Second Language: A Study of the Influence of Length of Residence, Age of Arrival, Sex, and Other Factors," *Bilingualism: Language and Cognition, 15,* pp.820-840.

Basnight-Brown, D.M., L. Chen, S. Hua, A. Kostiç and L. Feldmann. (2007). "Monolingual and bilingual Recognition of Regular and Irregular English Verbs: Sensitivity to Form Similarity Varies With First Language Experience," *Journal of Memory and Language*, *57,* pp.65-80.

Beck, M.-L. (1997). "Regular Verbs, Past Tense and Frequency: Tracking Down a Potential Source of NS/NNS Competence Differences," *Second Language Research, 13,* pp.93-115.

Clahsen, H. and C. Felser. (2003). Temple, Words and Rules in Williams Syndrome. In: Y. Levy and J. Schaeffer (eds.), *Language Competence across Populations*. (Erlbaum), pp.323-352.

Clahsen, H. and C. Felser. (2006a). "Grammatical Processing in Language Learners," *Applied Psycholinguistics, 27,* pp.3-42.

Clahsen, H. and C. Felser. (2006b). "How Native-like is Non-native Language Processing?" *Trends in Cognitive Science, 10,* pp.564-570.

Clahsen, H., M. Ring and C. Temple. (2004). "Lexical and Morphological Skills in English-speaking Children with Williams Syndrome," in S. Bartke and J. Siegmueller (eds.), *Williams Syndrome across Languages* (Benjamins: Amsterdam), pp.221-244.

Clahsen, H., C. Felser, K. Neubauer, M. Sato and R. Silva. (2010). "Morphological Structure in Native and Nonnative Language Processing," *Language Learning, 60,* pp.21-43.

Dalalakis, J. (1994). "English Adjectival Comparatives and Familial Language Impairment," in: J. Matthews (ed.), *Linguistic Aspects of Familial Language Impairment* (McGill University, Montreal).

Dulay, H.S. and M.K. Burt. (1974). "Natural Sequences in Child Second Language Acquisition," *Language Learning*, *24,* pp.37-53.

---

46. L. Babcock, J.C. Stowe, C.J. Maloof, C. Brovetto and M.T. Ullman, "The storage and composition of Inflected Forms in Üdult-learned Second Language," pp.820-840.

47. L. Babcock, J.C. Stowe, C.J. Maloof, C. Brovetto and M.T. Ullman, "The storage and composition of inflected forms in adult-learned second language."

Frank, M. (1972). *Modern English: A Practical Reference Guide* (Prentice-Hall: Englewood Cliffs).

Gathercole, V.V. (1985). "More and More and More About More," *Journal of Experimental Child Psychology, 40,* pp.73-104.

Graziano-King, J. (1999). New York, *Acquisition of Comparative Forms in English. (*PhD. Dissertation. CUNY Graduate Center).

Graziano-King, J. and H.S. Cairns. (2005). "Acquisition of English Comparative Adjectives," *Journal of Child Language, 32,* pp.345-373.

Hernandez, A., P. Li and B. MacWhinney. (2005). "The Emergence of Competing Modules in Bilingualism," *Trends in Cognitive Sciences*, *9,* pp.220-225.

Kırkıcı, B. (2005). *Words and Rules in L2 Processing: An Analysis of the Dual-mechanism Model.* (PhD dissertation, Middle East Technical University, Ankara)

Kırkıcı, B. (2007). "The Mental Processing of L2 English Lexical Compounds: A Developmental Dual-Mechanism Account," *EUROSLA Yearbook,* 7, pp.7-25.

Kırkıcı, B. (2010). "Distinct Mechanisms in the Processing of English Past Tense Morphology: A View From L2 Processing" in Pütz, M and Sicola, L. (Eds.), *Inside the Learner's Mind: Cognitive Processing and Second Language Acquisition,* (Amsterdam: John Benjamins), pp.67-84.

McDonald, J. (2006). "Beyond the Citical Period: Processing-based Explanations For Poor Grammaticality Judgment Performance by Late Second Language Learners," *Journal of Memory and Language*, *55,* pp.381-401.

MacWhinney, B. (1995). *The CHILDES Project: Tools for Analyzing Talk* (London: Lawrence Erlbaum Associates Publishers).

Mondorf, B. (2009). *More Support For More-Support*. (Amsterdam: John Benjamins Publishing).

Mueller, J. (2005). "Electrophysiological Correlates of Second Language Processing," *Second Language Research*, 21, pp.121-151.

Neubauer, K. and H. Clahsen. (2009). "Decomposition of Inflected Words in a Second Language: An Experimental Study of German Participles," *Studies in Second Language Acquisition, 31,* pp.403-435.

Silva, R. and H. Clahsen. (2008). "Morphologically Complex Words in L1 and L2Processing: Evidence From Masked Priming Experiments in English," *Bilingualism: Language and Cognition, 11,* pp.245-260.

Ullman, M.T. (2001a). "The Declarative/procedural Model of Lexicon and Grammar," *Journal of Psycholinguistic Research, 30,* pp.37-69.

Ullman, M.T. (2001b). "The Neural Basis of Lexicon and Grammar in First and Second Language: the Declarative/procedural Model," *Bilingualism, 4*, pp.105-122.

Ullman, M.T. (2005). "A Cognitive Neuroscience Perspective on Second Language Acquisition: The Declarative/procedural Model," in C. Sanz (ed.), *Mind and Context in Adult Second Language Acquisition: Methods, Theory and Practice*, (Washington, DC: Georgetown University Press), pp.141–178.

White, L. (2003). *Second Language Acquisition and Universal Grammar* (Cambridge University Press: Cambridge).