Linguistica Silesiana 32, 2011
ISSN 0208-4228

ANNA TURULA
College of Foreign Languages, Częstochowa

LANGUAGE ANALYTIC ABILITY IN ADVANCED FL LEARNERS: A COMPARATIVE STUDY

The article is intended as a voice in the discussion on language aptitude, with particular regard to its two components: memory and language analytic ability. It will be argued here that – unlike memory, favoured by Skehan (2003) – it may be the language analytic ability manifested, among others, as considerable dexterity in retrieving constructional schematizations to decode language innovation, which grows in importance with learner proficiency. It will also be stated that both capacities, the said ability as well as memory, should be considered in relation to working memory, which should be understood in terms of storage and processing considered separately and ascribed to individual differences, and not as a homogenuous storage-and-processing space.

To verify the above claim, a study was carried out in the years 2007-2008 in three groups of advanced EFL learners (N=60) at three different levels of language proficiency (B1/B2, N=20; C1, N=20; and C2, N=20). All testees were asked to solve two tests which required interpreting 32 (16/test) skeletal sentences containing schematic representations of events such as *X* verb*ed Y*. The only given in each sentence was the verb, a product of noun-to-verb conversion[1] like *to bottle* or *to buoy*. In Test 1 the constructions chosen for interpretation were highly schematic (in-, mono- and ditransitive); as a result, the testees had to deal with sentential constructions such as *X bottled Y* or *X buoyed*. Test 2, on the other hand, included examples of complex substantive constructions[2] such as *X buttered home* (where the verb slot is reserved for verbs of motion) or *X kept Y bungeed* (where only the final slot is open to interpretation).

The present article presents a comparative analysis of the results of both tests on the three different levels mentioned above. Their interpretation and following conclusions are based on VanPatten's Input Processing (VanPatten 1990, 2004), Cowan et al.'s model of working memory (Cowan et al. 2005), and Truscott and Sharwood-Smith's Acquisition by Processing Theory (APT; Truscott and Sharwood-Smith 2004). Towards the end of the article, all this is related to the discussion of language aptitude:

---

[1] Some sentences used actually existing from-noun verbs; some verbs were innovatively "converted" for the sake of the experiment.

[2] The labels for two types of constructions used after Croft and Cruse (2004).

its components, with special regard to the afore mentioned two: memory and analytic language ability; the importance of the two components as regards different perspectives on language aptitude (CALP vs. BICS; Cummins 1983).

1. Language aptitude: the modern controversy

Language aptitude, as it was understood by the proponents of the concept (Carroll and Sapon 1959) and the authors of first aptitude tests (MLAT, Carroll 1965; PLAB, Pimsleur 1966), was a sum total of component abilities and predispositions/preferences[3] and, as such, correlated quite significantly with language achievement (.40-.60; cf. Carroll 1981). Modern views on aptitude (Skehan 2003, Meara et al. 2001 among others) propose a similar subdivision into components[4]; where they differ from the traditional view, though, is the interpretation of the results, in the light of which it is the individual components that matter to a greater extent that the overall score, as each of them is a better predictor of both preferred instruction mode (of lesser interest to the present article) and the prognosed achievement, particularly reaching considerable language proficiency.

The learner chances for high levels of language attainment – considered in relation to these different sub-abilities of language aptitude – are among modern SLA controversies. One of the stances in this area, represented by Skehan based on his study of language savants (Skehan 2003: 94) is that memory is the highest predictor of outstanding achievement in learning languages other than one's mother tongue. An opposing view can be found in a number of studies (Goldin-Meadow 1982, Wells 1985, Robinson 1995, Liang 2002 [in Goldberg 2006] and Rysiewicz 2006) which demonstrate that it is the analytic ability, potentially reinforced by textual memory, that correlates with success in language learning, mainly because it facilitates the processing of the so-called fragile syntax as well as enables the recognition of constructional generalisations. Finally, the most up-to-date research (MacKay et al. 2002, Biedroń and Szczepaniak 2009, Weissheimer and Mota 2009, MacKay et al. 2010) into language aptitude points to efficient working memory as the most success-breeding component part of human special propensity for learning languages. Working memory is reported to be in charge of high scores on MLAT itself (Biedroń and Szczepaniak 2009), "fluency, accuracy,

[3] Four for Carroll (1965): phonemic coding, grammar sensitivity, inductive learning ability and rote memory; six for Pimsleur (1966): grade point average in areas other than foreign language study, interest in learning a foreign language, vocabulary (word knowledge in English), language analysis (similar to grammatical sensitivity), sound discrimination (differentiating between strings of similar sounds) and sound-symbol association.

[4] Three for Skehan (2003): auditory (phonemic coding) ability, linguistic (language analytic) ability and memory; five for Meara et al. (2001): aural memory for sound strings, visual memory of paired associates, ability to infer rules of a language, ability to recognize unfamiliar words and ability to make connections between unfamiliar sounds and symbols.

complexity, lexical density and syntactic planning of speech" (Weissheimer and Mota 2009: 94) as well as the ability to respond to corrections and modify speech (MacKay et al. 2002 and 2010).

2. A voice in the discussion: a description of a study

In an attempt at taking part in the discussion motivated by the above mentioned controversy, a study[5] was carried out in the years 2007-2008. The informants were three groups of advanced learners of English:

- Group 1: first-year students of the English Department (estimated level[6]: B1-B2), N=20
- Group 2: third-year students of the English Department (estimated level[7]: C1), N=20
- Group 3: ongoing academic teachers of English (estimated level[8]: C2), N=20.

In the course of the study two noun-to-verb conversion tests were used: Test 1 and Test 2. As it can be seen in Table 1, each of the tests was composed of 16 skeletal sentences containing schematic representations of events such as *X* verb*ed Y*. The only given in each sentence was the verb, a product of noun-to-verb conversion[9] like *to bottle* or *to buoy*. In Test 1 the constructions chosen for interpretation were highly schematic (in-, mono- and ditransitive); as a result, the testees had to deal with sentential constructions such as *X bottled Y* or *X buoyed*. Test 2, on the other hand, included examples of complex substantive constructions[10] such as *X buttered home* (where the verb slot is reserved for verbs of motion) or *X kept Y bungeed* (where only the final slot is open to interpretation). The skeletal constructions were used so as to preclude interpretations which would rely on memory alone.

Before the implementation of the tests, the meanings of all sixteen nouns were revised to prevent error resulting from the testee not knowing a given word. This was because the study concentrated on phenomena related to storage and processing and not to ignorance.

---

[5] The study was additionally motivated by an earlier research effort whose aim was to investigate metonymic extensions in English noun-to-verb conversion. During the analysis of way in which Polish testees processed zero derivation some some phenomena potentially related to language proficiency were observed (for details see Turula 2009).

[6] Based on the New Matura results of the testees.

[7] Based on positive end-of-year 2 exam results.

[8] the testees were English Philology teachers and/or – in most cases – CPE holders.

[9] Some sentences used actually existing from-noun verbs; some verbs were innovatively "converted" for the sake of the experiment.

[10] The labels for two types of constructions used after Croft and Cruse (2004).

Table 1. Tests 1 and 2

Test 1	Test 2
X bottled Y.	X bottled Y to death.
X buttered Y.	X buttered home.
X buoyed.	X buoyed X's Y full.
X cushioned Y.	X cushioned Y unconscious.
X bungeed Y.	X kept Y bungeed.
X dead-ended Y.	X dead-ended Y short of Z.
X wedged into Z.	X wedged Y out of Z.
X floored Y.	X downfloored Y.
X banked Y.	X banked Y for a rainy day.
X crowded Y.	X crowded Y out.
X snaked through Y.	X snaked X's way up.
X planed Y.	X deplaned.
X fished	X fished up.
X authored Y.	X outauthored Y.
X harpooned Y.	X harpooned back.
X nursed Y.	X came in, nursed from head to toe.

As for the procedure, both tests were carried out on the same day, with a 90-minute interval between them. The time allotted for each test was 10 minutes. The testees were asked to interpret the skeletal sentences in Polish and to be highly specific in their description of the event that, in their opinion, was described in each sentence. The former requirement was the result of the assumption that, being native speakers of Polish, the informants will find it easier to render certain sophisticated interpretations in their mother tongue. The specificity, in turn, was meant to facilitate the subsequent analysis of test results.

When the results for all three groups had been collated and analysed, three type of fallacies in the interpretation task were identified:

- lexical errors, in which the meaning of the converted noun was ignored or mistaken
- construction errors, such as argument omission/addition or ignoring the fragile syntax[11] / idiomaticity of the construction
- no answer

Based on the above error categorisation, the number of misinterpretations for each of the three groups on both tests was calculated and is as follows (Table 2):

For the sake of the clarity of presentation, every *no answer* was subsequently classified as both a lexical and a construction error. As a result, the number of errors subjected to further analysis amounted to (Table 3):

[11] Such as failing to notice that the verb to home construction is substantive: the verb slot is open to verbs of movement alone.

Table 2. Number of errors: groups 1, 2 and 3; tests 1 and 2; 3 error categories

Number of errors/ group	Group 1 (test 1)	Group 1 (test 2)	Group 2 (test 1)	Group 2 (test 2)	Group 3 (test 1)	Group 3 (test 2)
lexical	42	50	24	15	8	19
constructional	44	102	16	43	6	31
no answer	6	20	20	28	6	16

Table 3. Number of errors: groups 1, 2 and 3; tests 1 and 2; 2 error categories

Number of errors/ group	Group 1 (test 1)	Group 1 (test 2)	Group 2 (test 1)	Group 2 (test 2)	Group 3 (test 1)	Group 3 (test 2)
lexical	48	70	44	43	14	35
constructional	50	122	36	71	12	47

The differences between the three groups concerning the overall scores as well as individual lexis- or construction-specific test tendencies are graphically represented in figures 1-4.

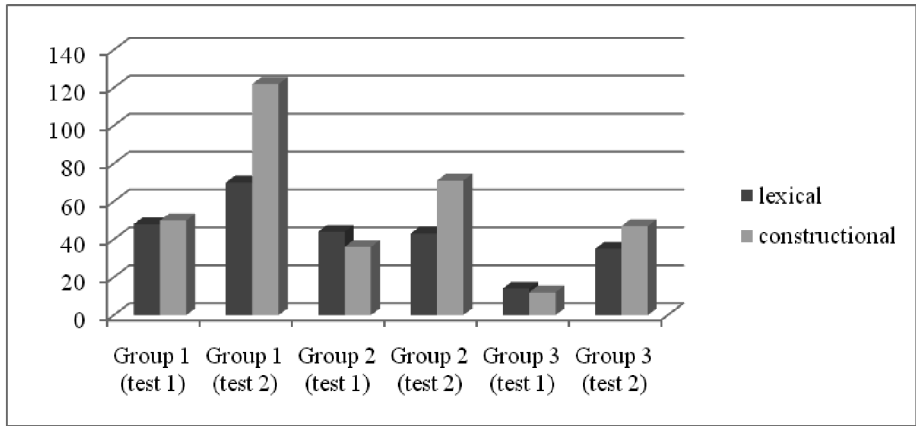

Figure 1. Number of errors: groups 1, 2 and 3; tests 1 and 2; both error categories

The above results have been checked for statistical significance: *STATISTICA 9.0* 2x2 chi square tests were run for each group to determine the strength of inter-group (tables 4 and 5) as well as intragroup (Table 6) differences as regards Test 1 and 2 scores in both lexis and constructions.

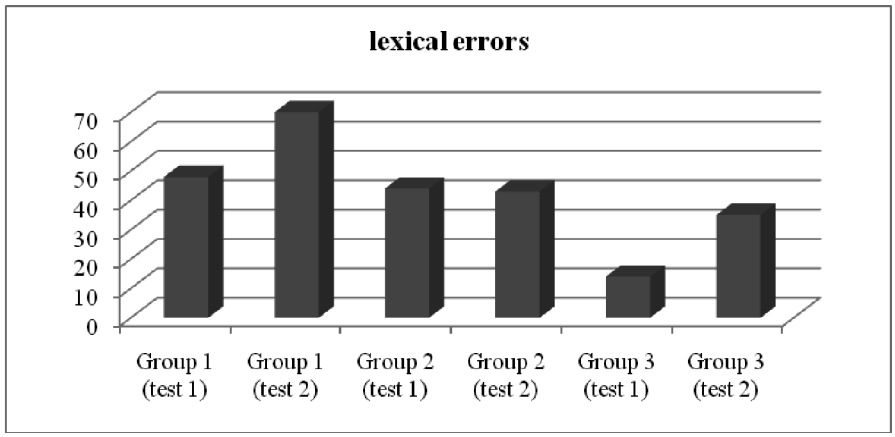

Figure 2. Number of errors: groups 1, 2 and 3; tests 1 and 2;
2 error category: lexical

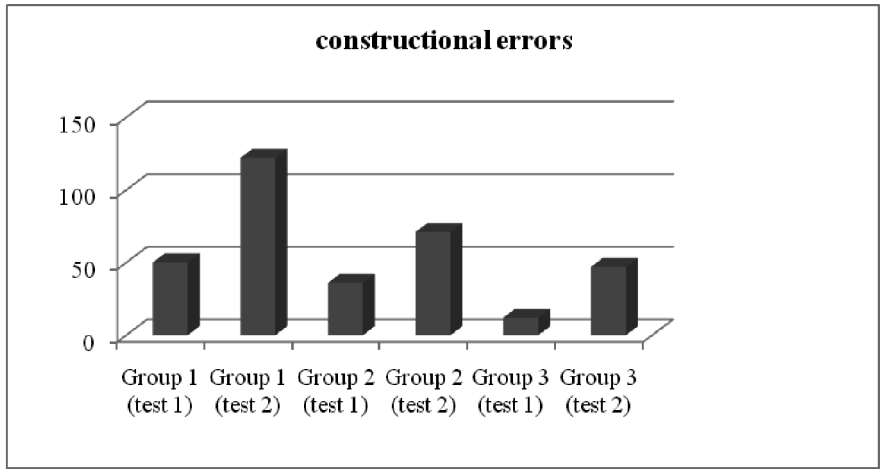

Figure 3. Number of errors: groups 1, 2 and 3; tests 1 and 2;
2 error category: constructional

As it can be seen based on relevant χ^2 and p scores, there are statistically significant differences in both lexical and constructional errors on Test 1 between the most advanced group 3 and the other two groups (Table 4). Table 5 shows that such differences can be noted on Test 2 between each two groups with the exception of the lexical error score variance between groups 2 and 3. Finally, groups 1 and 2 – but not group 3 – demonstrate a statistically significant difference in the

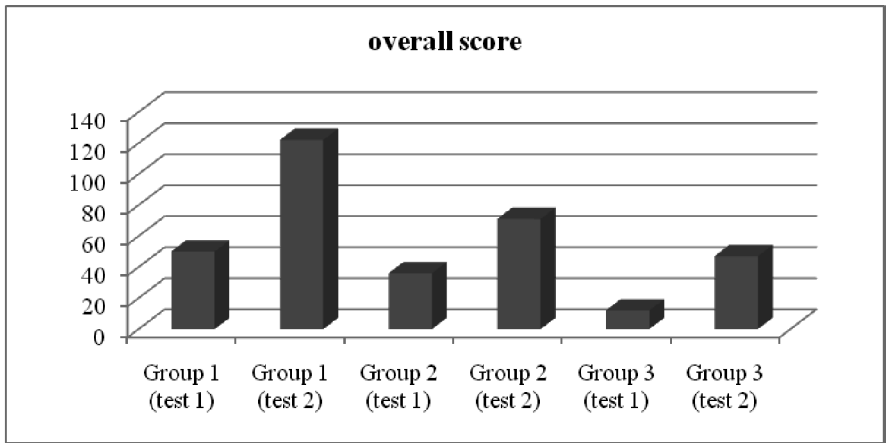

Figure 4. Number of errors: groups 1, 2 and 3; tests 1 and 2; the overall scores

Table 4. Intergroup differences in lexical and constructional error for Test 1

group/group → test component ↓	values	1/2	2/3	1/3
lexical error	χ^2	.20	17.06	20.65
	p	.6522	**.0000**	**.0000**
constructional error	χ^2	2.63	12.97	25.79
	p	.1047	**.0003**	**.0000**

Table 5. Intergroup differences in lexical and constructional error for Test 2

group/group → test component ↓	values	1/2	2/3	1/3
lexical error	χ^2	7.83	.93	13.96
	p	**.0051**	.3337	**.0002**
constructional error	χ^2	19.30	5.98	45.23
	p	**p= .0000**	**.0144**	**.0000**

lexical vs. constructional error scores on Test 2; such a difference, however, cannot be noted on Test 1 (Table 6).

Table 6. Intragroup differences in lexical and constructional error for tests 1 and 2

Group		1	2	3
test 1	χ^2	.05	.91	.16
	p	.8262	.3390	.6888
test 2	χ^2	20.12	8.37	2.01
	p	**.0000**	**.0038**	.1558

3. Discussion and conclusions

The main observation that can be made in relation to the above-presented results is that while Test 1 draws a line between the most advanced group 3 and the other two groups, it is Test 2 – with its much more fragile syntax – which far more reliably separates the higher-level from the lower-level testees on all three language levels. The relation between sensitivity to more specific, substantive constructions and language proficiency is further confirmed by intratest scores, which show that in the structurally more demanding Test 2 there is a statistically significant difference between the number of lexical and constructional errors (the latter being much more numerous) in both of the lower-level groups and not in group 3. This means that, when faced with a more demanding linguistic task, the less advanced learners are inclined to compromise the construction rather than lexis.

The final assertion can be explained with reference to trade-off phenomena of Input Processing, with regard to the Primacy of Meaning Principle (VanPatten 1990), particularly its component Lexical Preference Principle. In the light of the principle, lexical processing precedes allocating attentional resources to structure, the latter ability developing as the learner becomes more advanced. This observation relates directly to the discussion of the interdependency between proficiency and language aptitude. This is because out of the two aptitude component capacities, memory and language analytic ability, the former is more likely to be in charge of accessing and processing lexical resources while the latter will rather be related to the said attention to structure. Consequently, considering the results obtained in the study, it is only natural to assume that it is rather the capacity for inductive reasoning and grammar sensitivity – and not memory, as proposed by Skehan (2003) – that grows in importance with learner proficiency.

Yet, for the results of the study to be fully understood, it seems necessary to analyse the test task of skeletal sentence interpretation against a phenomenon which most probably occurred during this activity, namely conceptual blending preceded by a kind of mental juggling. As the said process is discussed at greater length in Turula (2009), the present article will limit itself to the presentation of its essentials. What happens in the case of the interpretation of each of the 32

sentences contained in tests 1 and 2 is a kind of interplay between two constructions: noun-to-verb conversion and the sentential construction in which the from-noun verb is placed. Considering the fact that each of the used words is a portal to a complex conceptualisation containing a dictionary definition of the notion together with rich encyclopeadic, experience-based knowledge (Langacker 1987 and later works) of it, there are numerous aspects of the word meaning waiting for activation. The meaning of each from-noun verb which is finally selected will be determined by the context, skeletal though it is, of the sentential construction. However, if the very construction is polysemous or has a number of different instantiations, the appropriate co(n)text itself will also have to be selected out of a number of candidate co(n)texts, based on the best match between the converted noun and the sentential construction. During this process the most prototypical semantic values will be the most eager to fire and on standby throughout the interpretation task while all the peripheral aspects of meaning may be initially backgrounded but will occasionally surface in all the attempts to match the other construction. As a result of all these mental operations, the whole construction-construction combination will, for a fraction of time, be in a state of suspension, semantic limbo, in which all possible meanings of the word as well as the potential instantiations of the skeletal constructions will be processed parallelly. All this will amounts to what was metaphorically referred to as mental juggling at the beginning of this paragraph.

The process can best be explained based on the example of *X bottled Y to death*. We can predict that during the required interpretation the word 'bottle' will have all its meanings activated, starting from the most prototypical (*a fluid container*) through less obvious (*an object made of glass*) to peripheral, associative meanings (*a glass container inhabited by gins*). All these semantic values will interact with the *verb sb to death* construction, which quite strongly brings out such well-imprinted instantiations as *bludgeon sb to death* as well as – less imposingly – *bore sb to death*. This was in fact confirmed by the study itself: in group 2 19 testees interpreted *bottle* in *bottle sb to death* non-prototypically, as an instrument used to kill, activating the action (instrument, *a glass object, hard enough to kill*) schema (*to bottle= to kill using a bottle*) while one testee, most likely unable to abandon the prototypical locative (container) schema, understood *to bottle to death* as killing somebody by locking them up in a bottle and having them suffocate to death. In both of these interpretations all the meanings of *bottle* and all the potential instantiations of *verb sb to death* are likely to have been juggled mentally until a certain satisfactory construction/construction match was found and the interpretation process was completed. In group 3, in turn, three testees ignored the word 'bottle' interpreting the sentence as *bore to death*, which proves the power of the prototypical instantiation of the construction which turned out to be strong enough to completely overshadow the from-noun verb.

When we go back to the results of the study, we notice that it is the said process of juggling – and not just dealing with constructions as opposed to lexis – which becomes more difficult with the growing task demands. This is proved,

among others, by the fact that in Test 2 there are statistically significant differences between groups not only in the area of constructions but also as regards lexical error (Table 5). This assertion is what seems to shed new light on the discussion of the individual components of language aptitude and their importance vis à vis language proficiency. The juggling is accommodated within another component of VanPatten's Primacy of Meaning Principle: the Availability of Resources Principle, in the light of which all facets of input are constrained by the learner's attentional capacity, which is largely determined by the efficiency of his/her working memory (also cf. VanPatten 2004 as well as Just and Carpenter 1992). What is important to mention here is that we are taking into account a new understanding of working memory, in which the traditional concept of WM capacity, seen in terms of storage-and-processing measures and control over them (Baddeley and Hitch 1974, Baddeley 2000), has been amended by highlighting either storage with its speed of memory commitment and retrieval, or processing with its scope-of-attention measures. Cowan et al. (2005) argue in favour of this WM specialisation, claiming that the traditional interpretation of working memory in terms of a united concept of storage and processing does not account for individual differences (IDs): some people may exercise better control over storing and some over processing.

Considering the above-presented WM model, we have to admit that the fact that more advanced learners are able to perform lexical and constructional processing simultaneously is definitely a function of their efficient working memory. It is, however, difficult to determine which component of the working memory is in charge of the storage-and processing success. The conclusion that the ability for constructional generalisation getting to the fore with learner proficiency points to processing rather than storage is quite attractive – and the results of the present study seem to be pointing to this interpretation – but, as it was mentioned earlier in this article, it may also be an intellectual shortcut. This is because successful constructional juggling will potentially be based on two different processes. On one hand, it will rely on the analytic ability allowing the testee to switch from instantiations to generalisation and vice versa based on certain noticed characteristics of a given generalisation/instantiation which serve as anchors for the more abstract or the more specific. For example, this could mean spotting the lack of article in the *to verb home* construction and, consequently, deciding that a verb of movement is the only option for the *verb* slot. On the other hand, though, the same constructional juggling may be possible owing to an already possessed repertoire of both schemata as well as exemplars, a long-term memory store which not only grows with language proficiency but also becomes more easily accessed as a result of the prolonged exposure to language. This remains in agreement with contemporary views on working memory, which, if referred to as a *space*, is no longer seen as a two/three-dimensional enclosed area (a blackboard; a desk) but is rather "a transient pattern of activation of elements within long-term memory stores" (Miyake and Shah 1999 cited in Truscott and Sharwood-Smith 2004: 3). These activation patterns become magnified as

a result of multiple firing in the course of language processing, as proposed by Truscott and Sharwood-Smith (2004) in their Acquisition by Processing Theory (APT). Consequently, to use another metaphor, they are paths frequently walked and, consequently, become paths strongly imprinted and easy to find in every next attempt to reach a language goal.

Finally, as Cowan et al. (2005) note, in addition to relating the two WM measures, storage and processing, to individual differences, it is also important to consider them in connection with task specificity; some tasks require more storage capacity and some, a greater processing effort. This leads us to another issue that needs to be considered in our discussion of what – memory or analytic language ability – grows in importance with developing learner proficiency. The question to pose here will be what kind of aptitude model we are considering BICS or CALP (Cummins 1983). With the former Basic Interpersonal Communication Skills, which require online processing in which the speed of retrieval is an important factor, memory is definitely of greater use. With Cognitive Academic Language Proficiency – whose very name containing words such as 'cognitve' and 'academic' seems to go hand in hand with deep processing tasks such as syntax analysis or translation assignments – may imply stronger reliance on inductive reasoning and sensitivity to grammar.

In conclusion, the results of the study confirm the findings of the new trend in aptitude research: that what is in charge of high levels of language attainment and, consequently, grows in importance with language proficiency is the efficiency of working memory. At the same time the present article intends to emphasise that the said efficiency of working memory is understood here as an individually specific as well as task-dependent combination of the storing and the processing capacities. The present study appears to have shown a slight preference for the analytic language ability as a correlate of language proficiency. Yet, we need to keep in mind that such – input- and not output-related – were the task demands: the testees were asked to perform mental feats of interpreting the doubly complicated skeletal sentences. The results might have pointed to memory, had the assignment required online language production instead.

All in all, considering the fact that working memory, whose significance increases with proficiency, amounts to efficient storage of language material, its skillful processing or both of these capacities along each other, Skehan's (2003: 217) graph showing the dominance of memory in high proficiency learners (Figure 5a) may need an amendment (Figure 5b). This is because it seems legitimate to state that both components of language aptitude will be equally important and utilised selectively or along each other, depending on the learner's predisposition and/or current task demands. When it comes to the special role of outstanding memory, it seems that it should be linked to language achievement only in the case of the extremely linguistically gifted individuals called language savants who, as Skehan (2003) notes, reach impressively high levels of attainment in numerous languages relying on their memory alone, and despite some deficits in IQ (related to various analytic abilities).

a *b*

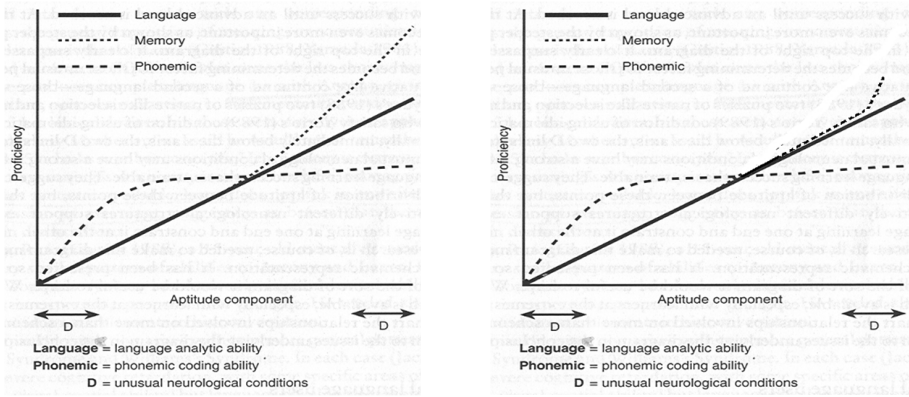

Figure 5. The amendment (Figure 5b) to Skehan's original graph (Figure 5a), presenting the relationship between language proficiency and three components of language aptitude

References

Biedroń, A. and A. Szczepaniak 2009. The cognitive profile of a talented foreign language learner. A case study. *Psychology of Language and Communication* 13,1: 53-71.

Carroll, J. 1965. The prediction of success in foreign language training. In R. Glaser (ed.) *Training, Research and Education*, 88-136. New York: Wiley and Sons.

Carroll, J. 1981. Twenty-five years of research on foreign language aptitude. In K. Diller *Individual Differences and Universals in Foreign Language Aptitude*, 83-118. Rowley, Mass.: Newbury House.

Carroll, J. and S. Sapon 1959. *Modern Language Aptitude Test – Form A*. New York: The Psychological Corporation.

Cowan, N., E. M. Elliott, J. S. Saults, C. C. Morey, S. Mattox, A. Hismjatullina, A. R. A. Conway 2005. On the capacity of attention: Its estimation and its role in working memory and cognitive aptitudes. *Cognitive Psychology* 51: 42-100.

Croft, W. and D. A. Cruse 2004. *Cognitive Linguistics*. Cambridge: Cambridge University Press.

Goldberg, A. 2006. *Constructions at Work. The Nature of Generalisation in Language*. Oxford: Oxford University Press.

Goldin-Meadow, S. 1982. The resilience of recursion: A study of a communication system developed without a conventional language model. In E. Wanner & L. R. Gleitman (eds.) *Language acquisition: The state of the art*, 51-77. New York: Cambridge University Press.

Just, M. A. and P. A. Carpenter 1992. A capacity theory of comprehension: Individual differences in working memory. *Psychological Review* 99: 122-149.

Langacker, R. W. 1987. *Foundations of Cognitive Grammar*, vol. I. Stanford: Stanford University Press.

Liang, J. 2002. *Sentence Comprehension by Chinese Learners of English: verb-centred or construction-based*. Unpublished MA thesis. Guangdong University of Foreign Studies.

Mackey, A., J. Philp, A. Fujii, T. Egi and T. Tatsumi 2002. Individual differences in working memory, noticing of interactional feedback and L2 development. In P. Robinson (ed.) *Individual differences and instructed language learning*, 181-208. Amsterdam: John Benjamins.

Mackey, A., R. Adams, C. Stafford and P. Winke 2010. Exploring the Relationship Between Modified Output and Working Memory Capacity. *Language Learning* 60 (3): 501-533.

Meara, P., J. Milton and N. Lorenzo-Dus 2001. *LEX_Manual*. Swansea: Centre for Applied Language Studies, University of Wales Swansea. Available at: http://www.swan.ac.ul/cals.

Pimsleur, P. 1966. *Pimsleur Language Aptitude Battery (PLAB)*. New York: Harcourt Brace Jovanowich.

Robinson, P. 1995. Aptitude, awareness and the fundamental similarity of implicit and explicit second language learning. In R. Schmidt (ed.) *Attention and Awareness in Foreign Language Learning (Technical Report 9)*, 303-358. Hawaii: University of Hawaii Second Language Teaching and Curriculum Center.

Rysiewicz, J. 2006. Aptitude profiles of successful FL learners – cluster analysis. Paper read at the *XVIIIth International Conference on Foreign/Second Language Acquisition*. Szczyrk, Poland.

Skehan, P. 2003. *A cognitive approach to language learning. 5th impression*. Oxford: Oxford University Press.

Truscott, J. and M. Sharwood-Smith 2004. Acquisition by processing. A modular perspective on language development. *Bilingualism: Language and Cognition 7*: 1-20.

Turula, A. 2009. Metonymic extensions in noun-to-verb conversion. On the importance of constructions. In M. Kuźniak and B. Rozwadowska (eds.) *Pase Papers 2008*. 103-112. Wrocław: Oficyna Wydawnicza Atut.

VanPatten, B. 1990. Attending to form and content in the input. *Studies in Second Language Acquisition* 12: 287-301.

VanPatten, B. 2004. Input and output in establishing form-meaning connections. In B. VanPatten, J. Williams, S. Rottand and M. Overstreet (eds.) *Form-meaning Connection in Second Language Acquisition*, 29-48. Mahwah, NJ: Erlbaum.

Weissheimer, J. and M. B. Mota 2009. Individual differences in working memory capacity and the development of L2 speech production. *Issues in Applied Linguistics* 17 (2): 93-112.

Wells, G. 1985. *Language Development in the Pre-school Years*. Cambridge: Cambridge University Press.