



Learning styles and cognitive achievement: the case of second language learners

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- I Psychological and affective factors predictors of academic achievement and well-being in the second language learning context:
 - * motivation, attitudes, *language anxiety*, learning styles
- II assessment of skills and coding/encoding processes in second language learning context.
 - * Cognitive achievement.

Theoretical: The learning styles are often associated to the first language development, and neglected in the context of the SL learning. Previous literature states that the kinesthetic learning style is the more appropriated to the language learning, because is the style widely related to youngest learners.

Method: Instrument: The main instrument was an 11-item questionnaire adapted from Madrid (1998) for use in Portuguese settings, to assess the sensory preferences of second language learners (Portuguese as SL).

Participants: 305 second language learners (different language speakers), and 192 monolinguals from several school levels and with ages between 7 and 21 years old;

Results and Discussion: The monolingual group have specific learning styles; the second language learners show flexibility toward all the styles. The kinesthetic and auditory styles are more present within immigrant students, than within monolinguals and native individuals. Motivation, learning styles and academic achievement (language proficiency) are inter-related and must be all considered into the scientific research, regarding practice into educative system.

The learning styles are preferences of the individuals, showing how (more visual, more auditory or more kinesthetic) acquire, retain and retrieve information (Felder, 1995), ‘learning style is a gestalt combining internal and external operations derived from the individual’s neurobiology, personality and development, and reflected in learner behaviour’ (Keefe & Ferrel, 1990, p. 16).

According to Keefe (1979), the learning styles are “characteristic cognitive, affective, and psychological behaviours that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (p. 58). This is a concept that must not be misunderstood with “learning strategies”.

The learning strategies could be acquired with consciousness and applied in several learning contexts; however, learning styles are innate preferences (Wintergerst, DeCapua & Itzen, 2001) but could be changed depending on the environment circumstances, although learning styles are more rigid than strategies (Carson & Longhini, 2002). Both, styles and strategies, are related in the process of language acquisition (Macaro, 2006).

Participants (Part II)

* **Case sample**: 305 participants;
126 (41,4%) children (7 – 12 years old) and 178 (58,6%) adolescents/adults (13 - 21), distributed by several educational levels: Basic, High and Higher School;

* **Control sample**: 192 subjects;
96 (50%) children (7 - 12 years old), 57 (29,7%) adolescents (13 - 17) and 39 (20,3%) adults (18 - 21), distributed by several educational levels: Basic, High and Higher School

Materials

The subscale (self-assessment) "Learning Styles" contains 11 items (alpha .68). The items show correlation with total note between .307 and .658. With factor analysis, we found 3 factors: "kinesthetic" (items 2, 3, 6, 10, 12), "auditory" (items 1, 9, 8 and 11) and "visual" (4, 5). This subscale was adapted from the Catalan version of Daniel de Madrid (1998), which in turn is based on the inventory of Barsch (English version, Barsch, 1980; 1996). The original scale (Madrid, 1998) features 15 items with Likert scale (1-5), but only 11 items were selected according to their relevance for the study (The test was applied to the control group with one more item, related to auditory style, which is deleted in the 1st phase due to internal consistency).

	Often	Sometimes	Seldom
1. Can remember more about a subject through listening than reading.			
2. Follow written directions better than oral directions.			
3. Like to write things down or take notes for a visual review.			
4. Bear down extremely hard with a pen or pencil when writing.			
5. Require explanations of diagrams, graphs or visual directions.			
6. Enjoy working with tools.			
7. Are skillful with and enjoy developing and making graphs and charts.			
8. Can tell if sounds match when presented with pairs of sounds.			
9. Remember best by writing things down several times.			
10. Can understand and follow directions on maps.			
11. Do better at academic subjects by listening to lectures and tapes.			
12. Play with coins or keys in pocket.			
13. Learn to spell better by repeating the letters out loud than by writing the word on paper.			
14. Can better understand a news article by reading about it in the paper than by listening to radio.			
15. Chew gum, smoke or snack during studies.			
16. Feel the best way to remember is to picture it in your head.			
17. Learning spelling by "finger spelling" the words.			



EA2: ESTILOS DE APRENDIZAJE 2

Preferencias sensoriales

(Basado en el cuestionario de Barsch (Davis 1989))

© Daniel Madrid (1998). *Guía para la investigación en el aula de idiomas*. Granada: Grupo Editorial Universitario (p. 44)

Colegio: Nº lista: Sexo: M F Fecha: Idioma:

¿Cuáles son tus preferencias y tus estilos de aprendizaje en la clase de lengua extranjera?

Conóctete mejor puntuando lo siguiente de 1 a 5 teniendo en cuenta que:

5 = siempre 4 = casi siempre 3 = a veces 2 = casi nunca 1 = nunca

- (...) 1. Prefiero las explicaciones y las actividades escritas a las explicaciones y actividades puramente orales.
- (...) 2. Me gusta escribir en el cuaderno determinadas palabras y frases para revisarlas después visualmente, porque viendo las cosas por escrito las aprendo mejor.
- (...) 3. Me gustan los trabajos manuales.
- (...) 4. Comprendo y sigo las instrucciones sobre mapas con facilidad
- (...) 5. Me encanta interpretar diagramas, ilustraciones y gráficos y no necesito que me ayuden a entenderlos.
- (...) 6. Recuerdo y aprendo mejor las cosas cuando las escribo varias veces.
- (...) 7. Aprendo las disciplinas académicas a través de conferencias, charlas, grabaciones e intervenciones orales mejor que a través de la lectura de libros.
- (...) 8. Aprendo la ortografía de las palabras repitiendo las letras y las palabras en voz alta mejor que escribiéndolas en un papel.
- (...) 9. Comprendo y me quedo mejor con el contenido de un reportaje oyéndolo por la radio que leyéndolo en un periódico.
- (...) 10. Trato de recordar lo que he estudiado imaginándolo visualmente en mi mente.
- (...) 11. Aprendo mejor a deletrear las palabras escribiéndolas imaginariamente con el



➤ Procedures

The tests were presented in a questionnaire format to all participants in their schools, between October 2006 and February 2007. Each individual application took 30 minutes (considering that the learning style test is 1 of 4 tests).

Data analysis

We achieve the *Average, Standard Deviation, Frequencies, Percentages, Pearson Correlations, Independent Samples T Tests, Factorial Analysis with Rotation Method* (Varimax with Kaiser normalization), as well as *Multifactorial Multivariate Analysis of variance (multi-way ANOVA)*. To achieve this we used the programme *SPSS* 14.0 and 15.0

- Hypothesis 4.
Since the younger subjects showed, generally, preference for the kinesthetic style, then it should correlate, in the situation of learning L2, with the successful acquisition of language.

Hypothesis 5.

Native learners, not experiencing the L2 learning, may provide different learning styles from those of L2 learners.

- Rationale

The main goal is to check consistent differences between groups of ages, nationalities and speakers (sample cases). Furthermore, we want, from the application of the same questionnaire to native individuals, to know if there are noticeable differences of learning styles between populations, migrant and non pupils. We believe that the experience with SL learning can reconfigure the styles of adaptation and of assimilation of new knowledge, specific or general. This type of research is recognized in the literature, however, not strongly, and only in the situation of learning English as a Second Language (Reid, 1987).

Results (Part II)

Legend

- Independent variables

Groups I (second language learners); II (Controls- monolinguals)

Dependent variables

Kinesthetic learning style

Auditory learning style

Visual Learning style

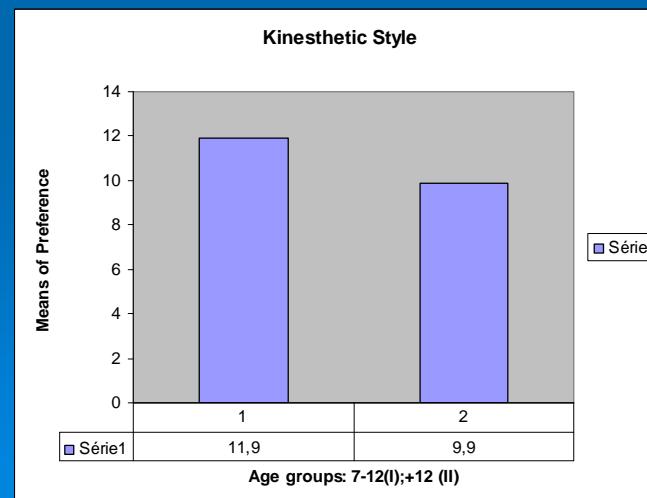
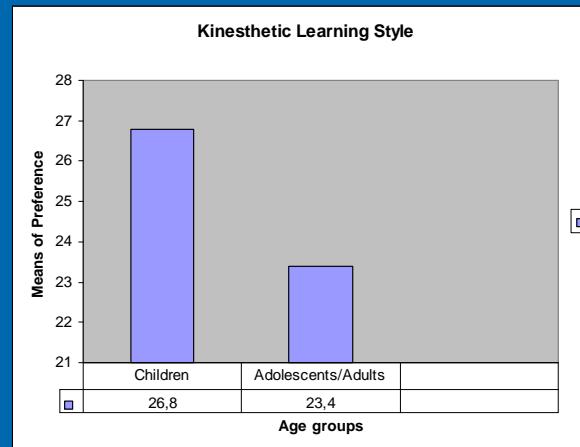
Children and kinesthetic style preference

➤ Case sample (kinesthetic)

Between the categories "Age", group I (7-12 years old) has the best average (26,8), followed by the group of adolescents (13-21), with statistical difference ($p=.006$).

➤ Control sample (Kinesthetic)

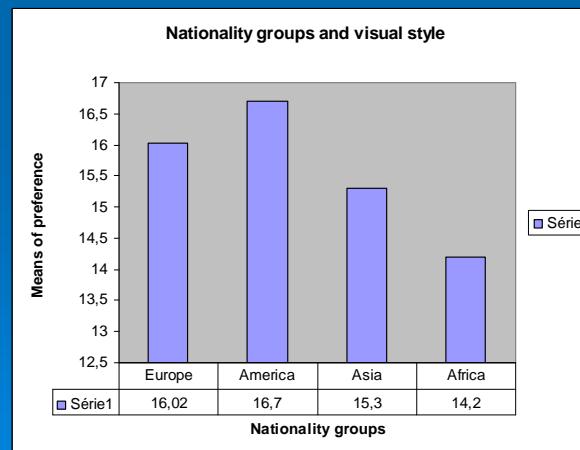
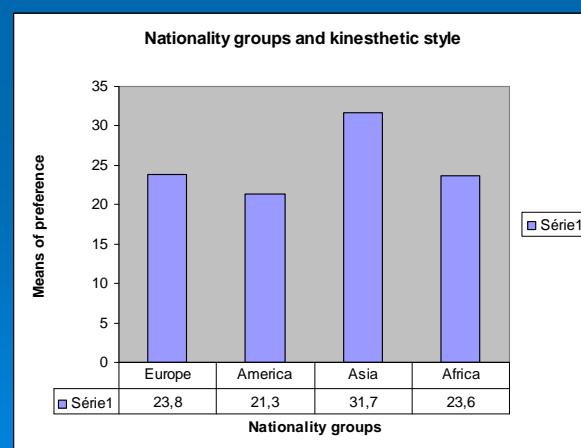
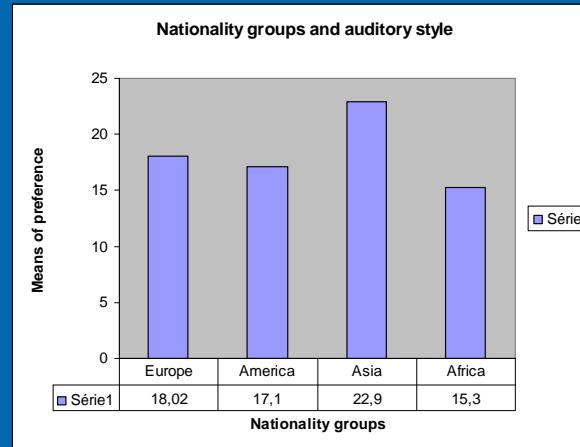
Between the categories "Age", the group I presents the highest mean (11,9), followed by the groups III (10,2)* e II (9,9). The correlation is significant at the $p<.000$ level, between the categories I and II (children and adolescents).



* This value is not considered in the second table, once in the first one (about case sample preferences) there is no adults group (+21 years old).

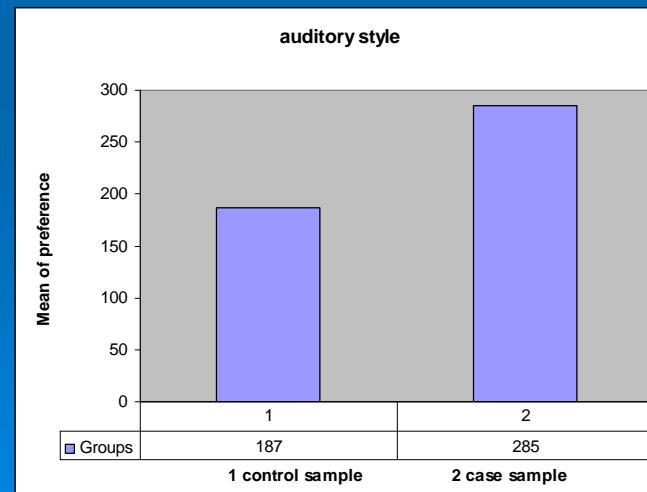
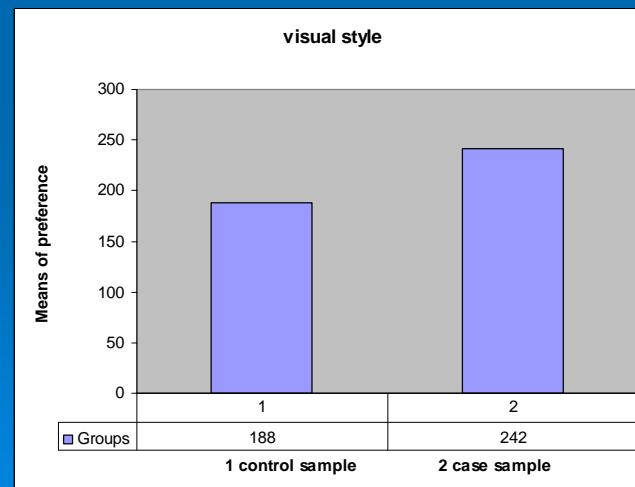
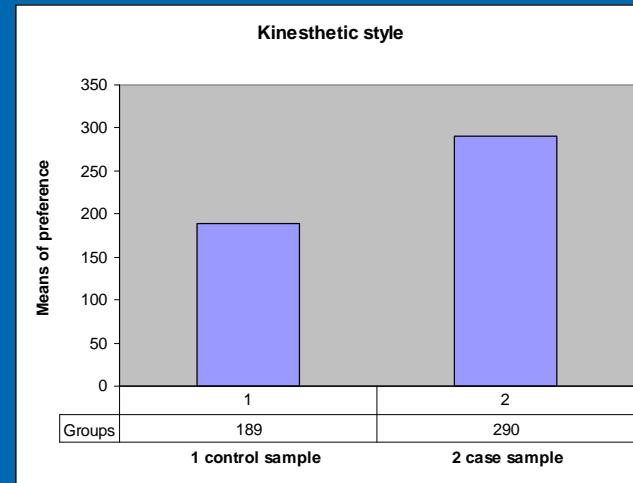
The Asian group leads in the kinesthetic and auditory styles – same profile of general sample cases : the flexibility of learning styles in second language learning (less definition of strategies).

*no statistical differences between nationality groups.



Control and case samples: preferences

- Regarding the differences in all the categories of learning styles (kinesthetic, auditory and visual styles), is the Group II (case sample) which has the greatest means followed by the group I (control group). There is no statistical differences between groups just regarding the Visual Learning Style.



Correlations between Learning styles and Anxiety and Motivation

		Kinesthetic style	Auditory style	Visual style	Motivation I	Motivation II	Motivation III
		1	,236(**)	,207(**)	,369(**)	,233(**)	,341(**)
Kinesthetic	Pearson	1					
	p		,000	,001	,000	,002	,000
	N	290	280	239	281	181	287
Auditory	Pearson	,236(**)	1	,065	,104	-,044	-,014
	p	,000		,322	,085	,559	,819
	N	280	285	234	277	176	282
Visual	Pearson	,207(**)	,065	1	,116	,118	,208(**)
	p	,001	,322		,077	,123	,001
	N	239	234	242	234	174	239
Motivation I	Pearson	,369(**)	,104	,116	1	,321(**)	,457(**)
	p	,000	,085	,077		,000	,000
	N	281	277	234	296	185	293
Motivation II	Pearson	,233(**)	-,044	,118	,321(**)	1	,171(*)
	p	,002	,559	,123	,000		,020
	N	181	176	174	185	189	185
Motivation III	Pearson	,341(**)	-,014	,208(**)	,457(**)	,171(*)	1
	p	,000	,819	,001	,000	,020	
	N	287	282	239	293	185	301

		Ansiedade	EA Factor I	EA Factor II	EA Factor III
Ansiedade	Correlação de Pearson	1	,133(*)	,319(**)	-,190(**)
	p (2-caudas)		,027	,000	,004
	N	282	276	272	228
EA Factor I	Correlação de Pearson	,133(*)	1	,236(**)	,207(**)
	p (2-caudas)	,027		,000	,001
	N	276	290	280	239
EA Factor II	Correlação de Pearson	,319(**)	,236(**)	1	,065
	p (2-caudas)	,000	,000		,322
	N	272	280	285	234
EA Factor III	Correlação de Pearson	-,190(**)	,207(**)	,065	1
	p (2-caudas)	,004	,001	,322	
	N	228	239	234	242

DISCUSSION

- * In the sample of cases the age factor is not a great differentiator of second language learners, since children leads with the highest means for the 3 types of styles. Only with regard to kinesthetic style, children are distributed in a more positive significant way, what would be expected of this age group (previous literature).
- * The preference for kinesthetic and auditory styles is more observed in young ages. The preference for the visual style of learning probably increases with age. Knowledge is, for the most part, assimilated by the vision skills and, as age progresses, it is natural that the vision is preferred for the acquisition of information, even not with the same capacity for discrimination – the plasticity of mental functions- in the language learning, and manual labour and, above all, listening skill (decoding skills) declines along life. The maturation influences the loss of kinesthetic preference and the loss of egocentrism behaviour, this one that is related to kinesthetic style (Heide, personal communication, 2002).

- * In a study of Pouwels (1992), the visual learning style protests against the auditory style regarding the success in tasks such as learning and retention of vocabulary. We suggest, as explanatory theory, the existence of a critical or sensitive period concerning the preference for kinesthetic learning, because at a certain age is normal for a person to avoid this strategy style, adopting other tendencies. If a style (mainly kinesthetic) is predominant outside that “critical period”, certainly will not have the same effect as actually shows early years of life. As example from our study, is verified that the individuals from the Asian continent (data not here reported) exhibit a more kinesthetic style course, but also is the group with the lowest proficiency. It is a discrepancy that we address here as purpose for this hypothesis (“critical period”) created based on the plasticity of learning styles. Also, visual style is to be considered as more stable style.
- * The cultural background is a great factor (Wintergerst et al., 2001). Lee (1976, cited by Wintergerst et al., 2001) suggests, from empirical study, that the Chinese and Vietnamese prefer the visual style of learning, while the Hispanic people prefer the kinesthetic style. Due to inconsistencies between studies and their results, the question of the relationship between nationality and learning style is still not consensual (Wintergerst et al., 2001).

* Age factor has great influence just in the context of native and monolingual subjects, for language learning. However, we must consider that the scale has an index of compromising fidelity (alpha .60), compared with higher results (.68) in the context of the test application to migratory population, suggesting inadequacy of the test to the native population (Portuguese). The two samples are differentiated by the task of learning a new language that just one of the samples must achieve, which involves other cognitive functions, especially at the level of strategies. Furthermore, the learning and acquisition of language, as different tasks and functions, appear to be more dependent on sensory preferences that are dependent on age variation.

Is a fact the earlier specialization of these sensory preferences in monolingual, by only focusing on a code, although the S2 learner is more flexible in relation to 3 types of learning styles, which can be used at any age..

* Correlations with other scales:

- visual style has a negative and significant correlation with anxiety, other styles has positive correlation, ie, the higher the anxiety, the greater the preference for auditory and kinesthetic styles. We observe in our study, against expected, that children, who tend to prefer these styles, have high levels of anxiety; visual style in correlation with the interest in foreign languages, and with instrumental motivation.
- kinesthetic style have the best correlation to all scales of AMTB , except for one item (AESP: attitudes to native speakers), denoting a very positive relationship between motivation and the “physical surroundings” for the learning. There was no significant relationship between the auditory style and the items of the scale AMTB; thus, especially in learning that requires more hearing, the motivation appears not to be a support.

* The biggest factor, however, is the object of learning: mother tongue or foreign language. In turn, the result is the greater flexibility of second language learners toward learning styles, while the native and monolingual subjects exhibit preferences more determined and less variable. However we believe that for certain levels of language, as the case of sounds perception, the visual style is more appropriate, besides the auditory stimulus, to support the perception and production of phones (labial movements is key to learning the shape of phones). In the Study II, we observe that children are the participants with more incorrect answers and absences regarding the perception of sounds (test 12 of the electronic battery of tests); children are the subjects with a preference more kinesthetic – less visual strategies.

A conclusion from literature:

“Some would claim that styles are stable traits in adults. This is a questionable view. It another, but that differing contexts will evoke differing styles in the same individual. Perhaps an “intelligent” and “successful” person is one who is “biocognitive” - one who can manipulate both ends of a style continuum.”

(Brown, D., 1973, p. 234).

Many thanks'!

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