Chapter 22

STRATEGY INVENTORY FOR LANGUAGE LEARNING: FINDINGS OF A VALIDATION STUDY IN GREECE

Konstantinos Petrogiannis[1] & Zoe Gavriilidou[2]
[1] *School of Humanities, Hellenic Open University, Greece*
[2] *Department of Greek Studies, Democritus University of Thrace, Greece*

ABSTRACT

Foreign language learning strategies are specific actions or techniques employed by the learner for the purpose of learning language, making learning easier, faster, more enjoyable, more self-directed, more effective, and more transferable to new situations, according to Rebecca Oxford. The paper presents a large scale project's (THALES: 379335) first phase findings regarding the validation of Rebecca Oxford's "Strategy Inventory for Language Learning" (S.I.L.L.) with a Greek sample of 1308 school-aged students from 16 schools representing 5 prefectures and 4 regions of the country. 46% of the students attended the last three grades of elementary school and 54% junior secondary school. Following a series of exploratory factor analyses we decided on a 29-item version retaining Oxford's factor structure. The confirmatory factor analyses revealed a marginal level of fit for the whole sample as well as the elementary school and secondary school sub-samples. The analyses indicated moderate to high internal consistency coefficients for the two- and six-category model of the SILL instrument. Based on these findings a number of analyses were performed regarding differences across all the six SILL first-order categories (memory, cognitive compensation, metacognitive, affective, and social strategies) and the two second-order categories (direct and indirect strategies) in relation to gender and school level revealing significant differences. The results are discussed in relation to other similar studies and the next phases of the study.

Keywords: learning strategies, S.I.L.L., validation, school-aged students, Greece.

1. INTRODUCTION

There has been an extensive body of research into language learning strategies, both in second/foreign language (SL/FL) studies and educational psychology, in the last four decades. The literature on learning strategies in SL/FL acquisition emerged from a concern for highlighting the characteristics of effective learners and promoting learner-centered models of language teaching. The focus was on the processes used by learners for managing their SL/FL learning and, more specifically, on identifying those strategies that make learners successful and those that lead to less successful learning. Based on these elements the present paper provide the findings of an empirical study that attempted to confirm a shortened version of Oxford's (1990) six-factor learning strategies classification system in a sample of Greek school-aged (elementary and secondary education) students learning English as second language.

1.1. Defining language learning strategies

Definitions regarding learning strategies are basically found in literature on psychology, where learning is commonly referred to as the process of storing and retrieving information (Dörnyei, 2005; Rubin, 1981). In general, strategies, have been described as

techniques or devices learners use to gain knowledge (Rubin, 1975) or as actions toward achieving a given objective (Cohen, Weaver, & Li, 1996). Their conscious character was emphasized in the work of Chamot (2005) and Griffiths (2007). Thus language learning strategies have been defined as "conscious thoughts and actions that learners take in order to achieve a learning goal. Strategic learners have metacognitive knowledge about their own thinking and learning approaches, a good understanding of what a task entails, and the ability to orchestrate the strategies that best meet both the task demands and their own learning strengths" (Chamot, 2005, p. 14) or as "specific actions consciously employed by the learner for the purpose of learning language" (Griffiths, 2007, p. 91). O'Malley and Chamot (1990, p. 1) define them as "the special thoughts or behaviours that individuals use to help them comprehend, learn or retain new information". Oxford (1990) describes them as "steps taken by learners to enhance their own learning" (p. 1) and claims that they refer to "specific actions, behaviors, steps or techniques that students use to improve their own progress in developing skills in a second or foreign language. These strategies can facilitate the internalization, storage, retrieval or use of the new language" (Oxford, 1999, p. 518). Weinstein, Husman, and Dierking (2000, p. 727) who studied learning strategies from the perspective of educational psychology, argued that "learning strategies include any thoughts, behaviors, beliefs or emotions that facilitate the acquisition, understanding or later transfer of new knowledge and skills". Recently there has been a shift in the focus of LLS research from the product (strategies) to the process (self-regulation). In that respect, Rubin (2001, 2005) introduced the term *learner self-management* defined as the ability to deploy metacognitive strategic procedures (such as monitoring, planning, evaluating, problem solving and implementing) and to make use of relevant knowledge and beliefs (such as task knowledge, self-knowledge, strategy knowledge) and Oxford (2011) maintained that self-regulated L2 learning strategies are defined as deliberate, goal-directed attempts to manage and control efforts to learn L2. In educational psychology, on the other hand, research has opted for the term of *self-regulation* (Boekaerts, Pintrich, & Zeidner, 2000).

1.2. The study background

Self-report procedures such as interviews, questionnaires, diaries and journals or think-aloud protocols, while sometimes subject to errors, are mainly used for identifying learner strategies. One of the most efficient and comprehensive ways to assess frequency of language learning strategy use is a questionnaire, also referred to as an inventory or a summative rating scale. Currently, the most frequently employed language learning strategy use screening instrument around the world is the Strategy Inventory for Language Learning (SILL) developed by Oxford in the early 1990s. Originally, it was designed as a tool for assessing the frequency of use of language learning strategies by students at the Defense Language Institute Foreign Language Center in Monterey, California. It was followed by two revised versions (Oxford, 1990): Version 5.1 for foreign language learners with English native language (80 items) and Version 7.0 (ESL/EFL) for learners of English as a second/foreign language (50 items). The self-report items of the instrument's latter form regarding the frequency of a number of language learning strategies use as indicated by the language learners are organized under two broader factors, i.e. direct and indirect learning strategies, depending on the extent to which each strategy item is involved in language learning. In addition, the items are further distributed under six factors:

i. "Direct strategies" include

(a) *memory strategies* (remembering and retrieving vocabulary), i.e. how learners remember and retain language;

(b) *cognitive strategies* (comprehending and producing text), which indicate how learners think of their learning; and

(c) *compensation strategies* (compensating for the lack of knowledge), reflecting how learners make up the limited language to achieve successful language use.

ii. "Indirect strategies" include

(d) *metacognitive strategies* (manipulating learning processes), i.e., how they manage their own learning;

(e) *affective strategies* (regulating affective state), or how learners adjust their affective status in the learning process;

(f) *social strategies* (learning with others) which refer to how learners learn language through social interaction).

The SILL uses a five-point Likert-type scale responses for each strategy described (1= never or almost never true of me, 2= generally not true of me, 3= somewhat true of me, 4= generally true of me, 5= always or almost always true of me).

This originally adult-oriented instrument has been translated into more than 17 languages and appears in plenty major publications involving the study of LLS among SL/FL learners. The psychometric properties of the instrument have been examined mainly with the focus on the reliability and validity of the translated versions (Oxford & Burry-Stock, 1995). In general, the ESL/EFL SILL reliabilities reported in the literature have been high. The internal consistency reliability of the SILL determined by Cronbach's alpha has been well above an acceptable alpha value of >.70 in most studies (Hair, Anderson, Tatham, & Black, 1998; Landau & Everitt, 2004). For instance, the alpha coefficients have been .94 for the Chinese translation version (Hsiao & Oxford, 2002; Yang, 1999), .93 for the Turkish, Korean and Japanese translation version (Park, 1997; Robson & Midorikawa, 2001, Demirel, 2009), .91 for the Greek translation (Gavriilidou & Mitits, 2014), .89 for the Turkish translation (Gavriilidou et al., in press), 86 for the Arabic translation version (Khalil, 2005), and from .67 to .96 for the English version (Hong-Nam & Leavell, 2006; Nyikos & Oxford, 1993; Wharton, 2000).

With regard to the construct validity of the SILL, findings were more controversial and less conclusive. Oxford and Burry-Stock (1995) and Oxford (1996) reported the results of exploratory factor analyses (EFA) that examined the underlying structure of the SILL using data sets from six studies, and noted that construct validity of the instrument has been studied in relation to the ESL/EFL setting, learning styles, gender, motivation etc. It has been found that there is a strong relationship between the SILL score and the aforementioned independent variables. A more recent CFA analysis carried out by Hsiao and Oxford (2002) revealed that among fourteen competing LLS taxonomies examined, Oxford's six-factor taxonomy provided the most consistent account of college student data, although the fit indices indicated that the model did not offer an adequate fit for the data. This evidence, according to the authors, indicated that there was still substantial room for instrument improvement. This conclusion was further supported by data reported in the studies of El-Dib (2004), Green and Oxford (1995), Nyikos and Oxford (1993), Robson and Midorikawa (2001), Yang (1999), Park (2011) who indicated that the construct validity of the SILL determined by exploratory factor analysis (EFA) has been inconsistent with different factor structures across different learning contexts. For instance, in the Robson and Midorikawa (2001) study of university students in Japan 15 factor structures were found in the SILL. Green and Oxford (1995) studied students in Puerto Rico and found nine

factors. El-Dib (2004) found eight factor structures in the SILL among university students in Kuwait. In Yang's (1999) study six factor structures emerged from the CFA analysis of data among university students in Taiwan. Finally Nyikos and Oxford (1993) found only five factors among university students in Korea and the USA. Differences found in the number of factor structures yielded in the above mentioned studies could be possibly accounted for by the following parameters: (a) in the SILL, items that are appropriate for second language contexts are not well-distinguished from items appropriate for foreign language learning (i.e., while watching shows in FL context represents a conscious learning strategy on the part of a foreign language learner, the same behavior may simply represent an everyday reality for a second language learner); (b) there is no clear distinction among strategy categories, consequently some strategies may belong to more than one category); and (c) items do not bear the same level of item specificity (i.e., they are worded in a way that does not clarify the context of strategy application for all respondents).

The SILL has been used mainly to investigate university students studying various foreign languages (e.g. Ehrman & Oxford, 1989; Nyikos & Oxford, 1993; Bedell & Oxford, 1986; Dreyer & Oxford, 1996; Ehrman & Oxford, 1995; Ehrman & Leaver, 2003) and it is also very acceptable when used with multilingual groups of ESL/EFL learners. In Greece, the most significant evidence of using the SILL to assess language learning strategies when learning English was the work of Kazamia (2003), Psaltou-Joycey (2003), Psaltou-Joycey and Kantaridou (2009), Vrettou (2011), Mitits (2014). Kazamia (2003) focuses on measuring the frequency of language learning strategy use in adult Greek learners of English while (Vrettou, 2011) records the frequency of use in primary school children who are learning English at school. Mitits (2014) focused on adolescent learners aged 12 to 15 learning English as foreign language and Greek as second language. Finally, Psaltou-Joycey (2008) used the SILL in order to study cross-cultural differences in the use of language learning strategies by students of Greek as a second language.

Even though the greatest amount of LLS research focuses on adult LLS use, several studies (e.g., Chen, 2009; Gavriilidou & Papanis, 2009; Gunning, 1997, 2011; Kaylani, 1996; Lan & Oxford, 2003; Magogwe & Oliver, 2007; Agathopoulou, in press; Kambakis-Vougiouklis, in press; Kazamia, in press; Platsidou & Sipitanou, 2015) used the SILL to profile strategy use among school-aged English as SL/FL learners. It was found that more successful students used more or more elaborated strategies (Kaylani, 1996; Lan & Oxford, 2003; Magogwe & Oliver, 2007) while less successful students may "sometimes use strategies even as frequently as more successful peers, but their strategies are used differently" (Chamot, 2003, p. 116). Good language learners have the ability to select the appropriate strategy or a set of strategies for each task, while less successful learners do not have the so-called metacognitive task knowledge to opt for the appropriate strategies (Chamot & El-Dinary, 1999; Chamot & Keatley, 2003; Oxford, Cho, Leung, & Kim, 2004). In addition, there was a difference in preference of the types of strategies between children, adolescent and adults. More specifically, elementary school students preferred affective, compensation (Gunning, 1997, 2011), and social (Magogwe & Oliver, 2007) strategies. Junior secondary school students reported greater use of social, metacognitive, affective, memory, and cognitive strategies; high-school students indicated a strong preference for compensation (Chen, 2009) and metacognitive (Magogwe & Oliver, 2007) strategies. These studies highlighted the need for simplifying, translating, or shortening the SILL for use with school-aged L2 learners together with investigating its psychometric properties either partly, placing emphasis on reliability coefficients for the modified SILL (e.g. Chen, 2009; Gunning, 1997, 2011; Magogwe & Oliver, 2007) and/or content validity

(e.g. Gunning, 1997, 2011; Magogwe & Oliver, 2007), or more thoroughly (Ardasheva & Tretter, 2013).

Given that: a) empirical evidence, particularly with regard to the relationship between L2 learning and LLS, remains inconsistent (Nisbet, Tindall, & Arroyo, 2005) due to the lack of a proper instrumentation that would accurately diagnose LLS and would provide reliable data about SL/FL learning and teaching practices, b) findings concerning the construct validity of the SILL are controversial, and c) the SILL is mainly adult-oriented and thus not appropriate for studying LLS of elementary or secondary school students, the aim of the present study is to illustrate the findings of a validation study that followed an adaptation process of Oxford's (1990) Strategy Inventory for Language Learning (SILL) from English into Greek with the aim of further administering it to school-aged students (upper elementary and junior secondary schools) as a part of a large-scale project (THALES #379335). More specifically, the purpose of this study was to examine whether a shortened version of the SILL reflects the six- and the broader, "second order", two-construct classification system proposed by Oxford (1990) by performing confirmatory factor analysis (CFA) among school-aged (elementary and secondary education) students learning English in Greece.

2. METHOD

2.1. Participants

The participants were 1308 students from 16 schools representing 5 prefectures (Athens, Peiraias, Thessaloniki, Rodopi, and Ioannina) and 4 regions (Attica, Central Macedonia, Eastern Macedonia-Thrace, and Epirus) of Greece. They attended the last 3 grades of elementary school and junior secondary school, and more specifically 46.2% (604) of them attended the 4th to 6th grade of elementary school (4th grade: 180 [13,8%], 5th grade: 224 [17,1%], 6th grade: 200 [15,3%]) and 53.8% (703) attended the 1st to 3rd grade of junior secondary school (1st grade: 231 [17,7%], 2nd grade: 241 [18,4%], 3rd grade: 231 [17,7%]). The mean age of the whole sample was 12.4 yrs (sd= 1.77) and the age range was 9-17 years. Out of the 1295 valid responses 617 (47,2%) were boys (M_{age}= 12.4, sd= 1.76) and 678 (51,8%) were girls (M_{age}= 12.5, sd= 1.79).

All research procedures were approved by the Institutional Review Board (Pedagogical Institute) for investigations involving human participants. Written informed consent was obtained from the legal guardians of the participants before they were allowed to participate in the study. The SILL questionnaire was administered during regular teaching hours in May (school year 2013-14) by EFL teachers who were instructed to read and explain the directions to the students.

2.2. Instrument

The instrument that was used herewith and subjected to validation control was the Strategy Inventory for Language Learning (SILL) version 7.0. The study used a recently adapted version of an independent study by Gavriilidou and Mitits (2014) which exhibited sound reliability and validity indices. The process of adaptation was broken down into two steps following Beaton, Bombardier, Guillemin, & Bosi Ferraz's (2000) suggestions in order to maximize instrument's reliability and validity with the particular learner population (see Gavriilidou & Mitits, 2014):

(a) The translation process: The translation process consisted of the initial translations, synthesis of the translations and back translation. The process of translating the SILL from English into Greek took place at three levels and equivalence between the

original and translated versions was considered at each level: linguistic/semantic, technical and conceptual. To these three, the 'comprehension level' was added to ensure that the target population – elementary and secondary school students aged 9-15 with Greek L1 understood the translated material as easily as the source population for whom the original questionnaire was designed.

(b) Verification and adaptation: This second step included the expert committee review in the light of the focus group suggestions and other verification methods. According to the written reports submitted by the panel of experts, it can be assumed that the Greek version of the questionnaire is as valid as the original one concerning the item-level equivalence since the careful adaptation procedure has ensured semantic, idiomatic, experiential and conceptual equivalence. Its validity is further improved by resolving technical issues of questionnaire translation (Gavriilidou & Mitits, 2014).

With regard to the validation procedure presented herewith, the adapted SILL was tested for its content validity through exploratory and confirmatory factor analysis, where a six-factor model based on the six subscales suggested by Oxford was retained and tested (see Demirel, 2009). In the final stage, the instrument was verified for its psychometric properties providing internal consistency coefficients.

3. RESULTS

Considering (a) the limited nature of empirical evidence for either supporting or refuting the adequacy of the 50-item SILL for school-aged English language learners (Oxford & Burry-Stock, 1995), (b) the common practice of simplifying and shortening the SILL for younger student populations (e.g., Gunning, 2011), and (c) the existing criticisms and recommendations for enhancing the instrument's validity (Hsiao & Oxford, 2002), the data processes for the present study were developed in two steps: instrument's item refinement and calibration and instrument validation.

Initially the items were subjected to quality checks for missing values or incorrectly coded responses. A check for missing values was executed to examine the percentage of items that was reported as missing and whether they we were represented uniformly. For 1020 (78%) cases the SILL was fully answered. The control for systematic pattern of missing values in any of the items (in relation to gender and educational level) did not reveal any critical result concluding that any potental differences could be attributed to random factors. In addition, because in none of the items the missing values exceeded 5% of the whole SILL responses dataset, no further checks were performed (Lynch, 2003, cited in Howell, 2008).

In the first step, using SPSS v. 20, a number of exploratory factor analyses were performed in order to proceed with further instrument modifications by identifying potentially problematic items. The analyses involved Principal Axis Factoring with either the two sub-samples (elementary school students, secondary school students) or the whole sample. The trials included a number of factorial solutions. Based on these analyses, the theoretical standpoint and the criteria mentioned above, we finalized a common factorial pattern for all the students consisting of 29 items while adopting Oxford's factorial structure (Table 1).

Table 1. The SILL items retained for the shortened school-student version:
Descriptive statistics for individual items.

Item #	Strategies	M	sd
	A. Memory strategies		
1	I think of relationships between what I already know and new things I learn in the SL/FL.	3.28	1.17
2	I use new SL/FL words in a sentence so I can remember them.	3.05	1.25
3	I use rhymes to remember new SL/FL words.	1.51	0.99
4	I physically act out new SL/FL words.	3.70	1.22
	B. Cognitive strategies		
5	I say or write new SL/FL words several times.	3.50	1.31
6	I try to talk like native SL/FL speakers.	3.54	1.26
7	I use the SL/FL words I know in different ways.	3.02	1.31
8	I watch SL/FL language TV shows spoken in SL/FL or go to movies spoken in SL/FL.	2.45	1.31
9	I read for pleasure in the SL/FL.	3.16	1.29
10	I try not to translate word for word.	2.53	1.31
	C. Compensation strategies		
11	I use reference materials such as glossaries or dictionaries to help me use the new language	3.02	1.44
12	To understand unfamiliar SL/FL words, I make guesses.	2.88	1.43
13	I try to guess what the other person will say next in the SL/FL.	2.47	1.32
14	If I can't think of an SL/FL word, I use a word or phrase that means the same thing.	3.68	1.30
	D. Metacognitive strategies		
15	I try to find as many ways as I can to use my SL/FL.	3.29	1.24
16	I notice my SL/FL mistakes and use that information to help me do better.	3.86	1.20
17	I pay attention when someone is speaking SL/FL.	3.98	1.12
18	I try to find out how to be a better learner of SL/FL.	3.72	1.20
19	I plan my schedule so I will have enough time to study SL/FL	2.86	1.26
20	I look for people I can talk to in SL/FL	2.76	1.33
21	I look for opportunities to read as much as possible in SL/FL.	2.82	1.29
	E. Affective strategies		
22	I try to relax whenever I feel afraid of using SL/FL.	3.40	1.43
23	I encourage myself to speak SL/FL even when I am afraid of making a mistake.	3.67	1.29
24	I talk to someone else about how I feel when I am learning SL/FL.	2.34	1.31
	F. Social strategies		
25	I ask SL/FL speakers to correct me when I talk.	3.04	1.40
26	I practice SL/FL with other students.	2.39	1.30
27	I ask for help from SL/FL speakers.	3.14	1.36
28	I ask questions in SL/FL.	3.45	1.24
29	I try to learn about the culture of SL/FL speakers.	2.55	1.34

In the second phase, the skewness and kurtosis of the data were examined. The skewness indices of all 29 items but one were ranged between -0.9 and 0.63, which are acceptable with regard to the distribution symmetry (the exception refer to item 3 ("I use rhymes to remember new SL/FL words") which was 2.13 indicating a positive assymetry. All but one of the kurtosis values were negative ranging within an acceptable range (-1.32 to 0.09); exception was again item 3 (3.88). According to the skewness and kurtosis values the form of the distribution for the whole sample was slightly platykutic and there was an indication that the data do not follow the multivariate normal distribution criterion since one item did not seem to follow the normal distribution pattern. Hence asymptotic Confirmatory Factor Analysis was performed involving the use of AMOS software.

The CFA revealed a relatively satisfactory level of fit to the whole sample (CFI 0.84, NFI 0.8, RMSEA 0.06) as well as the elementary school (CFI 0.85, NFI 0.8, RMSEA 0.05) and junior secondary school (CFI 0.82, NFI 0.8, RMSEA 0.06) sub-samples (see Table 2).

Table 1. Confirmatory Factor Analysis model fit of the 29 items.

Criterion	Total sample	Primary school children	Junior secondary school children
x^2	1936.388	972.961	1270.442
CMIN/DF<2	5.349	2.688	3.51
RMSEA<=0,06	0.058	0.053	0.06
TLI>=0,95	0.808	0.831	0.793
NFI>=0,95	0.812	0.796	0.798
CFI>=0,95	0.84	0.859	0.828

CMIN: [minimum discrepancy] maximum likelihood estimation chi-square test; RMSEA: Root mean square error of approximation; TLI: Tucker-Lewis Index; NFI: normed fit index; CFI: comparative fit index

The overall patern of results indicated a "borderline" goodness-of-fit with more powerful index the RMSEA values. Considering that RMSEA is appropriate in more confirmatory contexts (Rigdon, 1996) we may accept for this pilot study phase the structure's goodness-of-fit even at a marginal level.

In order to examine the internal consistency of the SILL's two- and six-construct classification system, the reliability of the constructs were investigated by calculating Cronbach's α, again for the whole sample and the two sub-samples (see Table 3).

Table 2. Items per learning strategies factor and internal consistency coefficients.

	Learning Strategies (LS)		
	Direct LS	memory (4)	cognitive (6)	compensation (4)
Whole sample	.77	.56	.71	.43
Elementary	.79	.58	.70	.50
Secondary	.75	.53	.72	.45
	Indirect LS	metacognitive (7)	affective (3)	social (5)
Whole sample	.87	.83	.52	.70
Elementary	.87	.82	.55	.70
Secondary	.87	.83	.48	.69

The internal consistency coefficients suggest a satisfactory degree of internal consistency using the shortened student version of the SILL in all the trials. It seems that lower, medium size, reliability coefficients were revealed for "compensation", "memory",

and "affective" strategies. On the other hand, metacognitive strategies presented the highest coefficients among the six subscales (α=0.83 for the whole sample). Moreover, the "higher order" two general factors (direct and indirect learning strategies) revealed the higher coefficients (α=.87 for both sub-samples and the whole sample) indicating that the items measure similar characteristics about language learning strategies. The finding is in accordance with the evidence from several other studies' (e.g. Park, 1997; Hsiao & Oxford, 2002; Yang, 1999).

Finally, using the mean scores of the two- and six-factor structure and with regard to the potential differences in terms of the students' gender (Table 4) and educational level (Table 5), the relevant analyses (t-tests for independent samples) indicated statistical differences both between boys and girls as well as between elementary and secondary school students.

Table 3. Independent samples t-test between boys and girls on language learning strategies.

	Gender	N	Mean	Std. Deviation	t	p
A. Memory strategies	Boys	614	2.85	0.79	-1.82	0.07
	Girls	678	2.93	0.74		
B. Cognitive strategies	Boys	615	2.89	0.81	-6.53	<0.001
	Girls	674	3.18	0.81		
C. Compensation strategies	Boys	613	2.93	0.83	-3.52	<0.001
	Girls	673	3.09	0.84		
D. Metacognitive strategies	Boys	610	3.13	0.85	-8.36	<0.001
	Girls	672	3.52	0.82		
E. Affective strategies	Boys	616	2.95	0.99	-6.84	<0.001
	Girls	678	3.31	0.90		
F. Social strategies	Boys	613	2.74	0.87	-6.77	<0.001
	Girls	675	3.07	0.89		
Direct strategies	Boys	616	2.89	0.63	-5.17	<0.001
	Girls	677	3.07	0.62		
Indirect strategies	Boys	616	2.94	0.76	-8.67	<0.001
	Girls	677	3.30	0.73		

With regard to students' gender the analyses revealed statistically significant differences in all the measures except for "memory strategies" ($p = 0,068$). In addition, in all the subscales as well as the two broader factors girls scored higher than boys. The pattern was similar for both elementary and secondary school with very few exceptions.

In a similar vein, in order to examine statistically significant differences between elementary and secondary school students, a number of t-tests for independent samples were performed (Table 5).

Table 4. Independent samples t-test between elementary
and secondary school students on language learning strategies.

	Educ. level	N	Mean	Std. Deviation	t	p
A. Memory strategies	Elementary	602	3.05	0.80	7.01	<0.001
	Secondary	702	2.76	0.71		
B. Cognitive strategies	Elementary	602	3.16	0.83	4.96	<0.001
	Secondary	699	2.93	0.81		
C. Compensation strategies	Elementary	599	2.91	0.90	-4.17	<0.001
	Secondary	696	3.10	0.78		
D. Metacognitive strategies	Elementary	602	3.52	0.84	7.54	<0.001
	Secondary	688	3.16	0.84		
E. Affective strategies	Elementary	604	3.27	1.01	4.64	<0.001
	Secondary	698	3.03	0.91		
F. Social strategies	Elementary	600	3.05	0.92	5.27	<0.001
	Secondary	696	2.79	0.86		
Direct strategies	Elementary	603	3.04	0.67	3.19	0.02
	Secondary	702	2.93	0.58		
Indirect strategies	Elementary	604	3.28	0.77	6.97	<0.001
	Secondary	697	2.99	0.73		

All the comparisons of the mean scores showed statistically significant differences with elementary school students scoring higher in all the factors but one, namely the "compensation strategies" (i.e. guessing, asking for help, and using gestures).

4. DISCUSSION

The aim of the study was to record how the SILL can be validated in the Greek context for school-aged student population using a translated and adapted version of the SILL (Gavriilidou & Mitits, 2014). Researchers performed EFA to explore latent factor structures and confirmatory factor analysis (CFA) to test *a priori* factor structures in the relationships between observed and latent variables.

Since EFA has shown limitations defining exact factor structures of the SILL because of different findings across studies, CFA was performed to get a better understanding of the latent constructs of the SILL by examining whether it represents either the two- or six-construct classification system, as originally proposed by Oxford (1990). With regard to this latter procedure it is surprising to note that only a limited number of published studies have performed CFA in an attempt to confirm *a priori* underlying constructs of the SILL either among adult participants, mostly university students (e.g. Hsiao & Oxford, 2002; Park, 2011) or elementary/secondary education students (Ardasheva & Tretter, 2013).

Based on the relevant analyses it seems that the modified shortened version of the SILL (Oxford, 1990) that was produced for the needs of the current study following a series of exploratory factor analyses as well as theoretical and methodological criteria, could be used with the Greek school-aged student population. More specifically, the current version with the 29 items seems to be functional both for elementary and secondary school students; the factorial structure of the second level (direct and indirect learning strategies) presented sufficiently high internal consistency; the results of the confirmatory factor

analysis marginally confirmed the factor pattern retaining Oxford's proposal but with almost half the items of the original version. The evidence approximates the findings of Ardasheva and Tretter's (2013) study, the only relevant study in terms of the age-range of the target group using the SILL, both in terms of the items used as well as their content (which items load to each factor).

A detailed examination is required in order to establish and generalize the current findings with data from a larger and nationwide sample. A further study is necessary to examine whether each of the strategy categories may have differential impact on language learning depending on, for example, the developmental needs and English proficiency level of the individual, the outcome of interest (i.e. linguistic, academic, or cognitive/behavioral), the specific learning and teaching goals and tasks etc. These are some of the issues that will be examined in the ensuing main phase of the current study.

REFERENCES

Agathopoulou. E. (in press). Factors affecting language learning strategy use by learners of English at Greek secondary schools: Proficiency and motivation. In Z. Gavriilidou, & K. Petrogiannis (Eds.), *Language Learning Strategies in the Greek context*. Kavala, Greece: Saita Publications.

Ardasheva, Y., & Tretter, T. R. (2013). Strategy Inventory for Language Learning-ELL Student Form: Testing for factorial validity. *Modern Language Journal*, *97*(2), 474-489.

Beaton, D. E., Bombardier, C., Guillemin, F., & Bosi Ferraz, M. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*, *25*(24), 3186-3191.

Bedell, D. A., & Oxford, R. L. (1996). Cross-cultural comparisons of language learning strategies in the People's Republic of China and other countries. In R. L. Oxford (Ed.), *Language learning strategies around the world: Cross-cultural perspectives* (Technical Report No 13, pp. 47-60). Honolulu, HI: University of Hawai'i Press.

Boekaerts, M., Pintrich, P. R., & Zeidner, M. (2000). *Handbook on self-regulation*. San Diego, CA: Academic Press.

Chamot, A. U. (2003). Issues in language learning strategy research and teaching. *Electronic Journal of Foreign Language Teaching*, *1*(1), 14-26.

Chamot, A. U. (2005). Language learning strategy instruction: current issues and research. *Annual Review of Applied Linguistics*, *25*, 112-130.

Chamot, A. U., & El-Dinary, P. B. (1999). Children's learning strategies in language immersion classrooms. *Modern Language Journal, 83*(3), 319-341.

Chamot, A. U., & Keatley, C. W. (2003, April). *Learning strategies of adolescent low-literacy Hispanic ESL students*. Paper presented at the 2003 Annual Meeting of the American Educational Research Association, Chicago, IL.

Chen, M.-L. (2009). Influence of grade level on perceptual learning style preferences and language learning strategies of Taiwanese English as a foreign language learners. *Learning and Individual Differences*, *19*(2), 304-308.

Cohen, A. D., Weaver, S. J., & Li, T.-Y. (1996). *The impact of strategies-based instruction on speaking a foreign language* (CARLA Working Paper #4). Minneapolis, MN: University of Minnesota, Center for Advanced Research on Language Acquisition.

Demirel, M. (2009). The validity and reliability study of Turkish version of strategy inventory for language learners. *World Applied Science Journal*, *7*(6), 708-714.

Dörnyei, Z. (2005). *The psychology of the language learner*. Mahwah, NJ: Erlbaum.

Dreyer, C., & Oxford, R. L. (1996). Learning strategies and other predictors of ESL proficiency among Afrikaans speakers in South Africa. In R. L. Oxford (Ed.), *Language learning strategies around the world: Cross-cultural perspectives* (Technical Report No 13, pp. 61-74). Honolulu, HI: University of Hawai'i Press.

Ehrman, M. E., Leaver, B., & Oxford, R. L. (2003). A brief overview of individual differences in second language learning. *System*, *31*(3), 313-330.

Ehrman, M. E., & Oxford, R. L. (1989). Effects of sex differences, career choice, and psychological type on adult language learning strategies. *Modern Language Journal*, *73*(1), 1-13.

Ehrman, M. E., & Oxford, R. L. (1995). Cognition plus: Correlates of adult language proficiency. *Modern Language Journal*, *79*(1), 67-89.

El-Dib, M. A. B. (2004). Language learning strategies in Kuwait: Links to gender, language level, and culture in a hybrid context. *Foreign Language Annals*, *37*(1), 85-95.

Gavriilidou, Z., Bardos, A., Petrogiannis, K., Kambakis-Vougiouklis, P., Mitis, L., & Molla, N. (in press). Translation and cultural adaptation of the S.I.L.L. into Western Thracian Turkish for measuring strategy use in Muslim children learning Greek as a second language. In G. Kotzoglou (Ed.), *Selected Papers of the 11ᵗʰ International Conference on Greek Linguistics*, Rhodes, Greece: University of the Aegean.

Gavriilidou, Z., & Mitits, L. (2014). Adaptation of the Strategy Inventory for Language Learning (SILL) for students aged 12-15 into Greek: A pilot study. In M. Mattheoudakis, & K. Nicolaidis (Eds.) *Selected papers from the 21st International Symposium on Theoretical and Applied linguistics (ISTAL 21), Thessaloniki, Greece: Aristotle University of Thessaloniki.*

Gavriilidou, Z., & Papanis, A. (2009). The effect of strategy instruction on strategy use by Muslim pupils learning English as a second language. *Journal of Applied Linguistics, 25*, 47-63

Green, J. M., & Oxford, R. L. (1995). A close look at learning strategies, L2 proficiency, and gender. *TESOL Quarterly, 29*(2), 261-297.

Griffiths, C. (2007). Language learning strategies: Students' and teachers' perceptions. *ELT Journal, 61*(2), 91-99.

Gunning, P. (1997). *The learning strategies of beginning ESL learners at the primary level.* (Master's thesis, Concordia University, Quebec, Canada). Retrieved from http://spectrum.library.concordia.ca/517/1/MQ40159.pdf

Gunning, P. (2011). *ESL strategy use and instruction at the elementary school level: A mixed methods investigation* (Unpublished doctoral dissertation). McGill University, Montreal, Quebec, Canada.

Hair, J., Anderson, R., Tatham, R., & Black, W. (1998). *Multivariate data analysis*. New York, NY: Prentice Hall.

Hong-Nam, K., & Leavell, A. G. (2006). Language learning strategy use of ESL students in an intensive English learning context. *System, 34*(3), 399-415.

Howell, D.C. (2008). The analysis of missing data. In W. Outhwaite, & S. Turner (Eds.), *Handbook of Social Science Methodology* (pp. 208-224). London, UK: Sage. Retrieved from http://www.uvm.edu/~dhowell/StatPages/More_Stuff/Missing_Data/missing_data_final.pdf

Hsiao, T.-Y., & Oxford, R. L. (2002). Comparing theories of language learning strategies: A confirmatory factor analysis. *Modern Language Journal, 86*(3), 368-383.

Kambakis-Vougiouklis, P. (in press). Variables affecting choice of language learning strategies by Greek learners of English attending elementary school. In Z. Gavriilidou and K. Petrogiannis (eds.), *Language Learning Strategies in the Greek context*. Kavala, Greece: Saita Publications.

Kaylani, C. (1996). The influence of gender and motivation on EFL learning strategy use. In R. L. Oxford (Ed.), *Language learning strategies around the world: Cross-cultural perspectives*, (Technical Report No 13, pp. 75-88). Honolulu, HI: University of Hawai'i Press.

Kazamia, V. (2003). *Language learning strategies of Greek adult learners of English* (Vols. I-II). (Unpublished doctoral dissertation). The University of Leeds, Leeds, UK.

Kazamia, V. (in press). Gender and age impact on language learning strategy use: a research on Greek EFL learners. In Z. Gavriilidou, & K. Petrogiannis (Eds.), *Language learning strategies in the Greek context*. Kavala, Greece: Saita Publications.

Khalil, A. (2005). Assessment of language learning strategies used by Palestinian EFL learners. *Foreign Language Annals, 38*(1), 108-119.

Lan, R., & Oxford, R. L. (2003). Language learning strategy profiles of elementary school students in Taiwan. *International Review of Applied Linguistics in Language Teaching, 41*(4), 339-379.

Landau, S., & Everitt, B. S. (2004). *A handbook of statistical analyses using SPSS*. Boca Raton, FL: Chapman & Hall.

Magogwe, J. M., & Oliver, R. (2007). The relationship between language learning strategies, proficiency, age, and self-efficacy beliefs: A study of language learners in Botswana. *System, 35*(3), 338-352.

Mitits, L. (2014). Language *Learning Strategy Use by early adolescent monolingual EFL and multilingual EFL/L2 Greek learners in the Greek educational context* (Unpublished doctoral dissertation). Democritus University of Thrace, Komotini, Greece.

Nisbet, D. L., Tindall, E. R., & Arroyo, A. A. (2005). Language learning strategies and English proficiency of Chinese university students. *Foreign Language Annals, 38*(1), 100-107.

Nyikos, M., & Oxford, R. L. (1993). A factor analytic study of language-learning strategy use: Interpretations from information-processing theory and social psychology. *Modern Language Journal, 77*(1), 11-22.

O'Malley, J., & Chamot, A-U. (1990). *Learning strategies in second language acquisition.* Cambridge, UK: Cambridge University Press.

Oxford, R. L. (1990). *Language learning strategies: What every teacher should know*. Boston, MA: Heinle & Heinle.

Oxford, R. L. (1996). Employing a questionnaire to assess the use of language learning strategies. *Applied Language Learning, 7*(1-2), 25-45.

Oxford, R. L. (1999). Learning strategies. In B. Spolsky (Ed.), *Concise encyclopedia of education* (pp. 518-522). Oxford, UK: Elsevier.

Oxford, R. L. (2011). *Teaching and researching: Language learning strategies*. Harlow, UK: Pearson Education.

Oxford, R. L., & Burry-Stock, J. A. (1995). Assessing the use of language learning strategies worldwide with the ESL/EFL version of the strategy inventory for language learning (SILL). *System, 23*(1), 1-23.

Oxford, R. L., Cho, Y., Leung, S., & Kim, H.-J. (2004). Effect of the presence and difficulty of task on strategy use: An exploratory study. *International Review of Applied Linguistics 42*(1), 1-47.

Park, G.-P. (1997). Language learning strategies and English proficiency in Korean university students. *Foreign Language Annals, 30*(2), 211-221.

Park, G.-P. (2011). The validation process of the SILL: A confirmatory factor analysis. *English Language Teaching, 4*(4), 21-27.

Platsidou, M., & Sipitanou, A. (2015). Exploring relationships with grade level, gender and language proficiency in the foreign language learning strategy use of children and early adolescents. *International Journal of Research Studies in Language Learning, 4*(1), 83-96. Retrieved from http://www.consortiacademia.org/files/journals/3/articles/778/public/778-2994-1-PB.pdf

Psaltou-Joycey, A. (2003). Strategy use by Greek university students of English. In E. Mela-Athanasopoulou (Ed.), *Selected Papers on Theoretical and Applied Linguistics of the 13th International Symposium of Theoretical and Applied Linguistics* (pp. 591-601). Thessaloniki, Greece: Aristotle University, School of English.

Psaltou-Joycey, A. (2008). Cross-cultural differences in the use of learning strategies by students of Greek as a second language. *Journal of Multilingual and Multicultural Development*, *29*(4), 310-324.

Psaltou-Joycey, A., & Kantaridou, Z. (2009). Foreign language learning strategy profiles of university students in Greece. *Journal of Applied Linguistics*, *25*, 107-127.

Rigdon, E. E. (1996). CFI versus RMSEA: A comparison of two fit indexes for structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal, 3*(4), 369-379.

Robson, G., & Midorikawa, H. (2001). How reliable and valid is the Japanese version of the Strategy Inventory for Language Learning (SILL)? *JALT Journal, 23*, 202-226.

Rubin, J. (1975). What the "good language learner" can teach us. *TESOL Quarterly, 9*(1), 41-51.

Rubin, J. (1981). Study of cognitive processes in second language learning. *Applied Linguistics, II*(2), 117-131.

Rubin, J. (2001). Language learner self-management. *Journal of Asian Pacific Communication, 11*(1), 25-37.

Rubin, J. (2005). The expert language learner: A review of good language learner studies and learner strategies. In K. Johnson (Ed.), *Expertise in second language learning and teaching*. (pp. 37-63). Basingstoke, UK: Palgrave Macmillan.

Vrettou, A. (2011). *Patterns of language learning strategy use by Greek-speaking young learners of English.* (Unpublished doctoral dissertation). Thessaloniki, Greece: Aristotle University of Thessaloniki, Department of Theoretical and Applied Linguistics.

Wharton, G. (2000). Language learning strategy use of bilingual foreign language learners in Singapore. *Language Learning, 50*(2), 203-243.

Weinstein, C. E., Husman, J., & Dierking, D. R. (2000). Self-regulation interventions with a focus on learning strategies. In M. P. Boekaerts, R. Pintrich, & M. Zeidner (Eds.), *Handbook on self-regulation* (pp. 727-747). San Diego, CA: Academic Press.

Yang, N.-D. (1999). The relationship between EFL learners' beliefs and learning strategy use. *System, 27*(4), 515-535.

ACKNOWLEDGEMENTS

AUTHOR(S) INFORMATION

Full name: Konstantinos Petrogiannis
Institutional affiliation: School of Humanities, Hellenic Open University
Institutional address: par. Aristotelous 18, Perivola, 26335 Patra, Greece
Biographical sketch: Konstantinos Petrogiannis is currently Associate Professor of Developmental Psychology at the Hellenic Open University, Greece. He graduated the Department of Philosophy, Education & Psychology of the University of Ioannina, Greece. He received his master's degree from the University of Strathclyde and his Ph.D. from the University of Wales-Cardiff. He has worked as a researcher in a number of projects. His main areas of research interest are in psychological measurement and research methodology, early child care and education impact upon children's development, parents-child relationship, parental involvement, children's resilience, computer use effects on preschool children's socio-emotional development, language development.

Full name: Zoe Gavriilidou
Institutional affiliation: Department of Greek Studies, Democritus University of Thrace
Institutional address: Democritus University of Thrace campus, 69100 Komotini, Greece
Biographical sketch: Zoe Gavriilidou is currently Professor of Linguistics at the Democritus University of Thrace, Greece. She graduated the Department of Philology of the Aristotle University of Thessaloniki, Greece. She received her D.E.A and Ph.D. from the University Paris XIII, France. She has worked as a researcher in a number of projects and is the coordinator of, among others, the THALES 379335 Project, which was co-funded by resources of the European Union (European Social Fund) and national (Greek) resources. She is the author of School books and member of the expert's committee for the revision of Greek curricula at primary and secondary education. Her main areas of research interest are in applied linguistics, language teaching, linguistic testing and pedagogical lexicography.