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## Reading literacy and metacognition in a Spanish Adult Education centre

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### Abstract

*In recent years, Spain's adult population has been characterised by high unemployment rates, particularly among people aged over 18 who do not have the Compulsory Secondary Education certificate. Their training in key competences, such as reading comprehension, would provide them with fundamental learning, empowerment, and better employment opportunities. This empirical study examines the relationship between the use of metacognitive skills while reading and improved reading comprehension – previously shown in other studies – evaluating both constructs and attempting to establish whether there is a relationship between them in a sample of 143 adult secondary education students. Research outcomes in reading competence were lower than expected, with significant differences between stages and average use of metacognitive strategies, influenced by gender and age. A significant, linear, and low to moderate degree relationship was found between two of the metacognitive strategies evaluated and so a predictive model was constructed in which age, level, and use of strategies for problem-solving and reading-support are predictive variables explaining 23.4% of the variance in reading skills. We also suggest some changes regarding teacher practice, prioritising active and self-regulating reading.*

**Keywords:** adult education; literacy skills; low educational level; metacognition strategies; reading comprehension



## Introduction

Europe currently has an alarming situation in which over 65 million people have not developed the basic reading, writing, arithmetic and digital skills, and have not reached ISCED (CINE in Spanish) level 2<sup>1</sup> (Bachmann & Holdsworth, 2016), something that has an impact on their social position (Organisation for Economic Co-operation and Development [OECD], 2010). The 2016 Panorama de la Educación report notes that command of reading comprehension and maths skills among adults are essential explanatory factors for the social results obtained, suggesting that high competence levels play a vital role in achieving better social results (Ministerio de Educación, Cultura y Deporte [MECD], 2016b, p. 39). In other words, empowering this social group largely depends on their acquisition of reading competence, as this is vital if people are to be able to do well in society, and it is a key component in intellectual enrichment, acquiring knowledge, and accessing culture.

This issue, which affects a section of society, has not gone unnoticed by institutions, and interest in this group has increased in recent years. Accordingly, the European Association for the Education of Adults (EAEA) proposed that 2017 should be the year of Adult Secondary Education (ASE), to raise awareness of the impact and benefits of ASE in the lives of individuals and in society in general (EAEA, 2017). This initiative ties in with the New Skills Agenda for Europe, developed by the European Commission, which emphasises the need to promote the empowerment of this group through education (Bachmann & Holdsworth, 2016).

In Spain, the economic crisis of the last decade has created high rates of unemployment among poorly trained adults (Feito, 2015), leading to an increase in the number of adults returning to the educational system to seek a second chance to join the job market (Rujas, 2015). This group's main motivation is to achieve an intermediate level of training and so have more and better opportunities to access the world of work (Salva-Mut, Quintana-Murci, & Desmarais, 2015). This education corresponds with the Compulsory Secondary Education certificate (ESO), which is the usual minimum requirement for entering the job market (Eurydice, 2011).

Official figures from 2015 on adult education in Spain indicate that 42.6% of the population aged between 25 and 64 had not completed Compulsory Secondary Education. If this is compared with the same year in the European Union, 77% of this age group has a secondary or higher level of education. In other words, Spain is 20 points below the European mean (MECD, 2016a). These figures agree with the latest results from the Programme for the International Assessment of Adult Competencies (PIAAC), in which Spain obtained a score 'significantly lower than those of the other countries and the mean of countries from the OECD and the European Union' (MECD, 2013, p. 30). This gap is the reason why increasing rates of academic success in adults should become a priority target (Feito, 2015).

However, despite the individual and social motivations that drive this group, the percentage of adults who manage to complete secondary education has progressively fallen from 76% in 1995 to 42% at present (MECD, 2016a). According to Arreaza (2017), it is the system itself that imposes barriers that foster failure: a disconnected and incoherent curriculum in which the accumulation of theoretical content is prioritised over skills, a lack of interdisciplinarity, an uneven distribution of time across the different areas and evaluation based on a traditional system of knowledge-accumulation that does not consider the acquisition of skills. This situation has not improved with the implementation

of the most recent education act (Organic Law for Improving Educational Quality [LOMCE], 2013), in which explicit references to key skills have been eliminated from the curriculum. Furthermore, cuts made to education policies particularly affect the most vulnerable groups (Salva-Mut et al., 2015).

Therefore, it is very interesting to combine forces from all areas to promote an all-round education at the same time as the personal development of the adults (Sarrate-Capdevila & Pérez de Guzmán, 2005), redirecting them towards completing their education and achieving the diploma, focussing on the fact that improving people's education increases their chances of a second chance in the world of work (OECD, 2010). Research into reading competence in adults with low levels of education has increased in recent years, especially in the English-speaking world (Sabatini, Sawaki, Shore, & Scarborough, 2010), although the Spanish-speaking world still requires further studies involving this population that explore questions relating to what difficulties they encounter while reading, how often they use learning strategies, and how using them has an impact on the improvement in their reading process. This study which considers these questions has been performed starting from the knowledge that formal adult education is a second chance to develop and perfect the skills needed for the world of work and also for life in society.

### **Adult secondary education in Spain**

In Spain, adult secondary education (ESPA) is offered to post-school age people who, for a variety of reasons, left the educational system during the obligatory stage and who are or should be working, as well as to young people and retired people. One of the objectives of this stage is to promote the acquisition of knowledge and skills not previously obtained, in the framework of the all-round training needed to join the world of work (Sarrate-Capdevila & Pérez de Guzmán, 2005). This sector has a diverse profile, with the shared characteristic of having limited education and coming from a background of academic failure (Feito, 2013; Sarrate-Capdevila & Pérez de Guzmán, 2005). As a result, any new setback at this stage has a high cost, both personally and socially (Fernández-Enguita, Mena & Riviere, 2010).

ESPA allows people to obtain the secondary education qualification and it is structured in levels I and II, of one year's length each, divided into four progressively ordered stages (stages 1 to 4 of ASE) corresponding to years 1 to 4 of compulsory secondary education (ESO). People aged over 18 who have completed primary education or its equivalent for adults (Enseñanza Básica – Basic Education) are accepted as ASE students. Over 16s who can show they are in work are also accepted. The curriculum does not differ from the one used in standard secondary education, although the subjects are grouped into areas (communication, social, and science-technology). According to Feito (2013), this group's distinguishing features include: a wide range of ages (students who have only recently become adults alongside others who are fully mature), a low cultural level, lack of study habits, and being on the lower rungs of the employment ladder.

### **Reading competence and metacognition**

The information society we inhabit demands people be able to process written information in varying contexts and apply it successfully to different real-world situations to allow personal and work goals to be achieved (UNESCO, 2016). Reading competence

not only includes decoding and understanding what one reads, but also reflecting on and evaluating information, to be able to build knowledge and so enable individuals to participate in society and integrate successfully.

Factors affecting the development of this skill include the type of text and the strategies the reader uses while reading (Cerchiaro, Paba, & Sánchez, 2011; Serrano, Vidal-Abarca, & Ferrer, 2017). Regarding the text type, reading texts of the *continuous type*, which are characterised by a linear narrative contained in several paragraphs, is not the same as reading *non-continuous or discontinuous texts*, which feature graphs and charts, diagrams, tables, images, and so on. These are often associated with academic contexts and are the main medium for knowledge transfer. Studies indicate that there is a difference in the level of processing between one type and the other, with discontinuous texts presenting greater difficulties than continuous ones (Serrano et al., 2017).

Regarding the types of strategies applied during reading, there are cognitive and metacognitive ones (Cornford, 2002; Solé, 2012). Three aspects in which a reader should be competent are distinguished in cognitive strategies: *retrieval* and *identification*, which involve being locating information in a text; *integration* and *interpretation*, which involve understanding the relationships between the different parts of a text and inferring non-textual information to piece together the meaning; and *evaluation* and *reflection* which require the reader to be able to relate to prior knowledge (Llorens, Vidal-Abarca, Martínez, Mañá, & Gilabert, 2011; OECD, 2016). In other words, in terms of reading competence, at the lowest stage, readers extract meaning literally, at the second stage they interpret this information, and finally, at the highest stage, they activate their prior knowledge, and by linking it to the information and combining it in their cognitive structure they create new knowledge. The PIACC results for Spain describe a reader with problems identifying, interpreting, and/or evaluating one or more fragments of information, as well as making inferences of different levels and relating them to their prior knowledge (MECD, 2013).

Metacognitive strategies refer to being aware of and controlling the cognitive strategies used and self-regulating them when reading (Cerchiaro et al., 2011; Fernández, Jiménez, Alvarado, & Puente, 2010; Flavell, 1987; Griffith & Ruan, 2005; Kolić-Vehovec Rončević, & Pahljina-Reinić, 2014). Three types of metacognitive skills are distinguished: *global reading strategies*, which include, among others, activating prior knowledge, or deciding to focus on a particular part of the text; *problem-solving strategies*, which include decisions such as re-reading parts that have not been understood or pausing to reflect; and finally *support strategies* which include taking notes while reading, paraphrasing parts of the text, and underlining (Griffith & Ruan, 2005; Mokhtari & Reichard, 2002). In much of the literature, metacognition is shown to be part of the self-regulatory processes necessary to develop reading competence (Llorens et al., 2011; Schreiber, 2005; Zimmerman, 1998), and it is understood that ‘the essential nature of metacognition and-self regulation in reading literacy exists in the ability of an individual to detect and correct errors in comprehension’ (Schreiber, 2005, p. 219). Previous studies also show that these processes have a positive influence on academic performance (Cornford, 2002; Zimmerman, 1998; Zimmerman, Kitsantas, & Campillo, 2005).

Given what is stated above, it should be noted that the students themselves should know and dominate cognitive and metacognitive strategies, because for them to be able to comprehend a text, there should be an intention to construct its meaning (Karbalaie, 2010; Kolić-Vehovec et al., 2014; Solé, 2012). Similarly, as well as the characteristics mentioned above regarding the ASE population, it should be noted that older adults gradually lose flexibility and motivation in the use of metacognitive strategies (Fernández et al., 2010). These are aspects that demand knowledge of the students’ particular

situation in this matter, in order then to be able to act in a way directed at achieving the objectives of the stage.

Therefore, starting from the premise that text type and structure have an effect on the reading comprehension process, as do the individual characteristics of the reader and the strategies the reader uses to comprehend texts, and that we found only a small number of studies in the ASE population, the aims of this study are: to identify the total degree of reading competence, to establish which aspects of the reading process are especially difficult, to describe the metacognitive strategies students use to comprehend what they are reading, and to develop an explanatory model combining all of these variables.

## Participants

The participants in this study were 143 students (64 men and 79 women) from an ASE centre in the Spanish Autonomous Region of Castilla-La Mancha, aged between 17 and 57 with an average age of 24.5. Purposive or convenience sampling was used, including all of the students registered with the centre.

## Materials

*Prueba de Competencia Lectora para Educación Secundaria* (Reading competence test for secondary education – CompLEC) (Llorens et al., 2011). This is an instrument for evaluating individual reading competence using reading situations focussing on tasks that require students in compulsory secondary education to answer questions based on texts similar to the ones they encounter in their everyday lives. It comprises five texts – three continuous and two discontinuous – and a total of 20 questions, which are divided into three categories in accordance with the three basic aspects considered in the PISA and PIACC framework: retrieval, integration, and reflection-evaluation of information. The CompLEC scale has shown that its own psychometric properties are adequate and satisfactory, both for diagnosis of reading competence and as a research instrument (Vidal-Abarca, Mañá & Gil, 2010). The study by Llorens et al. (2011) provided the normative sample with which the results presented here are compared, as we do not have tests previously performed in the ASE population with which to compare them. In addition, the level required and the curriculum are the same as the ones for which the CompLEC is intended, compulsory secondary education (ESO).

*Inventario de Conciencia Metacognitiva de las Estrategias de Lectura*, originally called *Metacognitive Awareness of Reading Strategies Inventory* (MARSİ) (Mokhtari & Reichard, 2002). This is a self-evaluation instrument, designed to measure the level of awareness (knowledge) and perception of the use of metacognitive strategies when reading texts for academic purposes. The inventory comprises 30 items, that analyse three groups of metacognitive strategies (global reading, problem solving, and support reading) and makes it possible to account for three processes associated with regulation (planning, monitoring, and evaluation). MARSİ was originally designed to be applied to English-speaking adolescents and adults with an educational level higher than fifth grade (Mokhtari & Reichard, 2002; Mokhtari & Sheorey, 2002) and its Spanish version has been validated with adolescents by Alvarado, Puente, Jiménez, and Arrebillaga (2011) who tested its internal validity (Cronbach's alpha 0.86) and confirmed the three-factor model proposed by the authors. It is used in this study because of its great potential as it makes it possible to increase awareness of the strategies used when reading, both among the students themselves and among the teachers (Mokhtari & Reichard, 2002). All of this



is relevant when considering the population of the educational centre being studied, which has the characteristics mentioned above in the introduction to this research. Table 1 shows a summary of the processes and strategies measured by both instruments.

Table 1. Description of the study instruments.

			N° Questions /Items	<u>Description</u>
CompLEC	Type of questions (reading process)	Retrieval	5	<u>Report on the reader's retrieval of explicit and implicit information from the text.</u>
		Integration	10	Analyze the reader's comprehension of general ideas of the text, its relations and inferences.
		Reflection-evaluation	5	Report the reader's prior knowledge use and the evaluation of quality and relevance of the text.
	Text type	Continuous	3	Classical texts that require a sequential order for reading.
		Discontinuous	2	Texts that require no linear reading, like texts with maps, charts, diagrams, etc.
<u>MARSI</u>	<u>Metacognitive strategies</u>	Global reading	13	The use of strategies such as setting the purpose of reading, activating previous knowledge, making decisions about the necessary focus of parts of the text, etc.
		Problem-solving	8	Strategies used to solve problems during reading, like read with attention, reread for better comprehension, stop to think about the text, etc.
		Support reading	9	The use of support techniques such as taking notes while reading, underlining, consulting the dictionary or re-reading extracts of text.

The Statistical Package for the Social Sciences program (SPSS) 20.0.1 (IBM®) was used to perform hypothesis tests and analysis of variance for parametric and non-parametric samples, testing the correlations of ordinal and quantitative variables, and multilinear linear regression statistical tests. The study variables were *type of question*, where it is necessary to consider the influence on performance of the reading process proposed (retrieval, integration, and reflection-evaluation), *text type*, which relates to influence of the structure of the text (continuous-discontinuous), the metacognitive strategies the subjects report using (*global*, *problem solving*, and *support*), *age* (grouped in four bands: ≤18, 19–25, 26–35, and 36–60 years), *gender* and *stage* (1–4 ESPA).

## Results

The reliability of both instruments was analysed using Cronbach's alpha for the study sample, which with CompLEC gave values of .814 and with MARSII values of .876 for global strategies, .793 for problem-solving strategies, and .729 for support strategies, indicating the high levels of internal consistency of the scale and subscales used.

The results show a sample with an overall reading performance below the mean found by Llorens et al. (2011) for a reference sample of 798 students in Compulsory Secondary Education (Table 2). Comparison by centiles indicates that as the individuals progress through the stages, their reading competence improves like in the normative sample. In the case of stage 3 of ESPA, discrepancies were observed in the data with mean and centile values below what might be expected.

Table 2. Comparison between percentiles of reading competence in Compulsory Secondary Education (ESO) students (Llorens et al., 2011) and adult secondary education (ESPA) students.

CompLEC Normative sample	Centiles											Statistics	
	01	10	20	30	40	50	60	70	80	90	99	M	SD
1° ESO	2.5	4.4	6.0	7.0	8.0	9.0	11	12	14	15	17	9,7	4,1
2° ESO	2.5	5.1	7.1	9.0	11	12	13	14	16	17	20	11,7	4,3
3° ESO	5.7	9.0	10	12	13	14	15	16	17	18	2	13,7	3,6
ESPA	Centiles											Statistics	
	01	10	20	30	40	50	60	70	80	90	99	M	SD
1° ESO	.00	2.0	3.2	5.0	5.0	7.0	8.6	9.7	11.0	11.9	14.8	7,03	3,9
2° ESO	.00	4.0	5.0	6.4	7.2	10.0	12.6	14.0	14.4	17.4	19.0	10,1	5,2
3° ESO	1	2.0	4.0	5.0	7.0	8.0	9.0	11.6	14.0	16.0	17.7	8,5	4,7
4° ESO	.00	5.0	8.0	9.0	10.0	12.0	13.0	15.0	16.0	17.0	19.00	11,6	4,7

The percentage of correct answers across the different types of questions and text types was calculated and compared with the normative sample (Table 3). The results, in all of the subdimensions of the instrument, indicate that the test sample displays lower percentages of correct answers than the normative sample. These differences, according to Cohen's *d*, are around 0.5, suggesting medium effect sizes, except in the case of integration type questions where the effect size is small.

Regarding the results in the sample itself, depending on the type of question, the data show that the mean performance of the sample is lower when solving the question requires readers to integrate the information they read (47.3%), followed by reflecting on it (52.2%), and they perform best with retrieval (53.8%). These differences are significant in the percentages of correct answers to retrieval questions compared with integration questions ( $Z = -8.963$ ;  $p < .001$ ) and integration-reflection ( $Z = -8,580$ ;  $p < .001$ ), according to the Wilcoxon non-parametric signed rank test.

Regarding the text type, and using the same statistic as before, the success rate is higher in continuous texts (52.2%) than in discontinuous ones (46.3%). This difference is statistically significant ( $Z = -9.583$ ;  $p < .001$ ). In addition, the coefficient of variation [CV] was calculated, providing information about the variance of correct answers in the sample, with the continuous texts variable having the lowest dispersion (50.8%) and the retrieval question type variable having the highest (59.4%).

Table 3. Comparison of percentage of correct answers and effect size (Cohen's *d*) between the adult education sample and the normative sample using the CompLEC instrument (Llorens et al., 2011).

		Correct Answers (%)		Correct Answers (%)		<i>d</i> Cohen
		ESPA		ESO		
		Media	SD	Media	SD	
	TotalCompLEC	47,7	24,7	58,0	13,5	0,52
Type of questions	Retrieval	53,8	32,1	65,2	20,7	0,42
	Integration	47,3	25,1	51,7	13,1	0,22
	Reflection evaluation	52,2	30,8	63,0	8,9	0,48
Text type	Continuous	52,2	26,6	59,8	12,9	0,36
	Discontinuous	46,3	26,3	54,7	14,7	0,39

SD= standard deviation

Non-parametric contrast tests were used to investigate these differences by independent variables (gender, stage, and age), as the assumptions of normality were not met.

The Mann-Whitney U test was used to analyse whether gender affects performance in the test depending on the type of question and the type of text, while the Kruskal-Wallis test was used to analyse the relationship with stage and age.

The analysis does not reveal significant differences that can be attributed to gender or age. However, with regards to the stage, the non-parametric tests show significant differences in the questions on integration and reflection and for continuous and discontinuous texts (Table 4).

Table 4. Analysis of differences by gender, stage, and age for the CompLEC instrument.

		Gender		Stage				Age					
		M	F	1°	2°	3°	4°	<=18	19-25	26-35	36-60		
		N	64	79	30	27	37	49	46	52	25	19	
Total CompLEC		Z=-0,407 p=,684		X=17,666**; p=,001				X=5,79; p=,122					
		R	73,5	70,5	51,6	75,7	63,1	89,2	60,9	75,6	79,2	84,1	
Type of questions		Retrieval		Z=-0,144; p=,885		X=5,122; p=,163				X=2,786; p=,426			
				R	71,4	72,4	61,2	75,8	66,7	80,5	63,5	75,0	73,9
		Integration		Z=-0,521-; p=,602		X=11,005*; p=,012				X=3,025; p=,388			
				R	73,9	70,3	54,4	78,2	66,7	83,4	62,4	69,0	80,7
		Reflection evaluation		Z=-0,825; p=,409		X=10,390*; p=,008				X=3,025; p=,388			
				R	75,1	69,5	50,4	77,5	72,2	82,1	63,9	72,2	79,4
Text type		Continuous		Z=-0,279; p=,780		X=10,390**; p=,016				X=3,785; p=,286			
				R	70,9	72,9	54,4	78,2	66,7	83,4	63,0	72,0	79,1
		Discontinuous		Z=-1,375; p=,169		X=10,734*; p=,013				X=5,941; p=,114			
				R	72,3	67,8	55,5	69,8	68,7	85,8	62,7	70,6	76,8

\*means difference is significant at  $p < ,05$  level

\*\*means difference is significant at  $p < ,01$  level.

M=Male

F=Female

R=Average ranges

A mixed ANOVA was performed, making it possible to analyse the significance of the interaction between stage and each dimension on the CompLEC questionnaire. In the case question type, lower bound estimated was used as two of the assumptions are not met (the Kolmogorov-Smirnov test for normality and Mauchly's sphericity test). In the case of text type, Pillai's trace was used as the assumption of normality was not met.

The main effects of stage replicate those already described in the Kruskal-Wallis test. Regarding within-subjects effects, pairwise comparisons indicate that there are significant differences for integration and reflection-type questions depending on whether the students are at stage 1 or 4 ( $U = -29.911$ ;  $p = .010$ , and  $U = -3.721$ ;  $p = .005$  respectively), with the range being favourable for students at ESPA stage 4. This pattern is repeated with text type. There are significant differences with continuous texts and discontinuous ones, and in both cases they are found between stages 1 and 4 of ESPA ( $U = -28.947$ ;  $p = .015$  and  $U = -30.249$ ;  $p = .009$ , respectively).

The results show that there is no cross effect between question type or text type and the stage. In other words, the differences found are maintained across the courses.

For the MARSII instrument, the descriptors were calculated for the sample as a whole, as well as the valid percentage for the three levels proposed by Mokhtari and Reichard (2002): high (mean of 3.5 or above), medium (mean of 2.5 to 3.4), and low (2.4 or lower). The results in Table 5 show a medium level of declared use of metacognitive strategies during the reading process. Similarly, the distribution by percentages makes it possible to refine the behaviour of the sample, so that most subjects report a high level of use of

strategies aimed at solving problems while for global and support strategies they report a low level.

Table 5. Descriptive statistics and levels of frequency of use of reading strategies.

⊕

	N	Maximun scale	Media	SD	% high	% medium	% low
Global reading	114	5	3,13	0,83	31,50	47,37	21,05
Problem-solving	125	5	3,66	0,76	64,80	29,60	5,60
Support reading	117	5	2,73	0,78	14,53	54,70	30,77

As in the reading comprehension test, possible gender, stage, and age differences in the use of metacognitive strategies have been investigated. To do this, after testing the parametric assumptions, the procedure described above was used (Table 6).

Table 6. Analysis of differences by gender, stage, and age for the MARSI instrument.

⊕

	Gender		Stage				Age			
	M	F	1°	2°	3°	4°	<=18	19-25	26-35	36-60
Global reading	t=-0,609; p=,544		F=0,610; p=,610				F=3,340*; p=,022			
	N	52 62	22	18	31	43	37	40	19	17
	M	39,94 41,19	39,77	42,83	41,77	39,20	38,27	39,37	41,36	47,7
	SD	10,8 11,1	11,1	11,1	9,8	11,6	9,7	10,6	12	11,1
Problem-solving	t=-2,376*; p=,019		F=1,350; p=,262				F=3,011*; p=,033			
	N	58 67	26	19	35	45	42	44	21	17
	M	27,9 30,5	29,1	31,8	29,2	28,5	27,5	29,4	29,8	32,5
	SD	6,5 5,5	6,6	4,7	4,9	7,1	5,8	6,1	7,4	3,6
Support reading	t=-1,445; p=,151		F=0,839; p=,475				F=8,618**; p=,000			
	N	54 63	26	18	30	43	37	44	19	17
	M	23,6 25,4	24,4	26,8	24,7	23,7	22,6	23,6	24,4	31,8
	SD	6,4 7,5	7,3	7,9	6,3	7,1	6,2	6,3	7,1	6,7

\* means difference is significant at p<,05 level

\*\* means difference is significant al p<,01 level.

Significant differences regarding gender and age were found. In the case of gender, female subjects report greater use problem-solving strategies than male subjects. This difference is significant (t = -2.376; p = .019). In the case of age, significant differences were present in all of the strategies evaluated. The ANOVA analysis by age group was expanded upon with a post hoc analysis. The 36 to 60 age group reported greater use of global strategies than the other age groups, and these differences were statistically significant with the first two groups (≤18 and 19 to 25). With problem-solving strategies, the oldest group again reported the highest use, although in this case the differences were only statistically significant with regards to the lowest age group (≤18). Finally, following

the same pattern, for support reading strategies, significant differences were found between the oldest group and all other age groups.

As in the analysis of reading competence, a mixed ANOVA was performed with stage as the variable and strategy type with three levels as the within-subjects factor to establish whether the adoption of metacognitive strategies (three types) develops differently over the levels. After meeting the assumptions of normality, sphericity, and homogeneity of variance, Pillai's trace shows a significant effect for the strategy type factor but not for the strategy type\*stage interaction, as a crossed effect of this type is not present. The pairwise comparisons between all levels for the strategy type within-subjects factor show significant differences in all combinations. As for the stage as a within-subject factor, no significant differences were found between use of metacognitive strategies and stage (replicating the previous results).

Next, to establish whether there is a relationship between the two constructs, a bivariate correlation between the total CompLEC dependent variable and each of the MARSII strategies was performed. This showed a weak to moderate statistically significant positive relationship for global strategies, moderate for problem-solving strategies, and non-significant for support strategies. A bivariate correlation was also performed with the remaining ordinary independent variables: age, gender, and stage. The results of both correlations were the basis for selecting the significant variables to prepare an explanatory model for variance in reading competence through multiple linear regression. Table 7 shows the Pearson coefficients for the quantitative variables and Spearman's rho for the ordinary variables, as well as their significance.

Table 7. Bivariate correlation between the independent variables and the CompLEC dependent variable.

	N	Pearson correlation	Spearman correlation	Sig. (bilateral)
Age	142	-	,236**	,005
Stage	143	-	,299**	,000
Gender	143	,024		,772
Global reading	114	,234**	-	,012
Problem-solving	125	,350**	-	,000
Support reading	117	,059	-	,525

The data show positive correlations in all cases, except for gender and the support reading metacognitive strategy and so these variables were not taken into account when preparing the model. Regarding the *age* variable, it should be noted that this displays an upward trend that gives a significant result for the correlation, even though it was not significant in the previous contrast test. This is because the differences are not large enough for the contrast test to be significant.

The stepwise regression procedure is the best predictive model of reading competence ( $F = 12.208$ ,  $p < .001$ ), with an explanatory capacity for the model of 23.4%. The predictor variables that form part of the equation are: metacognitive strategy, problem

solving ( $t = 4.059$ ,  $p < .001$ ), stage ( $t = 3.609$ ,  $p < .001$ ), and age ( $t = 2.460$ ,  $p < .05$ ), showing that experience and progress through the stages improve reading competence and that it is important to train students in metacognitive strategies such as reading slowly, rereading, visualizing what is being read, and/or reading aloud. Table 8 shows the data for the confidence levels and limits.

Table 8. Coefficients in the multiple linear regression model (stepwise method).

	B	Standard error	Beta	t	Sig.	CI 95%(B)	
						Lower limit	Upper limit
Constant	-3,705	2,300		-1,611	,110	-8,259	0,849
PROB_MARSI	0,261	0,064	0,333	4,059	,000	0,134	0,388
Stage	1,122	0,339	0,292	3,609	,000	0,552	1,892
Age	0,105	0,043	0,204	2,460	,015	0,020	0,190

Finally, the assumptions of multicollinearity were tested (variance inflation factor, VIF, between 1.027 and 1.074), independence of errors (Durbin-Watson test = 1.737), as well as normality and linearity (evaluation of residuals), which were met in all cases. It is important to note that while the global strategies variable is automatically eliminated by the stepwise method owing to the collinearity effect, when performing the regression with this single variable it is found that it explains 12% of the variance in the dependent variable ( $F = 7.585$ ,  $p = .001$ ), which is included in the accepted model.

## Discussion of results

In current society with its imbalance between the employee profiles available and what employers demand, evaluating key competences in adults is of great interest for establishing policies to boost the successful integration of members of this group into the job market (OECD, 2016). The PIACC evaluations, which are run by the OECD, and similarly PISA which is carried out in the European framework, are proof of this effort. The valuable information that these institutions provide must be complemented by empirical studies in the classroom to identify behaviour and aspects that help redirect teaching practice. Nonetheless, and insofar as we have been able to establish, the great majority of works on reading comprehension and metacognition focus on other academic levels and there are practically none regarding adult education (ASE).

### *Reading competence*

This study has found that the participating adults have a lower level of reading competence in all of the subdimensions and at all of the stages sampled when compared with the sample of adolescents, also secondary education students, used as a yardstick. Similarly, the discrepancy found (albeit not a statistically significant one) in the reading

progress of subjects at stage 3 of ASE seems to be evidence of a feature of the sample, or rather a consequence of automatic progression to the next stage, even with low reading competence. These aspects will be taken into account in future research.

A more detailed analysis of the performance shown by the participating adults in the situations proposed in CompLEC, based on the percentage of correct answers obtained, it is statistically significant and noticeable that the questions of the integration type and the discontinuous texts show the highest percentage of errors, a finding in accordance with other research carried out with adolescent secondary-education students (Serrano et al., 2017). The hypothesis tests showed significant differences in performance of tasks, text type, and question type in the course variable only. Therefore, final-stage students show a higher level of reading competence, regardless of their gender and age. This suggests that reading competence is a skill that is acquired gradually in accordance with the training received.

The result of the interaction between stage, question type, and text type was not significant, suggesting that the differences between the reading dimensions are maintained throughout the course, suggesting that the teaching model does not contribute to the acquisition of competences but instead prolongs initial differences.

### *Metacognitive strategies used and reading competence*

For the type and number of metacognitive strategies used when reading, the participants report a higher frequency of use for problem solving, something that coincides with the research of Hong-Nam and Leavell (2011) with a sample of university students.

The results suggest that the use of metacognitive strategies is positively related to age and gender. Women and individuals in the 36–60 age range report the highest use of metacognitive strategies. In contrast with what was expected, no relationship was found between higher reported use of strategies and better performance in tests to evaluate reading competence. These results are in line with other research (Jiménez-Taracido & Manzanal, 2018; Ruffing, Wach, Spinath, Brünken, & Karbach, 2015). This could be because of a difference between what is reported and real behaviour, or to misuse of the metacognitive strategies by the subjects (Winnie & Jamieson-Noel, 2003). As for stage, it has been observed that there are no significant differences linked to the adoption of one strategy or another depending on the stage the students are at, and the pattern of application of strategies does not change over the stages.

In general, a positive linear relationship was observed between the reading competence shown by participating adults and the use of metacognitive strategies during the task, with the problem-solving strategies standing out particularly whose has made it possible to develop an explanatory model. Metacognitive skills' contribution to reading comprehension is a productive field in the social sciences, where results from empirical evidence have been varied. Examples of this are the research by Flórez, Torrado, Mondragón, and Pérez (2003) and Flórez, Torrado, Arévalo, Mesa, Mondragón, and Pérez (2005) who respectively found high ( $r = .877$ ) and medium-high ( $r = .677$ ) correlations in primary-school pupils. Similarly, Mañá, Vidal-Abarca, Domínguez, Gil, and Cerdán (2009) showed in compulsory secondary education that the metacognitive strategies used when performing a task explain 30% of reading comprehension. However, other studies did not show a significant relationship between these two constructs, such as Paba and González (2014) with students from compulsory secondary education, or Cerchiaro, Sánchez, Herrera, Arbeláez, and Gil (2011) with university students, which confirms the interest and importance of continued research in this area of knowledge.



### *Limitations of the study*

With regards to the limitations of the study, several aspects must be considered. On the one hand, and considering the context of the area of study described above, although both constructs were measured using instruments that are endorsed and recognised in educational research, we must be prudent as reading comprehension and metacognitive activity are dynamic and complex processes, and the relationships between them and their various components are still a matter of debate, comprising one of the most important areas in cognitive psychology (Cerchiario et al., 2011). Furthermore, it is important to note that the sample was not picked randomly, and while it does comprise all of the students from a particular centre, it is relatively small. Therefore, it is advisable to expand the number of participants in future to examine in greater depth whether the results found are specific to adult secondary education students or if they are due to the variety in the reading level. Furthermore, we believe it is necessary to underline the lack of previous research in this topic in populations like the study sample. This meant we had to use as a reference other studies carried out with students who, while studying at the same stage, have limited similarities in their social characteristics, concerns, etc. This reveals a gap in the literature in this type of study which we see as an opportunity to start new research. Finally, it is important to reiterate the peculiarity of this type of sample (social and cultural aspects, etc.). Analysis of this, while it does fall outside the aims of our study, could have led to a limitation in the study by affecting people's predisposition to participate in the study, especially during the application of the self-report questionnaire, since as some subjects commented to us, these questions were ones they had never asked themselves and it seemed like a waste of time to them. Nonetheless, these were isolated cases and we do not believe affect the overall results. The variables relating to the social reality of this population will be considered in future work.

Ultimately, it is necessary to continue with research, including in future designs a broader spectrum of reading competences, not just higher aspects, and monitoring all of the phases in the process to examine the influence other variables or factors might have, as well as individual variations and variations caused by the social and cultural context of adult secondary education students.

### **Conclusions**

Following this empirical study carried out in a centre in Spain, it can be concluded that:

- The students who participated displayed a lower level of reading competence than the normative sample from compulsory secondary education, with medium differences observed in the effect size.
- The reading processes that show the highest level of difficulty are those that require understanding the general meaning of the text, connecting the ideas set out in it (cause-effect), and making inferences that make it possible to establish a coherent representation of the situation described in the text, as well as the comprehension of discontinuous texts, which do not present information in a progressive sequence or have a linear structure (graphs, tables, etc.).
- Significant differences were found between the reading behaviour of students in the first and final stages, with students from stage 4 of ESPA having a better reading profile. The differences found relating to the reading process (retrieval, integration, reflection-evaluation) are maintained across the stages.

- The strategies employed by the subjects do not differ significantly according to the stage they are at and the pattern of behaviour does not change throughout the stages, in other words, there is no cross effect between stage and type of strategy. However, women reported greater use of problem-solving strategies than men, as did the oldest group. In both of these cases the differences are statistically significant. Habitual use of these strategies does not result in better performance in the reading test for these groups, where no significant differences were found between men and women or between the oldest age group and the other ones.
- There is an increasing linear association between age (not grouped), stage, strategies in general, and problem solving with the performance on the reading test. After the linear regression analysis, these were identified as predictors of reading competence.

### **Implications for teaching**

We believe that the results shown here suggest a need to involve teachers in the use of strategies that direct students towards acquiring and perfecting reading competence. Instruction in tasks that favour active reading, especially in discontinuous texts, in which it is necessary to synthesise the main ideas, separate the relevant parts from the irrelevant ones, and infer and relate to prior knowledge, is predicted to be key to improving the reading process in adults with low educational levels. All through this process of improvement, it is also vital to instruct students in metacognitive strategies that help them to recognise their own learning process and make them capable of evaluating what they know and identifying difficulties that prevent them from progressing. Therefore, techniques like self-evaluation, rereading, paraphrasing, or consulting support materials when gaps in comprehension are detected are regarded as appropriate for this purpose and consequently for encouraging academic success. Accordingly, we propose, in future research identifying what influence the degree of reading competence and use of metacognitive strategies has on the academic performance of this target group.

Finally, we feel that the inequality in opportunities commonly linked with this social group and the high rates of adults with a low level of education (below ISCED 2) in Spain and other countries in southern Europe (Eurydice, 2011), should be the primary motivation to increase investment and research in the classroom in formal adult education centres. This could provide us with empirical results that would function as our starting point and provide the necessary arguments to improve an academic curriculum that favours real acquisition of competences and entails satisfactory entry into the world of work, whether it be at the first or second opportunity.

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## Notes

<sup>1</sup> International Standard Classification of Education

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