Calero, M. Dolores; Carles, Rosario; Mata, Sara y Navarro, Elena (2010). Differences in skills and behaviour between preschool groups of high and low educational performance. *RELIEVE*, *v. 16*, n. 2, art.5.
http://www.uv.es/RELIEVE/v16n2/RELIEVEv16n2_5eng.htm

e-Journal of Educational Research, Assessment and Evaluation

RELIEVE

Revista ELectrónica de Investigación y EValuación Educativa

DIFFERENCES IN SKILLS AND BEHAVIOR BETWEEN PRESCHOOL GROUPS WITH HIGH AND LOW SCHOOL PERFORMANCE

[Diferencias en habilidades y conducta entre grupos de preescolares de alto y bajo rendimiento escolar]

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Abstract

The aim of this study has been to analyze the relationship between psychological variables and school performance in preschool children. A collection of cognitive and behavioural variables were selected, that according to the most current bibliography are related to student learning, with the goal of identifying the factors that appear to influence educational performance in childhood. The final goal would be to try to prevent future performance problems by means of identifying early these variables in the children that present low performance. The sample is composed of 47 children: 23 children with high performance and 24 with low performance. The instruments used were the Kauffman Brief Intelligence Test, the EHPAP (Spanish version of ACFS de Lidz y Jepsen, 2003) and a questionnaire about metacognition. The results showed significant differences between both groups in the profile of skills, in behavioral variables, and in the use of metacognitive strategies. However, both groups present a similar learning potential.

Keywords

Learning potential, metacognition, attitudes, cognitive skills, preschoolers, prevention.

Resumen

El objetivo ha sido analizar la relación entre variables psicológicas y rendimiento escolar en niños preescolares. Se ha seleccionado un conjunto de variables cognitivas y conductuales, que según la bibliografía más actualizada se relacionan con el aprendizaje escolar, con el fin de identificar los factores que parecen influir en el rendimiento educativo en la etapa infantil. La meta final sería intentar prevenir problemas de rendimiento futuros mediante la identificación temprana de estas variables en los niños que parecen presentar bajo rendimiento. La muestra ha estado compuesta por 47 niños: 23 con alto rendimiento y 24 con bajo rendimiento. Se han utilizado medidas de inteligencia (K-BIT), potencial de aprendizaje (EHPAP) y metacognición. Los resultados muestran que los grupos difieren en el perfil de habilidades, en variables conductuales y en la utilización de estrategias metacognitivas. Sin embargo, todos presentan un potencial de aprendizaje similar.

Descriptores

Potencial de aprendizaje, metacognición, actitudes, habilidades cognitivas, preescolares, prevención.

Introduction

School performance is one of the most-studied and most-analyzed aspects of the educational process, due to its importance and impact on pupils' personal, social and academic development (La Paro, Pianta & Cox, 2000). Thus, there are numerous studies in developmental and educational psychology that seek to analyze the factors that account for school performance and learning strategies (for a review, see García, Caso, Fidalgo, Arias-Gundín & Nuñez, 2005). In Spain this has become an important topic, and one of the main concerns of the Spanish educational system. According to the Pisa report, (*Programme for International Student Assessment*, 2006), the level of school performance of Spanish children, especially in reading competence, is below average for the 57 countries evaluated. These results corroborate others from the PIRLS report (*Progress in International Reading Literacy Study*, 2006), where 94% of the Spanish children assessed scored below the mean in reading performance in comparison to other countries. As for Spain's autonomous regions, Andalusia falls below the mean score for Spain in competencies assessed by the Pisa report (reading, mathematics and sciences).

Conversely, according to data from the Ministry of Education and Science (MEC), the percentage of students in Spain who repeat a year in school increases progressively. During the 2006-2007 school year, 4.3% of second-graders had repeated a grade, 4.5% of fourth-graders, and 6.2% of sixth-graders (MEC, 2007).

In light of the growing concern for educational outcomes, it must be taken into account that the best educational, social and psychological policy is preventive. It has been proven important in the sphere of psycho-educational research to analyze school performance in Early Childhood Education. This period is critical for integration into primary education; studies show that performance improvement in Early Childhood Education has long-term effects that significantly contribute toward a decrease in school failure (Alexander, Entwistle & Kabbani, 2001).

In order to attempt to improve performance, assessment of children in Early Childhood Education is required for several reasons: first, because it provides information needed for early screening of children with any kind of deficit that may lead to difficulties in initial schooling; second, in order to direct psycho-educational interventions toward improving the most deficient capacities for learning (Ramírez, 1999); and third, in order to strengthen and consolidate cognitive processes that are pre-requisites to good performance in primary education (Lidz, 2000 , 2005).

Along these lines, it may be interesting to analyze whether children who, in their teachers' estimation, perform below the mean for their age group show a different profile of skills, behaviors and/or learning potential than children who are rated more positively. It is necessary to assess classification, memory, sequencing and planning processes, all of which represent universal abilities. These are related to mastering a broad range of important tasks, including: literacy (the ability to read and write), numerical ability and scientific thinking (Lidz, 2000). Assessment of these processes has traditionally been done through standardized achievement tests. However, this measurement (knowledge acquired by the pupil at a specific moment in the learning process) underestimates the potential of those that have not had the same opportunities for learning. Results are not valuable, since they represent verification of earlier learning outcomes instead of information on their learning processes or on their possibilities for learning. Similarly, they do not reveal the strategies children are using when they solve problems (Resing, De Jong, Bosma & Tunteler, 2009).

As an alternative to this type of assessment via traditional tests, over the past 30 years we have seen the development of the so-called *dynamic assessment* technology in the English language bibliography (Haywood & Lidz, 2007; Lidz & Elliot, 2000; Sternberg & Grigorenko, 2002) and of the assessment of learning potential in our own context (Calero, 2004). Assessment of learning potential presents highly useful characteristics for identifying risk factors and mediation strategies effective in overcoming learning disabilities. The objective of this methodology is to assess the person's potential to learn; that is, the extent to which the child improves in performing a certain task after having received an intervention or training from another person who guides him or her in task completion. The general methodology for assessing learning potential is based on Vygotski's "Zone of Proximal Development" concept, but has been modified by different authors who work in this field (Tzuriel, 2001). In general, this methodology includes a phase of training in the assessment situation. This phase can be administered between two applications of the same test (test-training-test format), or can be done item by item, in response to the errors made by the subject on each item applied. In any case, it is an active, monitored and guided mediation phase, intended to equip the subject with basic skills that will lead to better execution in the specific domain (Gerber, 2001). Interaction with the assessor provides important information about the child's execution, learning potential and cognitive processes while carrying out a certain learning task (Kuhn, 1995; Miller, 2002; Siegler, 2006). This interaction is key in revealing the metacognitive strategies and how the child learns while being assessed. The measurements are more indicative of thinking processes than static or traditional measures (Grigorenko & Sternberg, 1998; Lidz, 1991; Lidz & Elliot, 2000).

Likewise, learning potential assessment makes it possible to detect and describe each child's strong and weak points during the processes, before, during and after the mediation. Numerous studies show the effectiveness of the mediation phase, demonstrating how preschoolers respond to the intervention. They significantly improve their performance as compared to the control group that receives no mediation (Bensoussan, 2002; Brooks, 1997; Levy, 1999; Lidz, 1992; Lidz, 2004; Lidz & Van der Aalsvoort 2005; Malowitsky, 2001; Resing, De Jong, Bosma & Tunteler, 2009; Robles, 2007; Shurin, 1998).

Therefore, learning potential assessment allows us to understand what the child knows and how he or she learns. It provides us with information about the nature of his/her learning processes and allows us to determine the obstacles to learning success. Similarly, it is a useful tool for understanding what children with low school performance need, and for giving direction to potentially useful ideas for intervention (Van Der Aalsvoort & Lidz, 2007).

On the other hand, according to prior studies, it is important to examine the performance-behavior relationship. Specifically, behavioral dimensions such as self-regulation, tolerance to frustration, motivation and cognitive flexibility have been considered factors strongly associated with school performance during recent years. (Diamond, Barnett, Thomas & Munro, 2007; Gonzalez-DeHass, Willems & Doan Holbein, 2005; Kochanska, Barry, Aksan & Boldt, in press; Oudeyer, Kaplan, & Hafner, 2007). There is much research that studies the influence of behavioral variables on children's performance. For example, according to Alexander, Entwisle and Dauber (1993), preschoolers that showed a greater level of interest, attention and participation in class presented greater academic success and also scored higher on standardized measures of cognitive performance. In other studies, self-control and cooperation predicted greater advancement and better academic outcomes in preschoolers

(Agostin & Bain, 1997; Olson, Sameroff, Kerr, Lopez & Wellman, 2005). For Raymond (2000), high impulsivity and low attention were risk factors for school failure. Lidz (2000) concludes that self-regulation dominates the whole process of learning and characterizes successful learning in children. As for flexibility, Campione, Brown and Ferrara (1982) define it as the metacognitive skill that characterizes intelligent action. Finally, in a study by Robles, Calero and García (2010) in children with normal performance and children with learning problems, different behavioral profiles are found as a function of the group (Down Syndrome versus average intelligence).

Other studies show how behavioral variables are predictive of school success not only in early childhood education, but also in the first years of primary education (Bronson, Tivnan & Seppanen, 1995; Horn & Packard, 1985).

In addition to assessing these processes, analyzing the metacognitive strategies that children use in learning situations seems important for an analysis of school performance in early childhood. For example, the review by Wang, Haertel and Walberg (1990) shows that metacognition is the most powerful predictor of learning. Similarly, many studies show a close relationship between metacognition and school performance, concluding that students with better academic outcomes are those that frequently use self-regulation strategies when facing a learning task (García & Pintrich, 1994; Metcalfe, 1998; Ugartetxea, 2001; Versschaffel, 1999; Wong, 1996; Zimmerman, 2000). Research carried out to date underscores the influence of metacognitive skills in school performance. In fact, many studies have focused on strategies used by children in primary and secondary education in learning reading comprehension and mathematics, as a means toward designing intervention programs that improve performance in these competencies (Desoete, Roeyers & Buysse, 2001; Manzo, Manzo & McKenna, 1995; Siegler, 2006; Ward & Traweek, 1993). Nonetheless, metacognitive skills also appear in preschoolers at very basic levels that become increasingly more sophisticated when formal education so requires (Marcel, Vennman, Van Hout-Wolters & Afflerbach, 2006). At these early ages, such processes are incipient and their development is actively under way, making it necessary to assess them through learning potential procedures (Van Der Aalsvoort & Lidz, 2007) instead of through traditional static methods. The latter generally offer little in terms of information about cognitive and metacognitive processes involved in learning, since the examiner presents problems that the children must solve with little or no feedback (Sternberg & Grigorenko, 2002).

Due to all the above, this study has assessed children's skills and behavior related to school performance, and their learning potential using the EHPAP Scale (*Evaluación de habilidades y potencial de aprendizaje en preescolares*, Calero, Robles, Márquez & de la Osa, 2009, a Spanish version of the *ACFS: Application of Cognitive Functions Scale*, Lidz & Jepsen, 2000, 2003). This procedure was designed specifically for children between the ages of 3 and 5 years, or older but with a similar intelligence level (Lidz, 2000; Haywood & Lidz, 2007). The scale makes it possible to explore basic cognitive functions and learning strategies that most authors rate as basic or primary, and which are related to preschool curriculum content involved in a wide variety of tasks. Scores are produced which indicate the degree to which the child has mastered each task (pretest), the child's degree of receptivity to the intervention and his/her ability to learn (posttest and transfer). The EHPAP also includes a Behavior Observation Scale that describes qualitative, non-intellectual behavior aspects of the child's interaction with the materials and the examiner.

Thus, based on an application of the EHPAP, the general objective of this investiga-

tion was to determine whether there are significant differences in cognitive skills, learning potential, behavioral variables and/or metacognition between groups of preschool children with high and low school performance.

The specific objectives were as follows:

1. Analyze the differences in basic cognitive processes relative to school learning between children with high and low academic performance in early childhood education.
2. Check for any difference in the effectiveness of the mediation phase with the high and low performance groups.
3. Establish whether there is a certain behavioral profile related to high and low performance levels of children in early childhood education.
4. Check whether there are significant differences in the use of metacognitive strategies between pupils in early childhood education with high and low academic performance.

Method

Participants

The sample was selected randomly from children in public schools in and around the city of Granada, with prior authorization from the Educational Authority and with the informed consent of the school and the parents.

The study began with an initial sample of 79 children. From this initial sample, 47 children were selected as a function of their performance level (high and low), as indicated below in the procedure section. The 47 children were four- and five-year-olds (mean = 4 years, 8 months; standard deviation (s.d.) = 0.27). There were 21 boys and 26 girls. Intelligence level fell in the range of IQ scores from 90 to 120. The mean IQ score for all the children was 106 (s.d.= 10.80). The mean IQ was 104.63 (s.d.= 8.81) for the low performance group, and 107.48 (s.d.=12.58) for the high performance group, such that there were no significant differences between IQ scores for the high- and low-performance children (F (1/46)= 0.816 (p> .05). The sample of children was controlled to exclude the presence of additional behavior problems and specific pathologies, based on reports from their teachers and the School Psychology team.

Instruments

Kaufman Brief Intelligence Test (K-BIT) (Kaufman & Kaufman, 1994). This screening test produces a quick estimation of the child's general intelligence, through two subtests: vocabulary and matrices. The first assesses verbal skills related to school learning, and the second assesses the ability to solve reasoning problems. It provides a Verbal IQ, a Non-verbal IQ, and a composite IQ that summarizes total performance on the test. Validity and reliability studies show that its reliability coefficients vary according to age range, but are never below 0.76; furthermore, the composite IQ shows a mean correlation of 0.63 with the sum of mental processing scores on the K-ABC and 0.75 with the knowledge subtest of the same test. Additionally, the K-BIT composite IQ has a correlation of 0.80 with the WISC-R global IQ and 0.75 with the WAIS-R. These correlations support the construct validity of the K-BIT composite IQs.

Metacognition questionnaire. Metacognitive skills were assessed using a record of verbal information collected while the children were performing the Classification subtest task on the EHPAP. Keeping in mind the difficulties with introspection presented by children in this age group (Monereo, 1994), a series of direct questions were established to gather information on the children's metacognitive skills and their knowledge about the requirements of the task, their own abilities and the means of execution. The questionnaire contained 10 items that use direct questions to record what the child is thinking before performing the learning task (plan-

ning), during performance (self-regulation) and afterward (evaluation). The maximum score was 10 points. This format has been often used in educational research on tasks of reading comprehension and mathematical problem solving (Desoete, A., Roeyers, H. & Buysse, A. 2001 ; Manzo, Manzo & McKenna, 1995; Ward & Traweek, 1993).

EHPAP: *Evaluación de habilidades y potencial de aprendizaje en preescolares* [Assessment of skills and learning potential in preschoolers] (Calero, Robles, Márquez & de la Osa, 2009). This scale, as indicated in the introduction, is the Spanish adaptation of the *ACFS: Application of Cognitive Functions Scale* (Lidz & Jepsen, 2000, 2003) and is an assessment procedure that measures the application of learning strategies and cognitive processes on typical tasks in an Early Childhood Education curriculum. The age range for application is from 3 to 6 years old. It is composed of six subtests that measure the following cognitive skills: classification, auditory memory, visual memory, series, perspective taking and verbal planning. The scale format—as a test for assessing learning potential—includes a mediation phase between the standardized administration of pretest and posttest. On each subtest there is a pretest phase where the child must perform the task independently, in order to determine to the extent they already master the proposed tasks autonomously. Next, in the mediation phase, the child works interactively with the assessor who offers whatever help is needed to complete the proposed task successfully. Finally, there is a posttest phase where the child must perform the task independently again, in order to establish his or her receptivity to the intervention, that is, their learning potential. In addition, the EHPAP includes a Behavior Observation Scale (BOS) for recording a qualitative description of the child's behavior in interaction with the materials and the examiner. For this purpose the assessor must progressively record the behavioral dimensions of the BOS for each subtest during the pretest and mediation phases of the assessment. The specific parameters of behavior that this observational scale examines are: self-regulation, persistence, tolerance to frustration, flexibility, motivation, interactivity and receptivity.

The scores produced by the scale are quantitative but not normative. The direct scores obtained indicate the level of task mastery on the pretest and posttest and also make it possible to calculate the transfer (posttest - pretest) after the mediation. This transfer score has been analyzed in different studies that produce data on its reliability, construct validity and discriminant validity (for more information, see Calero, Márquez, Robles & del la Osa, 2009).

Although the original ACFS scale was initially developed to be used in the USA (Lidz & Jepsen, 2000, 2003), it has been used successfully with children in the United Kingdom, Netherlands, Romania and Australia, translated and adapted for use in Spain, and is currently the object of many studies in order to refute its validity and reliability in different populations (Haywood & Lidz, 2007).

Procedure

Performance information was obtained in six areas of the curriculum: mathematics, oral and written expression, identity and personal autonomy, physical and social environment, body expression, and artistic expression. The teacher scored each area as follows: 1) low performance (1 point), 2) average performance (2 points), and 3) high performance (3 points), such that the minimum score obtained was 6 and the maximum 18.

Our sample began with 79 children whose mean performance score was 13.15, with a standard deviation of 4.324. Since our objective was to compare children with high and low performance, we selected children from the two extremes, that is, whose performance differed from the group mean by greater than 1 standard deviation. Thus, children with

average performance were eliminated. The high performance group included 23 children whose mean school performance came to 17.92 (s.d.= 0.272; range 16-18) and the low performance group included 24 pupils with a mean performance of 7.92; s.d. = 1.521 (range 5-8).

Assessment sessions were administered individually, in a room separate from the classroom, and consisted of two sessions of 20-30 minutes each. The tests were presented in the same order for all participants. The first session assessed pupils with the K-BIT, and the auditory memory and series subtests of the EHPAP. The second session was dedicated to the subtests on classification, visual memory, verbal planning, perspective taking and the metacognition questionnaire. The time that elapsed between the two sessions was approximately 2 to 3 days.

Design and data analysis

A comparative, ex post facto design was followed with the two groups (high and low school performance). Data analysis was carried out using the statistical software SPSS version 15.0.

The independent variable (manipulated by selection of values, that is, by grouping) was the academic performance of the children being assessed.

Dependent variables were:

- Scores collected from all the subtests of the EHPAP (classification, auditory memory, visual memory, series, perspective taking and verbal planning).

- Scores obtained on all the components of the Behavior Observation Scale of the EHPAP: self-regulation, persistence, tolerance to frustration, flexibility, motivation and interactivity.

- Scores obtained on the metacognition questionnaire for preschoolers.

3. Results

Regarding the first objective, where we propose to analyze differences in the basic cognitive processes relative to school learning between young children with high and low performance, Table 1 and Figure 1 show us that results obtained with the Student t statistical analysis reflect the existence of significant differences between the two groups on the total pretest score for the EHPAP (t (1/45)= 3.47; p< .05), with the high performance group obtaining higher scores than the low performance group. Significant differences are observed on two subtests of this scale: visual memory (t (1/45)= 2.32; p< .05) and verbal planning (t (1/45)= 2.62; p< .05), the high performance group obtaining better scores than the low performance group.

On the subtests of classification (t (1/45)= 1.54; p> .05), series (t (1/45)= 1.53; p> .05), auditory memory (t (1/45)= 1.05; p>.05) and perspective taking (t (1/45)= 1.83; p> .05), significant differences were not found between the high and low performance groups.

Table 1. Student's t for independent, between-group samples (high-low performance) of the total pretest scores on the EHPAP

Group	Mean	Standard Deviation	t	Sig.
Low perf.	32.71	10.65		
High perf.	42.00	7.29	-3.47	**.01***
Total	37.26	10.21		

(*) Differences are significant at a level of 0.05.

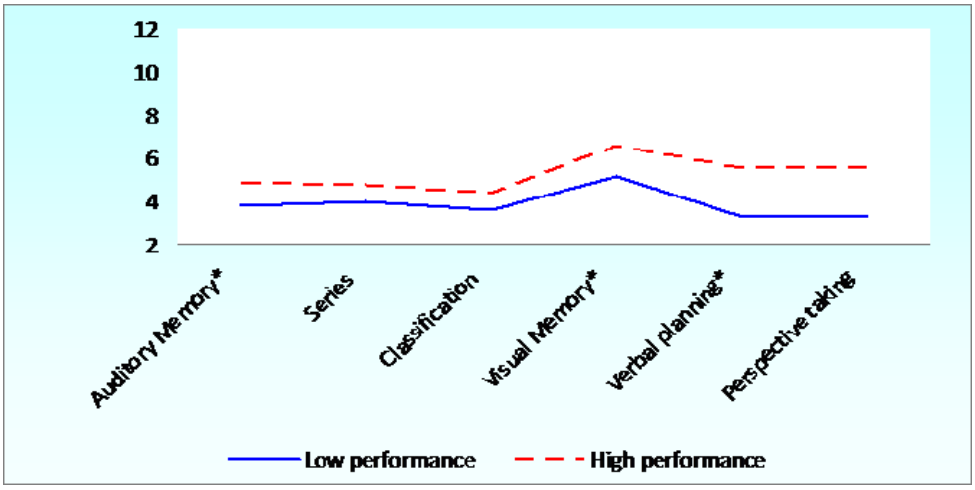

Figure 1. Mean pretest scores obtained by the low performance and high performance groups on the different subtests of the EHPAP

(*) Differences are significant at a level of 0.05.

The second objective aimed to verify a difference in effectiveness of the mediation phase for the high and low performance groups. Results reveal that there are no statistically significant differences between the two groups on scores for transfer obtained after training, on any of the subtests that make up the scale applied (see Table 2).

Table 2. Student's t for independent, between-group samples (high-low performance) of the transfer scores (post minus pre) on the different subtests of the EHPAP

	Group	Mean Gain	Standard Deviation	t	Sig.
Auditory Memory	Low Perf.	3.67	2.14	-1.08	.28
	High perf.	4.57	3.42		
Series	Low perf.	1.58	2.37	-2.88	.77
	High perf.	1.83	3.33		
Classification	Low perf.	3.21	2.10	-.01	.98
	High perf.	3.22	1.80		
Visual Memory	Low perf.	2.04	1.98	1.45	.15
	High perf.	1.35	1.15		
Verbal Planning	Low perf.	1.13	1.91	-.98	.33
	High perf.	1.70	2.05		
Perspective Taking	Low perf.	1.25	1.98	-.27	.78
	High perf.	1.39	1.53		

The third objective sought to establish whether there is a certain behavioral profile related to high and low performance levels in children in early childhood education (see Figure 2). Results show statistically significant differences between the two groups on the following behavioral dimensions: self-regulation ($t_{(1/45)}= 2.91$; $p< .05$), persistence on task ($t_{(1/45)}= 2.06$; $p< .05$), flexibility ($t_{(1/45)}= 4.76$; $p< .05$), and receptivity ($t_{(1/45)}= 2.78$; $p< .05$) in the sense that children from the high performance group obtain higher scores on these behavioral dimensions than those from the low performance group. However, the two groups do not present significant differences for the variables of tolerance to frustration ($t_{(1/45)}= 1.34$; $p>.05$), motivation ($t_{(1/45)}= 1.62$; $p> .05$) and interactivity ($t_{(1/45)}= 1.13$; $p> .05$). In order to verify the joint influence of these variables

on performance, we carried out a multivariate analysis where a significant joint effect was obtained (Hotelling T= 2.223; F (7/39) = 12.387; p = 0.0001), focusing on the same variables cited above, as can be observed in Table 3.

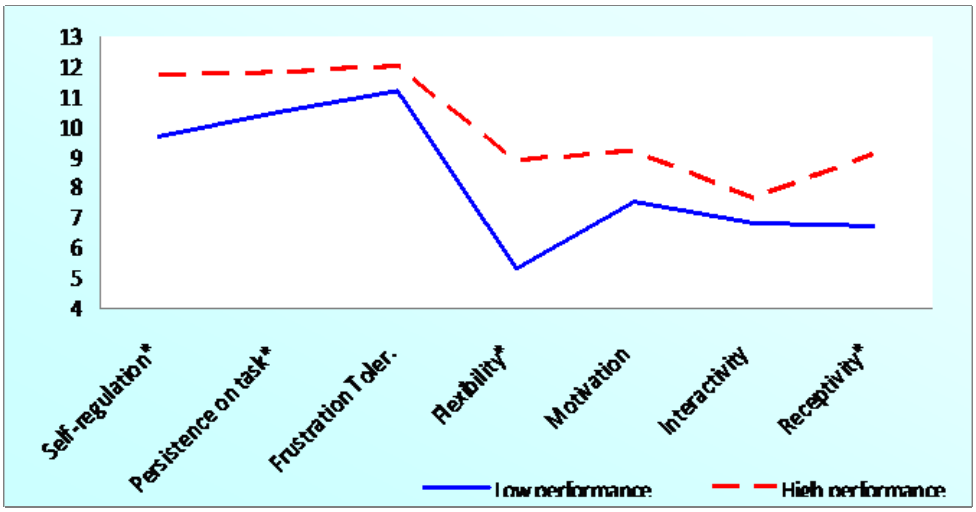

Figure 2. Mean pretest scores obtained by the low performance and high performance groups on the different subtests of the Behavior Observation Scale of the EHPAP
(*) Differences are significant at a level of 0.05.

To verify the existence of significant differences between the groups of high and low performance in all of these variables, we conducted a multivariate analysis that obtained a significant group effect (Hotelling´s T = 2.223; F (7,39) = 12.387, p = 0.0001), which focuses on the aforementioned variables, as shown in Table 3.

Table 3. Univariate contrasts between groups (high-low performance) of the total scores on the Behavior Observation Scale (pre-test) and total Metacognition score.

	F (1/45)	Sig.	Partial Eta Squared
Self-regulation	8.50	.0006	.150
Persistence	4.24	.0400	.080
Tolerance to Frustration	1.81	.1800	.030
Flexibility	22.70	.0001	.330
Motivation	2.64	.1100	.050
Interactivity	.01	.8900	.001
Total Metacognition	42.04	.0001	.480

The fourth objective was to check for any significant differences in the use of metacognitive strategies between pupils of early childhood education with high and low academic performance (see Figure 3). Our analyses reflect significant differences between the group means for total score obtained on the metacognition questionnaire (t (1/45) = 6.48; p< .05), where the high performance group obtained higher scores than the low performance group. As for the different areas assessed, differences were found to be significant for planning (t (1/45)= 5.16; p< .05) and evaluation (t (1/45)= 5.00; p< .05). In both cases the high performance group presents higher scores than the low performance group. However, differences in self-regulation were not significant between the two groups (see Figure 3).

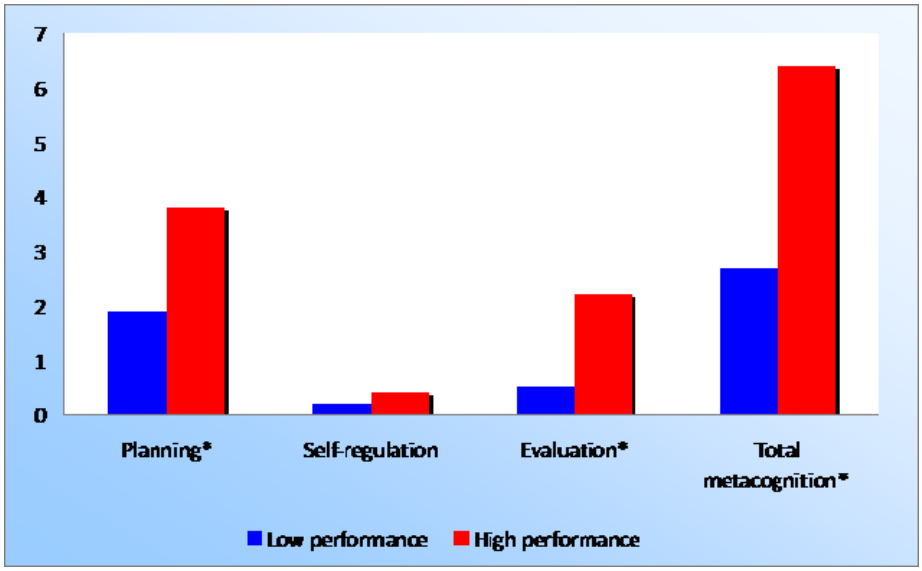

Figure 3. Mean scores obtained by the low performance and high performance groups on the different metacognition measures

(*) Differences are significant at a level of 0.05.

4. Discussion and conclusions

The general objective of this research has been to determine whether there are differences in the profile of cognitive skills, learning potential, behavioral variables and metacognitive strategies in preschool pupils with high and low school performance that present a similar intelligence level (in the mid-range of the K-BIT test).

As for the first objective, given that the EHPAP pretest assesses execution on certain tasks that are related to the curriculum for early childhood education, it was not surprising that results would show significant differences between the two groups in the pretest execution phase. Before the intervention phase, pupils from the high scholastic performance group obtained superior results to the other group on all subtests of the scale, even though these were statistically significant only for the subtests on visual memory and verbal planning. These results are consistent with earlier work such as Lidz (2000), where visual memory and verbal planning are found to be weak points in children with low performance. As this author indicates, this is likely due to the fact that execution of these tasks involves metacognitive processing. Likewise, in research by Resing et al. (2009), differences in pretest execution and the use of metacognitive strategies also appear, where the Dutch children obtained better results than the immigrants.

The second objective analyzed differences between the groups in their transfer scores, that is, after the mediation phase of the EHPAP. According to the results obtained, the two groups of participants did not present significant differences on this score, since both the high and low performance pupils made significant gains after the training. It may therefore be concluded that the intervention phase applied on each subtest is effective and produces significant improvements in performance for participants from both groups. These results, showing the effectiveness of the mediation phase, corroborate results found in other research (Bensoussan, 2002; Brooks, 1997; Lidz, 1992, 2004; Lidz & Van der Aalsvoort 2005; Levy, 1999; Malowitsky, 2001; Robles, 2007; Shurin, 1998) and make clear that differences between high and low performing preschoolers in execution of tasks related to the curriculum are not associated with their learning potential.

The third objective was to determine whether there are significant differences in the behavioral profile of children with high and low school performance. According to results obtained from the Behavior Observation Scale, variables assessed by this scale have a significant relationship with the performance of preschool children, with significant differences found between the two groups on self-regulation, persistence on task, flexibility and receptivity. The high performance group presented higher scores on these behavioral variables than the low performance group. These results are consistent with those found in other studies such as Diamond, Barnett, Thomas and Munro (2007); Gonzalez-DeHass, Willems and Doan Holbein (2005); Kochanska, Barry, Aksan and Boldt (2000); and Oudeyer, Kaplan, and Hafner (2007). On one hand, there is confirmation that children from the high performance group obtain better scores on the self-regulation variable than do those from the low performance group, demonstrating the relationship between high self-regulation and academic success. This result also corroborates the studies by Agostin and Bain (1997); Olson, Sameroff, Kerr, Lopez and Wellman (2005); Raymond (2000) and Lidz (2000). Differences in flexibility in favor of the high performance children were also reported by Campione, Brown and Ferrara (1982) and by Robles, 2007 and Calero, Robles and García-Martin (2010), where flexibility and persistence on task are significant discriminators between groups with and without learning problems.

As for the fourth objective, making reference to use of metacognitive strategies, we can conclude that there are significant differences between the two groups, that is, that pupils with high performance at school present better results in metacognition than do low performance pupils. These results are consistent with research on metacognition that has shown that effective students differ from ineffective students in the way in which they self-regulate mental processes and use learning strategies (García & Pintrich, 1994; Metcalfe, 1998; Ugartetxea, 2001; Verss-chaffel, 1999; Wong, 1996; Zimmerman, 2000). In our study, metacognitive skills that most differentiated the two groups were the ability to plan and the evaluation of a task, thus corroborating results obtained by Garrett, Mazzocco, and Baker (2006), where children with learning disabilities were less precise in evaluating their correct and incorrect solutions and in their ability to predict their own performance.

In summary, according to our results, preschool pupils with low and high performance present different profiles of execution at the beginning of the assessment (pretest). But in the case of the low performance children, their weak points are found not only in their skills but also in behavioral variables needed for successful learning in primary education (Lidz, 2000) and in the use of metacognitive strategies. Nonetheless, this investigation leads us to conclude that after brief training on the tasks, both groups achieve positive effects in their execution. Thus, there are no significant differences in learning potential between the groups: all of them were able to increase the number of correctly solved problems in the posttest phase of the assessment. According to these results, and keeping in mind that after the brief EHPAP intervention phase, children are able to apply what they have learned to new situations (transfer), revealing adequate learning potential, we can predict that with adequate training over the longer term, low performance children can achieve the scholastic skills needed for successful performance at school. This aspect is important enough to require that new research be carried out to test this possibility.

On the other hand, the results reveal the importance of attitudes and metacognitive processes in school performance at very early stages, an aspect that should be taken into account when evaluating school performance and when planning educational actions to prevent failure at later times.

Finally, this study confirms the utility of the EHPAP for this educational stage, as compared to traditional assessment methods, for several reasons: 1) it identifies weak points in how low performance children are learning, as compared to the high performance group (Grigorenko & Sternberg, 1998; Lidz, 1991; Lidz & Elliot, 2000), 2) it contributes important information on the child's cognitive functioning, learning potential and behavioral and attitudinal variables while carrying out the learning tasks (Kuhn, 1995; Miller, 2002; Siegler, 2006) and, 3) it offers indications that help to guide educational practice, and adjust it to the needs and level of help required by each pupil (Lidz, 2000, Resing, De Jong, Bosma & Tunteler, 2009). This way, based on assessment results, specific curriculum objectives can be designed, allowing for a stronger, closer connection between evaluation and instruction (Bosma & Resing, 2008; Lidz, 2000).

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Notas

The author team is executing a Project of Excellence, financed by the regional government of Andalusia (Ref. P07 HUM 2535) that focuses on prevention of school problems through assessment and implementation of intervention programs in Early Childhood Education. The present study forms part of this research.

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ARTICLE RECORD / FICHA DEL ARTÍCULO

Reference / Referencia	Calero, M. Dolores; Carles, Rosario; Mata, Sara y Navarro, Elena (2010). *Differences in skills and behaviour between preschool groups of high and low educational performance*. *RELIEVE*, *v. 16*, n. 2. http://www.uv.es/RELIEVE/v16n2/RELIEVEv16n2_5eng.htm
Title / Título	Differences in skills and behaviour between preschool groups of high and low educational performance [*Diferencias en habilidades y conducta entre grupos de preescolares de alto y bajo rendimiento escolar*].
Authors / Autores	Calero, M. Dolores; Carles, Rosario; Mata, Sara y Navarro, Elena
Review / Revista	RELIEVE (Revista ELectrónica de Investigación y EValuación Educativa / *E-Journal of Educational Research, Assessment and Evaluation*), *v. 16*, n. 2.
ISSN	1134-4032
Publication date / Fecha de publicación	2010 (**Reception Date**: 2009 November 25; **Approval Date**: 2010 December 3; **Publication Date**: 2010 December 3).
Abstract / Resumen	*The aim of this study has been to analyze the relationship between psychological variables and school performance in preschool children. A collection of cognitive and behavioural variables were selected, that according to the most current bibliography are related to student learning, with the goal of identifying the factors that appear to influence educational performance in childhood. The final goal would be to try to prevent future performance problems by means of identifying early these variables in the children that present low performance. The sample is composed of 47 children: 23 children with high performance and 24 with low performance. The instruments used were the Kauffman Brief Intelligence Test, the EHPAP (Spanish version of ACFS de Lidz y Jepsen, 2003) and a questionnaire about metacognition. The results showed significant differences between both groups in the profile of skills, in behavioral variables, and in the use of metacognitive strategies. However, both groups present a similar learning potential.* El objetivo ha sido analizar la relación entre variables psicológicas y rendimiento escolar en niños preescolares. Se ha seleccionado un conjunto de variables cognitivas y conductuales, que según la bibliografía más actualizada se relacionan con el aprendizaje escolar, con el fin de identificar los factores que parecen influir en el rendimiento educativo en la etapa infantil. La meta final sería intentar prevenir problemas de rendimiento futuros mediante la identificación temprana de estas variables en los niños que parecen presentar bajo rendimiento. La muestra ha estado compuesta por 47 niños: 23 con alto rendimiento y 24 con bajo rendimiento. Se han utilizado medidas de inteligencia (K-BIT), potencial de aprendizaje (EHPAP) y metacognición. Los resultados muestran que los grupos difieren en el perfil de habilidades, en variables conductuales y en la utilización de estrategias metacognitivas. Sin embargo, todos presentan un potencial de aprendizaje similar.
Keywords / Descriptores	Learning potential, metacognition, attitudes, cognitive skills, preschoolers, prevention *Potencial de aprendizaje, metacognición, actitudes, habilidades cognitivas, preescolares, prevención*
Institution / Institución	Departamento de Personalidad, Evaluación y Tratamiento Psicológico. Universidad de Granada (España).
Publication site / Dirección	http://www.uv.es/RELIEVE
Language / Idioma	Español & English version (Title, abstract and keywords in English & Spanish)

RELIEVE

Revista **EL**ectrónica de **I**nvestigación y **EV**aluación **E**ducativa
E-Journal of Educational Research, Assessment and Evaluation

[ISSN: 1134-4032]

Calero, M. Dolores; Carles, Rosario; Mata, Sara y Navarro, Elena (2010). Differences in skills and behaviour between preschool groups of high and low educational performance. *RELIEVE*, *v. 16*, n. 2, art.5.
http://www.uv.es/RELIEVE/v16n2/RELIEVEv16n2_5eng.htm