Child Indicators Research (2024) 17:289–307
https://doi.org/10.1007/s12187-023-10086-2

Individual and Sociodemographic Factors Associated to Prosocial Behaviors and Academic Performance in Portuguese Preschool and Elementary School Children: Highlights from a National Study After COVID-19

Marina Carvalho[1,2] · Cátia Branquinho[1] · Catarina Noronha[1] · Barbara Moraes[1] · Nuno Rodrigues[3] · Margarida Gaspar de Matos[1,4,5]

Accepted: 26 October 2023 / Published online: 9 November 2023

Abstract

Scientific knowledge has long been showing the intrinsic link between health and well-being with education highlighting the positive health impacts from improvements in education. The present study was developed with the main goal of analyzing the individual and sociodemographic predictors of prosocial behavior and academic performance in preschool and elementary school children. Data on 3623 school aged children, 1853 girls and 1770 boys, aged between 5 and 11 years old ($M = 7.25$; $SD = 1.56$) participating in the study "Psychological Health and Well-being | School Observatory" were analyzed. Prosocial behavior was measured by the SDQ, and academic performance was assessed by the students' classifications on different domains/subjects. The results of regression analyses showed that girls with less emotional, hyperactivity, behavioral and peer problems had more prosocial behaviors. Younger preschool children with more support from school social action tier, less hyperactivity problems and more prosocial behavior presented better academic performance. Elementary school children with parents/caregivers with higher educational attainment, more support from school social action tier, fewer hyperactivity and emotional symptoms and more prosocial and behavior problems presented better academic performance. We can conclude that gender and internalizing and externalizing symptoms are related to prosocial behavior and that hyperactivity problems and higher social action levels are related to a poorer academic performance. Future in depth studies will focus on the mechanisms of these relationships to better inform strategies for the promotion of prosocial behavior and academic performance. This is an important message for parents, educators, and teachers as well as for public policies in education, whenever pupils' psychological well-being and their academic growth is concerned.

Keywords Prosocial behavior · Academic performance · Predictors · Preschool · Elementary school · Children

Extended author information available on the last page of the article

The conditions in which children are born and grow, as well as the contextual factors shaping daily life conditions, have an important influence on health inequities (Donkin et al., 2017). One of the health determinants is education. Scientific knowledge in the area has long been showing the intrinsic link between health and well-being with education (Albert & Davia, 2011; The Lancet Public Health, 2020) evidencing the populational positive health impacts that can be obtained by implementing improvements in education (Albert & Davia, 2011).

Well-being has been pointed out in the literature by its association with prosocial behavior (Haller et al., 2021; Hui et al., 2020; Malonda et al., 2019; Martela & Ryan, 2016; Martin & Huebner, 2007), which is related to the promotion of positive social relationships and mitigation of undesirable behaviors such as externalizing (e.g. aggressive behaviors) and internalizing problems (Memmott-Elison et al., 2020), thus contributing to a healthy social adjustment and positive development (Malonda et al., 2019). Eisenberg et al. (2006) also emphasize the relationship between subjective well-being and prosocial behavior in children, referring that the latter is a factor that promotes more positive social relationships.

Prosocial behavior is described by King et al. (2005) as the child's ability to help, empathize and support others. Prosocial behavior, as part of the social skills' sphere, can also be described as a voluntary action that has a clear goal of benefiting others (Eisenberg et al., 2006, 2010). Social skills, together with academic performance, have been identified as relevant factors involved in the promotion of child's adjustment throughout childhood (Cowan et al., 1994; Parker & Asher, 1987; Pettit et al., 1997).

Prosocial behavior, which undergoes through developmental changes, depends on a complex interconnection between developmental, biological, contextual, and psychological factors, and individual experiences (Eisenberg et al., 2015). According to Malti and Dys (2018), prosocial behavior in childhood is linked to dispositional and situational characteristics, some of them (e.g., solidarity, concern for others) identified in the literature as being related to early prosocial behaviors (Song et al., 2018). Furthermore, individual traits such as temperament, self-regulation, and confidence appear to predict prosocial behavior in young children (Laible et al., 2014; Malti et al., 2016). Also, prosocial behavior has been related to externalizing and internalizing problems (e.g., Memmott-Elison et al., 2020) although in the case of internalizing problems, the relationships are complex (Huber, Plotner, and Schmitz 2019).

School serves as a context of opportunities for promoting social behavior, whether in a formal (for example, through collaborative learning activities) or informal way (through the interaction with peers in the context of recreational activities or play) (Wentzel, 2013; Wentzel & Watkins, 2011). Wentzel (2015a, b) emphasizes the importance of peers' interactions, along with interactions with teachers for the creation of a positive and cooperative classroom environment, promoting academic performance.

Likewise scientific knowledge in the area evidences the existence of a relationship between academic performance and health, it is also expected that health may be related to academic results and trajectories (e.g., Hamad et al., 2018) and therefore that internalizing and externalizing problems may be related to academic performance. In this specific context, literature presents two well-studied hypotheses

that seek to explain the mechanisms underlying this relationship, one concerning the role of academic performance on emotional and behavioral problems (e.g.: Dias et al., 2022; Verboom et al., 2014) and the other focusing on the role of emotional and behavioral problems on academic performance (e.g.: Sijtsema et al., 2014). Although the results of these studies may be limited due to the cross-sectional nature of many of the studies, the role of socio-emotional skills has been increasingly recognized as being linked to academic success, not only in children but throughout the entire life course (Flook et al., 2015).

The relationship between emotional and behavioral problems with academic performance, as well as their trajectories, has been empirically studied in recent decades (Gage et al., 2017; McLeod et al., 2012; Mundy et al., 2017). Children who present emotional and behavioral problems are at higher risk of academic failure (Mundy et al., 2017) and, according to Hinshaw (1992), up to 50% of the children who exhibit low academic performance present externalizing behaviors. Miles and Stipek (2006) also found that poor academic performance predicted aggressive behavior and Dias et al. (2022) found that academic performance presented an impact on internalizing and externalizing symptoms.

This relationship may be mediated by socio-demographic factors as gender and socio-economic status (SES). Studies in the area point to the existence of more prosocial behaviors in females (Cunico et al., 2012; Fabes & Eisenberg, 1998; Longobardi et al., 2019), specifically in some of the dimensions of prosocial behavior, such as kindness and consideration for others, and helping and sharing behaviors (Fabes & Eisenberg, 1998). Dias et al. (2022) obtained results evidencing the existence of gender differences in the relationship of academic performance with behavior problems, with academic performance having a greater impact on externalizing problems in boys. According to Armstrong-Carter and colleagues (2021), there also seems to exist a higher risk of low academic performance in children in higher disadvantage due to their socioeconomic background. In a study carried out to analyze the buffering role of prosocial behavior on academic risk in children, the authors obtained results that pointed to a positive association between SES and academic performance but only in children with lower levels of prosocial behavior, which means that prosocial behavior may mitigate academic risk in children with low SES (Armstrong-Carter et al., 2021) and may represent an adaptive response to low SES and social disadvantage (Robinson & Piff, 2017).

1 Purpose of the Present Study

The present study had the main goals of analyzing the individual (emotional and behavioral symptoms) and sociodemographic predictors of prosocial behavior and academic performance in preschool education and in elementary school students[1].

[1] In this document, for the purpose of simplifying the reading, the term "students" will sometimes be chosen, regardless of whether referring to children enrolled in pre-school education or students enrolled in the 1st cycle of basic education.

The obtained results, from a national study in the context of the post pandemic governmental support, are expected to serve as scientific basis to promote mental health in schools.

Based on previous studies carried out in this field, it was expected that students with fewer symptoms of internalizing and externalizing problems would present more prosocial behavior (e.g., Memmott-Elison et al., 2020). Among the sociodemographic variables, gender was also expected to predict general prosocial behavior (e.g.: Malonda et al., 2019; Van der Graaff et al., 2018). Also, from previous results regarding academic performance (e.g., Khanam & Nghiem., 2018; Tamayo Martinez et al., 2021; Salla et al., 2016), it was expected that students with fewer sociodemographic and psychological risk factors presented a better academic performance.

2 Method

2.1 Participants

A total of 3623 students participated in this study, 1853 girls and 1770 boys, aged between 5 and 11 years old ($M = 7.25$; $SD = 1.56$). The students, 971 from pre-school and 2652 from elementary school, belonged to different school groups within the different regions of the country. Additional information on the socio-demographic characteristics of the sample can be obtained from Matos et al. (2022).

2.2 Measures

The present study is included in the general study "Psychological Health and Well-being | School Observatory" commissioned by the Portuguese Ministry of Education, in which three types of data were collected with students: (i) preschool and elementary school students (answered by teachers/educators); (ii) middle school students (self-report); (iii) high school students (self-report); and a fourth type of data was collected with teachers (self-report).

For the purposes of the present study, only data from preschool and elementary school children were used, including (i) socio-demographic questions related to gender, school grade, age, educational attainment of the father/mother/caregiver, and school social action tier, (ii) indicators of school performance of preschool students and elementary school children, based on their classifications on different domains or subjects and (iii) indicators of psychological health and well-being, assessed by the teachers' report of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997, Portuguese adaptation of Marzocchi et al., (2004). SDQ is composed of 20 items in a three-point Likert scale (0 = Not true; 2 = Certainly True) within four dimensions of internalizing and externalizing symptoms (emotional symptoms, behavioral problems, hyperactivity, peer relationship problems) and one dimension related to prosocial behavior. SDQ presents adequate psychometric properties in the original and in the Portuguese version (Marzocchi et al., 2004).

2.3 Procedure

In a partnership between the Directorate-General for Education and Science Statistics, the Directorate-General of Education, the National Program for the Promotion of School Success, the Aventura Social Team/ISAMB, University of Lisbon (scientific coordinator), the Portuguese Psychologists Association and the Calouste Gulbenkian Foundation, the study "Psychological Health and Well-being | School Observatory" was developed under the support of the Portuguese Ministry of Education aiming at mitigating the mental health negative effect of COVID-19 pandemic. Starting in December 2021, with the design of the study and its protocol, the study was carried out through a stratified and random selection of public-school groupings in mainland Portugal, by NUTS III (Nomenclature of Territorial Units for Statistical Purposes). Contacted by email in January 2022, the school groupings unavailable to participate were replaced, after a new draw, until an agreement was obtained from another educational grouping of the corresponding NUTS. After acceptance, the classes were identically targeted in a stratified and random selection process.

The protocol was available between February and March 2022 in the computer rooms of the educational establishments, and its application was facilitated by the liaison teachers and psychologists of the participating school groupings. In the case of the children and adolescents, responses to the study required previous authorization of the students' parents/caregivers, and the acceptance of the informed consent information included in the online data collection instruments. The complete protocol had an average filling time of 20–30 min. Details related to the data collection procedure can be consulted online, available at http://www.dgeec.mec.pt/np4/1357.html.

2.3.1 Statistical Procedures

Data were analyzed using SPSS 25.0 (SPSS, Chicago IL, USA).

Prosocial behavior was computed by the sum of the answers to the five items composing this dimension of the SDQ. The measurement levels of each of the potential independent variables included in the analysis of prosocial behavior predictors are presented in Table 1. The measurement levels of each of the potential independent variables included in the analyses of academic performance predictors are presented in Table 2.

Correlation and directionality analyses of the data were first performed through Spearman's (variables with ordinal measurement level) and Pearson's (variables with interval measurement level) correlation coefficients, with the main goal of verifying their dependence of the two criterion variables, prosocial behavior, and academic performance.

Subsequently, multiple regression analyses were performed for each of the criterion variables using *stepwise* method to study the unidirectional relationships between sociodemographic and individual variables with prosocial behavior and academic performance. The sociodemographic variables and the individual variables that showed, in the previous analyses, correlating with the criterion variable

Table 1 Measurement levels of the independent variables included in the study of predictors of prosocial behavior in preschool and elementary school students

Independent variable	Level of measurement	Responses
Gender	Nominal	1 = Male; 2 = Female
Age	Interval	5 = 5 years old; 11 = 11 years old
Father/Caregiver Education attainment	Ordinal	1 = Elementary or less; 2 = Secondary; 3 = University
Mother/Caregiver Education attainment	Ordinal	1 = Elementary or less; 2 = Secondary; 3 = University
School Social Action Tier[a]	Ordinal	1 = High support; 2 = Medium Support; 3 = Low Support; 4 = No Support
Internalizing (5) and externalizing (15) SDQ items	Ordinal	0 = Not true; 1 = Somewhat true; 2 = Certainly true

[a]School Social Action Tier refers to individual measures, calculated every school year by the Government, based on parental annual income, which allow to support children in different areas, like meals and snacks, transportations, books and other school material, study trips, among others

Table 2 Measurement levels of the independent variables included in the study of predictors of academic performance in preschool and elementary school children

Independent variable	Level of measurement	Responses
Gender	Nominal	1 = Male; 2 = Female
Age	Interval	5 = 5 years old; 11 = 11 years old
Father/Caregiver Education attainment	Ordinal	1 = Elementary or less; 2 = Secondary; 3 = University
Mother/Caregiver Education attainment	Ordinal	1 = Elementary or less; 2 = Secondary; 3 = University
School Social Action Tier[a]	Ordinal	1 = High support; 2 = Medium Support; 3 = Low Support; 4 = No Support
Emotional symptoms	Ratio	0 = No symptoms; 10 = Extreme symptoms
Behavior Problems	Ratio	0 = No symptoms; 10 = Extreme symptoms
Hyperactivity	Ratio	0 = No symptoms; 10 = Extreme symptoms
Peer Problems	Ratio	0 = No symptoms; 10 = Extreme symptoms
Prosocial Behavior	Ratio	0 = Absent; 10 = High prosocial behavior

[a]School Social Action Tier refers to individual measures, calculated every school year by the Government, based on parental annual income, which allow to support children in different areas, like meals and snacks, transportations, books and other school material, study trips, among others

were included in the analyses. The basic assumptions for carrying out this type of procedure (sample size, linear relationship, normality, autocorrelation, multicollinearity, and homoscedasticity) were considered. In all analyses, a confidence level of 95% was considered.

3 Results

3.1 Prosocial Behavior

Considering the literature in health determinants and, specifically, on the factors associated with positive development, the analysis of the predictors of prosocial behavior included the items of internalizing and externalizing problems (SDQ) and the sociodemographic variables relating to children (gender and age), parents/caregivers (educational attainment) and context (school social action tier).

In the correlation analyses prosocial behavior was found to be significantly correlated in the expected direction with all SDQ internalizing and externalizing items, ranging from −0.06 ("Has a lot of worries, always seems worried.", $p \leq .001$) to 0.39 ("Other children generally like him.", $p \leq .001$). Age was not statistically significantly correlated with prosocial behavior and was therefore excluded from further regression analysis (see Table 3).

A multiple regression analysis was then performed to predict prosocial behavior based on sociodemographic (gender, parental/caregiver educational attainment, school social action tier) and individual (internalizing and externalizing symptoms) variables.

Table 4 shows the obtained results. A significant regression equation was found, $R^2 = 35\%$, F (14, 2988) = 112.56, $p \leq .001$, with a model composed of 14 independent predictor variables, which explained 34% (adjusted R^2) of the variance.

According to the obtained model, prosocial behavior was explained by gender, emotional symptoms related to worries and fears in new situations, behavior problems related to compliance with rules, fights and deceit, symptoms of hyperactivity related to attentional/concentration skills, impulse control, and restlessness, and by symptoms of peer problems related to peer support networks (empathy, friends, isolation, and threat perception). As can be seen in Table 4, being a girl, having more worries and less fears, more compliance with rules, less fights, and lying/cheating behaviors, higher attentional, concentration and impulse control skills, being more restless and having better peer support networks (more friends and empathy, less isolation and higher threat perception) were predictive of more prosocial behavior.

3.2 Academic Performance

To study the variables associated with preschool and elementary school students' academic performance, two new variables were computed, composed from the answers provided by educators and teachers at the time of the assessment (the end of the 1st period of 2020–2021) in their respective learning areas and domains.

Academic performance of preschool students was computed by the sum of the responses to acquired learnings in each of the six areas assessed. The results obtained ranged between 0 (No learning acquired) and 6 (All learnings acquired). Academic performance of elementary school students was computed by the weighted average of the results reported in each of the six areas evaluated. In this

Table 3 Correlation coefficients between prosocial behavior with age (Pearson) and SDQ items (Spearman) in preschool and elementary school children

	Prosocial behavior
Age	−0.02
Dimension: Emotional symptoms	
Often complains of headaches, stomach-aches or sickness	−0.10***
Many worries or often seems worried	−0.06***
Often unhappy, depressed or tearful	−0.20***
Nervous or clingy in new situations, easily loses confidence	−0.17***
Many fears, easily scared	−0.09***
Dimension: Behavior problems	
Often loses temper	−0.26***
Generally well behaved, usually does what adults request	0.37***
Often fights with other children or bullies them	−0.30***
Often lies or cheats	−0.27***
Steals from home, school or elsewhere	−0.11***
Dimension; Hyperactivity	
Restless, overactive, cannot stay still for long	−0.23***
Constantly fidgeting or squirming	−0.22***
Easily distracted, concentration wanders	−0.24***
Thinks things out before acting	0.33***
Good attention span, sees chores or homework through to the end	0.30***
Dimension: Peer Problems	
Rather solitary, prefers to play alone	−0.23***
Has at least one good friend	0.30***
Generally liked by other children	0.39***
Picked on or bullied by other children	−0.16***
Gets along better with adults than with other children	−0.11***

*** $p \leq .001$

case, the results ranged from 1 (Insufficient) to 4 (Very Good). Table 5 presents the descriptive values obtained in these two composite variables.

As in the previous analysis, considering the literature in the area, we also included as potential predictors of academic performance in each of the two levels of education the sociodemographic variables related to the children (gender and age), parents/caregivers (education) and context (school social action tier). The dimensions related to internalizing and externalizing problems and prosocial behavior of the SDQ were also included in the analysis as potential predictors.

Table 6 presents the results obtained by Pearson's correlation analyses between academic performance with age and the five dimensions of the SDQ. In both educational levels, preschool and elementary school, the obtained results showed that academic performance correlated significantly and in the expected direction with all the variables included in the analysis. Results ranged from −0.43 (Hyperactivity and

Table 4 Multiple regression analysis coefficients for predicting prosocial behavior in preschool and elementary school children ($N = 3623$)

	Unstandardized Coefficients		Standardized Coeficient			Collinearity Statistics	
	B	SE	β	t	p	Tolerance	VIF
Constant	3.284	0.228		14.395	0.000***		
Liked by others	0.949	0.074	0.215	12.764	0.000***	0.772	1.296
Well behaved	0.609	0.058	0.187	10.469	0.000***	0.686	1.458
Thinks before acting	0.384	0.055	0.136	7.031	0.000***	0.584	1.713
At least one friend	0.706	0.070	0.159	10.023	0.000***	0.868	1.152
Often fights/bullies	−0.454	0.067	−0.120	-6.771	0.000***	0.692	1.444
Gender	0.346	0.058	0.090	5.920	0.000***	0.939	1.065
Solitary	−0.272	0.052	−0.083	-5.203	0.000***	0.856	1.169
Restless	0.174	0.047	0.073	3.719	0.000***	0.571	1.753
Good attention	0.200	0.055	0.073	3.619	0.000***	0.545	1.835
Worries	0.202	0.048	0.068	4.230	0.000***	0.855	1.169
Nervous in new situations	−0.162	0.042	−0.063	-3.840	0.000***	0.807	1.239
Lies or cheats	−0.245	0.068	−0.063	-3.627	0.000***	0.731	1.369
Easily distracted	0.110	0.052	0.045	2.117	0.034*	0.475	2.105
Picked on/ bullied	0.126	0.064	0.032	1.967	0.049*	0.854	1.171

*** $p \leq .001$; * $p \leq .05$

Table 5 Descriptive statistics of academic performance in preschool and elementary school children

Academic performance	N	M	SD	Range	Skewness	Kurtosis
Preschool	971	3.97	2.42	0–6	−0.71	-1.18
Elementary school	1524	3.09	0.63	1–4	−0.34	−0.70

Table 6 Pearson correlation coefficients between academic performance with age and SDQ dimensions

	Academic performance preschool children	Academic performance elementary school children
Age	−0.31***	−0.05*
Emotional symptoms	−0.12***	−0.21***
Behavior problems	−0.12***	−0.23***
Hyperativivity	−0.22***	−0.43***
Peer problems	−0.16***	−0.19***
Prosocial behavior	0.21***	0.21***

*** $p \leq .001$; * $p \leq .05$

Table 7 Multiple regression analysis coefficients for predicting academic performance at the end of the 1st period in preschool children ($N = 971$)

	Unstandardized Coefficients		Standardized Coeficient			Collinearity Statistics	
	B	SE	β	t	p	Tolerance	VIF
Constant	4.901	0.518		9.455	0.000***		
Age	−0.367	0.042	−0.282	-8.723	0.000***	0.963	1.220
Hiperativity	−0.094	0.029	−0.113	-3.268	0.001***	0.842	1.238
Prosocial behavior	0.132	0.039	0.117	3.424	0.001***	0.871	1.036
Social action tier	0.192	0.069	0.089	2.764	0.006**	0.984	1.332

*** $p \leq .001$; ** $p \leq .01$

academic performance in elementary school children, $p \leq .001$) to 0.21 (prosocial behavior and academic performance in preschool and elementary school children, $p \leq .001$). Therefore, all the variables were included in the following regression analyses as potential predictors of academic performance.

Two multiple regression analyses were then calculated to predict academic performance separately in preschool and elementary school students, based on sociodemographic (gender, age, parental/caregiver educational attainment, school social action tier) and individual (emotional symptoms, behavior problems, hyperactivity, peer problems, prosocial behavior) variables.

In preschool children, a significant regression equation was found, $R^2 = 15\%$, $F(4, 846) = 36.16$, $p \leq .001$, with a model composed of four independent predictor variables (age and school social action tier, hyperactivity, and prosocial behavior), which explained 34% (adjusted R^2) of the variance (see Table 7). In preschool children, being younger and having a more support from the school social action tier, having fewer symptoms of hyperactivity and more prosocial behavior were predictors of academic performance.

In elementary school students, a significant regression equation was also found, $R^2 = 30\%$, $F(7, 1393) = 83.78$, $p \leq .001$, with a model composed of seven independent predictor variables (educational attainment of both parents/caregivers, school social action tier, emotional symptoms, hyperactivity, behavior problems and prosocial behavior), which explained 29% of the variance (see Table 8). In elementary school children, having parents/caregivers with higher educational attainment, more support from the school social action tier, less emotional and hyperactivity symptoms and more behavior problems and prosocial behavior were predictors of academic performance.

4 Discussion

The main goal of the present study was to study variables associated with prosocial behavior and academic performance in preschool and elementary school children. It was hypothesized that the existence of fewer internalizing and externalizing

Table 8 Multiple regression analysis coefficients for predicting academic performance at the end of the 1st period in elementary school children ($N = 2652$)

	Unstandardized Coefficients		Standardized Coeficient			Collinearity Statistics	
	B	SE	β	t	p	Tolerance	VIF
Constant	2.318	0.099		23.374	0.000***		
Hyperactivity	−0.084	0.006	−0.383	-13.29	0.000***	0.607	1.648
Mother/Caregiver Education Attainment	0.160	0.025	0.192	6.516	0.000***	0.580	1.724
Social action tier	0.076	0.013	0.136	5.656	0.000***	0.877	1.140
Prosocial behavior	0.042	0.008	0.123	4.952	0.000***	0.818	1.222
Behavior problems	0.040	0.011	0.110	3.604	0.000***	0.546	1.831
Father/Caregiver Educational Attainment	0.057	0.025	0.067	2.314	0.021*	0.600	1.667
Emotional symptoms	−0.014	0.007	−0.050	-2.029	0.043*	0.841	1.189

*** $p \leq .001$; * $p \leq .05$

symptoms was directly associated with more prosocial behaviors and that among the sociodemographic variables, gender was also a predictor of prosocial behavior. It was also expected that students with fewer sociodemographic and individual risk factors would present better academic performance.

In general, the obtained results suggest the existence of factors that are common to prosocial behavior and academic performance but, also, the existence of specific factors depending on the criterion variable and level of education, evidencing thus the need to understand these realities at different levels.

Girls presented an advantage over boys in terms of prosocial behavior, confirming our hypothesis. Although the literature on this subject is not consistent, the results obtained corroborated those obtained by Malonda et al. (2019) and van der Graaff et al. (2018) and may represent, on the one hand, an expectable developmental aspect, with gender differences in prosocial behavior blurring throughout development until adolescence. However, they may, on the other hand, be due to the assessment methodology used, which reflects general prosocial behavior and may not capture the specificities of its different dimensions that, as the literature demonstrates, may present a double gender standard when specifically assessed (Cunico et al., 2012; Fabes & Eisenberg, 1998; Longobardi et al., 2019; Xiao et al., 2019).

Different indicators related to behavior problems (more compliance with rules, less fights, lying or cheating), peer problems (more friendships and empathy, less isolation and higher perception of intimidation by peers), hyperactivity (higher impulse control and attention/concentration skills, restlessness) and emotional symptoms (less fears in new situations and more worries) showed to be relevant in predicting behavior prosocial in the studied sample. In general, these results were also in agreement with those obtained in other studies. Specifically, in a meta-analysis of studies about the relationship between internalizing, externalizing and prosocial behavior problems, Memmott-Elison et al. (2020) obtained results that

evidenced the existence of general relationships between prosocial behavior with externalizing and internalizing problems and the existence of specific relationships between prosocial behavior with aggressive behaviors and emotional symptoms.

However, it is worth mentioning the existence of specific factors, such as emotional symptoms related to worries, symptoms of hyperactivity related to restlessness and problems in peer relationships related to the perception of intimidation by peers, which were found to predict prosocial behavior contrary to expectations. Given that the assessment of these variables was carried out by educators and teachers, these results may correspond only to observable aspects. On the other hand, given that most of the sample is expected to include students with normative development, it is also possible that worries, restlessness, and perception of intimidation by peers have been perceived by educators and teachers as indicators of positive development and not as potential difficulties that students may present, particularly at the moment of the assessment, still adapting after the start of a new school year. Also, according to Hay and Pawlby (2003), it is possible, for some children, that prosocial behavior may be related to an over-concern or worries about other persons,

The results obtained about the academic performance predictors allowed us to observe that, in general, in both teaching levels, students with better academic performance were perceived as presenting fewer internalizing and externalizing problems, which was in agreement with the results obtained, at a national level, by Dias et al. (2022) in children and young people from different levels of education and, internationally, by Keilow et al. (2019), in children aged seven and 11 years.

Specifically, when exploring the unidirectional relationship between sociodemographic factors and academic performance, the results obtained showed that age was relevant for predicting academic performance only in preschool education students. Although it is expected that age, in developmental terms, may be directly related to the acquisition of cognitive and socio-emotional skills which, consequently, facilitates academic performance, in the present stud, the possible mechanisms of the obtained relationship remain unexplained. Since it is observed only in preschool children, we can, however, consider that the studied sample may include children who present neurodevelopmental or other difficulties and, since this variable has not been controlled in the present study, this may contribute to explain the obtained results.

On the other hand, the school social action tier, related to SES, as a measure of support according to individual needs, proved to be relevant in both teaching levels when studying the predictors of academic performance. We also highlight, due to its importance, the role of the educational attainment of both parents/caregivers on the academic performance of elementary school students. Although the underlying mechanisms remain to be demonstrated, these results must be further explored, given the implications they seem to have for academic success trajectories.

Considering now the role of psychological factors on academic performance, the obtained results showed, as expected, the role of hyperactivity symptoms, including attention/concentration difficulties, and prosocial behavior on academic performance. These results corroborated those obtained by Gage et al. (2017), Mundy et al. (2017), Keilow et al. (2019), Öner et al. (2019) pointing to the need of assessment, promotion and, when needed, intervention, of basic cognitive processes

throughout lifespan to promote successful school trajectories and contribute to a positive development.

Behavior problems, on the other hand, showed a positive role on academic performance in elementary school students and problems with peers were not shown to predict academic performance, which points to the existence of specific factors that must be considered when implementing strategies for behavioral change. Although these results need replication, it is possible that educators and teachers, as previously mentioned, as the only source of information, have perceived, among the observable aspects, behavior symptoms as an integral part of the normative development and not of potential difficulties. Also, SDQ, although is a widely used screening theoretical framed tool to assess behavioral and emotional problems and prosocial behavior, may not capture the multifaceted nature of prosocial behavior. We also know from previous studies in the area that children and adolescents with more behavior problems do not necessarily present learning difficulties, which may suggest that the impact of behavior problems on later levels of education may depend on their stability over development (Robson et al., 2020).

Despite the importance of the obtained results, the present study has some limitations, namely related to sampling, not allowing the generalization of the results. Also, its cross-sectional nature only allows the study of the proposed unidirectional relationships, elaborated from theoretical and intervention models, not allowing the study of trends and temporal causality relationships. On the other hand, the use of only one source of information, also subjected to the common method bias, even though students spend most of their time throughout the school year with educators and teachers, can constitute a bias, insofar as it provides only the perception of these professionals. Also, our findings emphasize the importance of considering the multifaceted nature of prosocial behavior in future studies. Overcoming this limitation, with a longitudinal assessment, using different sources of information and, in cases where it is developmentally appropriate, using different evaluation methods (including the observation of peer networks), can provide more robustness to the results to be obtained.

We also suggest, in future studies, the development of empirical tests of mediating models, including sociodemographic and individual variables, to allow a broader understanding of the mechanisms underlying the results obtained. Given the heterogeneities found in the previously presented results (Matos et al., 2022), an analysis of the role of these factors by region is also suggested. Also, an analysis of the role of the social ecosystem, including the determinants related to the community, family, and school (Flouri, & Sarmadi, 2016), on positive development, can contribute, subsequently, to more adequately direct the interventions that can be developed and implemented.

We also know, from the scientific knowledge available in the area, that there is a multiplicity of factors underlying the studied relationships, with interactions than can explain individual differences in prosocial behavior and academic performance. However, given the explained variance of the obtained models, the variables analyzed in the present study proved to be relevant for explaining part of the factors underlying social skills and academic performance. Overall, about a third of the variance in prosocial behavior and academic performance was explained by

psychological and sociodemographic factors related to gender or age, parental/caregiver educational attainment and school social action tier, demonstrating the need for the implementation of measures aimed at the factors that may be subject to change and contribute to the improvement of socio-emotional skills and academic success.

5 Conclusions

The results obtained showed that girls with less emotional and hyperactivity difficulties and less behavioral and peer relationship problems were perceived by educators and teachers as having higher levels of prosocial behavior. On the other hand, younger preschool children with a lower school social action tier, fewer symptoms of hyperactivity and more prosocial behavior were perceived as having better academic performance. Finally, elementary school children with parents/caregivers with higher educational attainment and a lower school social action tier, fewer hyperactivity symptoms and more prosocial behavior, fewer emotional symptoms, and more behavior problems, were perceived as having better academic performance.

From the obtained results it is possible to understand that peer problems and hyperactivity were relevant to prosocial behavior and that hyperactivity and prosocial behavior were relevant to academic performance at both levels of education. On the other hand, emotional symptoms and behavior problems proved to be relevant in explaining prosocial behavior in the whole sample and academic performance in elementary school. Finally, gender explained prosocial behavior and the support from the school social action tier proved to be relevant to explain academic performance and not prosocial behavior, while parental attainment explained academic performance only in elementary education students.

Since the relevance of prosocial behavior throughout development has been amply demonstrated, the obtained results show the importance of developing programs aimed at its promotion and at the prevention of internalizing and externalizing problems. In this context, promotion programs should also focus on the management of internalizing and externalizing symptoms through the improvement and promoting self-regulation skills. On the other hand, the promotion of academic success must also consider the existence of factors that, even of a sociodemographic nature, can impact on academic performance and, consequently, interfere negatively in academic success through lifespan.

Being part of a larger research, in other analyses are being carried out to analyze the possible mitigating effect of some of the variables on others, the obtained results represent an important message for parents, educators, and teachers as well as for public policies in the field of education, whenever students' psychological well-being and their academic growth is concerned.

Author contributions Cátia Branquinho, Margarida Gaspar de Matos and Nuno Neto Rodrigues contributed to the study conception and design. Material preparation was performed by Cátia Branquinho, Catarina Noronha and Bárbara Moraes and Nuno Neto Rodrigues. Data collection was performed by Cátia Branquinho, Catarina Noronha, Bárbara Moraes and Nuno Neto Rodrigues. Data analyses were

performed by Marina Carvalho and Margarida Gaspar de Matos. The original draft of the manuscript was written by Marina Carvalho, Cátia Branquinho, Catarina Noronha and Bárbara Moraes. Review and editing were performed by Marina Carvalho, Margarida Gaspar de Matos, and Nuno Neto Rodrigues. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Funding This study was designed in an optimizing care perspective and developed under the support of the Portuguese Ministry of Education, in a partnership between the Directorate-General for Education and Science Statistics, the Directorate-General of Education, the National Program for the Promotion of School Success, the Aventura Social Team/ISAMB, University of Lisbon (scientific coordinator), the Portuguese Psychologists Association and the Calouste Gulbenkian Foundation.

No funding was received for conducting this specific study and to assist with the preparation of this specific manuscript, although the research team had a small grant to undertake the national survey and data analysis in a first period of the complete study.

Data Availability All data and materials are available upon request from Nuno Neto Rodrigues.

Declarations

Statement Regarding Informed Consent Responses to the study required previous authorization of the students' parents/caregivers, and the acceptance of the informed consent information included in the online data collection instruments.

Statement Regarding Ethical Approval The study was approved by the Portuguese Ministry of Education and by a Consultative Committee composed of members of the Portuguese Ministry of Education, the Directorate-General for Education and Science Statistics, the Directorate-General of Education, the Portuguese Psychologists Association, the Calouste Gulbenkian Foundation, the National Program for the Promotion of School Success and the Aventura Social Team/ISAMB, University of Lisbon (scientific coordinator).

Statement Regarding Research Involving Human Participants and/or Animals The study was approved by the Portuguese Ministry of Education and the above referred Ethics Committee and was performed in accordance with the ethical standards of the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Competing Interests The authors have no competing interests to declare that are relevant to the content of this article.

References

Albert, C., & Davia, M. A. (2011). Education is a key determinant of health in Europe: A comparative analysis of 11 countries. *Health Promotion International, 26*(2), 163–170. https://doi.org/10.1093/heapro/daq059

Armstrong-Carter, E., Miller, J. G., Hill, L. J., & Domingue, B. W. (2021). Young children's prosocial behavior protects against academic risk in neighborhoods with low socioeconomic status. *Child Development, 92*(4), 1509–1522. https://doi.org/10.1111/cdev.13549

Cowan, P. A., Cowan, C. P., Schulz, M. S., & Heming, G. (1994). Prebirth to preschool family factors in children's adaptation to kindergarten. *Exploring Family Relationships with Other Social Contexts, 4*, 75–114.

Cunico, L., Sartori, R., Marognolli, O., & Meneghini, A. M. (2012). Developing empathy in nursing students: A cohort longitudinal study. *Journal of Clinical Nursing, 21*(13–14), 2016–2025. https://doi.org/10.1111/j.1365-2702.2012.04105.x

Dias, P., Veríssimo, L., Carneiro, A., & Figueiredo, B. (2022). Academic achievement and emotional and behavioural problems: The moderating role of gender. *Clinical Child Psychology and Psychiatry, 1359104521105941O*. https://doi.org/10.1177/13591045211059410. (Advance online publication).

Donkin, A., Goldblatt, P., Allen, J., et al. (2017). Global action on the social determinants of health. *BMJ Global Health, 3*, e000603. https://doi.org/10.1136/bmjgh-2017-000603

Eisenberg, N., Eggum, N. D., & Di Giunta, L. (2010). Empathy-related responding: Associations with prosocial behavior, aggression, and intergroup relations. *Social Issues and Policy Review, 4*(1), 143–180. https://doi.org/10.1111/j.1751-2409.2010.01020.x

Eisenberg, N., Fabes, R. A., & Spinrad, T. L. (2006). Prosocial development. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (pp. 646–718). John Wiley and Sons Inc.

Eisenberg, N., Spinrad, T. L., & Knafo-Noam, A. (2015). Prosocial development. In M. E. Lamb & R. M. Lerner (Eds.), *Handbook of child psychology and developmental science: Socioemotional processes* (pp. 610–656). John Wiley & Sons, Inc.. https://doi.org/10.1002/9781118963418.childpsy315

Fabes, R. A., & Eisenberg, N. (1998). Meta-analyses of age and sex differences in children's and adolescents' prosocial behavior. *Handbook of Child Psychology, 3*, 1–29.

Flook, L., Goldberg, S. B., Pinger, L., & Davidson, R. J. (2015). Promoting prosocial behavior and self-regulatory skills in preschool children through a mindfulness-based kindness curriculum. *Developmental Psychology, 51*(1), 44–51. https://doi.org/10.1037/a0038256

Flouri, E., & Sarmadi, Z. (2016). Prosocial behavior and childhood trajectories of internalizing and externalizing problems: The role of neighborhood and school contexts. *Developmental Psychology, 52*(2), 253–258. https://doi.org/10.1037/dev0000076

Gage, N. A., Adamson, R., MacSuga-Gage, A. S., & Lewis, T. J. (2017). The relation between the academic achievement of students with emotional and behavioral disorders and teacher characteristics. *Behavioral Disorders, 43*(1), 213–222. https://doi.org/10.1177/0198742917713211

Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*, 581–586. https://doi.org/10.1111/j.1469-7610.1997.tb01545.x

Haller, E., Lubenko, J., Presti, G., Squatrito, V., Constantinou, M., Nicolaou, C., ..., Gloster, A. T. (2021). To help or not to help? Prosocial behavior, its association with well-being, and predictors of prosocial behavior during the coronavirus disease pandemic. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.775032.

Hamad, R., Elser, H., Tran, D. C., Rehkopf, D. H., & Goodman, S. N. (2018). How and why studies disagree about the effects of education on health: A systematic review and meta-analysis of studies of compulsory schooling laws. *Social Science & Medicine, 198*(212), 168–178. https://doi.org/10.1016/j.socscimed.2018.07.016

Hay, D. F., & Pawlby, S. (2003). Prosocial development in relation to children's and mothers' psychological problems. *Child Development 74*(5). https://doi.org/10.1111/1467-8624.00609.

Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111*(1), 127–155.

Huber, L., Plötner, M., & Schmitz, J. (2019). Social competence and psychopathology in early childhood: A systematic review. *European Child and Adolescent Psychiatry, 28*(4), 443. https://doi.org/10.1007/s00787-018-1152-x

Hui, B. P., Ng, J. C., Berzaghi, E., Cunningham-Amos, L. A., & Kogan, A. (2020). Rewards of kindness? A meta-analysis of the link between prosociality and well-being. *Psychological Bulletin, 146*(12), 1084. https://doi.org/10.1037/bul0000298

Keilow, M., Sievertsen, H. H., Niclasen, J., & Obel, C. (2019). The strengths and difficulties questionnaire and standardized academic tests: Reliability across respondent type and age. *PLoS ONE, 14*(7), e0220193. https://doi.org/10.1371/journal.pone.0220193

Khanam, R., & Nghiem, S. (2018). Behavioural and emotional problems in children and educational outcomes: A dynamic panel data analysis. *Administration and Policy in Mental Health, 45*(3), 472–483. https://doi.org/10.1007/s10488-017-0837-7

King, G., McDougall, J., DeWit, D., Hong, S., Miller, L., Offord, D., Meyer, K., & LaPorta, J. (2005). Pathways to children's academic performance and prosocial behaviour: Roles of physical health status, environmental, family, and child factors. *International Journal of Disability Development and Education, 52*(4), 313–344. https://doi.org/10.1080/10349120500348680

Laible, D., Carlo, G., Murphy, T., Augustine, M., & Roesch, S. (2014). Predicting children's prosocial and co-operative behavior from their temperamental profiles: A person-centered approach. *Social Development, 23*(4), 734–752. https://doi.org/10.1111/sode.12072

Longobardi, E., Spataro, P., & Rossi-Arnaud, C. (2019). Direct and indirect associations of empathy, theory of mind, and language with prosocial behavior: Gender differences in primary school

children. *The Journal of Genetic Psychology, 180*(6), 266–279. https://doi.org/10.1080/00221325.2019.1653817

Malonda, E., Llorca, A., Mesurado, B., Samper, P., & Mestre, M. V. (2019). Parents or peers? Predictors of prosocial behavior and aggression: A longitudinal study. *Frontiers in Psychology, 10*, 2379. https://doi.org/10.3389/fpsyg.2019.02379

Malti, T., Averdijk, M., Zuffianò, A., Betts, L. R., Rotenberg, K. J., Ribeaud, D., & Eisner, M. P. (2016). Children's trust and the development of prosocial behavior. *International Journal of Behavioral Development, 40*(3), 262–270. https://doi.org/10.1177/0165025415584628

Malti, T., & Dys, S. P. (2018). From being nice to being kind: Development of prosocial behaviors. *Current Opinion in Psychology, 20*, 45–49. https://doi.org/10.1016/j.copsyc.2017.07.036

Martela, F., & Ryan, R. M. (2016). The benefits of benevolence: Basic psychological needs, beneficence, and the enhancement of well-being. *Journal of Personality, 84*(6), 750–764. https://doi.org/10.1111/jopy.12215

Martin, K. M., & Huebner, E. S. (2007). Peer victimization and prosocial experiences and emotional well-being of middle school students. *Psychology in the Schools, 44*(2), 199–208. https://doi.org/10.1002/pits.20216

Marzocchi, G. M., Capron, C., Di Pietro, M., Duran Tauleria, E., Duyme, M., Frigerio, A., Gaspar, M. F., Hamilton, H., Pithon, G., Simões, A., & Thérond, C. (2004). The use of the Strengths and Difficulties Questionnaire (SDQ) in southern European countries. *European Child & Adolescent Psychiatry, 13*(Suppl 2), II40–II46. https://doi.org/10.1007/s00787-004-2007-1

Matos, M. G., Branquinho, C., Noronha, C., Moraes, B., Santos, O., Carvalho, M., Simões, C., Marques, A., Tomé, G., Guedes, F., Cerqueira, A., Francisco, R., & Gaspar, T. (2022). Relatório técnico "Saúde psicológica e bem-estar – Observatório de Saúde Psicológica e Bem-Estar: Monitorização e Ação". Disponível em https://www.dgeec.mec.pt/np4/%7B$clientServletPath%7D/?newsId=1357&fileName=SaudePsi_final.pdf. Accessed 20 Mar 2023

McLeod, J. D., Uemura, R., & Rohrman, S. (2012). Adolescent mental health, behavior problems, and academic achievement. *Journal of Health and Social Behavior, 53*(4), 482–497. https://doi.org/10.1177/0022146512462888

Memmott-Elison, M. K., Holmgren, H. G., Padilla-Walker, L. M., & Hawkins, A. J. (2020). Associations between prosocial behavior, externalizing behaviors, and internalizing symptoms during adolescence: A meta-analysis. *Journal of Adolescence, 80*(1), 98–114. https://doi.org/10.1016/j.adolescence.2020.01.012

Miles, S., & Stipek, D. (2006). Contemporaneous and longitudinal associations between social behavior and literacy achievement in a sample of low-income elementary school children. *Child Development, 77*(1), 103–117. https://doi.org/10.1111/j.1467-8624.2006.00859.x

Mundy, L. K., Canterford, L., Tucker, D., Bayer, J., Romaniuk, H., Sawyer, S., Lietz, P., Redmond, G., Proimos, J., Allen, N., & Patton, G. (2017). Academic performance in primary school children with common emotional and behavioral problems. *Journal of School Health, 87*(8), 593–601. https://doi.org/10.1111/josh.12531

Öner, Ö., Vatanartiran, S., & Karadeniz, S. (2019). Relationships between teacher-reported ADHD symptom profiles and academic achievement domains in a nonreferred convenience sample of first- to fourth-grade students. *Psychiatry and Clinical Psychopharmacology, 29*(4), 502–508. https://doi.org/10.1080/24750573.2018.1457488

Parker, J. G., & Asher, S. R. (1987). Peer relations and later personal adjustment: Are low-accepted children at risk? *Psychological Bulletin, 102*(3), 357. https://doi.org/10.1037/0033-2909.102.3.357

Pettit, G. S., Bates, J. E., & Dodge, K. A. (1997). Supportive parenting, ecological context, and children's adjustment: A seven-year longitudianl study. *Child Development, 68*(5), 908–923. https://doi.org/10.1111/j.1467-8624.1997.tb01970.x

Robinson, A. R., & Piff, P. K. (2017). Deprived, but not depraved: Prosocial behavior is an adaptive response to lower socioeconomic status. *Behavioral and Brain Sciences, 40*, e341. https://doi.org/10.1017/S0140525X17001108

Robson, D. A., Allen, M. S., & Howard, S. J. (2020). Self-regulation in childhood as a predictor of future outcomes: A meta-analytic review. *Psychological Bulletin, 146*(4), 324–354. https://doi.org/10.1037/bul0000227

Salla, J., Michel, G., Pingault, J. B., Lacourse, E., Paquin, S., Galera, C., Falissard, B., Boivin, M., Tremblay, R. E., & Cote, S. M. (2016). Childhood trajectories of inattention-hyperactivity and academic

achievement at 12 years. *European Child and Adolescent Psychiatry, 25*(11), 1195–1206. https://doi.org/10.1007/s00787-016-0843-4

Sijtsema, J. J., Verboom, C. E., Penninx, B. W., Verhulst, F. C., & Ormel, J. (2014). Psychopathology and academic performance, social well-being, and social preference at school: The TRAILS study. *Child Psychiatry and Human Development, 45*(3), 273–284. https://doi.org/10.1007/s10578-013-0399-1

Song, J. H., Colasante, T., & Malti, T. (2018). Helping yourself helps others: Linking children's emotion regulation to prosocial behavior through sympathy and trust. *Emotion, 18*(4), 518.

Tamayo Martinez, N., Tiemeier, H., Luijk, M. P. C. M., et al. (2021). Aggressive behavior, emotional, and attention problems across childhood and academic attainment at the end of primary school. *Social Psychiatry and Psychiatric Epidemiology, 56*(5), 837–846. https://doi.org/10.1007/s00127-021-02039-3

The Lancet Public Health. (2020). Education: A neglected social determinant of health. *The Lancet Public Health, 5*(7), e361. https://doi.org/10.1016/S2468-2667(20)30144-4

Van der Graaff, J., Carlo, G., Crocetti, E., et al. (2018). Prosocial behavior in adolescence: Gender differences in development and links with empathy. *Journal of Youth and Adolescence, 47*(5), 1086–1099. https://doi.org/10.1007/s10964-017-0786-1

Verboom, C., Sijtsema, J., Verhulst, F., Penninx, B., & Ormel, J. (2014). Longitudinal associations between depressive problems, academic performance, and social functioning in adolescent boys and girls. *Developmental Psychology, 50*(1), 247–257. https://doi.org/10.1037/a0032547

Wentzel, K. R. (2013). School adjustment. In W. Reynolds & G. Miller (Eds.), *Handbook of Psychology*, Vol. 7: Educational Psychology (pp. 213–231). Wiley.

Wentzel, K. R. (2015a). *Prosocial behavior and schooling. Department of human development and quantitative methodology*. University of Maryland at College Park.

Wentzel, K. R. (2015b). Competence within context: Implications for the development of positive students identities and motivation at school. In F. Guay, H. Marsch, D. M. McInerney, & R. G. Craven (Eds.), *Self-Concept, motivation and identity: Underpinning success with research and practice (International Advances in Self Research)* (pp. 299–336). Information Age Publishing.

Wentzel, K. R., & Watkins, D. E. (2011). Peer relationships and collaborative learning: Implications for instruction. In R. Mayer & P. Alexander (Eds.), *Handbook of research on learning and instruction* (pp. 322–343). Routledge.

Xiao, S. X., Hashi, E. C., Korous, K. M., & Eisenberg, N. (2019). Gender differences across multiple types of prosocial behavior in adolescence: A meta-analysis of the prosocial tendency measure-revised (PTM-R). *Journal of Adolescence, 77*, 41–58. https://doi.org/10.1016/j.adolescence.2019.09.003

Authors and Affiliations

Marina Carvalho[1,2] · Cátia Branquinho[1] · Catarina Noronha[1] · Barbara Moraes[1] · Nuno Rodrigues[3] · Margarida Gaspar de Matos[1,4,5]

✉ Marina Carvalho
marina.carvalho@ismat.pt

1 ISAMB/Environmental Health/Medical School, University of Lisbon, Lisbon, Portugal

2 CHUA; ISMAT, Rua Dr. Estêvão de Vasconcelos, nº 33, Portimão 8500-656, Portugal

3 DGEEC, Lisbon, Portugal

4 APPSYCI/ ISPA, Lisbon, Portugal

5 FCH/ UCP, Lisbon, Portugal