



Cognitive and behavioural profile of minors in residential care: The role of executive functions

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ABSTRACT

The present study analysed the executive, emotional, and behavioural profile of 121 minors aged between 13 and 17, who were living in residential care homes funded by Asociación Nuevo Futuro (Spain). To this end, we used the Assessment System for Children and Adolescents (Fernández-Pinto et al., 2015) and the Spanish adaptation of the Behaviour Rating Inventory of Executive Function (Maldonado Belmonte et al., 2017). Data analysis was conducted using both classical and Bayesian methods. The results revealed strong correlations between children's executive functions and their behavioural problems. Behaviour regulation made a considerable contribution to children's behavioural problems. Moreover, age and gender proved to be significant predictor variables, with younger minors exhibiting more behavioural and emotional problems whilst emotional problems were more apparent among females. These findings highlight the need to develop and implement intervention programmes that take into account minors' age, gender differences, and particularly their cognitive and behavioural profile.

1. Introduction

Education is a key dimension for the well-being of children and a determining factor for the fulfilment of the rights established in 1989 by the Convention on the Rights of the Child (UNICEF, 2016). It is also a fundamental requirement for the sustainable development of societies and an essential mechanism for preventing inequalities and social exclusion (Assiego & Ubrich, 2015; Ministerio de Asuntos Exteriores, Unión Europea y Cooperación, 2018). However, the Spanish education system is still unable to guarantee school success and the appropriate skills development for all children and young people. Minors in residential care within the protection system have been described as one of the groups most likely to suffer educational exclusion, which is understood as the process that impedes the right to full education (Escudero, 2005; Escudero & Martínez, 2011). Most importantly, the difficulties and changes they go through often place these minors at a disadvantage and give rise to certain cognitive, emotional, and behavioural problems.

The residential care system in Spain includes homes designed in such a way that they aim to provide minors with a familiar and

comfortable environment. Educators and qualified professionals carry out therapeutic and rehabilitation actions and are responsible for the daily care and the affective and educational needs of the minors, with the ultimate goal of promoting their skills development and general well-being (Del Valle, Bravo Arteaga, Martínez Hernández, & Santos González, 2012). However, according to Spanish Organic Law 1/1996 of January 15th on the legal protection of minors (and its partial modification), the stay at residential care homes should be as short as possible and minors should primarily be placed with a foster family, which is believed to ensure a more stable environment and the necessary conditions for their academic and personal growth. Unfortunately, this seems to be a long-term goal because of the increasing number of minors in the Spanish residential care system. Indeed, the available data are alarming: 21,283 children –42% of the total number of foster children– have still not been placed with adoptive parents or legal guardians, and this number has increased by more than 21% in just one year (Ministerio de Sanidad, Consumo y Bienestar Social, 2019).

Although there is extensive research on the challenges that minors in foster care have to face, relatively little is known about the current situation regarding the protection system in Spain. Studies conducted to

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date have mainly focused on the emotional and behavioural problems of minors in residential care (Delgado, Fornieles, Costas, & Brun-Gasca, 2012; Martínez Martínez et al., 2017), their adaptation and social integration (Bravo Arteaga & Del Valle, 2001; Martín, García, & Siverio, 2012), and the process of transition to adulthood (López, Santos, Bravo, & Del Valle, 2013), with empirical work that jointly examined the cognitive, emotional, and behavioural profile of minors in foster homes in Spain being very scarce. A recent study conducted by Moreno-Manso et al. (2020) analysed the emotional, behavioural, and executive profile of foster children aged between 8 and 12 and, to our knowledge, no study to date has addressed this issue in minors aged above the age of 13 in Spain.

Therefore, the present study intended to contribute to the existing literature by exploring the emotional, behavioural, and executive profile of a group of minors aged between 13 and 17, who were living in residential care homes funded by Asociación Nuevo Futuro, a Spanish non-profit organisation aiming to provide residential care for children within the child protection system. Furthermore, the study sought to determine to what extent executive functions contributed to emotional and behavioural problems in these minors. The knowledge derived from such an analysis is crucial, since upon reaching the age of 18 this group leaves the protection system and is forced into a process of sudden emancipation (Martín, 2015).

2. Executive, emotional, and behavioural problems of minors in residential care

Executive functions are one of the cognitive systems most sensitive to environmental influences (Noble, McCandliss, & Farah, 2007). Studies that analysed the executive profile of children in foster care revealed that these children exhibited poorer inhibitory control (Bruce et al., 2013; McDermott et al., 2013; Pears, Fisher, Bruce, Kim, & Yoerger, 2010), attention problems (Palacios, Jiménez, Espert, and Fuchs, 2014), deficits in their working memory capacity (Wretham & Woolgar, 2017), and lack of cognitive flexibility (Lewis-Morrarty, Dozier, Bernard, Terracciano, & Moore, 2012). For instance, Nelson, Fox, and Zeanah (2014) carried out a longitudinal follow-up study of minors in residential care homes in Romania and found lower scores in the inhibitory control capacity of these minors, as well as deficits in their working memory capacity. Bruce et al. (2013) observed that the adversities often faced by children in foster care (negligent or abusive care, caregivers' history, etc.) influence the neuronal substrates of their inhibitory control capacity, while in McDermott et al.'s (2013) study a link emerged between early psychosocial deprivation and inhibitory control. In addition, a study conducted in the United States with children in residential care aged between 3 and 6 showed that the inhibitory control ability fully mediated the relation between their experienced adversity and school adjustment, and partially, the relation between adversity and socioemotional competence (Pears et al., 2010).

There is also extensive literature on the emotional problems of children in foster care. In particular, these children have been identified with higher levels of anxiety (Simsek, Erol, Öztop, & Münir, 2007) and depression (Verza, Bratu, & Foloștină, 2012), emotional attachment problems (Palacios et al., 2014), as well as affective perspective-taking problems in the case of children who have suffered abuse (Pears & Fisher, 2005). Children in residential care were also found to have difficulties in both the affective and cognitive dimensions of empathy, and they manifested low levels of empathic stress and empathic joy, which resulted in a coping style oriented towards the self (Moreno-Manso, García-Baamonde, Blázquez-Alonso, Guerrero-Barona, & Godoy-Merino, 2018). Moreover, empirical evidence suggests that age (Achenbach & Ndeti, 2018) and gender (Villegas & Pecora, 2012) seem to have an influence on the type of emotional problems these children develop.

At this point, it is important to acknowledge that self-regulation of emotions and behaviour is a fundamental requirement for children's development. Self-regulation is determined by cognitive abilities that help organise information, plan future actions, solve problems, and inhibit behaviour in a conscious and intentional manner (Diamond, 2013). Emotion regulation develops in an interrelated way with executive functions, since they share common attentional control processes and areas in the brain (Calkins & Marcovitch, 2010). Self-regulation skills are also important for successful school performance, and especially for the adequate adaptation to social and academic requirements in school settings (Blair & Diamond, 2008). Unstructured situations experienced by the majority of minors in residential care usually result in poor academic adjustment (Fisher, Leve, Delker, Roos, & Cooper, 2016). Healey and Fisher's (2011) study revealed that emotion regulation is related to school adjustment in the case of foster children. More interestingly, the authors found that emotion regulation ability of children aged between 7 and 11 was predicted by their executive functions at preschool age, which in turn played a significant role in their academic adjustment. These findings highlight the need to attend to and enhance the executive functions of minors in residential care through early intervention programmes.

Executive functions also contribute to regulated and goal-oriented behaviour. For instance, inhibitory control helps suppress irrelevant or distracting information, whereas response monitoring enhances the ability to assess one's own actions after they have occurred (McDermott et al., 2013). Minors in foster care have been found to exhibit impulsiveness and inattentive behaviour (Bernedo, Salas, Fuentes, & García-Martín, 2014; Palacios et al., 2014; Zima et al., 2000), as well as more difficulties in socialisation (Delgado et al., 2012). In addition, they present lower social competences compared to the normative group (Palacios, Moreno, & Román, 2013), which tend to increase the longer they remain in residential care homes (Delgado et al., 2012) and with a greater frequency of changes in placement (Newton, Litrownik, & Landsverk, 2000). Although behavioural problems usually persist throughout the maturation process, they tend to increase with age (Fernández-Pinto, Santamaría, Sánchez-Sánchez, Carrasco, & del Barrio, 2015) and manifest themselves differently depending on gender. Thus, while some studies concluded that young women in residential care have fewer behavioural problems than their peers (Farruggia & Germa, 2015; Martín, 2015; Montserrat, Casas, & Bertrán, 2013), others reported higher rates of relational aggression among females (Martínez Martínez et al., 2017). Furthermore, some neurobiological studies point to the important contribution of executive functions to the ability to anticipate the consequences of one's own behaviour and that of others and how executive problems have the potential to significantly impair adaptive, social, and emotional functioning (Kavanaugh & Holler, 2015; Vasilevski & Tucker, 2016).

To summarise, the existing evidence suggests that executive functions play an essential role in the emotional and behavioural development of minors who are more likely to suffer from social and educational exclusion. However, as highlighted in the introduction, the studies that addressed this issue in Spain, and particularly among minors above the age of 13, are still very scarce. Thus, the present study set out to explore the executive, emotional, and behavioural profile of a group of Spanish children aged between 13 and 17 who were living in residential care homes funded by Asociación Nuevo Futuro, a Spanish non-profit organisation which provides residential care to children within the child protection system. It also sought to determine the relation between problems in executive functions and those children's emotional and behavioural problems. In accordance with the literature review, we expected to find more executive, emotional, and behavioural problems among our participants compared to the normative group and –at least– some minimal contribution of executive functions to their emotional and behavioural problems.

Table 1
Distribution of minors according to age and gender.

		Gender		Total
		Males	Females	
Age	13	11	11	22
	14	7	8	15
	15	8	15	28
	16	17	13	30
	17	15	16	31
Total		58	63	121

3. Method

3.1. Participants

Participants were 156 minors living in 39 residential care homes of Asociación Nuevo Futuro located in 13 provincial delegations across Spain. However, the data of 35 of them were discarded because they either did not complete the psychological assessment measures employed in the study, or they scored high on the inconsistency scale of the Assessment System for Children and Adolescents (typical score > 75). Thus, the final sample consisted of 121 minors, 63 females (45.4%) and 58 males (53.7%), aged between 13 and 17 (see Table 1).

All of them were Spanish and the vast majority ($n = 111$) were more than 10 years old when admitted to the foster homes. At the time of data collection, 72 minors (62.8%) had been living in the foster homes for more than a year (range: 1 month to 12.5 years) and none of them had a cognitive disability.

3.2. Instruments

The Assessment System for Children and Adolescents (SENA; Fernández-Pinto et al., 2015) and the Behaviour Rating Inventory of Executive Function (BRIEF-2; Gioia, Isquith, Guy, & Kenworthy, 2015) in its Spanish adaptation (Maldonado Belmonte, Fournier del Castillo, Martínez Arias, & Gioia, 2017) were used to collect data regarding participants' cognitive, emotional and behavioural profile.

SENA is a multisource assessment test of emotional and behavioural problems (depression, anxiety, challenging behaviour, etc.), contextual problems (problems with family, school or classmates), vulnerability issues (emotion regulation, rigidity, etc.), and psychological resources (self-esteem, integration, emotional intelligence, etc.). It also provides a series of global indicators that assess performance related to more general areas (global index of problems, index of emotional problems, index of behavioural problems, index of problems in executive functions, and index of personal resources). SENA offers different formats for three age levels: preschool, primary, and secondary. The secondary school version was used, designed for evaluating children between 12 and 18 years old. The current study only reports the results obtained by the minors in the global indicators, which provide a summary of the scores on the different scales and reflect the minors' general functioning in the areas assessed using SENA. In addition, SENA includes a control scale, which was used in order to determine whether our participants had answered honestly. It is also important to note that SENA comprises three different questionnaires –SENA Self-report, SENA Family and SENA School– but only the first was employed in the study, which was completed by the minors. According to Fernández-Pinto et al. (2015), SENA presents a high level of internal consistency (average value of Cronbach's α coefficient of .86 and .87 in normal and clinical samples, respectively) and a high test-retest reliability (average value of .89). In addition to its good psychometric properties, it was chosen because it is an easily applied instrument that provides information about children's behaviour in different contexts.

BRIEF-2 is a questionnaire designed to assess the executive functions of children and adolescents aged between 5 and 18. It provides scores related to the following aspects: (a) nine clinical scales that assess inhibition, self-monitoring, flexibility, emotional control, initiative, working memory capacity, planning and organisation, task supervision, and organisation of materials; (b) three global indicators –behaviour regulation index, emotion regulation index, and cognitive regulation index–; and (c) a global index of executive functions. BRIEF-2 comprises two forms –BRIEF-2 Family and BRIEF-2 School– that can be administered either individually or in group and answered by parents, teachers or caregivers of the children. In the present study, only the BRIEF-2 Family form was used, which was completed by the responsible educator of each minor. BRIEF-2 was deemed an appropriate instrument because of its good psychometric properties and the fact that it assesses a broad range of executive processes and functions. According to Maldonado Belmonte et al. (2017), it has a high level of internal consistency (average value of Cronbach's α coefficient of .86) and high test-retest reliability (average value of .91), and it has widely been used for the evaluation of executive functions; for instance, only in 2014, 153 peer-reviewed papers were published that made use of this instrument (Gioia et al., 2015; Maldonado Belmonte et al., 2017).

3.3. Procedure

The current study is part of a larger project whose primary goal was to improve and adapt the interventions carried out by Asociación Nuevo Futuro –especially its educational reinforcement programme– to the minors' particular needs. All procedures were authorised and approved by the institutions which were in charge of the children who participated in the study and were performed in accordance with the ethical standards of the authors' institution and the 1964 Helsinki declaration and its later amendments. None of the children refused to participate in the study. The administration of SENA and BRIEF-2 was conducted individually with each minor, in the residential care homes and with the help of 36 educators who had previously been given a training course on how to apply the two instruments.

4. Theory calculation

In recent years, there has been a growing interest in providing adequate care to individuals in situations of social deprivation, and particularly to minors in residential care homes within the protection system (Johnson, 2019; Johnson, Strayhorn, & Parler, 2020; Real Fernández, Navarro Soria, Martín-Aragón Gelabert, & Terol Cantero, 2020). In order to address this goal and to design intervention programmes adapted to the needs of these minors, various authors point to the importance of previously determining the impact of adverse situations on children's well-being (Jackson, Gabrielli, Tunno, & Hambrick, 2012) and personal characteristics such as behavioural problems (Bernedo et al., 2014) and cognitive difficulties (Bernier, Carlson, & Whipple, 2010).

These theoretical premises motivated the current study, which attempts to explore the cognitive, emotional, and behavioural profile of minors in residential care homes in Spain. Our hypothesis was that children in residential care would have a differential cognitive, emotional, and behavioural profile and that executive (dys)functions would account for their emotional and behavioural problems –at least to some degree–, given the close link documented in the scientific literature between different executive dysfunctions and adversities experienced by these minors (Lind, Raby, Caron, Roben, & Dozier, 2017). We also expected that gender, age, and length of stay in residential care homes would mediate this relationship, as previous research suggests that these variables might play a role in the emotional and behavioural problems of minors in foster care (Chamberlain, Leve, & Smith, 2006; Fernández-Pinto et al., 2015; Martínez Martínez et al., 2017; Newton et al., 2000; Villegas & Pecora, 2012).

Table 2
Executive profile of the minors (BRIEF-2 Family).

	Mean	SD
Inhibition	63.742	15.244
Self-monitoring	62.311	13.410
Flexibility	65.621	16.127
Emotional control	60.439	14.256
Initiative	61.227	12.003
Working memory	61.644	13.900
Planning and organisation	61.144	11.326
Task supervision	60.045	13.224
Organisation of materials	60.939	15.512
Index of behaviour regulation	64.679	14.620
Index of emotion regulation	64.771	15.986
Index of cognitive regulation	63.206	13.868
Global index of executive functions	66.191	14.491

5. Results

5.1. Emotional, behavioural and executive profile of minors

Descriptive statistics for the BRIEF-2 Family (Table 2) and the SENA Self-report (Table 3) were estimated. In order to allow for comparisons with the normative sample, the typical scores were used and are reported here. The criteria for interpreting BRIEF-2 subscales' typical scores were the following:

- 70: Clinically significant elevation
- 65–69: Potentially clinical elevation
- 60–64: Slight elevation
- 0–59: No apparent clinical significance

For the SENA Self-Report we used the following bands:

- 10–19: Very low
- 20–29: Low (difficulties in developing resources)
- 30–39: Medium low
- 40–59: Medium
- 60–69: Medium high (precautionary area)
- 70–79: High
- 80–90: Very high

The results revealed that minors obtained scores above 60 (slight elevation) in all subscales of BRIEF-2 suggesting that these minors considered themselves as having difficulty regulating and effectively supervising their behaviour (inhibition and supervision), regulating their emotional responses especially in changing situations (flexibility and emotional control), controlling and managing their cognitive processes and solving problems (initiative, working memory, and planning and organisation), as well as in task supervision and organisation of materials. Regarding their emotional and behavioural profile, as assessed with the SENA Self-report, the minors self-reported having a wide range of problems and significant levels of affectation and malaise (global index of problems). In addition, their scores on the index of behavioural problems and the subscales of aggression and antisocial behavior were high (scores above 60).

5.2. Relation between executive functions and emotional and behavioural problems

A summary of correlations between the cognitive, emotional, and behavioural aspects assessed with the SENA Self-report and the BRIEF-2 Family are provided in Table 4. The results showed strong correlations between executive functions and behavioural problems. Specifically, scores on the SENA index of behavioural problems correlated positively with scores on the BRIEF-2 global index of executive functions

Table 3
Emotional and behavioural profile of the minors (SENA Self-report).

	Mean	SD
Global index of problems	61.023	15.669
Index of emotional problems	57.795	13.850
Index of behavioural problems	62.144	17.892
Index of problems in executive functions	58.129	12.899
Index of contextual problems	58.206	16.977
Index of personal resources	43.182	14.780
Depression	58.917	15.917
Anxiety	55.220	12.509
Social anxiety	52.364	11.366
Somatic complaints	54.629	12.033
Post-traumatic symptomatology	58.818	14.593
Attention problems	55.167	11.410
Hyperactivity-impulsivity	57.758	13.229
Anger control problems	59.129	14.986
Aggression	61.083	19.751
Challenging behaviour	57.611	13.498
Problems with family	59.826	17.256
Problems at school	56.462	15.008
Problems with classmates	52.492	16.524
Emotion regulation problems	56.189	14.787
Self-esteem	43.818	15.273
Integration and social competence	40.939	17.763
Awareness of problems	57.113	12.782
Obsession-compulsion	56.864	12.992
Antisocial behaviour	61.427	20.653
Substance use	59.008	17.738
Schizotypy	58.290	16.492
Problems related to alimentary behaviour	54.331	12.692
Sensation seeking	52.298	11.237

($r = .274$, $BF_{10} = 15.369$), the BRIEF-2 emotion regulation index ($r = .271$, $BF_{10} = 14.009$), and the BRIEF-2 behaviour regulation index ($r = .299$, $BF_{10} = 42.350$), and the evidence in favour of the alternative hypothesis ($H1: \rho \neq 0$) was strong ($BF_{10} > 10$). These findings suggest that minors with poor executive functioning skills tend to have more behavioural and emotional problems. In addition, positive and statistically significant correlations were obtained between the SENA index of problems in executive functions and the BRIEF-2 cognitive regulation ($r = .311$, $BF_{10} = 68.794$) and behaviour regulation ($r = .292$, $BF_{10} = 31.884$) indexes.

In order to shed more light on the correlation patterns observed, we conducted several linear regression analyses using the backward elimination method with the SENA indexes of behavioural (Table 5) and emotional problems (Table 6) as the outcome variables and the BRIEF-2 subscales (indexes of cognitive, emotional, and behaviour regulation) as the independent variables. Gender, age, and length of stay (LOS) in foster placements were also introduced into the models.

The results showed that both age and scores on the BRIEF-2 index of behaviour regulation explained 11.8% of the variability in minors' behavioural problems as assessed with the SENA Self-report. In other words, younger minors and those who reported having greater difficulties in efficiently regulating and supervising their behaviour perceived themselves as having more behavioural problems. On the other hand, only age and gender proved to be significant predictors of minors' perception of their emotional problems. These two variables accounted for 10.6% of the variability in scores on the SENA index of emotional problems. Once again, younger minors seemed to have more emotional problems and this pattern was more evident among the female participants.

6. Discussion

The aim of the current study was to analyse the executive, emotional, and behavioural profile of minors in residential care in Spain aged between 13 and 17. Moreover, it sought to determine to what extent executive functions contributed to those minors' behavioural and

Table 4
Relation between behavioural and emotional problems and executive functions.

		1	2	3	4	5	6	7	8	9
1. BRIEF Global index of executive functions	Pearson's r	-	-	-	-	-	-	-	-	-
	BF ₁₀	-	-	-	-	-	-	-	-	-
	Upper 95% CI	-	-	-	-	-	-	-	-	-
	Lower 95% CI	-	-	-	-	-	-	-	-	-
2. BRIEF Cognitive regulation index	Pearson's r	.897***	-	-	-	-	-	-	-	-
	BF ₁₀	1.376e + 44	-	-	-	-	-	-	-	-
	Upper 95% CI	0.925	-	-	-	-	-	-	-	-
	Lower 95% CI	0.854	-	-	-	-	-	-	-	-
3. BRIEF Emotion regulation index	Pearson's r	.771***	.439***	-	-	-	-	-	-	-
	BF ₁₀	8.336e + 23	87841.860	-	-	-	-	-	-	-
	Upper 95% CI	0.830	0.563	-	-	-	-	-	-	-
	Lower 95% CI	0.686	0.285	-	-	-	-	-	-	-
4. BRIEF Behaviour regulation index	Pearson's r	.880***	.648***	.771***	-	-	-	-	-	-
	BF ₁₀	1.548e + 40	1.227e + 14	7.749e + 23	-	-	-	-	-	-
	Upper 95% CI	0.912	0.734	0.829	-	-	-	-	-	-
	Lower 95% CI	0.831	0.531	0.685	-	-	-	-	-	-
5. SENA Global index of problems	Pearson's r	.236	.184	.220	.223	-	-	-	-	-
	BF ₁₀	4.169	0.984	2.550	2.828	-	-	-	-	-
	Upper 95% CI	0.388	0.341	0.374	0.377	-	-	-	-	-
	Lower 95% CI	0.066	0.013	0.049	0.053	-	-	-	-	-
6. SENA Index of problems in executive functions	Pearson's r	.330***	.311***	.221	.292**	.897***	-	-	-	-
	BF ₁₀	166.144	68.794	2.614	31.884	2.188e + 44	-	-	-	-
	Upper 95% CI	0.471	0.454	0.374	0.438	0.924	-	-	-	-
	Lower 95% CI	0.166	0.145	0.050	0.125	0.854	-	-	-	-
7. SENA Index of emotional problems	Pearson's r	.098	.076	.126	.052	.882***	.781***	-	-	-
	BF ₁₀	0.201	0.157	0.304	0.130	6.102e + 40	1.453e + 25	-	-	-
	Upper 95% CI	0.262	0.241	0.289	0.219	0.913	0.837	-	-	-
	Lower 95% CI	-0.074	-0.096	-0.046	-0.119	0.833	0.699	-	-	-
8. SENA Index of behavioural problems	Pearson's r	.274*	.189	.271*	.299***	.873***	.718***	.563***	-	-
	BF ₁₀	15.369	1.106	14.009	42.350	7.390e + 38	1.522e + 19	4.452e + 9	-	-
	Upper 95% CI	0.421	0.346	0.419	0.444	0.906	0.789	0.666	-	-
	Lower 95% CI	0.106	0.018	0.103	0.133	0.821	0.618	0.429	-	-
9. SENA Index of contextual problems	Pearson's r	.190	.192	.152	.122	.751***	.651***	.713***	.618***	-
	BF ₁₀	1.122	1.172	0.477	0.282	9.209e + 21	1.665e + 14	4.386e + 18	2.130e + 12	-
	Upper 95% CI	0.347	0.349	0.313	0.285	0.815	0.736	0.785	0.710	-
	Lower 95% CI	0.018	0.020	-0.021	-0.051	0.660	0.534	0.612	0.495	-
10. SENA Index of personal resources	Pearson's r	-.063	-.031	-.129	-.029	-.235	-.142	-.342***	-.106	-.341***
	BF ₁₀	0.141	0.116	0.318	0.115	4.133	0.398	306.324	0.225	284.138
	Upper 95% CI	0.108	0.140	0.043	0.142	-0.066	0.030	-0.179	0.065	-0.178
	Lower 95% CI	-0.230	-0.199	-0.291	-0.197	-0.386	-0.302	-0.480	-0.269	-0.480

Note. *BF₁₀ > 10, **BF₁₀ > 30, ***BF₁₀ > 100.

emotional problems. Previous empirical evidence suggests that the difficulties and changes experienced by minors in foster care place them at a disadvantageous situation compared to their peers and give rise to a higher rate of cognitive, emotional, and behavioural problems (Martínez Martínez et al., 2017; McDermott et al., 2013; Moreno-Manso et al., 2020).

In accordance with previous research (Bernier et al., 2010), the results of the current study revealed certain cognitive difficulties among the minors who took part in the study. The main areas affected were inhibitory control (for similar results, see Bruce et al., 2013; McDermott et al., 2013; Pears et al., 2010) and awareness of the impact and the consequences of their behaviour on other people. Those minors also exhibited problems in their ability to cope with changing situations or activities and to autonomously initiate tasks, which coincide with previous work suggesting a lack of cognitive flexibility (Lewis-Morrarty et al., 2012; Zima et al., 2000) and lower self-regulation ability (Fisher et al., 2016) among minors in foster care. These findings, along with the difficulties observed in our participants' working memory capacity and

their planning and organisation skills, could be the main factor underlying certain learning difficulties (Berlin, Vinnerljung, & Hjern, 2011; Sandh, Donaldson, & Katz, 2020) that often compromise those minors' school performance, and eventually their successful social integration later in life.

In addition, the results of the current study support the view that minors in foster care present a high rate of behavioural problems associated with the presence of disruptive behaviour that can cause friction with their family and social environment, confirming previous findings (Bernedo et al., 2014; Zima et al., 2000). In particular, the minors who took part in the study tended to exhibit more antisocial and aggressive behaviour –both physical and verbal– compared to the normative group, and these results are congruent with Palacios et al.'s (2013) findings, who also observed a lower level of social competences among minors in foster care.

As for emotional control, inconsistent results were obtained depending on the instrument used. While scores derived from BRIEF-2 indicate lower emotional control among the minors who took part in

Table 5
Contribution of behaviour, emotion, and cognitive regulation to behavioural problems as assessed with the SENA Self-report.

Model		B	SE B	t	p	F	R ²	Adj. R ²
1	(Intercept)	68.431	17.998	3.802	< .001	3.067	.362	.131
	Age	-1.897	0.974	-1.948	.054			
	Gender	3.909	3.050	1.281	.202			
	LOS	8.775e-4	0.047	0.019	.985			
	Behaviour regulation	0.257	0.196	1.312	.192			
	Emotion regulation	0.079	0.153	0.518	.605			
2	(Intercept)	68.392	17.803	3.842	< .001	3.711	.362	.131
	Age	-1.893	0.952	-1.988	.049			
	Gender	3.908	3.038	1.287	.201			
	Behaviour regulation	0.257	0.193	1.337	.184			
	Emotion regulation	0.079	0.150	0.523	.602			
	Cognitive regulation	-0.021	0.145	-0.144	.886			
3	(Intercept)	67.880	17.376	3.907	< .001	4.670	.362	.131
	Age	-1.893	0.948	-1.996	.048			
	Gender	3.868	3.013	1.284	.202			
	Behaviour regulation	0.243	0.162	1.501	.136			
	Emotion regulation	0.081	0.149	0.547	.585			
	Cognitive regulation	-0.021	0.145	-0.144	.886			
4	(Intercept)	69.941	16.916	4.135	< .001	6.161	.359	.129
	Age	-1.965	0.936	-2.098	.038			
	Gender	3.780	3.000	1.260	.210			
	Behaviour regulation	0.310	0.105	2.954	.004			
	Emotion regulation	0.081	0.149	0.547	.585			
	Cognitive regulation	-0.021	0.145	-0.144	.886			
5	(Intercept)	70.313	16.952	4.148	< .001	8.409	.343	.118
	Age	-1.904	0.937	-2.031	.044			
	Behaviour regulation	0.319	0.105	3.040	.003			

the study, their scores on SENA were below the precautionary area. This inconsistency could be attributed either to emotional instability which is typical in adolescents, or to the fact that while BRIEF-2 assesses the efficiency of cognitive regulation of emotions, the SENA index of emotional problems is an indicator of the degree of emotional alterations and symptomatology related to the most prevalent affective disorders, such as depression and anxiety.

The results also provide support for the important contribution of executive functions to the behavioural problems usually present in minors in foster care, which is in line with Pears et al.'s (2010) findings. They further argue that there is a greater prevalence of behavioural problems among younger minors, which contradicts previous studies reporting an increase in behavioural problems with age (Fernández-

Pinto et al., 2015). This result could be due to the fact that the most significant increase in behavioural problems occurs between 13 and 15 years of age, and it begins to decrease after this age (Fernández-Pinto et al., 2015).

On the other hand, only age and gender proved to be significant determinants of minors' emotional problems. Specifically, emotional problems were more evident among younger minors and also among females. These results are consistent with those obtained by Achenbach and Ndeti (2018) and Villegas and Pecora (2012), as well as with studies suggesting that the evolutionary development of executive functions improves emotional and behavioural control (Kavanaugh & Holler, 2015; Vasilevski & Tucker, 2016).

However, the present study is not without limitations that must be

Table 6
Contribution of behaviour, emotion, and cognitive regulation to emotional problems as assessed with the SENA Self-report.

Model		B	SE B	t	p	F	R ²	Adj. R ²
1	(Intercept)	81.641	13.777	5.926	< .001	3.315	.140	.098
	Age	-1.965	0.745	-2.637	.009			
	Gender	6.938	2.335	2.971	.004			
	LOS	-0.010	0.036	-0.286	.775			
	Behaviour regulation	-0.212	0.150	-1.414	.160			
	Emotion regulation	0.175	0.117	1.497	.137			
2	(Intercept)	82.099	13.633	6.022	< .001	3.991	.140	.105
	Age	-2.006	0.729	-2.751	.007			
	Gender	6.947	2.326	2.987	.003			
	Behaviour regulation	-0.219	0.147	-1.482	.141			
	Emotion regulation	0.180	0.115	1.561	.121			
	Cognitive regulation	0.075	0.111	0.680	.498			
3	(Intercept)	83.950	13.330	6.298	< .001	4.895	.136	.109
	Age	-2.008	0.728	-2.760	.007			
	Gender	7.093	2.311	3.069	.003			
	Behaviour regulation	-0.165	0.124	-1.328	.187			
	Emotion regulation	0.170	0.114	1.492	.138			
	Cognitive regulation	0.075	0.111	0.680	.498			
4	(Intercept)	80.385	13.096	6.138	< .001	5.903	.124	.103
	Age	-1.974	0.729	-2.707	.008			
	Gender	6.833	2.310	2.958	.004			
	Behaviour regulation	-0.165	0.124	-1.328	.187			
	Emotion regulation	0.170	0.114	1.492	.138			
	Cognitive regulation	0.075	0.111	0.680	.498			
5	(Intercept)	86.023	10.649	8.078	< .001	8.609	.120	.106
	Age	-2.113	0.704	-3.002	.003			
	Gender	6.863	2.305	2.977	.003			

acknowledged and adequately addressed in future work. For instance, the sample size was moderate and the data collection was carried out at foster homes founded by Asociación Nuevo Futuro. A larger sample size with the participation of more residential care centres would help to improve the generalisability of the findings. Also, in view of a future replication study, information about children's family history and experience of abuse or maltreatment should be gathered and included in the analysis, since these variables could modulate the evolution of the problems observed. Another limitation of this study is its cross-sectional design. Undoubtedly, a longitudinal design would provide essential information about the evolution of executive, behavioural, and emotional problems experienced by minors in foster care.

7. Conclusions

The results of the current study suggest that minors in foster care have higher rates of behavioural and cognitive difficulties compared to the normative group. In addition, they point to the important contribution of executive functions to those minors' behavioural problems. These results highlight the need to develop specific intervention programmes for minors in residential care homes, to take into account their needs, as well as the protective factors that could enhance their educational and social development. One of these factors is the degree of resilience, that is, the ability for adaptation and resistance of the minors in foster homes. Previous findings (see, for instance, Palacios et al., 2014) are quite promising, since they show that minors have the ability to move forward, become integrated, and socialise. The results of the present study also suggest that educational intervention programmes for children in residential care homes should take into account minors' age and gender differences and, at least, incorporate tools that provide these children with strategies aiming at helping them to improve their executive functions. Activities designed as part of these reinforcement programmes should be aimed towards helping minors to (a) identify and replace impulsive behaviours with more adaptive ones; (b) understand and monitor the way their behaviour affects other people; (c) reinforce flexible thinking and their ability to adapt to new or changing situations; (d) sustain their effort throughout an assignment or task; (e) think about their own emotions and be able to distinguish them; (f) express anger appropriately; (g) become aware of their thoughts and how these thoughts influence on the way they feel; (h) coordinate efficiently the steps or actions required to solve a problem or a difficult situation; (i) improve their working memory capacity (e.g. through information processing strategies); (j) boost their planning skills (e.g. by breaking down a task into small steps and setting priorities). Ultimately, any intervention action for minors in residential care homes within the protection system should attempt to foster their executive functions, which eventually would have a positive effect on their behavioural control, as supported by the findings of the current study.

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Compliance with Ethical Standards

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: The study focused on minors in residential care homes. Permission to conduct the study was obtained by the Dirección General de Servicio para las Familias y la Infancia (Ministerio de Salud, Servicios Sociales e Igualdad).

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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