



Grade Retention Impact on Academic Self-concept: A Longitudinal Perspective

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Abstract

The long-term effects on academic self-concept of grade retention are unclear. The objective is to examine the progression of academic self-concept in relation to school performance for retained students and non-retained students. The academic self-concept of 5712 students (1381 retained students) was evaluated at the fourth and eighth grade of compulsory school. Academic performance was also examined at a third point: sixth grade. Latent Class Analysis and Latent Transition Analysis were used to examine the transitions between the latent groups of academic self-concept. A BCH-LTA estimation for a distal outcomes was used to examine the influence of academic self-concept on school performance. Three latent groups of academic self-concept were identified. The transitions indicated a reduction in academic self-concept over time which was greater in retained students. School performance fell over time and was related to academic self-concept. These findings have significant implications in relation to grade retention and its negative impact on students' academic self-concept.

Keywords Academic self-concept · Grade retention · Academic performance · Longitudinal

School performance and motivation are two heavily researched variables in educational psychology. One of the motivational variables that has been shown to be strongly related to school performance is academic self-concept (Hansen & Henderson, 2019; Herrera et al., 2020; Marsh & Martin, 2011). Self-concept has a hierarchical structure that following the model from Shavelson et al. (1976), places a general self-concept at the top of the hierarchy, while at a lower level it proposes two types of self-concepts, academic and non-academic. Academic self-concept refers to the perception of the student's abilities in the school environment (Marsh & Seaton, 2013). It can relate either to a specific area (such as mathematics) or to overall academic

performance (Marsh et al., 2008). Academic self-concept not only has a clear, positive correlation with academic performance (Chapman et al., 2000; Jaiswal & Choudhuri, 2017; Marsh & Craven, 2006), but also has better predictive power than intelligence or socioeconomic status when it comes to whether students will pursue higher education (Álvarez-Díaz et al., 2021; Guay et al., 2004; Kobol & Musek, 2001; Marsh and O'Mara, 2010; Parker et al., 2012). In addition, it has shown positive correlations with non-academic outcomes in adulthood, such as higher psychological well-being and better work-related performance (Marsh, 2007; Marsh & Seaton, 2013).

Three models have been developed based on how the relationship between academic self-concept and school performance is conceptualised (Seaton et al., 2014; Valentine et al., 2004). The first model proposes that academic self-concept influences school performance (Marsh, 1990; Marsh & Martin, 2011). The second model, however, states that school performance affects academic self-concept (Helmke & van Aken, 1995; Marsh et al., 2012; Retelsdorf et al., 2014). The third model, finally, proposes a bi-directional model in which both variables mutually reinforce each other (Marsh & Craven, 2006; Marsh & Martin, 2011; Valentine

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et al., 2004). Most research supports this last model (Huang, 2011; Valentine et al., 2004).

Although the nature of the relationship between academic self-concept and achievement is controversial, this study will focus on the long-term consequences, as these are still unclear since most research consists of cross sectional studies (Huang, 2011). However, in recent years, the number of longitudinal studies has increased. Some of this new research follows a particular statistical method known as Latent Transition Analysis (LTA; Castejón et al., 2016; King & McInerney, 2014; Zhang et al., 2016), which is an adaptation of Latent Class Analysis (LCA) for longitudinal studies. LTA allows researchers to analyse the transitions between latent classes over time (Collins & Lanza, 2010). In this way, it is possible to categorise students into groups based on their academic self-concept and at the same time examine their transition between these groups over time. Moreover, since the items of the questionnaire assess different aspects of academic self-concept, we can find out the characteristics of each group (e.g. whether individuals with low academic self-concept perceive that their relatives think they are good students, whether their teachers think so, and even what they themselves think about their performance). For this purpose, it is essential to use the tool LCA, which allows us to determine the probability of agreement with each item in each of the latent classes.

Similarly, grade retention is also an important outcome to take into consideration on the relationship between self-concept and school performance. In brief, retained students are those that fail to reach the academic standards needed to continue into the subsequent school year and must remain in the same grade for another year. The argument for such practice is that it gives students a second opportunity to assimilate the concepts that they did not acquire the first time around (Lorence, 2006). However, grade retention has been heavily criticised, as many studies have noted its negative consequences such as poor emotional adjustment and deteriorating academic performance over time (Ehmke et al., 2010; Jimerson, 2001; Mathys et al., 2019; Postigo et al., 2022). For example, in the meta-analysis carried out by Jimerson (2001), the author found that, short term, retained students shown improved performance and emotional adjustment; however, long-term, studies shown that retained students had higher chance of dropping out than non-retained students. Moreover, academic self-concept remains low among retained students (Klapproth et al., 2016; Peixoto et al., 2016; Robles-Piña, 2011).

Therefore, a longitudinal study that distinguishes between retained and non-retained students may help to understand the effect of grade retention on the relationship between academic self-concept and academic performance. In this context, the aim of this study is to examine at different time-points the relationship between academic performance and

academic self-concept for both retained and non-retained students. This general objective could be divided into four specific objectives: (1) Determine whether it is possible to distinguish different latent classes based on each individual's academic self-concept at each timepoint and their defining characteristics; (2) to analyse the extent to which students' academic self-concept changes (transitions) between each timepoint; (3) to compare such changes (transitions) between retained students and non-retained students; and (4) to analyse the changes on academic performance over four years based on the transition of academic self-concept.

Method

Participants

The sample was made up of a total of 5712 (1381 retained students) attending students in the Principality of Asturias, a region in northern Spain. This sample comprised all registered students attending school in the geographical region and was thus considered a complete population. The students were assessed at two timepoints four years apart. The first assessment took place in fourth grade, with a mean age of 9.9 years ($SD=0.41$). The second assessment took place in the eighth grade, with an average age of 13.87 ($SD=0.82$). All retained student had repeated at least one year between fourth and eighth grade. Non-retained students were assessed in the eighth grade along with other age-matched students. On year later, the retained students, who were then in eighth grade, were assessed with their new class reference group. This new class reference group was therefore one year younger than them. The majority of students (92.7%) were of Spanish origin, and 49.6% were girls.

Instruments

Academic Self-Concept Scale

Academic self-concept was measured using five items: 1) I learn lessons easily, 2) I get good marks, 3) I am a good student, 4) The teachers think I am a good student, and 5) My family think I am a good student. Despite the small number of items, the scale demonstrates good reliability ($\alpha=0.87$) and is essentially unidimensional, as the first factor explains 58.7% of the total variance. Students rated each statement on a four-point Likert-type scale (0–3) where 0 = “never or almost never”, 1 = “sometimes”, 2 = “often”, and 3 = “always or almost always”. To make results more understandable, the LTA was carried out with the items recoded so that 0 and 1 meant “little agreement” while 2 and 3 meant “strong agreement”. Once dichotomised, the test demonstrated good internal consistency ($\alpha=0.76$) at the first timepoint and was

essentially unidimensional (Calderón et al., 2019; Ferrando et al., 2022), with the first factor explaining 52% of the total variance and very good fit indices (CFI = 0.997 and RMSEA = 0.047). Similar results were observed at the second timepoint. Internal consistency was good ($\alpha = 0.82$), the first factor explained 56% of the total variance, and the indices of fit were excellent (CFI = 0.999 and RMSEA = 0.065). This scale has also shown adequate evidence of convergent validity with variables such as academic expectations and effort (Suárez-Álvarez et al., 2014).

Retained Variable

Grade retention was evaluated by a dichotomous variable depending on whether the student had repeated at least one school year during the evaluation period of the study, where 0 is “non-repeater” and 1 is “repeater”.

School Performance

School performance was measured using the school grades in Spanish Language and Mathematics (GPA; *Grade Point Average*) in the corresponding timepoint (fourth, sixth and eighth grade). GPA ranged from 0 to 10, where 0 indicates a very poor performance, and 10 is outstanding performance.

Socioeconomic and Cultural Index (SECI)

The Socioeconomic and Cultural Index (SECI) has been developed with data regarding the level of studies and professions of the students’ parents (Peña-Suárez et al., 2009). Information was reported by the teacher–tutor of each student who participated in the evaluation. Thus, a scale was constructed following normal distribution [$N(0, 1)$]. Through an Exploratory Factor Analysis, it was estimated that the SECI is essentially one-dimensional, for the following statistical reasons: The optimal implementation of the Parallel Analysis (Timmerman & Lorenzo-Seva, 2011) recommended a single factor, the percentage of variance explained by the first factor is very high (61.41%), the one-dimensionality indices are adequate ($UniCo = 0.952$; $MIREAL = 0.307$; Calderón et al., 2019; Ferrando et al., 2022), and the fit indices of the one-dimensional model are very good (CFI = 0.977; RMSR = 0.049).

Procedure

The data collection was carried out within the framework of the *Diagnostic Evaluation of the Education System* program of the Asturian Government Department of Education. It is a large-scale group score assessment, in which cognitive tests and student context questionnaires are applied to participating students. By law, the test is controlled by the Asturian

Department of Education and is performed in accordance with the manual of *Instructions for carrying out the diagnostic evaluation* (Government of the Principality of Asturias, 2018). The school principals managed and coordinated the battery’s application within their schools, and the school also inspectorate monitors’ quality.

The student context questionnaire, which included the items making up the Self-concept Scale, was applied at the two timepoints (fourth and eighth grades) under the same conditions. School grades were parallel obtained from the Department of Education records system at the three timepoints (fourth, sixth and eighth grade).

Data Analysis

To determine the underlying students’ groups based on levels of self-concept, we used LCA. Because of the longitudinal nature of the study, we complemented that with a LTA analysis to examine the changes in group composition between the two study timepoints (fourth and eighth grades).

First, we determined the best latent class model at each timepoints according to the scores in academic self-concept. The idea is to group students with similar profiles in terms of the indicator variables (Vermunt & Magidson, 2002). We specified models between 2 and 5 latent classes. As indices of fit we considered both the *Bayesian Information Criterion* (BIC) as well as its sample adjusted version (ABIC) and the *Akaike Information Criterion* (AIC). The lower the values of BIC, ABIC and AIC, the better the fitness of the model. We also used entropy as an indicator of fit, which values between 0 and 1. A higher value of entropy indicates better separation between the latent classes, and the recommendation is that it should be greater than 0.70 (Collins & Lanza, 2010; Lanza & Cooper, 2016).

The next step was to perform the LTA analysis, which would give us the probabilities of transition between the latent classes at the two timepoints. To put it another way, it provides an indication of the extent to which students change groups over time (Collins & Lanza, 2010; Lanza et al., 2013). The latent classes were defined according to the probability of changing between groups. The LTA was performed for the complete sample and for the retained students and the non-retained students separately in order to compare the transitions between retained and non-retained students between the two timepoints. This will show whether the transitions in academic self-concept are different depending on having been retained a year or not during the four years of the study.

Once the academic self-concept transitions were analysed at the two timepoints, we looked at whether the groups making up the transitions differed in school performance over the four years, considering retained students and non-retained students together. To do that, academic performance has

been further analysed based on the latent classes of academic self-concept by considering the probability of each student belonging to each latent transition group. We analyse the BCH-LTA estimation for a distal outcomes (academic performance in three times [4^o, 6^o and 8^o grade]. An LTA model is estimated in the first step. In the second step we estimate the mean of these distal outcomes in every pattern/combination of latent class values (Asparouhov & Muthén, 2014).

All of the analyses were carried out using MPLus8 (Muthén & Muthén, 2017).

Results

We specified models between 2 and 5 latent classes at the two timepoints (Table 1). The 3-class model gave the best fit (lowest AIC, BIC, and ABIC) at timepoint 1, and the

4-class model gave the best fit at timepoint 2. We chose to use the model with 3 latent classes at both timepoints. Despite the 4-class model demonstrating better fit at the second timepoint, the size of one of the groups was below 5%, so could not be considered representative (Lanza et al., 2010). Entropy was greater than 0.70 at both timepoints, indicating good separation between the latent classes (Lanza & Cooper, 2016).

Once we had chosen the 3-class model, we considered the item response probabilities to define them, both at timepoints 1 and timepoints 2 (Figs. 1 and 2). The probabilities related to the level of agreement with each statement (item) about academic self-concept. The model indicated 3 well-differentiated groups. At both timepoints, the black line represents the first latent class that we called *High self-concept* ($N_{T1} = 69.6\%$; $N_{T2} = 43.2\%$), made up of students who were likely to respond with “strong agreement” to the five items ($M_{T1} = 0.96$; $M_{T2} = 0.95$). In the

Table 1 Fit in time 1 and time 2 of latent class analysis models

Class	Time 1				Time 2			
	2	3	4	5	2	3	4	5
AIC	28,674.412	28,465.295	28,466.014	28,469.119	32,785.391	32,238.177	32,193.022	32,200.600
BIC	28,749.698	28,581.646	28,623.430	28,667.601	32,859.515	32,352.733	32,348.010	32,396.019
ABIC	28,714.743	28,527.624	28,550.342	28,575.446	32,824.560	32,298.711	32,274.922	32,303.865
Entropy	.833	.706	.738	.789	.847	.722	.706	.639

The LCA model chosen at each timepoint is shown in bold

AIC Akaike information criterion, BIC Bayesian information criterion, ABIC Sample-size adjusted BIC

Fig. 1 Model with Three Latent Classes in 4th Grade. *Note* The wording of each item is as follows: 1) I learn lessons easily, 2) I get good marks, 3) I am a good student, 4) The teachers think I am a good student, and 5) My family think I am a good student

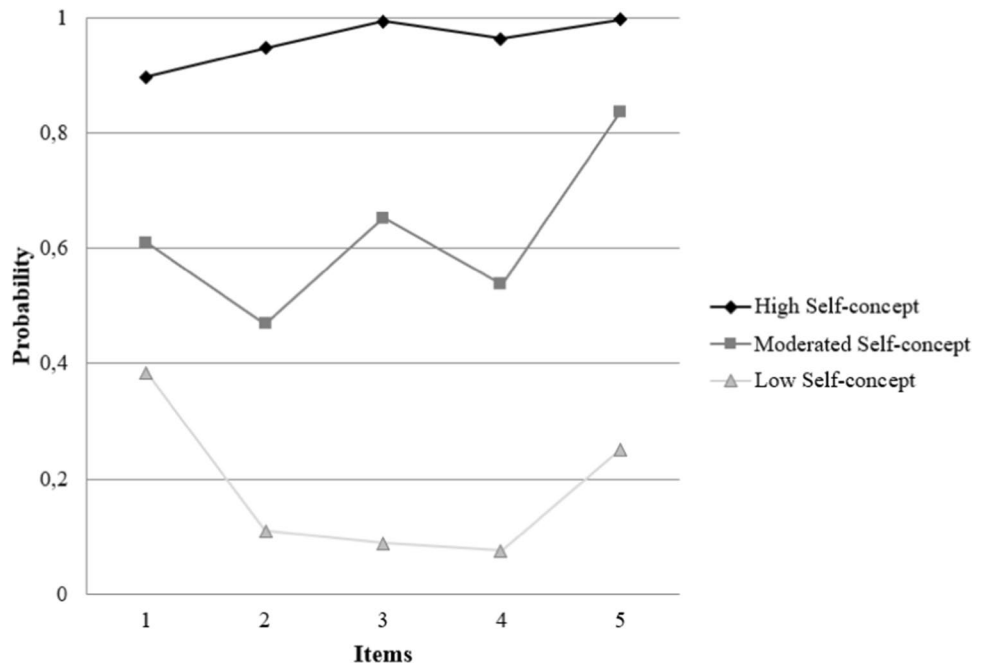
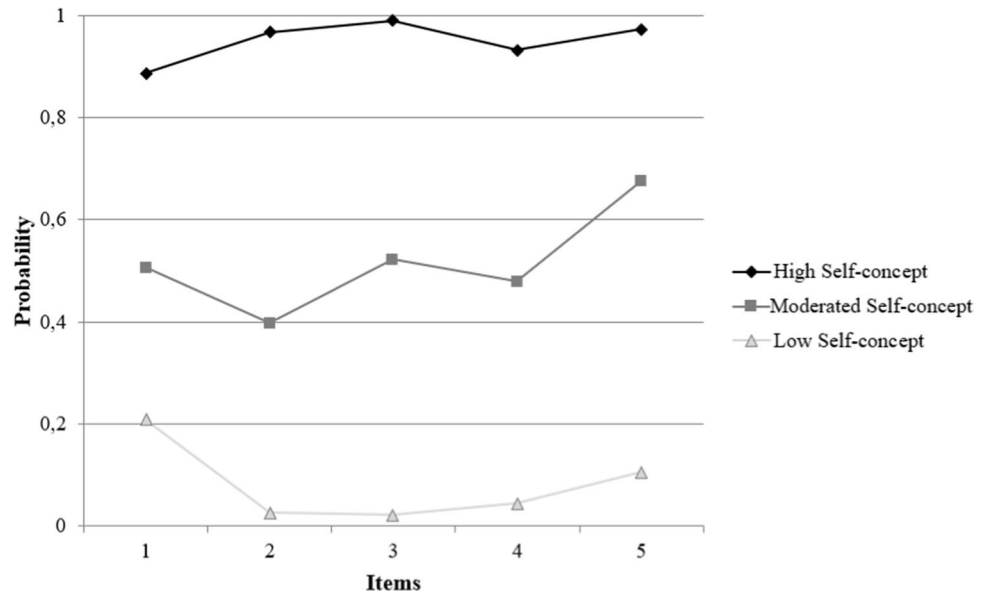


Fig. 2 Model with Three Latent Classes in 8th Grade. *Note* The wording of each item is as follows: 1) I learn lessons easily, 2) I get good marks, 3) I am a good student, 4) The teachers think I am a good student, and 5) My family think I am a good student



High Self-concept group, both the personal items and the teacher- and family-related items have a very high level of agreement. We called the second latent class (dark grey line) *Moderated self-concept* ($N_{T1} = 20.4\%$; $N_{T2} = 29.3\%$) as they were moderately likely to agree with the five items ($M_{T1} = 0.62$; $M_{T2} = 0.52$). Greater variability is observed in this group. In particular, the likelihood of agreement is high for the items related to their personal perceptions (item 1 “I learn quickly” and 3 “I am a good student”) and their family (item 5 “My family thinks I am a good student”). In contrast, the likelihood of agreement with the items directly related to their performance and recognition at school is lower (item 2 “I get good grades” and

4 “The teachers think I am a good student”). The third latent class, the light grey lines, exhibited very low likelihood of agreeing with the academic self-concept items ($M_{T1} = 0.18$; $M_{T2} = 0.08$), especially items 2, 3 and 4, so we labelled them *Low self-concept* ($N_{T1} = 10\%$; $N_{T2} = 27.5\%$). The probabilities in each group were very similar at the two timepoints, suggesting that they referred to the same latent classes of self-concept in both the fourth and the eighth grade.

Once we had defined the groups, we examined the students’ transitions between the two timepoints, the fourth and the eighth grade with the whole sample and by dividing the sample between students who had not repeated a school year

Table 2 Probabilities of transition of academic self-concept latent classes between the two timepoints and number of students in each of the transition groups

			Time 2		
			High self-concept	Average self-concept	Low self-concept
Time 1	High self-concept	Retained	.023	.509	.468
		Non-retained	.782	.002	.216
		Total	.519	.318	.163
		n (%)	2372 (41.5%)	1332 (23.3%)	624 (10.9%)
	Moderated self-concept	Retained	.216	.098	.686
		Non-retained	.427	.397	.176
		Total	.164	.375	.461
		n (%)	163 (2.9%)	409 (7.2%)	597 (10.5%)
	Low self-concept	Retained	.169	.359	.473
		Non-retained	.154	.311	.536
		Total	.081	.143	.777
		n (%)	13 (0.2%)	22 (0.3%)	180 (3.2%)

Retained students: $n = 1381$

between fourth and the eighth grade (non-retained students), and students who had repeated at least one of those four school years (retained students) (Table 2). Students’ self-concept lowered over the four school years. The most stable group was the *Low self-concept* group, who had a probability of 0.777 of remaining in the group. The *Moderated self-concept* group had a probability of 0.461 of moving to the *Low self-concept* group after four years. Lastly, the *High self-concept* group had a probability of 0.318 of moving to the *Moderated self-concept* group. The number of students in each of the transition groups is given also in Table 2.

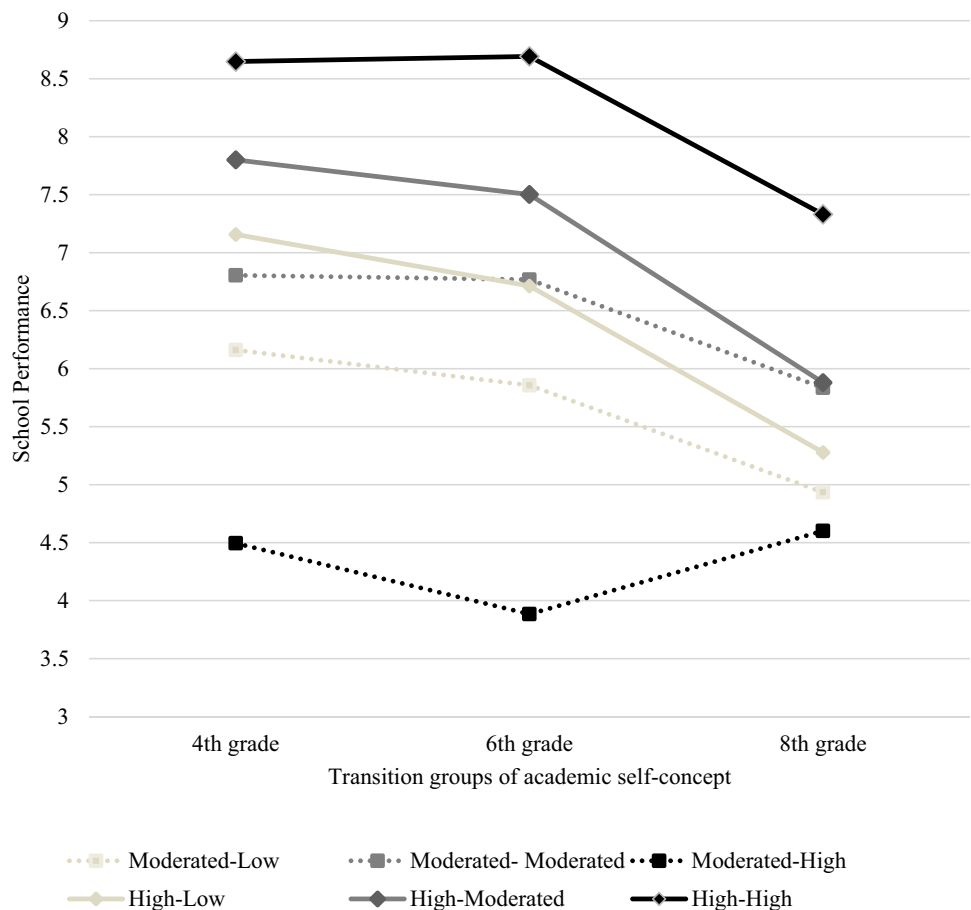
Table 2 shows the transitions of the non-retained students, which indicates that there was greater transition towards increased academic self-concept than in the overall sample (e.g. the probability of remaining in the *High self-concept* group was 0.782 for non-retained students compared to 0.519 for the overall sample). This is consistent with retained students, for example, being very unlikely to remain in the *High self-concept* group (0.023), and the transitions to the *Low self-concept* group standing out.

Finally, we examined the school performance over time of each transition group of academic self-concept. In general terms, there are three notable aspects to this result. Firstly, the groups with greater self-concept tended to perform

better than the other groups. Secondly, the groups with high academic self-confidence at the first timepoints and whose academic self-concept was lower at the second timepoints exhibited a marked reduction in school performance. Finally, the groups with a moderate level of academic self-concept at the first timepoint who maintained or increased their levels of academic self-concept at the second timepoint exhibited stable levels of school performance over the three assessments (fourth, sixth and eighth grade). However, the groups who started with a moderate level of academic self-concept which then decreased at the second timepoints did exhibit a marked reduction in performance.

These results are displayed graphically in Fig. 3, which shows the longitudinal relationship of school performance at the three evaluation timepoints according to the academic self-concept transition group (9 transition groups). The y axis only gives the grades between 4.5 and 8.5 (out of 10) as there were no grades outside this range.

Fig. 3 Relation between Academic Self-Concept and Scores in Mathematics and Spanish Language over Four Years. *Note* The Low-Average, Low-Moderate and Low-High transition groups have been eliminated as they are not representative of the student population (they consisted of less than 5% of the population)



Discussion

The aim of this study was to examine the change in academic self-concept between the fourth and eighth grades of compulsory school, both among students who repeated at least one school year and among students who did not, and its relationship with school performance. In order to do that, we first carried out a latent class analysis. The model that fitted best at the two timepoints was the three-class model, defined as: *High self-concept*, *Moderated self-concept* and *Low self-concept*. In the case of the students with *High Self-concept*, all items were high, both those related to their academic self-perception and those related to how other people perceive them academically. In contrast, for the *Moderated Self-concept* group, the items related to their own and their family's perceptions had a high likelihood of agreement and the items related to their academic performance and recognition were low. This could be related to a protective role of the family in academic self-concept (Basharpour, 2022). Finally, although the *Low Self-concept group* has the probability of agreeing with item 1 "I learn quickly", the remaining items have a very low probability. As in the previous case, this may be related to the negative role of the family, as it is not supportive.

The next step was to examine the transitions between the different self-concept groups over time. A general trend of decreasing self-concept over time was observed. Looking at the overall sample, the most stable group is *Low self-concept*, as students who belonged to this group at the first timepoints, generally remained in the same group at the second timepoints. However, in terms of transitions between groups, students were more likely to drop from the *High self-concept* to the *Moderated self-concept* and from the *Average self-concept* to the *Low self-concept*.

This general decline in self-concept has also been found in previous longitudinal studies (Becker & Neumann, 2018; Han, 2019). One possible explanation relates to the changes associated with entering preadolescence in eighth grade. Such transition involves not only cognitive, social and emotional changes, but also relates to changes in the concept of oneself and of the world (Alsaker & Olweus, 2002; Hines, 2007). Another explanation for the differences in self-concept at the second timepoints (eighth grade) could be due to the change of educational phase in Spain (from primary to secondary school). Thus, students in eighth grade, face more difficult content, which may contribute to greater differentiation between students (Marsh, 2007).

When analysing the results distinguishing between retained and non-retained students, different outcomes were observed. In the case of non-retained students, the most stable group was *high self-concept*; however, students were more likely to transition from the *Moderated self-concept*

to the *High self-concept group*. As for retained students, the most stable group was *Low self-concept*, while the most likely transition was from the *Moderated self-concept* to the *Low self-concept*.

As we can see, the distinction between retained and non-retained students can be useful in understanding the results obtained in the overall sample. Retained students tend to stay in their group or move to a lower self-concept group, while non-retained students tend to stay in their group or move to a higher self-concept group. This result is consistent with other longitudinal studies (Klapproth et al., 2016; Kretschmann et al., 2019; Peixoto et al., 2016; Postigo et al., 2022) specially with Green et al. (2012), in which the authors found a tendency for those with lower self-concept and academic performance to be stuck in a vicious circle. In other words, having low self-concept leads to a poor attitude and worse performance in class, which in turn produces reduced academic performance. This tendency to get stuck in a negative vicious circle could explain the results obtained in our study. However, some longitudinal studies have found that, while retained students were observed to academically perform worse over time, their academic self-concept did not change (Lamote et al., 2014).

Finally, we examined whether experiencing a given transition in academic self-concept from one of the six possibilities (the Low-Average, Low-Moderate and Low-High transition groups have been eliminated as they are not representative of the student population because they consisted of less than 5% of the population) was related with a change in school performance. These results can be summarised in three points. Firstly, group transitions that showed a high academic self-concept performed better in school than the other groups. Secondly, a marked decrease in GPA was observed among students who moved from *High self-concept* to *Moderated self-concept* and *Low self-concept*. Previous longitudinal studies such as Becker and Neumann (2018) and others (Grygiel et al., 2017; Liu et al., 2005; Niepel et al., 2014) have also found a clear correlation between high self-concept and performance, with a marked decrease in both at the beginning of secondary school. An explanation for this phenomenon can be found in Grygiel et al. (2017). In their study, the authors found that both academic performance and self-concept decreased because students tend to overestimate their abilities in the early years of primary school due to a lack of self-critical capacity. Finally, the group with the most atypical trend is the *Moderated-high Self-concept* transition group in which the students remained practically in the same grade from the fourth to the eighth grade. Further research is needed to find out what is going on in this group, but it may indicate an unrealistic assessment of their abilities, which teachers and families do not disagree with.

In summary, there seems to be a relationship between academic self-concept and performance which differs depending on the time of evaluation and on the condition of being a retained student or not. This result raises a question about the effectiveness of grade retention for improving performance, as retained students often find themselves in a vicious circle of lower self-concept and thus lower performance. In other words, repeating a school year (due to poor academic performance) reduces students' academic self-concept. This, in turn, will become a burden in subsequent stages of education, where the added academic demands of secondary school will lower the student's academic self-concept and, therefore, lead to an academically damaging situation. This may be important when assessing the level of academic self-concept and intervening to promote it during the educational stage.

One limitation of our study is that self-concept was only measured at two timepoints, while academic performance was measured three times. Another limitation is that the sample, which is made up of students from northern Spain, has a particularly high percentage of retained students (approx. 25%), which could affect the generalisability of the results. Although these results are difficult to generalise globally, the large number of retained students provides a particularly interesting insight into the impact of grade retention and can be extrapolated to regions with high grade retention rates. Besides, relevant interpersonal factors which have been observed to influence academic self-concept were not taken into account. Such variables include family support and teacher expectations (Fernández-Lasarte et al., 2020; Helm et al., 2020; Mortimer et al., 2017; Sadoughi & Hejazi, 2021; Schwabe et al., 2019; Szumski & Karwowski, 2019; Westphal et al., 2020). Moreover, it would be important to consider other, non-cognitive variables that have been shown to be strongly related to self-concept. One example is grit, as students with passion and perseverance in the pursuit of long-term academic objectives has shown both high academic self-perception and results (Morales-Vives et al., 2020; Postigo et al., 2021a, 2021b; Vazsonyi et al., 2019) or the emotional development (Llorent et al., 2020). Finally, a limitation and a future direction of study are to analyse the bi-directional relationship between academic self-concept and achievement and not only its longitudinal development.

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Author Contributions All authors whose names appear on the submission: 1) made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data; or the creation of new software used in the work; 2) drafted the work or revised it critically for important intellectual content; 3) approved the

version to be published; and 4) agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Data Availability The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare that there are no conflicts of interest.

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