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Differences in causal attributions of academic performance in secondary school students with learning difficulties based on the type of difficulty and their engagement in other rewarding activities

Diferencias en las atribuciones causales del rendimiento académico en alumnos de secundaria con dificultades de aprendizaje en función del tipo de dificultad y de su participación en otras actividades gratificantes

Diferenças nas atribuições causais do desempenho acadêmico em alunos dos anos finais do fundamental e ensino médio com dificuldades de aprendizagem, em função do tipo de dificuldade e de sua participação em outras atividades gratificantes

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Abstract

This study analyses causal attributions in secondary school students and whether these attributions vary according to the type of difficulty, as well as to success in other areas of personal performance. Patterns of causal attributions and their relation to academic performance and to participation in sports and artistic activities, were assessed on a sample of 371 students aged 13 to 16, of whom 67 were diagnosed with learning difficulties. Results show that the greater the difficulty, the greater the attribution in considering effort as the main cause for achieving success in their learning process; no differences were found by the type of difficulty. Likewise, findings indicate that when students with learning difficulties feel competent in non-academic areas, they can develop better predisposition to achievement. This could have an impact on their ability to cope with learning, their perception of competence and self-regulation processes.

Keywords: motivation; learning difficulties; causal attributions

Resumen

Este estudio analiza las atribuciones causales en alumnos de educación secundaria y si estas atribuciones varían de acuerdo con el tipo de dificultad, así como al éxito o no en otras áreas de desempeño personal. A partir de una muestra de 371 alumnos entre 13 y 16 años, 67 de ellos con diagnóstico de dificultades de aprendizaje, se evaluaron los patrones de atribuciones causales y su relación con el rendimiento académico, como con su participación en actividades deportivas y artísticas. Los resultados muestran que a mayor dificultad mayor la atribución en considerar el esfuerzo como causa principal para alcanzar éxitos en su proceso de aprendizaje; no encontrándose diferencia en función del tipo de dificultad. Asimismo, cuando los alumnos con dificultades en el aprendizaje se sienten competentes en áreas no académicas, pueden desarrollar una mejor predisposición al logro. Esto impactaría en sus capacidades para enfrentar los aprendizajes, su percepción de competencia y procesos de autorregulación.

Palabras clave: motivación; dificultades de aprendizaje; atribuciones causales

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Resumo

Este estudo analisa as atribuições causais em alunos dos anos finais do fundamental e ensino médio e se estas atribuições variam de acordo com o tipo de dificuldade, bem como o sucesso ou não em outras áreas de desempenho pessoal. A partir de uma amostra de 371 alunos entre 13 e 16 anos, 67 deles com diagnóstico de dificuldades de aprendizagem, se avaliaram os padrões de atribuições causais e sua relação com o desempenho acadêmico, bem como com sua participação em atividades esportivas e artísticas. Os resultados mostram que quanto maior a dificuldade, maior a atribuição do esforço como principal causa de sucesso em seu processo de aprendizagem; não foram encontradas diferenças de acordo com o tipo de dificuldade. Da mesma forma, quando os estudantes com dificuldades de aprendizagem se sentem competentes em áreas não acadêmicas, eles podem desenvolver uma melhor predisposição para o sucesso. Isto impactaria em sua capacidade para enfrentar a aprendizagem, sua percepção de competência e processos de autorregulamentação.

Palavras-chave: motivação; dificuldades de aprendizagem; atribuições causais

Making students with learning difficulties (LD) feel motivated in the pursuit of academic achievement is a challenge for educational systems; there is sufficient evidence of the impact of the lack of motivation of these students on their learning (Louick & Scanlonb, 2019; Tsujimoto et al., 2018).

From the perspective of achievement motivation, motivation has been linked to the probability of success in tasks (Atkinson, 1964; Eccles & Wigfield, 2002). In this sense, the attribution theory (Weiner, 1979, 1986, 1992) assumes that the way in which people make causal attributions, that is, with the perceived reasons for success or failure, determines the motivation, the performance behaviour and the achievements they attain (Valenzuela, 2007). The attributions of students affect the effort that their learning requires, as well as their social, cognitive and affective development (Soria et al., 2004).

Weiner (1979, 1986) proposes the causes of attribution from three dimensions: internal or external, stable or variable and controllable or uncontrollable by individuals. The interrelationships of these dimensions give rise to the type of attribution which would affect achievement motivation. Thus, when there is high achievement motivation, success is attributed to one's own abilities, while failure is attributed, for example, to a lack of effort or work. In low achievement motivation, success is attributed relatively often to uncontrollable external causes such as the ease of tasks or luck, while failure is attributed to a lack of personal ability (possibly to uncontrollable external causes) which tends to lead away from the task (Haynes et al., 2008).

Studies with secondary school students showed that the attribution of success to effort or ability were positive predictors of average academic performance, while attribution to luck was a negative predictor (Barca et al., 2000; Barca & Peralbo, 2002; Manassero & Vázquez, 1995). Sáez et al. (2018), analysing the readiness strategies for study, the causal attributions and the perception of self-efficacy in a sample of 695 Chilean university students, found positive and moderate correlations between the causal strategies of success and effort. They also identified weak relationships between the attributions of academic failure to effort, ability and to external causes. Likewise, Ramudo

et al. (2017), in a sample of 1,505 Spanish upper secondary education students, found that internal causal attributions, such as ability or lack of effort, are explanatory variables of academic performance, also finding differences between women and men.

In the case of students with LD, it is common for them to attribute their successes to external factors and their failures to internal causes (Sideridis, 2009), such as lack of ability, which tends to be stable and uncontrollable, due to repeated academic failure (González-Pienda et al., 2000). It is then to be expected that they have negative achievement attributions (Gil & Hernández, 2017), as well as low academic confidence, to the extent that the success or failure of a task depend, to a large extent, on how people attribute their previous successes and failures (Barca, 2005). The study carried out by Fernández et al. (2015) with 787 Dominican university students shows that internal causal attributions (ability and effort) are related to high academic performance and are good predictors of performance, while external attributional styles (to the task, to the teaching staff and to luck) are related to low academic performance.

For this reason, it is common in clinical and institutional practice to tell the families that have children with LD the importance of carrying out activities in which they enjoy and have experiences of successful competence and of attaining achievements, as a way of minimizing the attributional effects of LD. But we have not found studies that analyse LD associated with success in other areas of non-academic learning. Everything seems to indicate that if students feel competent and capable in other areas of their life, not necessarily academic, they develop a better predisposition to achievement. Neither have we found specific work that associates the development of causal attributions based on the type of LD, an aspect that is of great value to analyse risk and protection factors in the different phases of development and evolution of students. The exception is the work of Tsujimoto et al. (2018) who analysed the causal attributions in students from 8 to 15 years old with reading difficulties and attention deficit, whose results show that less adaptive causal attributions were linked to greater reading and attention difficulties.

The main purpose of this study is to analyse the causal attributions in secondary school students with LD and to identify if these attributions vary according to the type of difficulty, as well as to the success or not in other areas of personal performance. It is to be expected that the greater the difficulty, the greater the attribution in considering effort as the main cause to achieve success in learning. In the same way, students with LD who feel competent in non-academic areas develop a better predisposition to achievement. Finally, the differences in the causal attributions will be more associated with the degree of severity of the difficulties than with the type of difficulty.

Method

Participants

The sample consisted of 371 students (between 13 and 16 years old, $M = 14.4$; $SD = 1.97$) between the first and fourth year of secondary school in Montevideo of a very favourable socioeconomic level; 18 % (67) of them have a LD diagnosis made by specialized clinical teams that do not belong to the educational centre. 53 % of the total sample were female students and 47 % were male students. Table 1 shows the distribution by year of the total number of participating students.

Table 1
Sample distribution by year

Year	Number of students	Percentage (%)
1st	91	24.5
2nd	99	26.7
3rd	95	25.6
4th	86	23.2
Total	371	100.0

   The participating students were distributed according to the type of difficulty diagnosed by external teams (Table 2).

Table 2
Distribution of the sample according to the clinical diagnosis

Difficulty	*n*	%
Dyslexia	28	41.8
Specific Language Impairment (SLI)	14	20.9
Attention-Deficit / Hyperactivity Disorder (ADHD)	2	3.0
Dysgraphia	1	1.5
SLI – Dyslexia	7	10.4
SLI- ADHD	5	7.5
Dyslexia- ADHD	8	11.9
Dyslexia-Dysgraphia	2	3.0
Total	67	100.0

Instruments

   To assess the degree, level and types of Styles or Patterns of Causal Attributions that students make based on their academic results we used the subscale of Evaluation of Causal and Multidimensional Attributions (ECMA) belonging to the Integrated System of Evaluation of Causal Attributions and Learning Processes (SIACEPA scale [by its acronym in Spanish]) by Barca et al. (2000). The subscale consists of 24 items with statements in which the degree of agreement must be completed according to a Likert scale from 1 to 5 —1 (*Strongly disagree*), 2 (*Somewhat disagree*), 3 (*Agree more than disagree*), 4 (*Agree*) and 5 (*Strongly Agree*)—. Thus, we obtain seven factors of causal attributions by crossing the internal/external, stable/unstable and controllable/uncontrollable dimensions with the four attributional causes: ability, effort, luck/chance and task difficulty. The factors are: Attribution of High Academic Performance to Subject Ease (HAP-SE), Attribution of Low Academic Performance to Little Effort (LAP-LE), Attribution of High Academic Performance to Ability (HAP-A), Attribution of High Academic Performance to Effort (HAP-E), Attribution of Academic Performance to Luck (APL), Attribution of Low Academic Performance to Teaching Staff (LAP-T) and Attribution of Low Academic Performance to Low Ability (LAP-LA). The psychometric studies yielded a total Cronbach's alpha of the scale of .71 and a total explained variance of the ECMA subscale of 52.92 % for 7 factors (Barca et al., 2004).

In order to assess the academic performance of the students we used the average marks of the first meeting of teachers, in which the pass mark for year promotion is 6 which is equivalent to *Fairly Good* and the highest mark is 12 which is equivalent to *Outstanding*.

In order to categorize the sample of students with LD and their performance in non-academic activities, they were asked to indicate whether they practice sports and/or artistic activities outside the school environment. Individual interviews were also carried out with the coordinators of the sports area and the director of the artistic area of the educational centre so that they could account for the degree of competence that these students have in the different activities and the roles they play.

Procedure

The study was implemented upon the signing of an informed consent by the educational centre and the families of the participants. In a period corresponding to three weeks of work, the ECMA subscale was administered to all groups in digital version through a digital form (Google Forms). The objectives of the research and the interest that the students participate in it were mentioned to them. Interviews were then scheduled with the coordinators and directors corresponding to the sports and artistic areas and they were asked to organize the students with clinical LD diagnoses, according to a classification table that was given to them. In this way, three groups of students were identified in the sports area: those who do not play with 28 students, those who play without having an outstanding performance with 18 students and the group of those who play and excel in their discipline with 21 members. In the artistic area they were grouped into three categories: those who do not do any activity with 44 students, the students who have been selected to display a single artistic skill, competence or ability on stage (dancing, singing or acting) with 21 participants, and those who have been selected to display more than one artistic skill, competence or ability on stage (singing, dancing and acting; singing and dancing; singing and acting; dancing and acting) with 2 students.

According to the average marks obtained in the first meeting of teachers, students with LD were distributed into three groups (Table 3).

Table 3
*Distribution of the sample according to the academic performance criterion (*n = 67*)*

Type of performance	Average marks	N	(%)
Barely acceptable	4-5	3	5
Acceptable	6-7	41	62
Very good	8-9	22	33

Data analysis

The JAMOVI programme (Jamovi Project, 2022) was used for statistical analysis. We worked with the descriptive data (Mean *(M)* and Standard Deviation *(SD))* of the dimensions of the ECMA scale, according to the profiles of the participants. The differences between the groups were calculated using two procedures for contrasts on means: a) test for two independent samples to analyse the attributional profiles of students diagnosed with LD and students without learning difficulties (WLD) in each of the seven causal attribution factors; b) analysis of variance of one factor to analyse the differences

in each of the seven causal attribution factors between the 8 profiles of LD and between two levels of academic performance (barely acceptable-acceptable and very good). Previously, the descriptive statistics were calculated and compliance with the model assumptions, normality test (Shapiro-Wilks Test) and homoscedasticity (Levene Test) were verified in order to decide to use parametric or non-parametric procedures. For the use of post-hoc tests to determine between which groups there are statistically significant differences, the Jamovi programme controls the type I error rate in two-to-two comparisons using the Dwass-Steel-Critchlow-Fligner method (Douglas & Michael, 1991). The effect was calculated with the gpower programme (Faul et al., 2007; Faul et al., 2009).

Results

Table 4 shows the descriptive statistics obtained from the seven dimensions of the ECMA scale according to the characteristics or profiles of the participants.

The normality of the scores in the seven causal attribution factors of the students was evaluated. The Shapiro-Wilk test indicated that the scores were not normally distributed in any of the seven dimensions ($p < .001$), in the comparisons between students with LD and WLD, between types of LD, and considering the sports and artistic skills and abilities. In the comparisons of students with LD based on academic performance, a normal distribution was found only in the HAP-A dimension ($p > .09$), so in this case parametric statistics were used.

Table 4

Descriptive statistics of the dimensions of the ECMA scale, according to participants' profile

Types	HAP-SE	HAP-A	LAP-T	APL	HAP-E	LAP-LE	LAP-LA
	M(*SD*)	*M*(*SD*)	*M*(*SD*)	*M*(*SD*)	*M*(*SD*)	*M*(*SD*)	*M*(*SD*)
WLD	2.6(0.7)	3.3(0.7)	3.0(0.8)	2.2(0.6)	37.3(0.7)	3.3(0.1)	24.1(0.7)
LD	2.8(0.7)	3.1(0.9)	3.2(0.8)	2.1(0.7)	37.7(0.7)	3.3(0.8)	25.2(0.8)
DL	2,7(0.6)	3.3(0.8)	3.4(0.8)	2.1(0.7)	3.8(0.7)	3.3(0.8)	2.3(0.6)
SLI	2.5(0.8)	3.2(1.0)	3.0(0.8)	2.2(0.6)	3.7(0.7)	2.9(1.0)	2.6(0.9)
ADHD	3.0(0.5)	2.0(0.0)	3.8(1.5)	2.0(0.0)	3.8(0.9)	2.0(0.0)	2.2(0.3)
DYSG	3.0(0.0)	2.7(0.0)	2.0 0.0)	2.0(0.0)	2.0(0.0)	2.0(0.0)	2.5(0.0)
SLI/DL	3.1(0.7)	2.8(0.7)	3.2(0.9)	2.1(0.5)	4.3(0.4)	3.6(0.7)	2.7(0.9)
SLI/ADHD	3.1(0.8)	3.8(0.6)	3.2(0.4)	2.7(0.4)	4.0(0.7)	3.7(0.8)	2.9(0.6)
DL/ADHD	2.9(0.6)	2.9(1.1)	3.4(1.1)	2.3(0.4)	3.6(0.6)	3.9(0.4)	2.7(1.0)
DL/DYS	3.2(0.7)	3.0(0.9)	4.3(0.5)	2.8(1.2)	2.6(0.2)	4.2(0.2)	3.0(0.7)
LD/VGP	2.9(0.7)	3.5(0.7)	3.3(0.5)	2.2(0.5)	4.0(0.7)	3.4(0.8)	2.6(0.8)
LD/AP	2.7(0.7)	3.1(0.9)	3.2(1.0)	2.1(0.6)	3.7 0.8)	3.3(0.9)	2.4(0.8)
LD/BAP	2.7(0.6)	2.6(0.9)	3.2(1.0)	2.3(0.6)	3.4(0.4)	3.0(0.81)	2.6(0.5)
LD/NOS	2.6(0.6)	3.0(0.9)	3.0(0.9)	2.1(0.6)	3.8(0.7)	3.0(0.9)	2.5(0.7)
LD/CB	2.8(0.7)	3.6(0.2)	3.4(0.4)	2.2(0.0)	3.6(0.4)	3.3(0.4)	2.6(0.6)
LD/CA	2.9(0.6)	3.0(0.8)	3.5(0.7)	2.3(0.7)	3.8(0.6)	3.6(0.8)	2.5(0.8)
LD/NPA	2.9(0.7)	3.1(1.0)	3.4(1.0)	2.3(0.6)	3.7(0.7)	3.3(0.9)	2.6(0.9)
LD/SS	2.6(0.6)	3.2(0.8)	3.1(0.5)	1.9(0.4)	4.0(0.8)	3.3(0.9)	2.4(0.6)
LD/MS	2.7(0.5)	2.8(0.2)	2.3(0.5)	1.8(0.2)	2.9(1.2)	2.8(1.2)	2.2 0.35

Note. DL: Dyslexia; SLI: Specific Language Impairment; ADHD: Attention-Deficit/Hyperactivity Disorder; DYSG: Dysgraphia; SLI/DL: Specific Language Impairment and Dyslexia; SLI/ADHD: Specific Language Impairment and Attention-Deficit/Hyperactivity Disorder; DL/ADHD: Dyslexia with Attention-Deficit/Hyperactivity Disorder; DL/DYS: Dyslexia with Dysgraphia; LD/VGP: LD with Very Good Performance; LD/AP: LD with Acceptable Performance; LD/BAP: LD with Barely Acceptable Performance; LD/NOS: LD who do not play any sport; LD/CB: LD playing category B sports registered with a federation; LD/CA: LD playing category A sports registered with a federation; LD/NPA: LD who do not do physical activity; LD/SS: LD showing a single skill; LD/MS: LD showing more than two skills.

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Attributional profiles of students diagnosed with LD and students WLD

When comparing the differences in the causal attributions at the 7 factors level of the students with learning difficulties (LD) and those who do not have LD (WLD), significant differences were only found in the scores in Attribution of High Academic Performance to Subject Ease (HAP-SE) between regular students and those with LD. The scores in Attribution of High Academic Performance to Subject Ease (HAP-SE) in students with LD ($Mdn = 2.00$, $M = 2.78$, $SD = 0.66$) were higher than those of regular students ($Mdn = 2.00$, $M = 2.57$, $SD = 0.73$). The results in the Mann-Whitney U test indicated that this difference was statistically significant, $U(n_{DA} = 67, n_{SDA} = 304) = 8521.00$, $Z = -2.43$, $p < .015$, with a small effect size ($d = 0.29$).

When the three questions that make up the APL factor were analysed, we found a significant difference in question 15 "I think that my highest marks depend to a large extent on luck-related factors, such as, for example, whether the questions I studied fall or come out on the exam or not". These scores were higher among students with LD ($Mdn = 2.00$, $M = 2.25$, $SD = 0.78$) than among regular students WLD ($Mdn = 2.00$, $M = 2.07$, $SD = 0.86$). The results of the Mann-Whitney test indicated that this difference is statistically significant, $U (n_{DA} = 67, n_{SDA} = 304) = 8668.00$, $Z = -2.26$, $p < .023$, with a small effect size ($d = 0.15$).

Attributional profiles of students diagnosed with LD according to the type of clinical diagnosis

The Kruskal-Wallis test only found statistically significant differences among the eight types of LD profiles in the LAP-LE variable, $H(7) = 14.44$, $p = .044$ with a large effect size ($d = 0.81$). Despite not reaching a significant value in the Kruskal-Wallis test, among the eight types of LD profiles in the HAP-E factor, we considered it appropriate to report these results since it was close to significance, $H(7) = 12.20$, $p = .068$.

Considering that the differences of the various attributional factors as well as in the questions that make them up were based on whether the students had only one learning difficulty or had comorbidity, two groups were formed: with only one learning difficulty, DL, SLI, ADHD, DYSG type with $n = 45$ and another one with comorbidity, SLI/DL, SLI/ADHD, DL/ADHD, DL/DYSG type with $n = 22$ students.

The scores in the LAP-LE factor in students with only one LD ($Mdn = 3.0$) were lower than those of students with more than one LD ($Mdn = 3.67$). The Mann-Whitney U test indicated that this difference is statistically significant, $U(n_{1 LD} = 45, n_{Comorbidity} = 22) = 289.00$, $Z = -2.78$, $p < .005$, with an effect size $d = 0.87$. In particular, the Mann-Whitney test indicated that this difference is statistically significant in question 13 "Low marks indicate that I haven´t worked hard enough" and in question 20 "When I can't do something in class as well as I want it's generally because I don´t try hard enough" Both results were lower in students with only one LD (P13: $Mdn = 2.00$; P20: $Mdn = 2.00$) compared to students with more than one LD (P13: $Mdn = 4.00$; P20: $Mdn = 4.00$); for question 13 ($U(N_{1 LD} = 45, N_{Comorbidity} = 22) = 306$, $z = -2.66$, $p = .008$, with a medium to large effect size, $d = 0.75$) and in question 20 ($U (N_{1 LD} = 45, N_{Comorbidity} = 22) = 341$, $z = -2.22$, $p = .027$, with a medium effect size, $d = .59$).

Attributional profiles of students diagnosed with LD based on academic performance

Scores in the seven dimensions of the ECMA scale were compared between students with very good performance and acceptable or barely acceptable performance. Statistically significant differences were only found in two factors (HAP-A and HAP-E). On average, students with very good performance in HAP-A and HAP-E

(M $_{GP\ HAP\text{-}A}$ = 3.53, SD $_{GP\ HAP\text{-}A}$ = 0.78; M $_{GP\ HAP\text{-}A}$ = 4.03, SD $_{GP\ HAP\text{-}A}$ = 0.67) performed better than students with acceptable performance (M $_{AP\ HAP\text{-}E}$ = 3.00, SD $_{AP\ HAP\text{-}E}$ = 0.93; M $_{AP\ HAP\text{-}E}$ = 3.64, SD $_{AP\ HAP\text{-}E}$ = 0.74). This difference in the HAP-A dimension was statistically significant, $t(65)$ = -2.30, $p < .025$, with a small effect ($d = 0.40$). For the HAP-E dimension, the Mann-Whitney U test indicated that this difference is statistically significant, $U(n$ $_{VG\ performance}$ = 53, n $_{A\ performance}$ = 14) = 188.00, Z = -2.83, $p < .12$, with an effect size $d = 0.20$.

The analysis of the questions that make up both factors indicates significant differences: in the HAP-A factor, questions 9 "When I can't do something in class as well as I want it's generally because I don´t try hard enough" and 16 "I think my good marks directly reflect my ability" obtain higher scores in students grouped with very good performance. The same happens in the HAP-E factor, in question 5 "Sometimes I feel lucky for the good marks I get". Students with very good performance scored higher on the three questions (Table 5).

Table 5
Differences of means between performance type and items of the HAP-A/HAP-E dimensions

	Very Good Performance (n = 22)		Acceptable Performance (n = 45)					
	Median (Mdn)	Range	Median (Mdn)	Range	U	Z	p	d
HAP-A Dimension								
Question 2	4.00	3.00	3.00	4.00	449.00	-0.66	.514	0.09
Question 9	4.00	3.00	3.00	4.00	344.00	-2.11	.035	0.31
Question 16	4.00	4.00	2.00	4.00	334.00	-2.29	.022	0.33
HAP-E Dimension								
Question 5	4.00	3.00	2.00	4.00	346.00	-2.11	.035	0.30
Question 12	4.00	3.00	4.00	4.00	480.50	-0.21	.837	0.03
Question 19	4.00	3.00	4.00	3.00	482.50	-0.18	.857	0.02

Attributional profiles with LD diagnosis based on different sports skills and abilities

When students with LD who do not practice sports are compared with those who do, statistically significant differences were only found with the Mann-Whitney U test in the LAP-LE factor. Performance was higher in students who practice sports ($Mdn = 3.66$) compared to students who do not ($Mdn = 2.66$) ($U(n_{Sport} = 39,$ $n_{No\ sport} = 28)$ = 365.00, $z = -2.33$, $p = .020$, with a moderately large effect size, $d = 0.79$).

Likewise, among all the items that make up the LAP-LE factor, statistically significant differences were only found in question 20, "*When I can't do something in class as well as I want it's generally because I don't try hard enough.*" The scores in this item among students who do sports ($Mdn = 4.0$) were higher than those of students who do not practice sports ($Mdn = 2.0$). The results in the Mann-Whitney test indicated that

this difference was statistically significant ($U(n_{sport} = 39$, $n_{No\ sport} = 28) = 317.50$, $z = -3.14$, $p < .002$, with a large effect size, $d = .98$). No differences were found according to their sports conditions to access categories of higher or lower level of competitiveness.

Analysis of attributional profiles with LD diagnosis based on artistic skills and abilities

According to the results of the Mann-Whitney U test from the 7 attributional factors, a significant difference stands out in the Attribution of Academic Performance to Luck (APL) factor, where students with LD who score higher in this factor are those who do not participate in artistic activities ($Mdn_{No\ artistic} = 2.00$, $M = 2.16$) compared to those students who do participate ($Mdn_{Artistic} = 2.00$, $M = 1.74$) with a U statistic ($N_{Artistic} = 23$, $N_{No\ artistic} = 43) = 253.50$, $z = -3.35$, $p = .001$, with a large effect size ($d = 0.95$). When all the items of this factor are analysed, statistically significant differences were found in question 4 "Sometimes my success in exams depends in part on luck" U ($N_{Artistic} = 23$, $N_{No\ artistic} = 43) = 350.00$, $z = -2.49$, $p = .013$, with a small effect size ($d = 0.49$) and in question 18 "I think some of my low marks are due, in part, to injustices" U ($N_{Artistic} = 23$, $N_{No\ artistic} = 43,) = 292.50$, $z = -3.16$, $p = .002$, with a medium effect size ($d = 0.71$). In both questions, the students who do not do any artistic activity (P4: $Mdn_{Artistic} = 2.00$, $M = 2.16$; P18: $Mdn_{Artistic} = 2.00$, $M = 2.60$) score higher than those who do artistic activities (P4: $Mdn_{Artistic} = 2.00$, $M = 1.74$; P18: $Mdn_{Artistic} = 2.00$, $M = 1.74$).

Discussion

The main objective of this study was to analyse the causal attributions of students with LD, considering whether these attributions vary according to success or not in other areas of their performance such as artistic and sports, as well as according to the type of difficulty they have.

In the first place, students with LD differ significantly from students WLD, obtaining a higher score in the HAP-SE factor. This factor implies the attribution of high performance to causes external to the individual and not to his/her personal effort, which is consistent with the studies that show that students with LD have less motivation towards learning since, among other things, they tend to doubt their abilities when facing tasks (González-Pienda et al., 2000). This type of attribution produces an effect of inhibition towards learning motivation, since motivation increases in situations in which students attribute their success to internal and controllable factors, such as personal effort, and decreases when they do so to external, stable and uncontrollable factors (Barca et al., 2000; Weiner, 1986) or to internal, stable or uncontrollable factors such as lack of ability (González & Tourón, 1992). As Weiner (1986) already stated, in order to improve achievement motivation, it is important to attribute both success and failure to the effort made.

The results of this study only showed significant results in students with LD in the factor that focuses the value on academic success and not on the value of failure. A possible explanation for this aspect is the value and social connotation of having reached secondary school with LD and of advancing through years in educational centres with a very favourable sociocultural context that are characterized by higher levels of requirements. The experience of success in students with LD would be based on the "luck" factor, also showing a significant difference within the factor itself in the question that best describes this aspect: "I think that my highest marks depend to a large extent on

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luck-related factors, such as, for example, whether the questions I studied fall or come out on the exam or not".

When we analyse the attributional profiles of students diagnosed with LD based on academic performance, a significant difference is observed in the HAP-A and HAP-E factors. In both factors, students with very good performance score higher. The first of the factors is indicative of the motivation towards good performance, which causes it to be maintained or increased. This type of attribution produces feelings of self-confidence and satisfaction in the work carried out at a personal satisfaction level. The second factor also promotes feelings of self-confidence and positive assessment, as well as satisfaction with the work carried out by the student. Both patterns attribute learning success to factors that are internal and stable over time. Both factors, therefore, produce in individuals a feeling of high self-esteem, positive assessment and satisfaction with the work they carry out for themselves, which impacts on the motivation towards learning and causes it to be increased or maintained (Barca et. al 2000; Navarrete & Cuadro, 2007).

When analysing the attributional patterns in students with LD who have developed other areas of successful performance, relevant results were found in achievement motivations. The results according to whether they belong to a sports team and/or sports league or not show a significant difference in the LAP-LE factor, where students who practice sports scored higher than those who do not do any activity. This factor, as we have developed it for students who showed comorbidity, indicates that students value effort. The sample of students who do sports was distributed in similar percentages according to their academic performance (42 % good performance, 43 % acceptable performance, 15 % barely acceptable), therefore it does not seem to be the variable associated with their marks the one that promotes this answer, but on the contrary, we can wonder if the conditions generated by sports registered with federations (work, effort and discipline) and the belonging to a team and the consequent work are the ones that impact on the students´ ability to recognize effort as a promoter of their academic results. No significant differences were found among students who do sports in categories of higher or lower level of competitiveness. We only observed, without the difference being significant, that when the best athletes do not perform in their learning as they wished, they attribute it to a lack of effort. What has a positive impact on the perception that a student with LD has as a pupil would be belonging to a team, representing a group, training and valuing effort and the process rather than competitive quality and his/her sports conditions.

Finally, when studying the behaviour of students with LD who have managed to develop artistic skills, a very significant difference is found in the APL factor in students who do not participate in any strictly artistic activity. This factor leads to superficial learning approaches and tends to alter or modify attributions depending on various environmental factors. The attribution is placed on the outside (external), is unstable over time, and students do not feel they have the ability to control their results. This result does not seem to be related to the marks of these students either, since they show a similar distribution in their performance (52 % good performance, 43 % acceptable performance, 4.3 % barely acceptable). The results agree with those of sports competition. No statistically significant difference is observed depending on the type of participation they have in this area. Once again, there are significant differences depending on whether they participate or not and not on the role they occupy in it. The differences regarding the attributional pattern of the students with learning difficulties would not be due to the skills or abilities in each area but to being part of a group they represent and with which they are identified, and this would impact on a different attributional profile than the students who do not belong.

Students who participate in sports or artistic activities, faced with failure, would tend to seek solutions or alternative approaches that enable them to attain achievements. It is worth wondering if the learning goals are only those of academic learning, since the results of these studies open the way for further study, or whether it is learning and achievement motivation in a more general sense that affect the way and effectiveness with which students face challenges, failures and successes in the area of formal learning.

Regarding the attributional differences according to the type of LD, differences were found based on the presence of one or two difficulties and not necessarily according to the type of difficulty. The students who have comorbidity showed a significant difference in the LAP-LE factor. This factor is an indicator of a positive effect towards motivation or goals for learning, since the negative result is attributed to a lack of effort which is an internal, stable and controllable cause (Barca et. al 2000). This aspect could indicate that the greater the severity of the LD, the greater the experience of students who advance in their academic achievements of considering effort as the main cause to achieve success in their learning process. The students who have more difficulty explain their results, unlike the students who have only one difficulty, stating: "Low marks tell me that I haven't worked hard enough", "When I can't do something in class as well as I want it's generally because I don't try hard enough". This result could lead to future research on whether if faced with greater difficulty in an academically demanding context, students can develop better strategies that allow them to face academic challenges and therefore perceive the value of their effort as a key element to surpass themselves and attain academic achievements (Sáez et al., 2018).

The studies that associate LD with causal attributions mostly conclude that there are considerable differences between students with and without LD, the former being those with the least motivation towards learning since, among other things, they tend to doubt their skills when facing tasks (Louick & Scanlonb, 2019; Tsujimoto et al., 2018). The interest in studying this association in depth and what conditions could change it led us to propose this study. The results open up new ways for in-depth studies and research both in the clinical area and in educational improvement programmes for students with LD. Taking care of the way they perceive themselves and analysing risk and protective factors to promote a healthy psychic structure that supports their approach to learning is undoubtedly a responsibility that concerns all those who work in the field of learning and its difficulties. It is even worth wondering in new research if it is learning and achievement motivation in a more general sense, and not purely academic, that affect the way and effectiveness with which students face challenges, failures and successes in the area of formal learning.

Limitations

The main limitation of this study is the size of the sample of students with LD and that it is not representative of secondary school students. And the limitations of a self-report instrument such as the ECMA subscale which do not allow us to guarantee all the desired objectivity.

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