

The Relaxation-Mindfulness Competence of Secondary and High School students and its influence on classroom climate and academic performance

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The aim of this work is twofold: first, to find out if there are differences by gender and academic level in relaxation and mindfulness competence in high school students. Second, it is intended to analyze the relation between Relaxation-Mindfulness, Classroom Climate and Academic Performance based on the hypothesis that classroom climate acts as a mediator between relaxation-mindfulness and academic performance. The study was conducted during an intervention of TREVA's Relaxation-Mindfulness Program on a sample of 420 students of Compulsory Secondary School and High School with an average age of 14.29. The results showed no differences by gender in mindfulness but partially, by educational level. It was found that classroom climate acts as a mediator between mindfulness and academic performance. The implementation of programs of relaxation-mindfulness is highly recommended for Secondary and High School students.

Keywords: Relaxation-Mindfulness, classroom climate, academic performance, Secondary and High School students.

La competencia en Relajación-Mindfulness en estudiantes de Educación Secundaria y Bachillerato y su influencia en el clima de aula y el rendimiento académico. El objetivo de este trabajo es, por una parte, averiguar si existen diferencias por género y nivel académico en la competencia en relajación y *mindfulness* en el alumnado de Educación Secundaria Obligatoria y Bachillerato. Por otra, se pretende analizar la relación existente entre relajación-*mindfulness* (REMIND), clima de aula (CA) y rendimiento académico (RA) partiendo de la hipótesis de que el clima de aula ejerce de mediador. El estudio se realizó durante una intervención del Programa TREVA de REMIND sobre una muestra de 420 alumnos/as de Educación Secundaria Obligatoria y Bachillerato con una media de edad de 14.29. Los resultados no muestran diferencias en REMIND por género pero sí, parcialmente, por nivel educativo. Se comprobó que el CA ejerce como variable mediadora entre REMIND y RA. Se recomienda la implementación de programas de relajación-*mindfulness* en los centros educativos de Secundaria y Bachillerato.

Palabras clave: Relajación-Mindfulness, clima de aula, rendimiento académico, estudiantes de Secundaria y Bachillerato.

Research on mindfulness in the educational area is being very productive in the last years (Schonert-Reichl & Roeser, 2016; Zenner, Herrnleben-Kurz, & Walach, 2014) and can be framed within so-called *Positive Education* (Ramos-Díaz, Rodríguez-Fernández, Revuelta, & Axpe, 2016). An extensive number of studies show that relaxation-mindfulness (REMIND) improves the cognitive and socio-emotional abilities of Secondary School students (Amutio, Franco, Gázquez, & Mañas, 2015; Bogels, Hoogstad, Van Dun, de Schutter, & Restifo, 2008), classroom climate (CC) and academic performance (AP) (López-González, Amutio, Oriol, & Bisquerra, 2016; Stea & Torstveit, 2014; Schonert-Reichl & Roeser, 2016). On the other hand, it is known that CC influences AP directly (Aritzeta et al., 2016; Hattie, 2009). However, there is a shortage of studies on the relationship among the three variables: REMIND, CC, and its influence on AP, with some exceptions (López-González et al., 2016a; Wisner, 2014).

Mindfulness in adolescents: differences by gender and educational level

Mindfulness is defined as the quality of being aware of the present moment with acceptance (Bishop et al., 2004). It implies the ability of observing one's own thoughts, sensations and emotional reactions without identifying with them and the development of specific attitudes such as not judging, patience, confidence, absence of effort, openness, curiosity and compassion, acceptance, and a beginners mind (Kabat-Zinn, 1990; Siegel, 2010). The benefits of the practice of REMIND in children and adolescents are increasingly evident, according to the results of several review studies that have been carried out in recent years (Weare, 2013; Zoogman, Goldberg, Hoyt, & Miller, 2014). Some studies highlight that REMIND generates in adolescents effects of calm and subjective well-being (López-González, Álvarez, & Bisquerra, 2016), improves their emotional competences (López-González et al., 2016b; Schonert-Reichl & Roeser, 2016) and promotes the acquisition of healthy habits (López-González et al., 2016a). Likewise, REMIND reduces impulsivity (Oberle et al., 2012; Franco, Amutio, Oriol, López-González, & Martínez-Taboada, 2016) and prevents depression in adolescents (Raes, Griffith, Van der Gucht, & Williams, 2013). Moreover, there are already studies on the positive impact of mindfulness on the physiology of adolescents (Barnes, 2016; Wright et al., 2011) and the neurocognitive mechanisms implied in the improvement of attention and emotional self-control are being studied (Sanger & Dorjee, 2015) through neurofeedback and neuroimaging (Brown, Goodman, & Inzlicht, 2013).

It can be confirmed that the regular practice of REMIND for 10 minutes has positive effects on adolescents in the educational field (Felver & Jennings, 2015; Sanger & Dorjee, 2015), and even in the treatment of adolescents diagnosed of attention deficit disorders with hyperactivity (Zylowska et al., 2008). However, research on gender differences is rare and contradictory. Most investigations have not revealed

significant differences (Metz et al., 2013; López-González et al., 2016a), although some differences were observed in favor of the female gender in some studies (Hennelley, 2011; Sturgess, 2012), while in others the opposite results were obtained (Huppert & Jhonson, 2010).

As for educational level, there is insufficient evidence of differences in REMIND skills between 12 and 16 years, and even some studies deny them (Shapiro, Brown, & Biegel, 2007).

Relationships between mindfulness, classroom climate and academic performance

Academic performance is the subjective perception of the students of all the interactions that occur in their group-class between equals and with the teacher and an orientation towards achieving goals and targets (López-González & Bisquerra, 2013). It has been demonstrated that CC predicts AP (Esteban, Bernardo, Tuero, Cerezo, & Núñez, 2016; López-González & Oriol, 2016; Rosario, Núñez, Valle, Paiva, & Polydoro, 2013) because it improves learning, with the figure of the teacher being a key element in the achievement of an adequate AP (Brackett, Reyes, Rivers, Elberston, & Salovey, 2011).

The systematic practice of REMIND improves the attentional skills in adolescent students (Bogels et al., 2008) and activates their internal resources (Kaspereen, 2012; Zenner, Herrnleben-Kurz, & Walach, 2014) which, in the long run, has a positive influence on the CC and on the learning process and AP (López-González et al., 2016a; Schonert-Reichl & Lawlor, 2010; Schonert-Reichl & Roeser, 2016). Likewise, there are some studies demonstrating the direct influence of REMIND on AP (Amutio, Franco, Gázquez, & Mañas, 2015; Franco, 2009). Consequently, different countries in the world have educational programs on relaxation-mindfulness, such as, United States, Canada, Belgium, United Kingdom, and Holland (Jennings, Snowberg, Coccia, & Greenberg, 2011; Meiklejohn et al., 2012). In Spain, it is worth noting the *TREVA Program* (López-González, 2013; López-González, Álvarez, & Bisquerra, 2016), *Aulas Felices* (Arguis et al., 2011), and *Meditación Fluir Program* (Franco et al., 2011).

The goal of this study is twofold. First, to find out the relationship between REMIND, CC and AP, and if CC has a mediating role between REMIND and AP. Second, whether there are differences by gender and academic level in the Relaxation-Mindfulness competence. Our main hypothesis is that these variables will be positively related to each other and that REMIND and CC will exert a predictive function over AP. Finally, CC is expected to act as a mediating variable between the REMIND level and AP. Secondly, it is believed that there will be differences in the REMIND variable by gender and educational level.

METHOD

Participants

The sample consisted of 420 students from four Compulsory Secondary Education (ESO) and two High School (BACH) courses (201 male students and 219 female students) from an educational center in the outskirts of Barcelona ($M=14.29$ years old, $SD=1.52$). They were duly informed, as well as their families, before asking them to sign the informed consent. The facility of access by the researchers was the criterion for choice of this educational center.

Measures

Skills and Relaxation-Mindfulness States Inventory for Adolescents–Escala de Habilidades y Estados de Relajación-Mindfulness para Adolescentes (EHERMA López-González et al., 2016b). It is a likert-type questionnaire composed of 19 items (1=nothing at all; 2=a little; 3=quite; 4=much) in which three factors are measured: focusing, passivity-receptivity and REMIND states (Table 1). It is based on the cognitive abilities that intervene in the practice of relaxation and mindfulness collected by Amutio (1998) and on the Smith Relaxation States Inventory (Smith, 2005). Reliability, according to Cronbach's alpha, is .90.

Brief Classroom Climate Scale–Escala Breve de Clima de Clase (EBCC; López-González & Bisquerra, 2013; López-González et al., 2016a; López-González & Oriol, 2016). It is a Likert-type questionnaire ranging from 0 to 3 (0=never, 1=sometimes, 2=frequently, 3=always), and consisting of 11 items clustered in two dimensions: group cohesion (level of satisfaction, implication and cohesion among members) and management of the class-group (order and organization, and quality of the relation between teachers and students). Cronbach's alpha is .83.

In order to assess AP, the arithmetic mean of all global end-of-course grades was obtained.

Procedure

The study was carried out at the end of an intervention of the TREVA 12-week relaxation-mindfulness program (López-González, 2013; López-González, Álvarez, & Bisquerra, 2016). This program was conducted by certified trainers of the University of Barcelona who follow a very standardized protocol to ensure maximum similarity in its application. The objectives of the investigation and the need for anonymity were explained and informed consent was requested. The EBCC was given prior to the 15-minute REMIND practice and the EHERMA immediately afterwards.

Confirmatory factor analysis (CFA) of the EHERMA was performed. Convergent validity of the EHERMA was calculated by means of obtaining the correlations with the School Relaxation and Mindfulness Habits Brief Questionnaire (CBHRME; López-González et al., 2016a) and the Relaxation and Mindfulness Scale for Adolescents (EREMIND-A; López-González et al., in press), which shows a high internal consistency (Cronbach's $\alpha=.91$). In both cases, obtained correlations were statistically significant ($r=.156, p=.007$; $r=.512, p=.000$). Reliability of the EHERMA is high ($\alpha=.90$) (López-González et al., 2016b). At the end of the academic year the final grades of the course were asked for and the arithmetic mean of the scores were obtained.

Data Analysis

First, a CFA of the EHERMA was carried out by means of Lisrel 8.80 (Jöreskog & Sörbom, 1993). Diagonal weighted least square method was applied as the variables were ordinal (Míndrilă, 2010). In order to evaluate the Goodness of fit indices of the proposed models the ratio between the statistic *S-B* χ^2 and the degrees of freedom of the model was used, whose value must be less than 3 to be considered valid (Carmines & McIver, 1981). The Comparative Fit Index (CFI), the Non-Normed Fit Index (NNFI), the Goodness of Fit Index (GFI), and the Adjusted Goodness of Fit Index (AGFI), where values have to be higher than .95 (Hu & Bentler, 1999) were obtained. In addition, the Root Mean Squared Error of Approximation (RMSEA), including the confidence interval of 90% of the mean value and the Standardized Root Mean of Residuals (SRMR), where values must be lower than .08 (Browne & Cudeck, 1993) were calculated.

Second, gender differences and the effect of educational level both in the three factors, and in the global score of the EHERMA were analyzed through a Multivariate Analysis of Variance (MANOVA) executed with the SPSS 21.0 package. Statistical significance and effect sizes (η^2) were observed and interpreted in accordance with Cohen's criteria: between .01 and .04 were considered small, between .05 and .14 medium, and above .14 a big effect (Cohen, 1988). Finally, an analysis of mediation was made through the macro PROCESS of SPSS (Hayes, 2013) in order to analyze the mediating effect of CC in the relation between REMIND and AP, and to calculate the total and direct effects of the independent variable on the dependent variable. The nonparametric bootstrapping procedure was used with 5000 repetitions to calculate the confidence intervals of 95% of the indirect effects. The significance level used was $p<.05$.

RESULTS

Psychometric analysis of EHERMA

Results from CFA (factor loadings, and estimation errors, descriptive statistics and internal consistency) are detailed on table 1. As can be observed, the distribution of most items was asymmetrically negative, with coefficients ranging from -0.35 to -2.01. Moreover, factors showed adequate levels of internal consistency, with coefficients ranging from .68 to .87.

Table 1. Descriptive statistics: Mean, Standard deviation, Asymmetry (As.), Factorial loadings, Estimation error (EE) and item and factor correlations of EHERMA

Item / Factor	M	SD	As.	Factor load	EE	r item-total
Global	76.43	12.36				
<i>Focusing (α=.75)</i>	12.63	2.35	-1.42	-	-	-
2. He seguido el ejercicio con atención	4.40	0.91	-1.84	.78	.40	.62
4. Sentía las sensaciones diferentes de mi cuerpo	4.12	0.91	-1.15	.79	.37	.59
15. Estaba concentrado	4.14	1.03	-1.21	.77	.41	.53
<i>Passivity-Receptivity (α=.68)</i>	23.44	4.39	-0.67			
12. Estaba tenso porque quería relajarse y no podía	3.36	1.40	-0.35	.26	.93	.44
9. Me ha gustado la experiencia	4.38	0.85	-1.65	.80	.36	.50
6. Me hubiera podido quedar relajado mucho rato más	3.91	1.26	-1.02	.84	.30	.51
5. He mantenido los ojos cerrados	4.07	1.12	-1.31	.69	.53	.40
14. Estaba abierto a sentir lo que fuera	3.87	1.06	-0.84	.12	.99	.24
11. Me he preocupado porque sentía cosas extrañas	3.72	1.27	-0.77	.57	.67	.47
<i>Relaxation States and Mindfulness (α=.87)</i>	39.93	7.20	-1.13			
19. Me siento feliz	4.08	1.03	-1.05	.49	.76	.37
13. Me sentía como dormido	4.15	1.05	-1.32	.72	.48	.59
10. Me sentía desconectado de todo	3.89	1.24	-1.05	.69	.52	.58
8. Mi cabeza estaba en silencio	3.78	1.25	-0.83	.82	.33	.66
1. Sentía el cuerpo muy relajado	4.14	1.04	-1.35	.54	.71	.47
17. Me encuentro despreocupado	3.87	1.23	-0.88	.74	.49	.61
18. Estoy tranquilo y en calma	4.53	0.79	-2.01	.75	.44	.60
16. Me sentía muy lleno de energía	3.58	1.17	-0.64	.80	.36	.69
3. Sentía alegría y placer	3.73	1.10	-0.74	.82	.33	.71
7. Me sentía emocionado, como agradecido	3.72	1.06	-0.56	.66	.57	.58

Differences in Mindfulness levels by gender and educational level

When analyzing the differences between males ($M=76.45$; $DT=12.09$) and females ($M=76.41$; $DT=12.68$), a significant multivariate effect was obtained, $F(3.252)=4.07$, $p=.008$, $\eta^2=.05$, but the analysis of univariate contrasts revealed that none reached statistical significance, so it can be confirmed that there were no significant differences by gender. Statistical analyses by academic level showed a significant multivariate effect, $F(12.753)=2.99$, $p<.001$, $\eta^2=.05$ (Table 2). When analyzing the corresponding univariate contrasts, only significant differences were found in the Passivity-Receptivity factor, being lower in 2º ESO ($M=22.54$; $SD=5.12$) than in 3º ESO ($M=24.85$; $SD=3.57$).

Table 2. Univariate differences by academic level

	Academic Level										F	η^2
	1º ESO (n=53)		2º ESO (n=59)		3º ESO (n=55)		4º ESO (n=54)		BACH (n=35)			
	M	SD	M	SD	M	SD	M	SD	M	SD		
Focusing	12.45	2.58	12.44	2.88	13.24	2.33	13.09	1.50	12.40	1.85	1.58	.02
Passivity-Receptivity	22.66	4.35	22.54	5.12	24.85b	3.57	24.13	3.18	24.83	3.84	3.92*	.06
REMIND States	40.34	7.73	39.86	9.35	40.95	6.05	39.30	6.85	39.14	5.83	0.49	.01
Total	75.45	12.92	74.85	15.94	79.04	10.07	76.52	10.42	76.37	10.44	0.94	.02

Bonferroni's Post-Hoc test. * $p < .01$. ESO=Compulsory Secondary Education; BACH=High School

Mediation analysis

As shown in table 3, the global mean and the three factors of the EHERMA were significantly correlated with the rest of the variables, except for relaxation-mindfulness states (REMIND states) and AP.

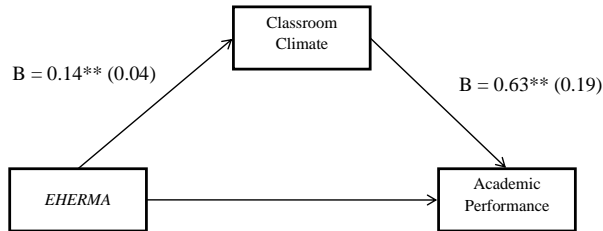
Table 3. Correlation coefficients (Pearson's r) between variables

	Focusing	Passivity-Receptivity	REMIND States	Mean EHERMA	Academic Performance
Focusing	-				
Passivity-Receptivity	.63***	-			
Relaxation-Mindfulness states	.75***	.59***	-		
Mean EHERMA	.85***	.84***	.94***	-	
Academic performance	.17**	.13*	.08	.15**	-
Classroom climate	.28***	.13*	.27***	.21**	.21***

Note. * $p < .05$. ** $p < .01$. *** $p < .001$

When analyzing the mediating effect of CC on the relationship between REMIND and AP, the results showed that the total effect was significant, while the direct effect was not significant (Figure 1). Bootstrapping showed a significant mediation effect on the model for CC, so the relation between the REMIND competence measured with the EHERMA and the AP variable is indirect. This is due to the influence of CC.

Figure 1. Mediation model of CC in the relationship between REMIND (measured with EHERMA) and AP



Total effect: B = 0.30* (0.13) / Direct effect: B = 0.21 (0.13)

Bootstrapping Classroom climate: Effect = .09 (L.C. 95%: .03 / .18).

Non-standardized Betas and estimation errors are in parenthesis.

* $p < .05$, ** $p < .001$.

DISCUSSION

Observing the relations between REMIND, CC and AP, results have shown that the effect of REMIND is not direct on AP, but it is significant through CC, which exerts a mediating function. This would confirm the first hypothesis of the study, which is in line with other studies (López-González et al., 2016a; Zenner, Herrnleben-Kurz, & Walach, 2014). The fact that REMIND does not directly influence AP, as in other studies (Aritzeta et al., 2016; Franco et al., 2011) may be explained by the used measurement instrument used. The EHERMA evaluates to a large extent the subjective state after the REMIND practice, and not other attentional or cognitive factors such as concentration, included in other mindfulness assessment instruments and that more directly influence academic performance. Finally, CC influenced directly AP. As for the lack of significant differences in REMIND by gender, this result is in line with some studies (Metz et al., 2013), but in contradiction with others, which obtained significant differences in favor of females (Hennelley, 2011; Sturges, 2012), or males (Huppert & Johnson, 2010). Similar results are obtained for adults (Williams et al., 2012; Slonim et al., 2015). The absence of significant global differences by academic level reinforces the findings of other studies (López-González et al., 2016a; Shapiro, Brown, & Biegel, 2007). The only significant difference was found in the passivity-receptivity factor and, specifically, between 2° ESO and 3° ESO, that is from 13 to 14 years. This can be explained by the possible differences in the implementation of the intervention program in both courses, in addition to the logical emotional fluctuations in 12 to 15 year olds (Silvers et al., 2012). For all of the above, the second hypothesis on differences by gender and academic level was entirely rejected. The limitations of this study lie in the specificity of the sample, the lack of control of some of the variables, such as the design of the program, instructor, number of sessions or time employed, among others.

CONCLUSIONS

REMIND-based interventions may contribute to counteracting the negative effects that impulsivity has on attention and memory (Franco et al., 2016; Shackman et al., 2011). This fact would strengthen the specific brain activity of cognitive zones, such as the prefrontal cortex, which play an important role in emotional regulation (Blakemore & Choudhury, 2006; Quintana & Quintana, 2015), which, undoubtedly, would have effects on AP. Given the teacher's influence in the achievement of an adequate learning climate (Brackett et al., 2011; Castejón, Gilar, Miñano, & Veas, 2016; López-González & Oriol, 2016), it is recommended that the teachers themselves practice these techniques (Kemeny et al., 2012) in order to be able to

implement interventions based on REMIND as, for example, the TREVA Program (López-González, Álvarez, & Bisquerra, 2016). Also, it is necessary to include instruments that assess relaxation mindfulness levels as a state, such as the EHERMA, to complement trait assessments.

Conflict of interest

The authors of this article declare no conflict of interest.

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