

Original article

COVID-19 resilience and neuroscience

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Abstract

Lately, neuroscience has proven key in providing scientific answers to research conducted in other disciplines. Resilience, from the point of view of neuroscience, takes on a new meaning due to the lockdown experienced under the COVID-19 pandemic. This article is the result of an investigation carried out during confinement in Spain, Mexico and Chile. It shows the preliminary results of the analysis of stress risk factors and resilience in neuroscience, identifying possible stress risk factors using socio-demographic data. A descriptive, cross-sectional, correlational and comparative study was conducted in a sample of 784 participants. The Connor-Davidson Resilience Scale (CD-RISC10) was used to identify resilience traits. The findings reveal a non-significant result among the countries, but statistically significant results in the level of education variable, which is associated with cognitive flexibility. The possible stress risk factors did not evince significant results. Thus, promoting resilience at an early age comes as a relevant finding. As argued by epigenetics, to immerse oneself in contexts where meaningful bonds are promoted, is essential to improve vital processes such as resilience and prevent potential stress risk factors.

Keywords: Covid-19; neuroscience; resilience; neuroeducation; well-being

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Resiliencia y neurociencia ante el COVID-19

Resumen

La neurociencia en los últimos años ha dado respuestas científicas a trabajos ya realizados desde otras disciplinas. La resiliencia desde la mirada de la neurociencia recobra nuevos significados ante la situación de confinamiento generada por la pandemia COVID-19. Este artículo es fruto de una investigación realizada durante el confinamiento en España, México y Chile, da cuenta de los resultados preliminares del análisis entre factores estresores y la resiliencia desde el enfoque de la neurociencia, identificando eventuales factores estresores a partir de datos socio-demográficos. Se realizó un estudio descriptivo, transversal, correlacional y comparativo con una muestra de 784 participantes. Se utilizó la escala de Connor - Davidson (CD-RISC10) para identificar conductas resilientes. Los hallazgos revelaron que la CD-RISC10 no presenta diferencia significativa entre los países, pero sí en el nivel de estudios; variable asociada a la flexibilidad cognitiva. Los potenciales factores estresores no arrojaron diferencias significativas. Por lo tanto, emerge la necesidad de promover la resiliencia desde etapas tempranas del desarrollo de los individuos como elemento clave de la epigenética, que apunta a rodearse de contextos enriquecidos para mejorar procesos vitales como la resiliencia y revertir eventuales factores estresores.

Palabras clave: Covid-19; neurociencia; resiliencia; neuroeducación; bienestar

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INTRODUCTION

A significant number of research has been conducted in neuroscience focusing on resilience. Authors such as Feder, Nestler & Charney (2009) and Burt et al. (2016) have analyzed the brain in the adaptation process. Similarly, Yang et al. (2016) have researched the areas of the brain that may be involved in resilience. Other studies, like Kong, Wang, Hu & Liu (2015) have investigated resilience's correlation to happiness. Therefore, it is possible to claim that the study of resilience in neuroscience is diverse and sometimes biased, for instance, when inspecting its link to anxiety in Clauss et al. (2014), or its connection with stress by Rothman & Mattson (2013).

Nevertheless, the question that should be posed is what concept of resilience is underlying these studies, as many of them take an individualistic and limited approach of the concept. As proposed by Grané & Forés (2019), neuroscience has been defining the neurological mechanisms associated with resilience. Even though resilience is seen as a professional motivational practice in social action rather than scientific evidence, in the last decades a great number of research has been carried out in the topic, which have provided scientific evidence to locate resilience in the neurological area. To go even further, neuroscience has yielded neurological evidence on the resistance to stress, trauma and recovery. This shows that neuroscience has endorsed to this day, the traditional perception of resilience. A prominent author from a neuroscientific view is Richard Davidson, who asserts that every person is characterized by an emotional profile composed of six styles: outlook (how long a positive emotion lasts), social intuition (ability to perceive social cues), self-awareness (to understand the body response to emotions), sensitivity

to context (to adapt our emotional response to context), attention (ability to focus), and resilience (how fast or how slow we can respond to adversity). According to Davidson, these six styles reflect the findings of contemporary neuroscientific investigation (Davidson & Begley, 2012). As a consequence, resilience has been the object of analysis in the latest neuroscientific studies.

Based on what was previously explained, it seems imperative to investigate the neuroscientific findings of resilience in the COVID-19 pandemic context (Yıldırım & Arslan, 2020), with subjects from varied social, cultural, and economic contexts when having to experience mandatory confinement. This research seeks to scrutinize how resilience is connected to potential stress risk factors during lockdown.

METHODOLOGY

The purpose of this investigation was to analyze from a neuroscience perspective, the relationship between resilience levels and potential stress risk factors with participants from Spain, Mexico and Chile during the social distance and confinement in the COVID-19 pandemic. A descriptive, cross-sectional, correlational and comparative study was carried out in June 2020. Another questionnaire response instance is scheduled to happen in December 2020 to the same subjects.

A nonprobability sampling technique was used with 784 subjects. Participants' ages ranged from 18 to 80 years ($M = 39.74$; $SD = 14.12$), 77.6% identified as female, and 22.7% as male. Participants come from 3 countries: Chile ($n = 369$), Spain ($n = 194$), and Mexico ($n = 194$). Subjects with incomplete or non-valid data were left out of the study. Other socio-demographic data are depicted in Table 1.

TABLE 1.
Descriptive characteristics of the subjects

Country*	Frequency	Percent	Valid percent	Cumulative percent
Mexico	194	24.7	25.6	25.6
Spain	194	24.7	25.6	51.3
Chile	369	47.1	48.7	100.0
Total	757	96.6	100.0	
Level of education*				
Uneducated	2	.3	.3	.3
Primary school	38	4.8	4.8	5.1
Secondary school (mandatory)	142	18.1	18.1	23.2
College undergraduate	171	21.8	21.8	45.0
University graduate	335	42.7	42.7	87.8
Postgraduate studies	96	12.2	12.2	100.0
Total	784	100.0	100.0	
Marital status*				
Married	325	41.5	41.6	41.6
Divorced/Separated	83	10.6	10.6	52.2
Widow/widower	9	1.1	1.2	53.4
Common-law relationship	93	11.9	11.9	65.3
Single	271	34.6	34.7	
Total	781	99.6	100.0	100.0

* The informed consent of the data was conducted in full agreement to Law 3/2018 of personal data protection and digital rights. Source: Authors.

A socio-demographic data questionnaire was used to collect data, as well as the Connor-Davidson scale (CD-RISC 10). The socio-demographic data was grouped in variables that could cause stress in confinement, such as number of people in the same household, marital status, and level of education. To measure the resilience level, CD-RISC 10 was used in its short version of 10 items to consider its validity and reliability (Notario-Pacheco et al., 2011; Serrano-Parra et al., 2013). Also, a unidimensional scale, with alternatives in Likert scale of 5 was employed. The questionnaire was self-administered and anonymous using Qualtrics.

RESULTS

The descriptive and inferential statistics analysis of CD-RISC, incorporated as a de-

pendent variable in the Anova and T-test to determine the differences between resilience and socio-demographic data such as level of education, number of people living in the same household, and marital status, were performed using the SPSS program.

In the first analysis, CD-RISC does not show a significant difference among the countries in the sample ($F= 1.896, p> .05$). There is a difference in the means, but it is not statistically significant: México ($M = 39.56$), Chile ($M = 38.74$), and Spain ($M = 38.24$).

The second analysis was performed with CD-RISC and the variable *level of education*, with the categories: primary school, secondary school, college undergraduate, university graduate, postgraduate studies. There was a significant difference among the groups ($F = 3.853; p < .01$) (Figure 1).

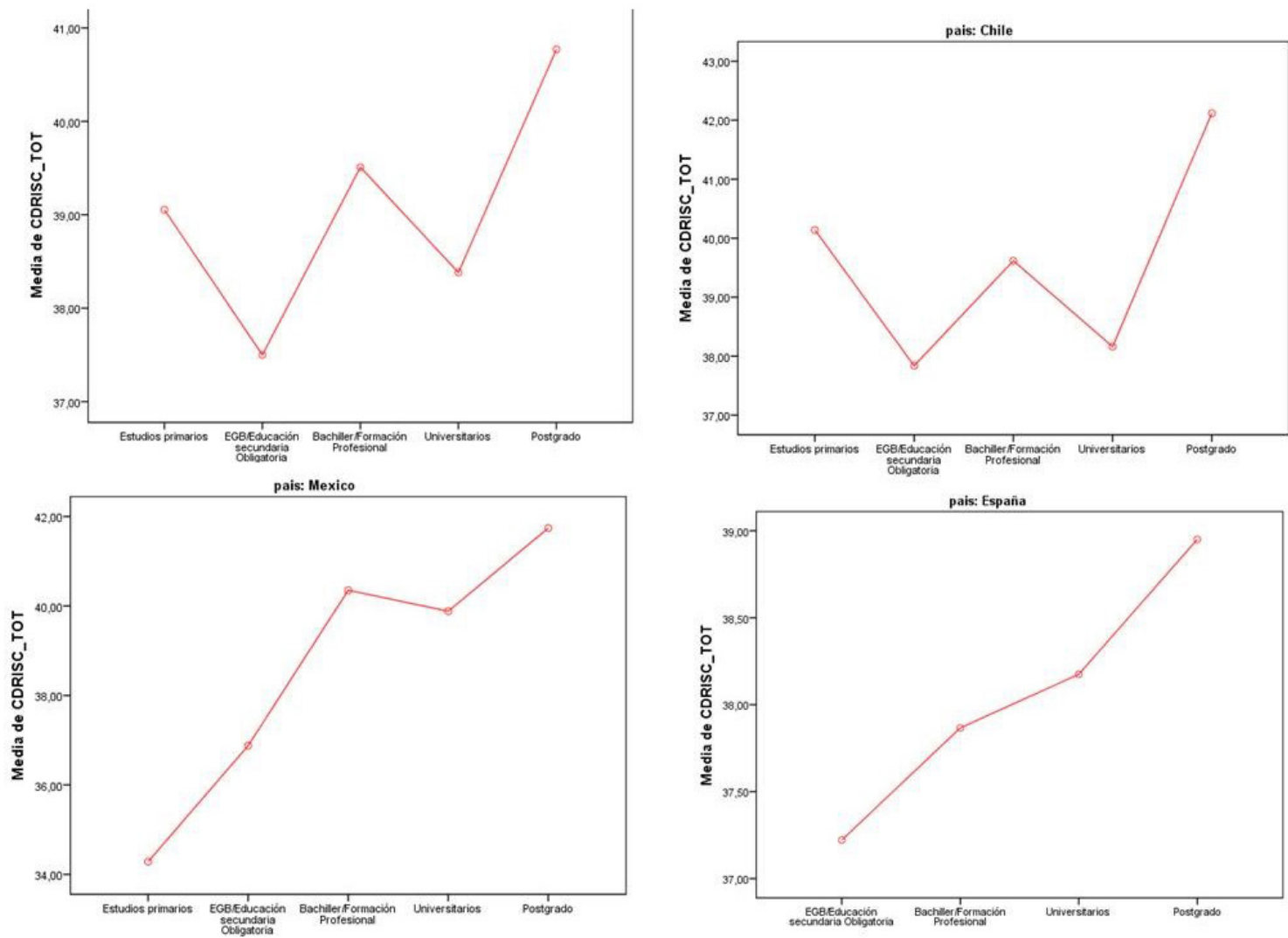


Figure 1. Level of education.
Source: Authors.

By analyzing these differences per country, it is possible to observe that Mexico reveals significant differences ($F = 3.225$; $p < .05$) in resilience levels depending on the level of education, according to a pairwise comparison, specifically between postgraduate studies and secondary school ($p < .05$).

The third analysis takes into account CD-RISC and the number of people in the same household during confinement. The descriptive results reveal a mean of 3.19 subjects ($M = 3.19$), with an interval from 0 to 12 people. Here, the correlation is not significant ($r = .060$, $p < .05$) in total, nor among countries. When comparing this data to marital status and performing a group analysis, the results indicate that single participants who live with more that

2 people show significant differences and a lower resilience level when compared to the other groups ($p < .05$).

CONCLUSION

Promoting resilience from a neuroeducational perspective considers many internal, external, and community factors, as it has been revealed by this research paper. In the three participating groups the results are almost identical, with minimal statistically significant differences. This pseudo “non-significance” in the case of stress risk factors, as it is in the number of people living in the same household, evinces the role of resilience in the adaptation and flexibility when faced against stressful situations

such as confinement, regardless of context variables.

One interesting conclusion of this preliminary study, is that rather than confinement itself, the quality of the relationship among people living in the same household and the strategies they use to promote resilience to face confinement, is fundamental. In the same vein, the level of education can be interpreted as a protection variable associated with cognitive flexibility in a person.

In light of the findings of this research, it seems essential to establish a course of action that promotes resilience from an early age. As proposed in epigenetics, to immerse oneself in contexts full of meaningful bonds is key to improve vital processes, as it is the case of resilience.

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