

Cognitive Reserve: A Crucial Construct for Addressing Mental Health

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Mental health is also cognitive health. This statement may seem obvious, given that standard definitions of mental health refer to the capacity of an individual to use their abilities productively and adaptively (World Health Organization, 2004; Galderisi, 2017). This includes cognitive functions such as reasoning, attention, memory and executive control. However, the affective and interpersonal components of mental health tend to receive greater attention from both the general public and professionals, with most clinical research focusing on affective disorders (Moitra et al., 2023). Nevertheless, according to the most widely used form of psychotherapy, cognitive behavioral therapy (CBT), cognition is a key determinant of mental health even in its broadest definition: the absence of psychopathology.

One of the main focuses of clinical research in neuroscience is cognitive reserve (CR), expressed through the capacity of an individual to maintain their cognitive functioning in the context of brain pathology (Stern, 2021). CR attempts to explain why two individuals with similar brain lesions, as regards both extent and location, may nonetheless show different cognitive profiles, with one of them conserving more functionality than the other. This phenomenon raises two main questions: what neuropathologies does CR protect against and what are the determinants of CR?

Scientific research has explored genetics, with incipient findings concerning specific genes in elderly rodents (Yegla & Foster, 2022). It has examined nutrition, discovering that certain dietary regimes seem to protect against cognitive decline (Puri et al., 2023). But it has primarily analyzed engagement in cognitively stimulating activities (CSAs) such as education, work, leisure and socialization. Studies have observed a mild-to-moderate negative correlation between the severity of cognitive impairment and degree of engagement in CSAs across the lifespan (Stern, 2021). More recent research has observed a similar correlation with the severity of mental disorders (Porricelli et al., 2024). This has also been found in psychological traits that are common predictors of psychopathology, such as negative emotionality (Cuéllar-García et al., 2023; Karsazi et al., 2021). This cluster of findings answers the first question. CR not only protects against Alzheimer's (Nelson et al., 2021), traumatic brain injuries or strokes (Oliva et al., 2025), but also against mental disorders that are not merely neurological.

Although the rationale for this relationship is not yet understood, it is possible to put forward a few hypotheses. First, as the theory supporting CR suggests (Stern, 2021), engagement in CSAs may boost the efficiency of neural networks, including those involved in behavioral self-regulation, extending from the prefrontal cortex to crucial areas of the limbic system. Second, engagement in CSAs may provide cognitive or behavioral strategies (such as self-directed verbal instructions, self-monitoring of internal states, planning techniques, or modes of socialization) transferable to the self-regulation of psychopathological symptoms. These first hypotheses are in line with the current view of mental disorders as being not only psychosocial but also having neurocognitive roots (Haber & Robbins, 2022). Moreover, the relationship between CR and mental health could be explained by the behavioral effects created by an environment of CSAs creates, for it may provide goals for structuring and directing behavior, offer an incentive provide an incentive to adhere to these stimulating activities, and maintain social interactions within these

environments. This is true of schools and the workplace, commonly regarded as contexts for engagement in CSAs in the literature, and therefore as promoters of CR.

However, as promising as the research on CR may seem, there are substantial caveats. First, there is no single, universally accepted operationalization of CR. The use of several proxies is the common measuring procedure (Kremen et al., 2022), restricting the comparability of results between studies and populations. Current trends suggest the use of multidimensional batteries, including CR questionnaires and performance tests (Pinto et al., 2024). More recent studies are beginning to pay attention to the use of data analysis techniques for neuroimaging, such as graph theory for integrating several sources of neuroimage data (Pappalettera, et al., 2024), or using the residuals of the association between cognitive and brain integrity measures (Elman et al., 2022).

Second, since most of the evidence comes from observational studies, we have yet to see the magnitude of the effect of CR in prevention or treatment. One example would be the trial by de la Serna et al. (2023), which plans to promote CR in children with a substantial risk of schizophrenia and bipolar disorder. Third, much of the evidence on the use of CR with psychopathology has been conducted in populations with severe disorders, such as schizophrenia. This points to the need for research on more common mental health disorders like anxiety and depression.

Finally, there is limited published research on CR and mental disorders with Mexican or Latin American samples. Efforts in this regard are required to promote mental health in all its expressions, not merely in its affective dimension. Addressing CR could take the form of research trials for programs designed to encourage engagement in CSAs, not only in adults or elderly people but from an early age. The aim would be to mitigate the risk for mental disorders with cognitive tools for self-regulation. It could also be expressed through testing complementary psychotherapeutic procedures designed to foster attention, memory and executive control in cases with non-cognitive disorders such as anxiety and depression.

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