

Cognitive reserve and anosognosia in questionable and mild dementia

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Abstract

Cognitive reserve (CR) theory posits that the clinical presentation of individuals with the same brain disease varies based upon premorbid variables (e.g., education, occupation, reading ability). Anosognosia (decreased insight regarding one's deficits) is common in dementia and has implications for safety, treatment, and caregiver burden. The current study examined the role of CR in anosognosia in individuals with mild dementia. Participants were individuals diagnosed with questionable or mild dementia (Clinical Dementia Rating 0.5 or 1) after neuropsychological evaluation. Anosognosia was measured by informant–patient discrepancy on the Cognitive Difficulties Scale. High and Low CR groups were created based upon reading performance. Low CR showed greater anosognosia than High CR. Anosognosia was associated with reduced reading performance, even after controlling for global cognitive decline. These findings suggest CR is related to anosognosia in questionable and mild dementia, and have clinical implications for the assessment of awareness in dementia.

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The theory of cognitive reserve (CR) or brain reserve capacity postulates that premorbid factors such as high educational and occupational attainment (e.g., Stern, Albert, Tang, & Tsai, 1999) or level of literacy (e.g., Manly, Touradji, Tang, & Stern, 2003) provide a buffer against cognitive impairment, and that the cognitive presentation of individuals with the

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same brain insult or disease varies according to these premorbid variables (Satz, 1993). Two models for the protective function of CR have been proposed. In one model, CR is a passive process of brain threshold, or “brain reserve capacity,” in which increased concentration of cortical synapses allows greater cognitive capability that masks or delays expression of cognitive decline (e.g., Satz, 1993). The other model relies on the brain actively coping or compensating for neurologic problems with utilization or recruitment of other pathways as necessary (Stern, 2002). CR has been investigated in several insults or diseases of the brain, including traumatic brain injury (e.g., Farmer et al., 2002; Ropacki & Elias, 2003), electroconvulsive therapy (Legendre, Stern, Solomon, Furman, & Smith, 2003), temporal lobe epilepsy (Sawrie et al., 2000), human immunodeficiency virus (Stern, Silva, Chaisson, & Evans, 1996), Parkinson’s disease (Glatt et al., 1996), and most frequently in dementia (e.g., Alexander et al., 1997; Bäckman, 1998; Stern et al., 1999; Wilson et al., 2000).

Studies of CR are of particular importance in dementia, as individuals with features of low CR (e.g., illiteracy) are at greater risk for developing dementia relative to those with higher reserve (7.2% prevalence vs. 0.5%; Bonaiuto et al., 1990). Studies of individuals with dementia demonstrate that individuals with high CR can sustain greater neuropathological insult, yet still exhibit the same clinical presentation as those with lower CR (e.g., Alexander et al., 1997; Stern, Alexander, & Prohovnik, 1995; Stern, Alexander, Prohovnik, & Mayeux, 1992). The role CR plays in delaying the clinical expression of dementia has been demonstrated numerous times (e.g., Sanchez, Rodriguez, & Carro, 2002; Wilson et al., 2000).

Several criticisms have been leveled against CR research, including the suggestion that inconsistent correlations between CR variables and dementia prevalence are artifactual (e.g., Bowler, Munoz, Merskey, & Hachinski, 1998; Cobb, Wolf, Au, White, & D’Agostino, 1995). However, differential findings may better be attributed to heterogeneity of research methods (reviewed by Fioravanti & Carbone, 2001). For example, some investigations of CR employ demographically based measures such as educational level or occupational achievement, while others utilize performance-based measures, such as reading performance. It is plausible that different CR levels are yielded from demographic measures compared to performance measures, as education and occupation may reflect opportunity rather than intellectual capacity. This may be especially true for elderly (Van Exel et al., 2001) and ethnically diverse populations (Manly et al., 2003). In fact, recent research suggests that measures related to level of literacy, such as reading ability or reading for enjoyment, may better predict CR in older adults than education level or occupational attainment (Manly et al., 2003).

Although CR in dementia has been well-studied with regard to cognitive, functional, and neuropathological changes, the relationship between CR and anosognosia in dementia has not been examined. Investigations of anosognosia, or reduced awareness regarding one’s “sensory, motor, cognitive, or other behavioral deficit” (Lamar, Lasarev, & Libon, 2002) in dementia indicate that it is an important component of clinical presentations in Alzheimer’s disease (e.g., Derouesné et al., 1999; Seltzer, Vasterling, & Buswell, 1995; Zanetti et al., 1999), vascular dementia (Zanetti et al., 1999), and Parkinson’s dementia (Seltzer, Vasterling, Mathias, & Brennan, 2001). Anosognosia can lead to unsafe behavior, such as continuing to drive after cognitive or functional impairment prevents safety doing so (Cotrell & Wild, 1999). It is

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