# Self-prediction of performance to detect changes of impaired self-awareness during neurorehabilitation

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Persons with moderate to severe acquired brain injury often show impaired ability to accurately perceive the effects of their disorders on their physical, cognitive, emotional, and behavioral abilities. Impaired self-awareness has received particular attention from rehabilitation professionals because unawareness is considered an impeding factor in the rehabilitation process. Individuals who are unaware of their limitations may not actively engage in therapeutic activities, may choose activities beyond their abilities, and require supervision because of poor safety judgement [1].

Impaired self-awareness is a disturbance of phenomenological experience, and it is difficult to measure directly. Clinicians usually assess it through the discrepancy method: the patient with acquired brain injury rates his/her ability to perform cognitive, neurobehavioral, or functional tasks. A second person (e.g. family member) also rates these abilities (presumably more objectively). The discrepancy (commonly measured as the value obtained by subtracting the other observer rating from the self-rating) indicates severity of impaired self-awareness [2]. An alternative method to assess impaired self-awareness is the predicted performance method. This method involves asking patients to self-predict their performance prior to completing a task; following task performance, patients self-evaluate their performance of the task [3,4]. Although the predicted performance method has been used to study the presence or absence of impaired self-awareness, we are not aware that it has been done to assess discrepancies in impaired self-awareness between two time points. The objective of this study was to evaluate impaired self-awareness changes in a sample of inpatients with acquired brain injury by predicted performance method.

The sample comprised 23 patients with acquired brain injury admitted to a subacute neurorehabilitation hospital (19 males and four females). Participants had an average age of 46,7 years –standard deviation (SD): 15,2; range: 18-79–. Of this group, 39,1% ($n$ = 9) had an ischemic stroke, 3,8% ($n$ = 8) a hemorrhagic stroke, and 26,1% ($n$ = 6), a traumatic brain injury.

Accuracy of performance prediction was assessed by the awareness scale of the BNI Screen for Higher Cerebral Functions (BNIS) –a short screening test that include seven subscales to evaluate different cognitive domains as well as affective and metacognitive aspects–. The awareness scale of BNIS rate the ability of the person to estimate the number of words he/she will later remember on one of the memory items. If the number estimated and actual remembered words are the same, 1 point is given. Zero points are given if patient estimate more or fewer words than he/she remembers [5]. Participants were assessed at two time points: baseline and follow-up. The baseline assessment was administered an average of 123 days after injury (SD: 71,1; range: 36-370 days). The follow-up assessment was completed an average 46,78 days after the baseline assessment (SD: 5,8; range: 30-57 days). A neuropsychologist administered a Spanish version of the BNIS. Between the baseline and follow-up assessment all patients have undergone neurorehabilitation treatment.

At the baseline assessment the person's self-reported assessment of performance differs from his/her actual performance in 60,9% of patients. At the follow-up assessment the percentage is reduced to 30.,% (Z = –2,111; $p$ = 0,035; effect size $r$ = 0,311). This difference wasn't explained by the sex of the patient, educational background, or etiology. In the subgroup of patients with stroke there is no relationship between the side of the injury (right vs. left) and the improvement of predicted performance capacity.

This result indicates that, in general, patients predict their performance more accurately at follow-up than at baseline assessment. The lack of a control group does not allow us to confirm whether the changes in predictive ability would have occurred naturally or is related to neurorehabilitation. On the other hand, impaired self-awareness is not a unitary disorder, and dissociations have been reported within different domains. Therefore, it is advisable to use different approaches to assess different self-awareness domains. Finally, the BNIS is a screening measure used to identify areas of impairment, it is not designed to measure any one single area of functioning and, therefore, caution is warranted when interpreting the results of this study.

To summarize, our purpose was to evaluate discrepancies in impaired self-awareness between two time points using the predicted performance method. The results suggests that the awareness scale of BNIS could be a good measure to detect changes in impaired self-awareness after acquired brain injury, particularly in the domain of memory self-awareness.

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