



ORIGINAL ARTICLE

Spanish normative studies in young adults (*NEURONORMA* young adults project): Norms for the Visual Object and Space Perception Battery and Judgment of Line Orientation tests[☆]

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KEYWORDS

Normative data;
Age;
Educational level;
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Abstract

Introduction: The Visual Object and Space Perception Battery (VOSP) and Judgment of Line Orientation tests (JLO) are used in clinical practice to assess visuoperceptual and visuospatial abilities.

Objective: In this study, as part of the Spanish normative studies project in young adults (*NEURONORMA* young adults), we present normative data for a short version of the VOSP test and for the JLO test.

Material and methods: The sample consisted of 179 participants who are cognitively normal and range in age from 18 to 49 years. Tables are provided to convert raw scores to scaled scores. Education- and sex-adjusted scores were obtained by applying linear regression techniques.

Results: Our results show that education and sex only affect scores on the JLO test, and that age has no effect.

Conclusions: The normative data obtained will be extremely useful in the clinical evaluation of young Spanish adults.

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PALABRAS CLAVE

Datos normativos;
Edad;
Escolaridad;
Percepción espacial;
Reconocimiento
visual

Estudios normativos españoles en población adulta joven (proyecto NEURONORMA jóvenes): Normas para las pruebas Visual Object and Space Perception Battery y Judgment of Line Orientation

Resumen

Introducción: La Visual Object and Space Perception Battery (VOSP) y el Judgment of Line Orientation (JLO) son pruebas utilizadas para explorar habilidades visuoperceptivas y visuoespaciales.

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Objetivo: En el presente estudio, como parte de los estudios normativos españoles del proyecto NEURONORMA jóvenes, se presentan datos normativos para una versión abreviada de la VOSP y el JLO.

Material y métodos: La muestra está formada por 179 participantes, cognitivamente normales, de entre 18 y 49 años de edad. Se aportan tablas para convertir las puntuaciones brutas en escalares y tablas con los ajustes pertinentes por escolaridad y género a partir de regresiones lineales.

Resultados: Los resultados obtenidos muestran la influencia de la escolaridad y el género únicamente en el JLO, y nulo efecto de la edad.

Conclusiones: Las normas obtenidas aportan datos de gran utilidad clínica para la evaluación de población adulta joven española.

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Introduction

Spatial and visual perception tasks provide data about visuoperceptual and visuospatial abilities, visual processing and recognition, object and space perception, and spatial orientation.^{1,2} In addition, the characteristics of these tests help minimise the impact of motor and verbal mediation abilities¹ and other cognitive capacities,^{2,3} regardless of whether tasks are examined one by one or collectively within a semiological group.^{4,5}

In 1991, Warrington and James² developed the Visual Object and Space Perception Battery (VOSP) in order to analyse the perception of objects and space according to Warrington's model.⁶ He recognised 3 subtypes of deficits in object perception: sensory and visual processing disorder, apperceptive agnosia, and associative agnosia. Since that time, the test has not been modified. As explained in certain compilations of neuropsychological tests, the test may be administered as a whole or as a selection of subtests.^{1,4} Researchers generally use the entire battery. However, in light of the data from a recent study,⁷ we opted to administer the VOSP shape detection screening test followed by a selection of 4 subtests from the battery: object decision, progressive silhouettes, position discrimination, and number location.

Several normative studies highlight the importance of the sociodemographic variables and their impact on the VOSP performance. Some of the subtests show a decrease in performance beginning at the age of 50 years^{2,7-9} and an additional decline in subjects aged 70 and older.^{7,9} Most studies suggest that education is correlated to performance on many of the subtests in the battery.⁷⁻⁹ Results regarding a sex effect on the VOSP are inconclusive, although some studies found no significant differences.^{8,9} Nevertheless, one study⁷ identified a sex effect on 5 of the 8 subtests. Researchers do not know how cultural factors affect results from these subtests, since one of the studies identified a culture effect⁹ and another did not.⁷ The influence of cultural factors on the performance of the full VOSP test also remains unclear, based on differences in results from the studies cited above.^{7,9} There are only 2 normalisation studies of the VOSP battery in Spain.^{7,8} Age, educational level,⁷ and sex distribution in both studies are similar to those in the American sample.⁸

Benton^{3,10} designed the Judgment of Line Orientation test (JLO) in order to assess spatial perception and orientation. The test assesses the subject's ability to estimate angular relationships between line segments. Subjects are asked to match an angled line on a stimulus card to one of the angled lines shown on a reference card. The test includes 2 complete versions and a few abbreviated versions that have been described in multiple neuropsychological test compendia.^{1,4} The complete version contains 30 items, with 2 alternative forms (H and V). Since it was published, several abbreviated versions have been proposed, and most of these versions include 15 items. Another adapted version includes 20 items. Lezak et al. collected a wide selection of the different versions.¹ Additionally, the Repeatable Battery for the Assessment of Neuropsychological Status presents a JLO-type subtest with 10 items involving comparing line segments.¹¹

Multiple normative studies highlight the impact of sociodemographic factors on JLO performance. According to several studies, there is curvilinear age effect on test performance.³ A decline is recorded beginning at the age of 50 for both the long version^{3,12,13} and the abbreviated versions.¹⁴ Researchers have also found an education effect on JLO scores, since subjects with a low educational level present poorer performances,³ which also reveal differences between men and women. In addition, an education effect has also been observed in JLO results collected from a sample of older adults,^{8,12,13} and in studies using the abbreviated 15-item version. Concerning sex, published data on JLO show that men score higher than women on both the long version^{3,8,16-20} and the abbreviated versions.^{14,21} This effect has also been confirmed in studies of patients with stroke or Parkinson's disease matched to control group subjects.^{13,22} A sexual orientation effect has also been observed among males, with the heterosexual group scoring higher than the homosexual group.^{23,24} According to the literature, ethnic factors do not have a significant effect on JLO results,^{3,25} with the exception of one study reporting poorer performance in an African-American adult population.¹⁵

A recent study published normative data for the JLO taken from a sample of Spanish adults aged between 50 and 90.⁸

Until now, research intended to obtain normative data for the VOSP and JLO tests has focused on older adults. Some of

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