Defining Dyslexia
Published by: American Association for the Advancement of Science
Stable URL: http://www.jstor.org/stable/3083748
Accessed: 18/12/2009 03:59

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at http://www.jstor.org/page/info/about/policies/terms.jsp. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at http://www.jstor.org/action/showPublisher?publisherCode=aaas.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

American Association for the Advancement of Science is collaborating with JSTOR to digitize, preserve and extend access to Science.
Defining Dyslexia

DYSLEXIA IS CALLED “THE LANGUAGE DISORDER that makes reading and writing a struggle” by Laura Helmuth in her News of the Week article “Dyslexia: same brains, different languages,” (16 Mar., p. 2064). Although she is in the good company of many cognitive neuroscientists and educational psychologists, her terminology is in error. Evolution prepared us for language, but not for reading or writing. Indeed, Western cultures have demanded that our brains should normally allow for the acquisition of reading. If they don’t, then there must be an abnormality. The question is whether this “abnormality” is still within the normal evolutionary range.

In other words, would our ancestors with such brains have become normally speaking and normally functioning hunter-gatherers? If so, it is a misnomer to denote dyslexics as neurologically abnormal. It

---

References and Notes
should not be the arbitrary prevalent culture that defines what is neurologically normal or deviant.

WILLEM J. M. LEVELT
Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands. E-mail: pim@mpi.nl

Response

Since reading represents highly artificial behavior, and is of historically recent origin, Levelt concludes that a dyslexic would be well off in a nonreading world, and he therefore assumes that the dyslexic's altered pattern of brain response does not represent an underlying neurological abnormality.

However, reading difficulties can no longer be considered a necessary or a sufficient sign of dyslexia (1). The primary and enduring cognitive consequences of dyslexia are subtle deficits in speech/language processing. Affected individuals, from early childhood onwards, have problems in tasks that tap phonological skills (e.g., word repetition, verbal short-term memory) and tasks that require the rapid retrieval of words (e.g., object naming, digit naming). Phonological competence is part of linguistic competence and has a basis in the brain (2), plausibly with a heritable component (3). It is manifest with the ease by which we learn new words in our mother tongue and when we learn a foreign language (4). These are skills that even hunter-gatherers may have found useful for communication with their neighbors. The spectacular rise of writing systems in the last 5000 years testifies to the existence of a strong human instinct for communication.

Given that reading problems by themselves do not distinguish dyslexics from those who are merely at the tail end of the normal distribution, we suggest that the combination of cognitive neuropsychology and neuroimaging may provide a better criterion. Our results show that the brain activation pattern in dyslexics, identified as possessing impaired phonological skills, is different while they are reading simple words (5).

Why is reading affected at all in these people? In adult normal readers, the neural systems for reading largely overlap with those for object naming (6, table 2e); learning to read may imply a systematic moulding of that part of the neural system that allows the brain to name objects. We propose that dyslexic brains are not able to mould connections between the sight, sound, and meaning of a word as efficiently as other brains (7). In a preliterate world, this disorder would not lead to the same kind of social exclusion, but it could have subtle consequences for an individual's status in societies that value verbal ability.

E. PAULESU,1,2* J.-F. DEMONET,3 F. FAZIO,4 S. F. CAPPA,5 G. COSSU,6 C. D. FRITH,7 U. FRITH8
1Psychology Department, University of Milan Bicocca, Milan, Italy; 2INB-CNR, Scientific Institute H San Raffaele, Milan, Italy; 3INSERM U455, Hopital Purpan, Toulouse, France; 4Neuroscience and Biomedical Technologies Department, University of Milan Bicocca, Milan, Italy; 5Psychology Department, University Vita e Salute H San Raffaele, Milan, Italy; 6Institute of Human Physiology, University of Parma, Parma, Italy; 7Wellcome Department of Cognitive Neurology, Institute of Neurology, London, UK; 8Institute of Cognitive Neuroscience, University College London, London, UK
*To whom correspondence should be addressed.
E-mail: eraldo.paulesu@unimib.it

References and Notes

A New Xenon Arc Lamp for Fluorescence Microscopy

Powerful: 175Watts
Compact: Internal power supply
Cool: IR eliminating cold mirror
Flexible: Adapters for most microscopes

PRECISION INSTRUMENTATION FOR THE SCIENCES

SUTTER INSTRUMENT COMPANY
51 DIGITAL DRIVE, NOVATO, CA. 94949
PHONE: 415.883.0128 FAX: 415.883.0572
EMAIL:INFO@SUTTER.COM WWW.SUTTER.COM

Circle No. 48 on Readers’ Service Card

Spectrum Laboratory Products

just a... CLICK away

11,000 Fine CHEMICALS and SUPPLIES

www.spectrumchemical.com

Circle No. 46 on Readers’ Service Card