PEDIATRIC NEUROLOGICAL DISORDERS; THE IMPACT OF DISCREPANT DATA ON THE NEUROPSYCHOLOGIST

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Abstract

Pediatric neurological disorders are rather common and severely impact cognitive functioning and put children at great mortality risk. Some of the most prevalent neurological disorders include seizures, tbi, and stroke. Epilepsy, cerebral palsy, and multiple sclerosis are also common, but occur less often. Discrepant documentation of these prevalence and incidence rates, with only little differentiation of typology of disorders in research, creates a need for exploration to allow neuropsychologists to have a better understanding of performance expectations, and norms for cognitive functioning. This poster will aim to bring light to such discrepancies and indicate future directions for researchers.

Etiology of Neurological Disorders

- Some research states that neurological disorders are brought on by a form of insult or trauma to the central nervous system (Aylward, 1997).
  - “In addition to preterm birth, such CNS insults include prenatal drug exposure, intrauterine growth retardation, seizures, intraventricular hemorrhage, hydrocephalus, perinatal asphyxia, or hypoxic-ischemic encephalopathy” (Aylward, 1997, p. 2).
  - Causes can also include factors that are not only genetic. Causes can 2be prenatal, perinatal, and postnatal.
    - These incidents are more common in poorer areas and related factors include low socioeconomic status, less education, and less access to hospital, leading to riskier in-home deliveries by untrained individuals (Kumar et al., 2013).

The Role of the Neuropsychologist

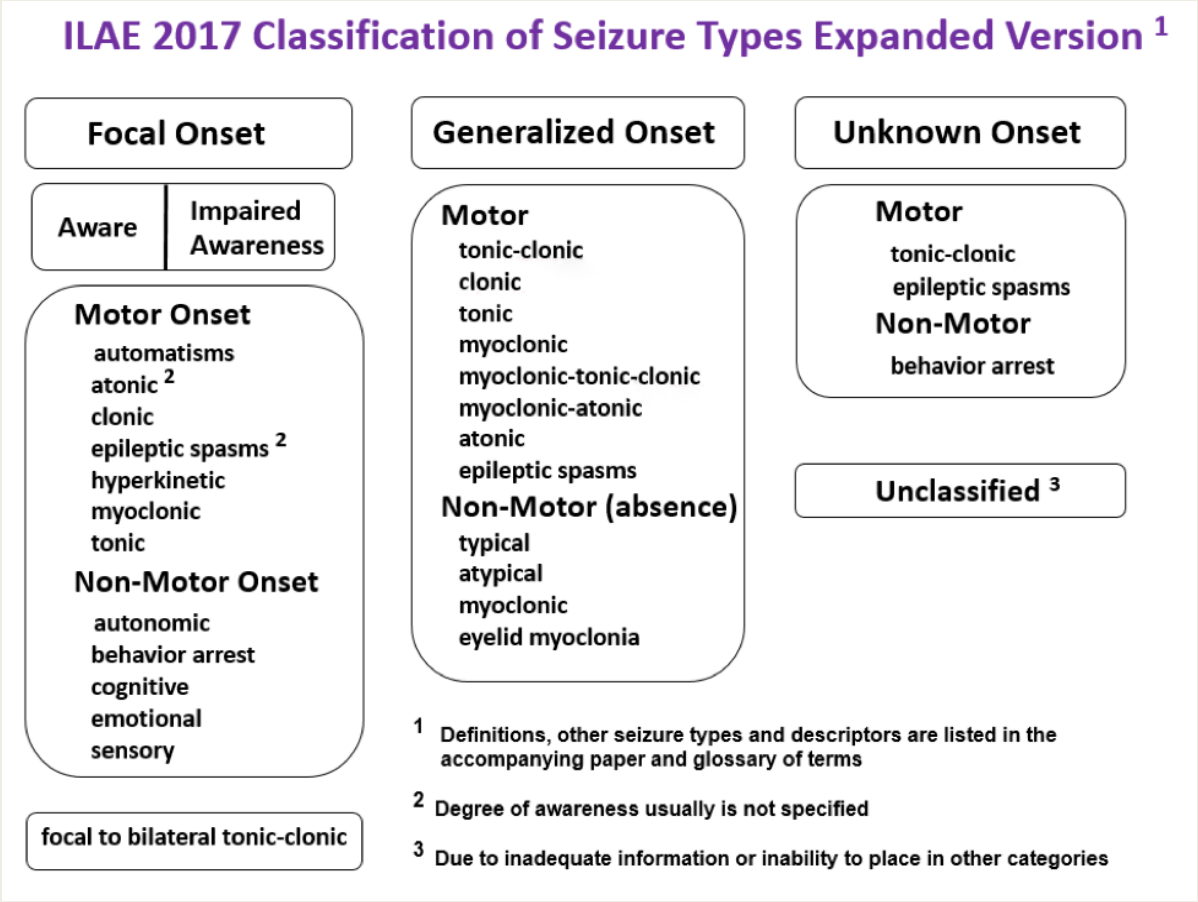
- Identify and diagnose the neurological disorder and etiology (Moller et al., 2019).
- Provide comprehensive neuropsychological evaluations, including pre and post surgical evaluations and individualized educational plan assistance (Heffelfinger & Koop, 2009).
- Determine what specific interventions need to be implemented (Heffelfinger & Koop, 2009).
- Help parents understand developmental trajectory, cognitive functioning, and ability levels (Heffelfinger & Koop, 2009).
- Provide post-injury (tbi) symptom management (Echemendia & Gioia, 2018).
- Assist with ’return-to-school’ or ‘return to sports’ processes (Echemendia & Gioia, 2018).
- Provide cognitive rehabilitative services for cognitive difficulties (Strong & Donders, 2013).
- Provide emotional management for patients and families (Echemendia & Gioia, 2018).

The Problem with Little Typology Differentiation

Many disorders come in several forms but the prevalence and symptoms are often grouped without categorization and distinction, leading to less accuracy in the understanding of disorders.

Table 2 — Physiological classification of cerebral palsy.

Major types	Description
Spastic (80%)	• Velocity-dependent increase in muscle tone with passive stretch • Joint contractures are common
Athetoid	• Dyskinetic, purposeless movements • Joint contractures are uncommon • Dystonia or hypotonia can be associated
Choreiform	• Continual purposeless movements
Rigid	• Hypertonicity occurs in the absence of hyperreflexia, spasticity and clonus • "Cogwheel" or "lead pipe" muscle stiffness
Ataxic	• Disturbance of coordinated movement, most commonly walking • Normal head/neck control
Hypotonic	• Low muscle tone and normal deep tendon reflexes
Mixed	• Features of more than one type • No head/neck control



The Problem with Little Typology Differentiation Cont.

Table 1. Types Of Primary Traumatic Brain Injuries

Intra-axial Injury
- Diffuse axonal injury
- Cortical contusion
- Intracerebral hematoma

Extra-axial Injury
- Epidural hematoma
- Subdural hematoma
- Subarachnoid hemorrhage
- Intraventricular hemorrhage

Vascular Injury
- Vascular dissection
- Carotid cavernous fistula
- Arteriovenous dural fistula
- Pseudoaneurysm

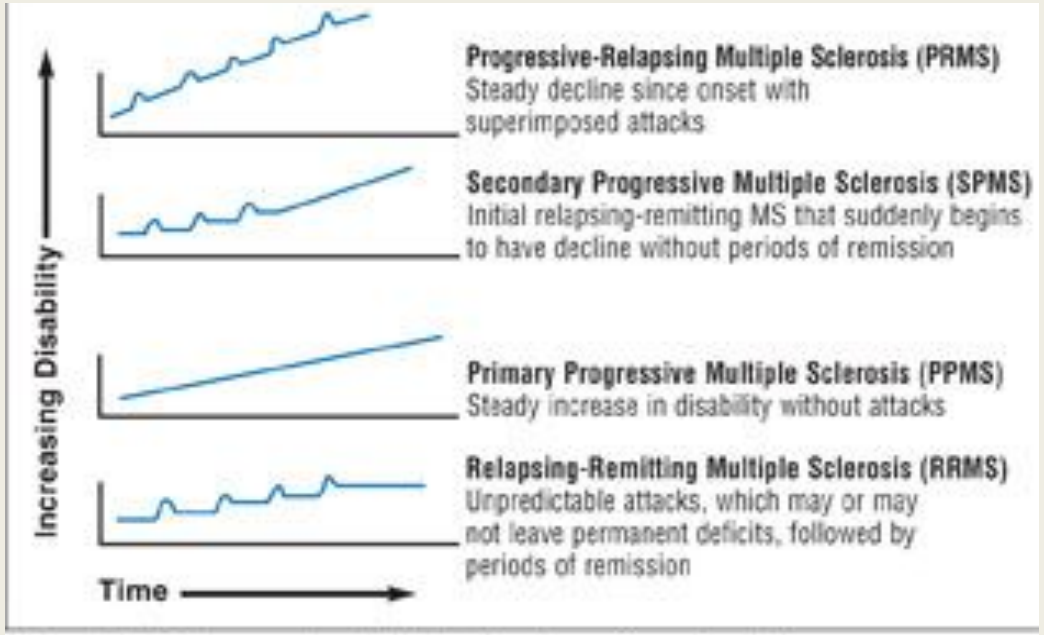


Figure 1. The four types of multiple sclerosis. Source: Crown Copyright.

Thus, it becomes important to recognize that using umbrella are an injustice for researchers, physicians, neuropsychologists, and the parents of the children with neurological disorders.

Common Pediatric Neurological Disorders

Neurological Illness	Differing Prevalence
Seizure	• Seizures occur in 3.2-5.5/1,000 in developed countries and 3.6-44/1,000 in underdeveloped countries (Camfield & Camfield, 2015). • Of 273,900 admissions of children with neurologic diagnoses, 53.9% experienced seizures (Moreau et al., 2013).
Traumatic Brain Injury	• Of 273,900 admissions of children with neurologic diagnoses, 17.3% experienced traumatic brain injury (Moreau et al., 2013).
Stroke	• 25–37 per 100,000 infants and 1–13 per 100,000 children (Champigny et al., 2020). • 2 or 3 per 100,000 children (Engelmann & Jordan, 2012).
Epilepsy	• 7.1/1,000 in general population (Hirtz et al., 2007). • Per Ekinsi and colleagues, prevalence in childhood is estimated to be 0.05–1% (2008).
Cerebral Palsy	• 2.4/1,000 children (Hirtz et al., 2007). • 3-4 children in the United States (Braun et al., 2016).
Multiple Sclerosis	• 0.9/1,000 in general population (Hirtz et al., 2007).

Note that different articles differ in the estimated prevalence numbers

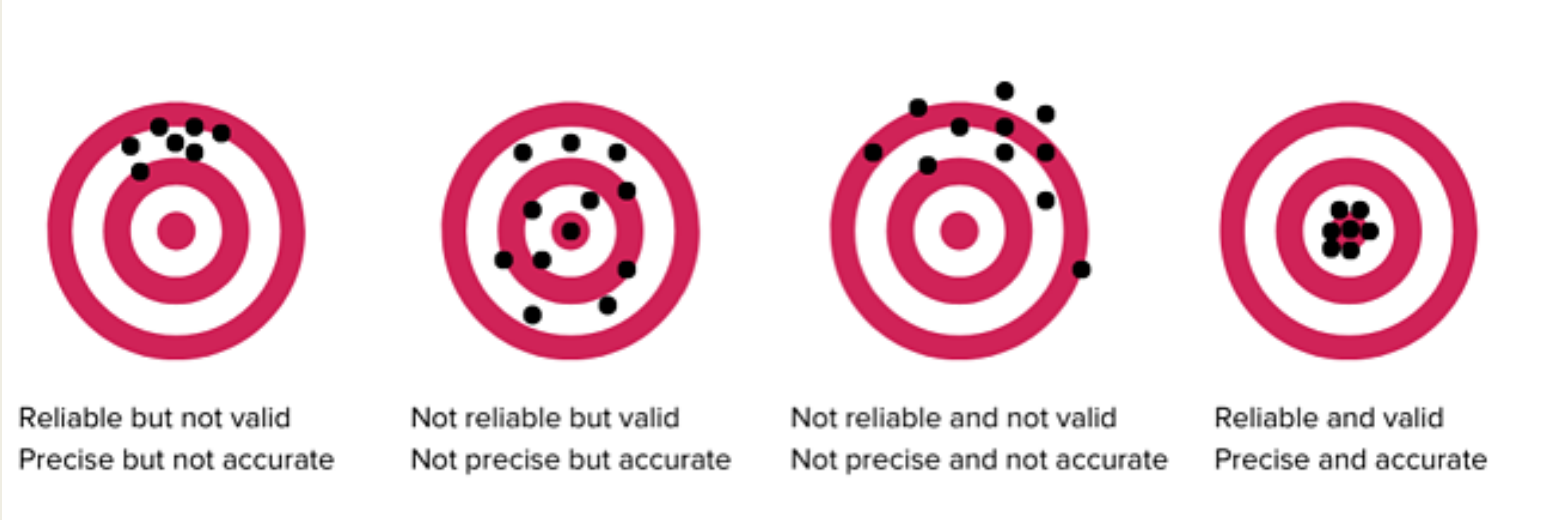
Why is this Important?

- Understanding the correct prevalence and typology of disorders will help physicians and neuropsychologists better identify occurrence rate likelihoods and eventually will allow for a better understanding of the cognitive difficulties and performance expectations for each type or division of a neurological condition.

How Does This Impact the Neuropsychologist?

More specification will assure that neuropsychologist can:

1. Provide more accurate depictions of cognitive effects on subtypes of disorders
2. Have a more well defined pool of representative data to compare individuals to
3. Ascertain more valid and reliable testing interpretations
4. Help parents and children better understand their diagnosis



Future Directions

- Avoid generalizations and usage of broad categories.
- Try to be as specific as possible when differentiating between subtypes of neurological disorders.
- Allow for differentiation between general symptoms experienced versus more specific ones that come with subtypes.
- Consider differentiating between cultural and socioeconomic backgrounds when studying pediatric populations for ecological validity (Olson et al., 2013).
- Incorporate effects of symptoms with day to day functioning for a better understanding (Olson et al., 2013).

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