Nonverbal Learning Disabilities

- NLD overview

- Examination of an Intervention Used to Improve Visual Working Memory

- Hypothesized Intervention to Improve Social Competency

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Overview of NLD

- **General Features**
  - Pluralistic population
  - Etiological uncertainty
  - Relative dearth of research

- **Areas of Strength**
  - Above average verbal skills
  - Strong rote memory
  - Become experts on subjects
  - Follow the rules (sometimes to a fault)
  - Correlation with high intelligence and NLD
Overview of NLD (cont’d)

- **Areas of Weakness**
  - Visual-spatial recognition/perception skills
  - Attention/focus/processing speed
  - Social skills (e.g. pragmatic language, expressive language, nonverbal communication, semantics)
  - Emotional stability (advanced risk for suicide)
  - Executive functioning (e.g. organization, planning, prioritizing)
  - Reading comprehension
  - Rigidity (i.e. poor adaptability)
  - Fine and gross motor skills
Overview of NLD (cont’d)

- Practical Examples
  - Locker/desk/nap sack
  - Lost in the hallway and playground
  - Social isolation
  - Copying from the board
  - Written work and phonetic spelling
  - Lots of questions
  - Bullying
  - Linear objects
Overview of NLD (cont’d)

- More than Just a Learning Disability
  - Co-morbidity with behavioural and psychological pathologies
  - NLD with: processing speed disorder, ADHD, OCD, OCPD (perhaps maladaptive perfectionism), Tourette’s syndrome, Anxiety disorders, ODD, clinical depression, substance abuse, bipolar
  - greater risk for physical injury
  - greater risk for stress related diseases (e.g. hypertension, stroke, heart attack, depression)
Evidence


- Initial study to prove difference between spatial-simultaneous and spatial-sequential working memory in individuals with NLD

- Discusses the importance of distinguishing between these processes within the visuospatial working memory

- Distinction between sequential and simultaneous processes may contribute to the further understanding of working memory

- Further research is necessary
Simultaneous-Spatial Working Memory


- Literature
  - Intact verbal but impaired visuo-spatial abilities
  - Types of deficits include: visuo-spatial organizational, psychomotor, tactile-perceptual, non-verbal problem solving skills, visuo-spatial working memory deficits
Visuo-Spatial Working Memory

- Working memory for manipulating visual and spatial info

- These areas activate different areas of the brain and may be separate components
Aim

- Test the efficacy of a visuo-spatial memory treatment for a child with NLD.
- Specifically could this child improve on visuo-spatial working memory (VSWM) after training in this area.
Subject

- 11 year old with a diagnosis of NLD
- Grade six in Italy
- School reported concerns with: recalling the positions of objects, orientation around the school, and remembering the locations of familiar landmarks
Assessment

- Visuo-spatial Battery (BVS)
- 9 computerized tests
- These assessed visual, sequential-spatial, and simultaneous-spatial components
- Had to indicate whether the slide was the same as the one previously presented
- Test progress through a hierarchy starting with two objects up to eight objects with three repetitions at each level
Assessment

- Half the responses at each level were the same, the other half were different.
- Presentation of slides was timed.
- Final score is the sum of the last three correct questions.
- Results were compared to a normative sample.
Visual Memory Assessment

- Nonsense shapes task
- Little fish recognition task
- Toy balloons recognition task
Sequential-Spatial Assessment

- Sequential light-bulbs recognition task
- Sequential lines test
- Dot matrix sequential test
Simultaneous-Spatial Assessment

- Simultaneous light-bulbs recognition task
- Simultaneous lines test
- Dot Matrix Simultaneous test
Assessment

- Child scored below the mean on spatial-simultaneous tests
  - Simultaneous light-bulb recognition task
  - Simultaneous lines test
Treatment

- Designed to improve child's ability to memorize simultaneous-spatial material
- Conducted over seven sessions within one month
- 40 minutes of playing games
- 10 minutes of discussing strategies with a trainer and providing a metacognitive briefing to the child where strategy efficacy was discussed
Treatment

- Strategies discussed include:
  - Chunking
  - Verbalization of stimuli
  - Mental imagery

- Three phases of training: memory recognition, memory recall, and everyday memory
Treatment

- Memory recognition:
  - Sessions 1-3
  - Session 1- recognize location of objects after being read a story (point to correct picture in booklet)
  - Session 2- answer simple questions about location of objects from a story
  - Session 3- answer simple questions about location of landmarks from a story
Treatment

- Memory recall
  - Sessions 4-6
  - Same as above but the child had to recall rather than recognize

- Everyday memory
  - Session 7
  - Maps of cities with landmarks were shown
  - Child had to recall locations of landmarks
Results

- Child was retested on BVS battery after treatment and 6 months later
- He improved significantly but was still below the mean
- Results were maintained at follow-up
Limitations

- Small sample size

- Would children in different countries respond to intervention

- Are results generalizable to academic achievement
Evidence


- Individuals with NLD have highly developed rote verbal skills

- Sample:
  - 7 individuals with NLD (4 children, 3 adults)
  - 7 individuals with VLD (4 children, 3 adults)

- Test:
  - Recalling grocery list A (5 different types of fruit, toys and clothing)
  - Recalling grocery list B (5 different types of fruit, desserts and household items)
Evidence

- Individuals with NLD performed within average range for serial but not semantic clustering

- **Serial clustering**: 2 consecutive items in the same order as they appeared on the shopping list

- **Semantic clustering**: 2 consecutive responses from the same semantic category

- These results translate into an individual with NLD taking a passive/unorganized approach to verbal learning strategies
Evidence


- Sample:
  - 2 teenage participants with NLD
  - 2 typically developing teenage participants – no known learning disorder

- Tests:
  - 2 identical conditions; differing of mode of instruction (verbal vs. tactile)
Evidence

- Results:
  - Brain area was affected for those with NLD but not the controls; based on instructional mode
  - Individuals with NLD showed more errors with tactile instruction
  - Brain patterns suggest that individuals with NLD may use silent verbalization to help rehearse information that is given to them in a non-verbal format
Evidence


- Tutor and student work side by side to teach the student how to gain meaning from written word, verbal instruction or social situations

- Goal:
  - Learn strategies to be generalized
  - Learn to silently analyze and verbalize situation in order to compute it
Evidence

- Elements of Effective intervention:
  - Explicit direct instruction
  - Association of verbal and non verbal aspects
  - Use of verbal skills to analyze situations
Hypothesized Intervention

Social Competence Intervention Program

- SCIP published by Guli, Wilkinson and Semrud-Clikeman in 2008
- Drama based intervention program for youth on the Autism spectrum, but also relevant for NLD and ADHD
- First published initial research back in 2000
- Eventually was the basis for doctorate by Guli in 2004
- Very well grounded in evidence based research
- Program was developed and piloted at University of Texas at Austin
Hypothesized Intervention (cont’d)

- SCIP Overview
  - 16 session, divided into 3 segments:
    1) **Input** – emotional knowledge, facial expressions, vocal cues
    2) **Integration** – when cues do not match, point of view, understanding interactions
    3) **Output** – becoming fluent in conversation, dealing with teasing, review
Hypothesized Intervention (cont’d)

- **Program Limitation**
  - Target population is 8 to 14 years old
    - Early intervention key, not just academically but socially
    - Almost every article we have read in HDAP 1285 underscores the benefits to early intervention
    - By age 8, a child may already be socially isolated, typecast and vulnerable to teasing and bullying
Hypothesized Intervention (cont’d)

- Hypothesized Program

  - Remedies to SCIP
    - Add two new stages to program:
      - pre-school and K-2
    - Reduce length and number of sessions
    - Adapt program content to each new stage
Thank You