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*Learning Disabilities Assessment and Intervention: New
Challenges in Uncertain Times*

Book of Abstracts

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Universidad de Oviedo



William M. Cruickshank Memorial Lecture

New Directions in the Study of Neurodevelopmental Disorders

Prof. Timothy C. Papadopoulos

Department of Psychology and Center for Applied Neuroscience, University of Cyprus, Cyprus

Abstract

Research on neurodevelopmental disorders leads us to continue refining our theoretical and methodological approaches for identifying, instructing, and better understanding relevant constructs. Among the suggested methods, the Research Domain Criteria framework (RDoC; National Institute of Mental Health, 2013) integrates many information levels (from genomics and neural circuits to behaviour) to identify neurodevelopmental disorders, such as dyslexia, specific language disorder or attention deficit disorder better. Thus, it is argued that RDoC can help distinguish the neural, cognitive, linguistic, and behavioural etiological pathways that cut across different known pediatric disorders. RDoC was proposed because the single prevailing deficit (Morton & Frith, 1995; Pennington & Ozonoff, 1996), severity hypothesis (Harm & Seidenberg, 1999) or comorbidity (Pennington, 2009) models have failed. The former posited that a single cognitive deficit is sufficient to explain the symptoms of a given disorder, especially when considering the severity of that deficit. The latter asserted that a disorder might be better explained by partially shared etiological and cognitive risk factors among subtypes or disorders hypothesized as having similar origins. Given the growing importance of the RDoC framework for theory and practice, this presentation explores (a) whether new deficit clusters in line with the RDoC central methodology could better explain neurodevelopmental disorders; and (b) how the RDoC framework could better inform longitudinal investigations in related difficulties. Relevant literature is reviewed based on various databases (e.g., Google Scholar, PubMed, Scopus, APA PsycNET), focusing on studies conducted between 2015 and 2021 on the RDoC framework and learning disorders. Pertinent deficits to constructs of the Cognitive Systems domain of RDoC (e.g., language, working memory, or executive functions) are of interest. This presentation is expected to show that one theoretical challenge is determining how the RDoC framework could be falsified or, given the varying degrees of dysfunction that RDoC integrates, whether the model could account for most learning disorders-related profiles.

Biography

Timothy C. Papadopoulos (Ph.D.) is a Professor at the Department of Psychology, University of Cyprus and a founding member of the Center for Applied Neuroscience. He pursued his graduate studies at the University of Alberta, Canada, in Educational Psychology, where he was also employed as a Research Associate at the JP Das

Developmental Disabilities Centre. His research and teaching focus on studying neurodevelopmental disorders, particularly learning disorders, and their treatment. He leads or participates in consortiums of international projects funded by international and national agencies from the European Union (e.g., Interreg, FP7, Horizon 2020, Horizon Europe), Canada (Social Sciences and Humanities Research Council) or Cyprus (Research & Innovation Foundation). He is the Project Coordinator of the Neo-PRISM-C ITN MSCA project, also funded by the EU (2019-2023), <http://www.neoprismc.org/>. He has co-authored three books and has published over 120 scientific articles and book chapters. Work of his has received awards from scientific organizations (such as the American Psychological Association), citation databases (such as Scopus), or scientific publishers (such as Elsevier or Wiley). He has served as Vice-Chair (2012-14) and Chair (2014-2016) of the Department of Psychology, Member of the Faculty Board of Social Sciences and Education (2012-present), and Member of the University Senate (2014-2016). He has been a Visiting Professor at the University of Tromsø (Norway), Queen's University (Canada), St. John's University (NY, USA), University of Sheffield (UK), University of Jyväskylä (Finland), University of Crete (Hellas), University of Alberta (Canada), and the Brain Imaging Center of the Hungarian Academy of Sciences (Hungary). In 2019, the Cyprus Research and Innovation Foundation awarded Prof. Papadopoulos the Distinguished Researcher Cyprus Research and Innovation Award.

Conference

Moving Attention to the Prevention of Learning Difficulties

Heikki Lyytinen

Unesco Chair on Inclusive Literacy to All &
Prof. of Developmental Neuropsychology (emeritus)
Jyväskylän yliopiston, Finland

Abstract

This presentation makes an attempt to open the mystery of dyslexia and reasons as well as bottlenecks which tend to compromise children's acquisition of full literacy – the mean goal of reading (reflected in PISA). The relevant results of my research during and after the Jyväskylä Longitudinal study of Dyslexia (JLD, which followed children with and without familial risk for dyslexia from birth to adulthood) will be summarized. The main emphasis is given to ways how most children can be helped to acquire full literacy by using optimal ways the digital tools based on our GraphoLearn technology (grapholearn.info) and Comprehension Game (CG, see comprehensiongame.info). That this is true concerning learners of most widely spoken languages (including some African ones) on which the empirical validation of the efficiency of these tools has been focused. To learners who have acquired basic reading skills the CG can offer help independent of e.g. age, language, orthography and background knowledge everywhere where they can connect their Android, Apple or Windows digital tools to internet.

SYMPOSIA

Symposium 1

Do Not Forget Foundations: What We Have Learned

Participants

Linda Mason, Division of Special Education and disAbility Research, George Mason University, Fairfax, VA

Jenna Basile, George Mason University, Fairfax, VA EEUU

Margaret E. Pierce, Education Studies Department, Stonehill College, MA EEUU

Stacie Brady, George Mason University, Fairfax, VA EEUU

Lindsay Sanborn Owen, George Mason University, Fairfax, VA EEUU

Discussant

Linda Mason, George Mason University

Abstract

Few would argue the importance of proficient writing for establishing the foundational knowledge and skills needed for a student's future academic success. Students who develop strong writing skills gain a tool that will support learning, communication, and self-expression throughout their schooling. In fact, learning to write is critical to students' future success. For students with learning disabilities, writing is challenging. Writing requires the coordination of multiple motor, metacognitive and self-regulatory skills to learn and apply basic skills to produce a written product. Despite a large research base in instruction for written expression, not all aspects of writing are well-addressed in the research literature. In this symposium, researchers will discuss instruction for writing in abbreviated formats, reading and writing difficulties noted to be common in children with dyslexia and dyspraxia, and the use of morphological forms in students' writing.

Improving Skills for Writing Summaries and Quick Writes

Jenna Basile and Linda H. Mason

George Mason University, Fairfax, VA, EEUU

Objectives

With the focus on writing across the curriculum (e.g., Common Core State Standards Initiatives, 2010), students with learning disabilities (LD) ability to express ideas in a variety of writing formats is critical. Writing-to-learn formats such as summaries and quick writes, for example, are often used to allow students the opportunity to recall, clarify, and question information and to demonstrate thinking about a topic; and, to

allow teachers the opportunity to assess student understanding of material read or taught (Fisher & Frey, 2012). Writing within these short formats is challenging for many students due to a lack of the self-regulation and cognitive skills needed for producing and completing a final written product (Harris et al., 2011; Graham et al., 2017). The current systematic review examined intervention research targeting summary and quick writing for students with high-incidence disabilities, including LD.

Method

Summarizing and quick writing intervention studies were located through a systematic search of prominent databases. After eliminating duplicate studies and screening the literature for applicability to the inclusion criteria, a total of 56 studies were considered for further review. Studies were included if they utilized an experimental single-subject or group research design and were peer-reviewed and written in English. In addition, reviewed studies included (a) interventions with a focus on instruction for summary and quick writing, (b) students in grades 1 - 12, and (c) students previously diagnosed as having a high-incidence disability. Studies that included students without disabilities were reviewed only if the data was disaggregated for those with disability diagnoses. Studies were coded for the study's experimental design, school setting, student demographics (e.g., gender, grade level, age, disability status), procedures (e.g., instructor, instructional time, number of phase probes in single-subject studies), and measures such as quality and number of strategy elements or information units and number of words written. Group experimental study effect size results were coded for Cohen's *d*. Single-subject studies were coded for the percentage of non-overlapping data (PND) found in visual graphs of data.

Results

Fourteen studies met the inclusion and exclusion criteria - four evaluated summarization instruction (Asaro-Saddler et al., 2018; Ennis, 2016; Rogevich & Perin, 2008; Saddler et al., 2017) and ten evaluated quick writing instruction (Benedek-Wood et al., 2014; Ciullo et al., 2019; Mong Cramer & Mason, 2014; Garwood et al., 2018; Hoover et al., 2012; Mason, Kubina, & Hoover, 2013; Mason, Kubina, Kostewicz et al., 2013; Mason et al., 2011 - two studies; Mason et al., 2010). Eleven studies used single-subject design methodology; three studies used a quasi-experimental design (Asaro-Saddler et al., 2018; Mason, Kubina, Kostewicz et al., 2013; Rogevich & Perin, 2008). Students' grade levels ranged from grade four to grade 12. Of participants identified with a disability, 60% were identified with or had comorbid LD. Studies were implemented in inclusive classrooms, learning support and alternative classrooms, alternative day schools, and residential treatment facilities. All reviewed studies included explicit strategy instruction with self-regulation, specifically self-regulated strategy development (SRSD) instruction. Instruction in eight of the 14 studies was provided by the school personnel.

Large effects for writing quality were noted in the three quasi-experimental summary writing studies and in the seven single-subject quick write studies. Instructional time appeared to have an impact on results. For example, in studies where time was restricted to five to six sessions for strategy acquisition (Hoover et al., 2012; Mason et al., 2011 - two studies; Mason et al., 2013) effects were more variable, ranging from *small* to *large* effects across measures and time.

Importance of Study

SRSD instruction for summary and quick writing resulted in positive outcomes. Of the fourteen revised studies, all except Ennis (2016) and Asaro-Saddler et al. (2018), which included complex reading plus summary writing, provide evidence that students with learning disabilities can be taught to write a brief summary or quick write within a ten- to 20-minute time period. These findings substantiate recommendations for extra time and accommodations for more complex writing tasks such as essays, reports, and writing tasks that require reading from one or more text sources (e.g., Graham et al., 2017). Given this, it is critical that teachers identify writing task demands, address instruction to meet those demands, and individualize based on the needs of students with disabilities. The magnitude of the effects, although varied from *small* to *large* effects across settings, instruction, and tasks, indicated additional large-scale replication and efficacy study is warranted for summarization and quick writing instruction, especially when combining this instruction with a reading comprehension strategy.

Reading and Writing Profiles of Children with Developmental Dyspraxia

Margaret Pierce

Education Studies Department, Stonehill College, MA EEUU

Objectives

Developmental dyspraxia has a long history of empirical study, particularly in the fields of neurology (Denkla, 1984), neuropsychology (Dewey, 1995), and occupational therapy (Ayers, 1972). This research has identified planning and carrying out skilled non-habitual motor acts in the proper sequence – *praxis* -- as the primary area of deficit in this disability. Research on the co-occurrence of learning disorders and dyspraxia has revealed increased incidence of language impairment (Archibald & Alloway, 2003), math disability (Pieters, Desoete, Van Waelvelde, Vanderswalmen, Roeyers, 2012), and handwriting weakness (Rosenblum & Livneh-Zirinski, 2008) among children with dyspraxia. Although theory implicates the praxis skills of planning and sequencing in reading comprehension and written expression, these academic skills have not yet been carefully examined in dyspraxic children.

This research study aimed to address this gap in the research by investigating the academic performance of a sample of children who meet criteria for developmental dysgraphia and who were referred to a clinic for a multidisciplinary evaluation of learning disabilities.

Methods

Subject Selection

- Children (grades 1.9-10.9) participating in a neuropsychologically-informed multidisciplinary evaluation between 2014-2017 (~775 kids)
- A text search of the summary report generated for each evaluation was performed using the words “dyspraxia” or “dyslexia” – review of report to ensure diagnosis was given

- Excluded 10 children with very low IQ
- Excluded 29 children identified with BOTH dyslexia and dyspraxia
- Randomly selected 50% of dyslexic group
- Resulting sample:
 - DYSP: $n = 44$
 - DYSL: $n = 114$

Record Review Procedure

Data were extracted from the clinical records in the following areas:

- Demographic Characteristics
- Developmental History
- Neurology
- Neuropsychology
- Speech and Language
- Reading & Writing

Scans of the writing sample were also extracted for secondary analysis. Coding of the writing samples was conducted blinded for participant group.

Sample Matching Procedure

- Subjects evaluated in 2016-2017 participated in a criterion-referenced assessment of writing, aligned with the common core state standards for narrative or argument writing.
- Each DYSP subject was matched with a DYSL subject by first matching grade level, and then matching gender if possible.
- The low number of female subjects with dyslexia prevented consistent gender matching.

Results

RQ1:

Among children referred for a hospital-based multidisciplinary evaluation, how do the reading/writing profiles of children diagnosed as dyspraxic compare to the reading/writing profiles of children diagnosed as dyslexic?

Table 1: Comparison of DYSP vs. DYSL Groups on Reading Dichotomous Variables

Measures	Dyspraxic Group $n = 44$	Dyslexic Group $n = 114$	Pearson Chi Square
Phonological Awareness Weakness Documented Y/N	16%	40%	$p = .004$
Narrative Comprehension 2+ Years Delayed Y/N	52%	49%	$p = .970$
Expository Comprehension 2+ Years Delayed Y/N	43%	41%	$p = .970$
SPED Services Target Reading Y/N	84%	73%	$p = .098$

Table 2: Comparison of DYSP vs. DYSL Groups on Reading Continuous Variables

Measures	Dyspraxic Group <i>n</i> = 44	Dyslexic Group <i>n</i> = 114	ANOVA
Word Identification, WRMT-3	89.4 (12.1)	81.2 (12.4)	<i>p</i> = .000
Decoding, WRMT-3	91.2 (15.6)	80.1 (10.2)	<i>p</i> = .000

Table 3: Comparison of DYSP vs. DYSL Groups on Writing Dichotomous Variables

Measures	Dyspraxic Group <i>n</i> = 44	Dyslexic Group <i>n</i> = 114	Pearson Chi Square
Writing Performance 2+ Years Delayed Y/N	73%	60%	<i>p</i> = .074
SPED Services Target Writing Y/N	96%	93%	<i>p</i> = .567

RQ2:

How do the writing samples produced by a matched sample of dyspraxic and dyslexic children differ?

Table 4: Comparison of Matched DYSP/DYSL Samples

Measures	Dyspraxic Group <i>n</i> = 44*	Dyslexic Group <i>n</i> = 11*
Handwriting Difficulties Noted	50%	40%
Spacing Difficulties Noted	30%	30%
Sizing Difficulties Noted	50%	20%
Difficulties Spelling Sight Words	73%	70%
Average Spelling Stage (Stage 1-4)	2.3 (0.79)	2.2 (0.75)
Difficulty with Easily Confused Words	18%	36%

Table 5. Comparison of Matched DYSP/DYSL Samples

Measures	Dyspraxic Group <i>n</i> = 44	Dyslexic Group <i>n</i> = 11
Capitalization Difficulties Noted	73%	36%
Punctuation Difficulties Noted	73%	18%
Difficulties Identifying Sentence Boundaries	64%	46%
Run on Sentences Noted	64%	36%
Number of Sentences	5.7 (3.8)	6.2 (3.9)

Mean Length Utterance	13.7 (5.1)	12.9 (4.7)
Grade Level Equivalent	2.1 (0.66)	2.3 (0.76)

Importance of the Study

These results demonstrate that reading comprehension and writing weaknesses are typical among children with dyslexia *and* children with dyspraxia (at least among those referred for a hospital evaluation). For dyspraxic children, reading comprehension challenges exist despite average performance on tasks of word identification and decoding, suggesting it is a primary impairment. Both dyspraxic and dyslexic children commonly exhibit challenges with handwriting, spelling of sight words, and spelling of regular words. Dyspraxic children are more likely to experience challenges with sizing, punctuation, capitalization, sentence boundary identification, and run-on sentences as compared to dyslexic children.

Increasing Teachers’ Knowledge and Skills to Impact Student Learning

Paige Pullen

University of Florida

Considerations for intensive intervention for students with learning disabilities –Are methods of good instruction enough?

Annmarie Urso

The State University of New York at Geneseo

As specified in the federal special education law in the United States, states may now permit a process that examines whether or not a student responds to scientific, research-based intervention as part of the learning disability evaluation procedure (Individuals with Disabilities Improvement Act, 2004). This process of research-based intervention and data collection is most commonly referred to as response to intervention (RTI) or multiple tiered systems of support (MTSS). Although RTI/MTSS may be used as part of the process of learning disability identification, it is not clear how significant that part should be, or how and when that part is integrated into the diagnostic assessment process.

Schools implement RTI/MTSS in hopes of (a) reducing the number of students referred for evaluations, (b) providing research-based early intervention to children in a more timely fashion, (c) ensuring targeted assistance to all children who need help, and (d) increasing the validity of actual placement decisions (Mather & Urso, 200X). Clearly, efficient progress monitoring and early intervention can provide benefits and help improve the quality of instruction to all children.

Numerous reasons exist for why a student would not fully respond to a certain intervention or treatment, only one of which is a learning disability. Some of the reasons for low achievement are extrinsic (e.g., limited or inadequate instruction, failure to make informed data based decisions), whereas others would be considered intrinsic (e.g., SLD or ADHD).

(a) **Objectives of Research** – This case study spans two academic years, post-COVID-19 school closures in the United States and asks the following questions:

1. Does the implementation of evidence-based interventions following the science of reading in an intensive intervention delivery framework increase the response in children who are performing below the 16th%tile in reading based on benchmark assessment scores in sight word fluency, nonsense word fluency, and oral reading fluency in grade 1?
2. Do teachers know how to accurately interpret data from benchmark and progress monitoring programs (e.g., iReady, Acadience [formally DIBELS], etc.) in order to make appropriate programming recommendations?
3. How do teachers make decisions for special education placement based on MTSS data when compared with data from psycho-educational assessments?

(b) **Importance of Topic within the Symposium:** Teacher training in effective methodologies for teaching reading and writing is critical to the success of all children. This study explores whether good teaching is enough for children who are falling behind or not progressing as expected and what skills are also needed by teachers to help students reach their fullest potential.

(c) **Methods:** This was a single subject casestudy. The subject was a female first-grade student in a rural public school who was followed for two academic years (2020-2021, 2021-2022) as her teachers made instructional and intervention decisions in a RTI/MTSS framework based on benchmark data, progress monitoring data, and teacher observation of student performance. The study started in the fall of the first-grade year and concluded at the end of the second-grade year. The researcher met every 5 weeks with the parent, classroom teacher, and reading specialist to follow progress and make recommendations related to delivery of intervention and method of intervention. Fidelity of implementation data was collected on both Tier 1 reading instruction and small group intervention in Tier 2 (2020-2021) and Tier 3 (2021-2022).

(d) **Results** – Analysis of data from weekly progress monitoring demonstrated that with intensifying interventions from the initial 2x per week to 3x/30 minutes per week (maximum due to districts constraints) to 5x/40 minutes per week in grade 2, the child showed significant progress and demonstrated growth.

(e) **Conclusions.** Teachers required additional training in interpreting the data of benchmark and progress monitoring assessments. They additionally need to be trained in the limitations of these instruments and how to use data to make appropriate decisions for long term goals. Problematic and inappropriate identification as a student with learning disabilities was a concern as it was used as a way to provide the level of remediation required to the student in grade 3 as the school doesn't have an adequate number of general education interventionists.

(f) References

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Symposium 2

Coping with academic, social and emotional challenges during Covid-19 period, among undergraduate students with SLD and ADHD in Italy and Israel

Participants

Adi Sharabi, Kibbutzim College of Education Technology and the Arts, University of Tel Aviv, Tel Aviv Israel.

Barbara Carretti, Department of General Psychology, University of Padova, Italy.

Nicole Casali, Department of General Psychology, University of Padova, Italy.

Tali Heiman, Department of Education and Psychology, The Open University of Israel, Israel.

Discussant

Celestino Rodríguez, Faculty of Psychology, University of Oviedo, Spain

Abstract

Students with SLD and ADHD often experience academic and social emotional challenges at any given time. The social distance and distance learning imposed on higher education around the world during Covid-19 period, emphasized these challenges. The three studies in the symposium focus on key aspects related to the academic and emotional-social resources and challenges of undergraduate Israeli and Italian students with SLD and ADHD during the Covid 19 period. The first presentation focuses on the role of soft skills and motivational factors related to academic achievement; the second presentation focuses on social networks, and experiencing cyber harassment in the context of social support; and the third presentation shows the relation between students' sense of coherence, loneliness, perceptions of distance learning and academic self-efficacy. The discussion will explore the factors that can support academic, social, and emotional aspects among undergraduate students with SLD and ADHD.

Soft skills, study-related factors, academic achievement, and satisfaction in students with or without specific learning disabilities

Nicole Casali, Chiara Meneghetti, Gerardo Pellegrino, and Barbara Carretti

Department of General Psychology, University of Padova, Italy

Objective

Students with specific learning disabilities (SLDs) often struggle in the transition to university, having to manage note-taking during lectures, reading many books or articles, and keeping up with assignments (Pino & Mortari, 2014).

Contemporary models such as the integrated self-regulated learning model (iSRL, Ben-Eliyahu, 2019) suggest that academic learning is a complex phenomenon comprising

both achievement and satisfaction, and that this is supported by a series of intraindividual factors. These factors include study-related factors such as SRL and motivation to succeed, together with general characteristics such as personal skills and genetics (Ben-Eliyahu, 2019). Soft skills can be defined as general, acquirable character qualities that can be applied to different life situations. They are considered crucial for 21st-century students to approach complex challenges and changing environmental conditions (Heckman & Kautz, 2012; World Economic Forum, 2015).

Although intraindividual factors could be of special importance to SLD students, they have been mainly neglected by the literature, especially when it comes to soft skills.

Understanding the factors that influence the academic success and well-being of university students with SLDs can serve as a baseline to elaborate interventions and policies that can help students improve their careers and enjoying their study paths.

The aim of this study was to examine the roles of several intraindividual factors (both general and study-related) with respect to three academic and nonacademic outcomes (achievement, life, and academic satisfaction) in students with and without SLDs using the iSRL theoretical framework (Ben-Eliyahu, 2019). Data were collected in 2021, therefore during the pandemic of COVID-Sars-19.

Methods

The present sample includes 318 university students aged 19-45 years old (79 males, Mage = 22.70, SDage = 3.56). Of them, 147 (46,23%) participants were students with self-reported valid SLD diagnoses (69 with two or more SLDs, 40 with dyslexia, 15 without a specific diagnosis, 14 with dyscalculia, and nine with impairment in written expression).

Sociodemographic schedule: Information on students' characteristics such as age, gender, SLD diagnosis, and field of study.

Soft skills

1. Curiosity: I/D Epistemic Curiosity Scale – Interest Subscale (Litman et al., 2014), five items. Cronbach's alpha = .88
2. Creativity and Social intelligence: Values in Action Inventory of Strengths-120 – Creativity and Social intelligence subscales (Feraco et al., 2021), five items each. Cronbach's alphacreativity = .90, Cronbach's alphasocial intelligence = .79
3. Critical thinking: Motivated Strategies for Learning Questionnaire – Critical Thinking (Moretti et al., 2018), four items. Cronbach's alpha = .79
4. Perseverance: Short Grit Scale – Perseverance of Effort Subscale (Sulla et al., 2018), four items. Cronbach's alpha = .73

Study-related factors

Five questionnaires drawn from the same battery measuring study abilities and motivation (De Beni et al., 2014), assessing:

1. Self-Regulated Learning: 20 items. Cronbach's alpha = .74
2. Learning Goals: four items, Cronbach's alpha = .55
3. Academic Self-Efficacy: five items, Cronbach's alpha = .78
4. Growth mindset: four items, Cronbach's alpha = .74
5. Study resilience: 14 items, Cronbach's alpha = .88

Cognitive Abilities

1. Fluid intelligence: Cattell Test – Scale 3A (Cattell, 1940), four different types of timed problems, with a total of 60 items and 12 min 30 s

Outcome Measures

1. Academic achievement: Students self-reported their average grades. In the Italian university system, grades range from a minimum of 18 to a maximum of 30.
2. Life satisfaction: Satisfaction With Life Scale (Di Fabio & Gori, 2016), five items. Cronbach's alpha = .83
3. Academic satisfaction: adapted from the Multidimensional Students' Life Satisfaction Scale – Short Form – School subscale, Zappulla et al. (2013), five items. Cronbach's alpha = .87.

Results

Group Differences

The independent t-tests indicated that students with SLDs reported greater creativity, lower academic self-efficacy, lower study resilience, and lower grades (p s < .001). Effect sizes were small for all variables and medium for academic self-efficacy (see Table 1).

Soft skills, study-related factors, achievement, and satisfaction

The results of the multivariate regression models for academic achievement (see Table 2) showed significant direct effect of academic self-efficacy ($\beta = .21$, $p < .01$), and an inverse effect of creativity ($\beta = -.19$, $p < .01$). Concerning life satisfaction, the model showed a significant direct effect for study resilience only ($\beta = .29$, $p < .001$). For academic satisfaction, critical thinking ($\beta = .30$, $p < .001$), academic self-efficacy ($\beta = .30$, $p < .001$), and curiosity ($\beta = .17$, $p < .01$) all emerged as significant predictors.

The model was scalarly invariant with respect to gender (male vs. female) and partially scalarly invariant with regards to diagnosis (with vs. without an SLD) This means that the patterns of relationships between the predictors and the outcomes in female and male students with and without SLDs can be considered similar, except for a difference in academic achievement, which was higher for students without SLDs.

Conclusions

This study showed that students with SLDs seem to report lower academic self-efficacy, study resilience, and academic achievement and higher creativity, with small-to-medium effect sizes. In both groups, achievement significantly positively related with academic self-efficacy and negatively with creativity. Life satisfaction was positively related with study resilience; and academic satisfaction was related to critical thinking, curiosity, and academic self-efficacy. Nurturing such intraindividual factors can benefit students with and without SLDs.

Having found that the relationships between predictors and outcome variables were similar for students with and without SLDs, it could be argued that universally offered services or interventions can have positive consequences for students with and without SLDs. To conclude, our results could guide researchers and practitioners interested in a strength-based approach to SLDs to devise interventions and expand the research to more deeply examine the positive qualities that sustain students throughout their academic careers.

Table 1. Results of the independent t-tests

Variable	SLD	Non-SLD	<i>t</i>	<i>p</i>	<i>d</i>
Creativity	3.66 (.83)	3.35 (.8)	3.41	.001	.38
Critical thinking	3.45 (.85)	3.4 (.78)	.51	.61	.06
Curiosity	4.07 (.72)	4.03 (.7)	.52	.61	.06
Perseverance	3.37 (.76)	3.43 (.73)	-.69	.49	-.08
Social intelligence	3.33 (.78)	3.32 (.76)	.07	.94	.01
Academic self-efficacy	3.46 (.62)	3.78 (.59)	-4.77	< .001	-.54
Growth mindset	3.4 (.8)	3.61 (.74)	-2.49	.01	-.28
Learning goals	3.65 (.64)	3.68 (.63)	-.47	.64	-.05
SRL strategies	3.51 (.44)	3.58 (.4)	-1.47	.14	-.17
Study resilience	2.96 (.7)	3.26 (.68)	-3.81	< .001	-.43
Cattell test	21.77 (5.97)	23.32 (6.09)	-2.28	.02	-.26
Life satisfaction	3.08 (.75)	3.11 (.79)	-.40	.69	-.04
Academic satisfaction	3.51 (.83)	3.6 (.82)	-.95	.34	-.11
Grades	24.8 (2.83)	26.23 (2.97)	-4.38	< .001	-.49
Credits	68.27 (53.76)	87.06 (65.22)	-2.77	.006	-.31

Table 2. Results of the regression models

	Grades		Life satisfaction		Academic satisfaction	
	β	CI	β	CI	β	CI
Creativity	-.19*	[-.32; -.06]	.13	[.01; .26]	-.06	[-.17; .06]
Critical thinking	.05	[-.08; .17]	.08	[-.04; .20]	.30**	[.20; .41]
Curiosity	.08	[-.06; .22]	-.04	[-.17; .09]	.17*	[.06; .29]
Perseverance	.03	[-.10; .16]	.14	[.02; .26]	-.06	[-.17; .05]
Social intelligence	-.06	[-.17; .06]	.07	[-.05; .18]	.09	[-.01; .19]

Academic self-efficacy	.21*	[.08; .34]	.12	[-.01; .25]	.30**	[.18; .42]
Growth mindset	.05	[-.06; .16]	-.07	[-.17; .04]	.08	[-.02; .17]
Learning goals	-.06	[-.19; .07]	-.05	[-.17; .07]	-.02	[-.13; .09]
SRL strategies	.06	[-.08; .19]	-.03	[-.15; .10]	-.05	[-.17; .07]
Study resilience	.05	[-.08; .18]	.29**	[.17; .41]	.11	[-.01; .22]
Cattell test	.12	[.01; .23]	-	-	-	-

Note. β = standardized beta coefficient; CI = 95% confidence intervals; * = $p < .01$, ** = $p < .001$.

Examining characteristics and associated psychological aspects related to Internet harassments: Findings from higher education students in Israel

Tali Heiman and Dorit Olenik-Shemesh

Department of Education and Psychology, The Open University of Israel, Israel

Objective

Social-networking sites are almost an inseparable part of students' lives (Vollink, et al., 2016). Along with the benefits of social-networking, a form of interpersonal aggressive behavior that takes place through electronic means (Bilik, 2013). Findings regarding the prevalence of involvement in cyber harassment (CH) among students in higher education varies between 10% and 35% (Kokkinos et al., 2014; Lawler & Molluzzo, 2011; Schenk, et al., 2013).

Previous examination of the relationship between CH and psychological aspects revealed low self-esteem and low self-perception (Mishna, et al., 2012); difficulties in social adjustment and/or social withdrawal (Kowalski, et al., 2014) and low levels of social support (Eden et al., 2014). Findings showed that increased peer social support was the most significant predictor of decreased bullying, victimization, fighting, and anger for both students with and students without LD (Rose et al., 2015). Significant correlations were found between poor body esteem, body dissatisfaction, well-being and cyber victims (Frisén, et al., 2014).

Methods

The present sample includes 214 students (20.34%) having been diagnosed with LD, and 838 Israeli higher education students without disability. General mean age = 28.7, S.D. = 7.9, and 56% women. No significant differences were found between students with and without LD regarding age and achievement scores.

Measures

1. Students' background. Students' characteristics such as age, gender, diagnosed with LD, and field of study.
2. Cyber-harassment) Campbell et al., 2012) included 14 items regarding experiences as cyber victim. Reliability = .89.

3. Multidimensional scale questionnaire for perceived social support (Zimet, Dahlem, Zimet, & Parkley, 1988) included 12 items regarding family, friends, and significant other support. Reliability = .95
4. Self-efficacy (Muris, 2001) included 13-item assessed students' social and emotional self-perception. Reliability = .85.
5. Subjective well-being scale (Diener, et al., 1985) included 5 items to measure global satisfaction with one's life. Reliability = .85.
6. Body-perception scale (Cash, 2002) included of 10 items. Reliability = .75.

Results

Significant differences were found between students with and without LD regarding CH: 26% of students with LD reported being CH during the last year, compared to 8.7% students without LD, $F(1,1039) = 4.2, p = .040$.

Correlations: Pearson-correlation analyses show significant correlations between students with LD and CH, and negative correlations between students with LD and self-perception and subjective well-being (see Table 1).

Multivariate analysis: To examine the differences between students' groups (LD/non LD) and gender as related to the study measures, a multivariate analysis of variance was conducted. Results yielded a significant main effect for disability status, $F(5, 1041) = 3.08, p < .01$, Partial Eta² = .016, and a significant main effect for gender, $F(5, 1041) = 7.96, p < .001$, Partial Eta² = .041.

Findings of ANOVA's analysis between students' groups (LD and non-LD) showed that students with LD were more likely to be CH, and reported lower self-perception and lower well-being compared to non-LD students.

Hierarchical regressions: Two separate hierarchical regression analyses examined whether CH can be predicted differently for each group of students (LD and non-LD). Findings indicated significant predictors for both groups, $p < .01$. Students with LD group were low social support, low self-perception, and gender (women). As for non-LD students, the significant predictors for being at risk of CH were low social support, low subjective well-being, and low body perception.

Conclusion

The findings emerged from data analyses regarding students with LD present higher levels of CH; having lower social self-perception and lower well-being compared to non-LD students. The predictors of CH for the LD group were social support, self-perception, and gender, and the predictors for the non-LD group were social support, well-being, and body perception.

The present results show lower self-perception predicted a higher risk of CH only for the LD group. Gender differences reveal the higher vulnerability of women to CH, having high social support and lower body-perception compared to men.

The present findings highlight the vulnerability of students, both those with and those without LD. The results emphasize the need to support students with LD in various areas, such as by implementing an effective social support and coping strategies for increasing their self-perception and improving their well-being, as well as protecting themselves from becoming cyber victims.

Importance of the study

The aims of the current research were to examine CH experiences among higher education students, with and without LD, during the Covid 19 period, as related social support, self-perception, wellbeing, and body-image perception, and to examine whether the predictors of CH are different in students with and without LD.

Table 1. Pearson Correlations between Cyber-Harassments, Social Support, Self-perception, Well-Being, Body Perception, Disability Status, and Gender

<i>Variables</i>	1	2	3	4	5	6
1. Cyber-Harassments	1.00					
2. Social support	-.21**	1.00				
3. Self-perception	-.15**	.54**	1.00			
4. Well-being	-.16**	.51**	.62**	1.00		
5. Body perception	-.03	-.18**	-.23**	-.18**	1.00	
6. Disability status ^a	.15**	-.02	-.19**	-.18**	.04	1.00
7. Gender ^b	-.09*	-.13**	.01	-.01	.17**	.04

Note: * $p < .05$. ** $p < .01$.

Disability status a: 0 = not-LD, 1= LD; Gender b: 0 = female, 1 = male

Table 2. Mean and F-scores for the Measures between Students with and without LD

<i>Variables</i>	Students with LD		Students without LD		<i>F(1,1039)</i>	<i>Partial Eta</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Cyber-Harassments	.21	.41	.11	.26	8.42**	.018
Social support	5.79	1.30	5.93	1.35	1.42	.00
Self-perception	3.54	.75	3.79	.67	3.7*	.012
Well-being	4.40	1.53	4.96	1.36	13.1**	.016
Body perception	2.40	.75	2.32	.71	1.84	.00

Note: * $p < .05$. ** $p < .01$.

Table 3. Predicting Cyber-Harassments by Social Support, Self-perception, Body Perception, Well-Being, and Gender for each students' groups.

1. Students with LD (n = 214)

Independent variable	<i>B</i>	<i>SE(B)</i>	β	<i>t</i>
Social support	-0.09	0.03	-0.19	-2.39**
Self-perception	-0.16	0.07	-0.19	-2.06*
Well-being	0.03	0.04	0.08	0.83
Body perception	0.02	0.06	0.03	0.35
Gender	-0.17	0.08	-0.13	-1.94*

$F(5,213) = 4.33, p = .00. R = 0.31, R^2 = 0.09, Adj R = 0.07.$

* $p < .05$. ** $p < .01$.

2. Non-LD Students (n = 834)

Independent variable	<i>B</i>	<i>SE(B)</i>	β	<i>t</i>
Social support	-0.06	0.01	-0.2	-4.77**
Self-perception	0.02	0.03	0.03	0.58
Well-being	-0.03	0.01	-0.8	-1.88*
Body perception	-0.05	0.02	-0.09	-2.56**
Gender	-0.05	0.03	-0.6	-1.79

$F(5,833) = 9.89, p = .00. R = 0.24, R^2 = 0.06, Adj R = 0.05$

* $p < .05$. ** $p < .01$.

Academic Self-Efficacy, Distance Learning Perspectives, Sense of Coherence and Loneliness: Comparison between Israeli Undergraduate Students with and without SLD and/or ADHD

Adi Sharabi & Orit Shelach Inbar

Kibbutzim College of Education Technology and the Arts, Tel Aviv, Israel

Objective

Students with specific learning disorder (SLD) and attention deficit hyperactivity disorder (ADHD) in higher education often express lower levels of academic self-efficacy, personal strengths (e.g., sense of coherence), and higher levels of loneliness than their peers without disability (Karmvir, 2015; Sharabi et al. 2016). The Covid-19 period led to social distancing and the forced entry of distance learning into the higher education system (Rashid & Singh Yadav, 2020). For students with SLD and ADHD, this time period was particularly challenging; beyond additional academic struggles, these students suffered greater loneliness than their peers without Laslo-Roth et al., 2020). This study aimed to examine how personal strength (sense of coherence [SOC]) and vulnerability (loneliness), along with perspectives on distance learning predict students' academic self-efficacy (ASE). In addition, the differences between students with and without disabilities in each of the variables were examined.

Methods

The sample consisted of 276 Israeli undergraduate students: 138 students (35 male - 25.4%, 103 - 74.6% female; mean age=26.6, SD=3.07) with ADHD and/or SLD [23 (16.4%) SLD; 58 (42.5%) ADHD; 56 (41%) combined ADHD+SLD], and 138 students without a disability (29 male - 21%, and 109 female - 79%; mean age=26.5, SD=4.32).

Self-Report Instruments:

1. Academic self-efficacy (Zimmerman et al., 1992);
2. Distance Learning perspective scale – developed for the current study
3. Sense of Coherence Scale – SOC (Antonovsky, 1987);
4. Loneliness scale (De Jong Gierveld & Van Tilburg, 2006).

Results

Pearson correlations were performed separately for students with and without SLD and/or ADHD examining the relations between all study variables (Table 1). Significant positive correlations between ASE and SOC, and negative correlations between ASE and loneliness were found for both groups, but significant negative correlations between ASE and positive distance learning perspective was found only among students with SLD.

To decrease the chance of Type 1 errors, a two-way MANOVA was conducted with group (with SLD or ADHD/without disabilities; sex - male/female) as the independent variables, and with the following dependent variables: ASE, perspective on distance learning, SOC, and loneliness. Results revealed a significant main effect for group (SLD/non-SLD), $F(5, 268) = 4.29, p < .01, \text{partial } \eta^2 = .08$, and significant main effect for sex, $F(5, 268) = 2.27, p < .05, \text{partial } \eta^2 = .04$, but no significant interaction (Table 2).

Findings revealed significant differences between the SLD and non-SLD groups. Students with SLD and/or ADHD expressed less positive perception of distance learning, than students without disability; lower ASE than students without SLD; lower SOC than students without SLD and higher loneliness than students without SLD. Sex differences were found only for ASE, as female students reported higher ASE than male student.

Importance the study: This study demonstrates the differences in perceptions of distance learning between students with and without SLD/ADH, examines the value of personal resources in predicting the ASE of college students with SLDs, and explores the relation between a vulnerability factor and students' ASE. Recognizing personal strength and vulnerability is important in explaining resilience and adjustment among college students with SLD. Examining the impact of forced entry of distance learning into the education system on students with SLD/ADHD in relation to their ASE is important for future support and adaptations for these students to new learning situations.

Symposium 3

Addressing sources of reading difficulties in the global South – the Interplay of Multiple Factors ON- LINE

Participants

Kaja Jasińska, Applied Psychology and Human Development, OISE, University of Toronto, kaja.jasinska@utoronto.ca

Alexandra Gottardo, Wilfrid Laurier University, Ontario, Canada; agottardo@wlu.ca

Gloria Ramirez, Thompson Rivers University; Gramirez@tru.ca

Discussant

Esther Geva, OISE, University of Toronto; esther.geva@utoronto.ca

Abstract

This symposium brings together three researchers who examine a complex array of complementary developmental, instructional, societal, attitudinal, and policy factors that underlie sources of children's poor reading in the Global South. Professor Kaja Jasińska presents results of research conducted in Cote D'Ivoire pointing to sensitive periods for reading acquisition evident in children's L1 and L2, as well as to challenges of identifying children with reading disabilities in communities with a high risk of illiteracy. In the 2nd presentation Professor Alexandra Gottardo focuses on Kenya. She reports on outcomes of an intervention project that tracked the impact of teacher professional development targeting principles of Universal Design for Learning on children's reading skills development. The 3rd presentation shifts to Columbia. Professor Ramirez offers a systemic, top down analysis of the interplay between factors such policy, approaches that inform teacher training that ignore what we have learned from the "science of reading" and misapplication of inclusion policies in Columbia. Professor Geva, the discussant, will propose a model that integrates these complementary "layers" and that challenges simplistic definitions of what is a reading difficulty, how to measure it, and how to address it.

Reading development in low-literacy contexts

Kaja Jasińska

Applied Psychology and Human Development, OISE, University of Toronto.

Objective

Learning to read is a complex process dependent on multiple linguistic and cognitive systems and crucially requires quality education to achieve mastery. Worldwide, millions of children fail to achieve target literacy outcomes. In Côte d'Ivoire, youth (16-24 years) literacy rate is 53% (UNESCO, 2017). We present results from a neuroimaging study of children learning to read French in rural Côte d'Ivoire. 5th graders with poor literacy skills completed a behavioral language and reading battery (n=839) and participated in a functional Near Infrared Spectroscopy (fNIRS) neuroimaging study

(n=51), examining patterns of neural activation for spoken language and reading. Results indicated that many of the basic components of literacy are not evident even among 5th graders. On average, a 5th grader could correctly read only 27/100 letters and 2-letter combinations. Phonological awareness in both French and the child's first language (an Ivorian language) positively and significantly predict reading outcomes. Neuroimaging results indicate robust left hemisphere engagement of the left inferior frontal gyrus and superior temporal gyrus for stronger readers but poor neural sensitivity to orthographic, phonological, and lexical features of words among the poorest readers, with patterns of neural activation unlike those of children with reading disorders or younger children with low reading skills. Results are discussed in terms of sensitive periods for reading acquisition and the challenges of identifying children with reading disabilities in communities with a high risk of illiteracy.

Incorporating the Concept of Universal Design for Learning in a Teacher Professional Development Program in Kenya

Alexandra Gottardo

Wilfrid Laurier University, Ontario, Canada

Objective

A common method of enhancing the skills and knowledge of in-service teachers is teacher professional development (TPD). TPD can deliver technological knowledge, content area knowledge, or pedagogical knowledge (TPACK), or any combination of these three types of knowledge. The Technological Pedagogical and Content Knowledge (TPACK) framework proposed by Mishra and Koheler (2006) was used to develop the current TPD. A more recently acknowledged type of pedagogical knowledge is Universal Design for Learning (UDL), which facilitates the delivery of instruction to students of all ability levels in mixed-ability classrooms with students with a wide range of strengths and weaknesses, as is the case in Kenya. UDL has been used in education to design teaching practices which meet the needs of all students (Hall, Meyer & Rose, 2012; Rose & Meyer, 2006). This pedagogical instruction was embedded in a TPD course for teachers of early elementary grades in Kenya. The TPD targeted early literacy instruction as the content area. The present study examined the inclusion of universal design for learning in the TPD with the UDL component being described and elaborated upon in the context of lesson plans targeting early literacy skills.

Importance

This study examined the role of a TPD which targets the components of an evidence-based literacy program and uses the components of the TPACK model as well as introducing teachers to the concept of UDL. The present study examined these factors in Kenya with teachers of children on the early elementary grades.

Methods

150 teachers were enrolled in the course and completed the surveys. The majority of the teachers were female. The teachers had completed a wide range of educational

levels, ranging from eighth grade to an undergraduate degree with a teaching certificate.

Teachers completed a series of surveys accompanying the course. The surveys included pedagogical practice regarding UDL as well as content knowledge regarding the TPD course, specifically teaching alphabetic knowledge, phonological awareness, phonemic awareness, and phonics. Early literacy content knowledge was discussed in the context of integrating technology using an evidence-based online software program (ABRACADABRA) (Abrami, Lysenko, & Borokhovski, 2020; Abrami, Savage, Deleveaux, Wade, Meyer, & Lebel, 2010). UDL was discussed for each content unit in terms of applications and adaptation of the content for diverse learners.

Results

The participants' responses were collected at three timepoints: pre-test, mid-test and post-test, for the UDL questions. Data collection is on-going.

Conclusions

The results will examine the effectiveness of the TPD in conveying information about UDL to teachers of elementary school-aged children in Kenya. It is anticipated that this TPD will encourage teachers to consider the needs of diverse learners while engaging with evidence-based literacy instruction.

A Critical Examination of Reading Instruction and Inclusion in Colombia and of their Impact on Children with Learning Difficulties

Gloria Ramirez

Faculty of Education and Social Work, Thompson Rivers University, Kamloops, British Columbia, Canada

Objective

According to the Colombian Ministry of health 20% of Colombians live with dyslexia, yet most teachers lack knowledge about this learning difficulty and about effective methods to teach reading. Other factors such as large class size (e.g., up to 60 children per class) and misapplication of inclusion policies exacerbate the learning conditions of school children. This results in an exorbitant 60% of children with reading and writing difficulties. Not surprisingly, Colombia regularly underperforms in international assessments such as PISA and PIRLS. Although there are undergoing efforts to establish a learning difficulties and dyslexia law to mandate early identification and effective instruction, the current mandate and practice is inclusion without appropriate support. These practices reflect Colombian education leaders' pervasive infatuation with humanistic perspectives and disdain for cognitive, metacognitive, psycholinguistic, and psychodynamic approaches. This paper critically examines these issues, their impact on Colombian children with learning disabilities, and their implications for the peace process. It emphasizes the danger of endorsing teaching reading approaches without regard for the science of reading and the misapplication of inclusion policies.

Symposium 4

Comparing strategy interventions and evaluations: Implications for methods and outcomes

Participants

Michael Grosche, University of Wuppertal

David Scanlon, Boston College

Allision Nannemann, University of New Mexico

Matthias Grünke, University of Cologne

Jennifer Karnes, University of Cologne

Discussant

Nigel Marsh, James Cook University

Abstract

In the symposium, three different strategy interventions [*i.e.*, *a*) accommodations & self-advocacy, *b*) multiplication fluency, *c*) spelling in transparent orthographies] were taught with differing instruction for acquisition approaches: strategic coaching, musical mnemonics, and direct instruction, respectively). Participants had learning disabilities or were identified as at-risk. The studies used three different research designs (*i.e.*, mixed-methods comparative case study methodology, single-case research design, randomized controlled trial, respectively). Results of all three studies show the general effectiveness of the interventions; students initiated and utilized accommodations more independently and appropriately; multiplication fluency increased; more words were spelled correctly. In the discussion, we will compare content / goals of the interventions, the teaching methods, and the research designs utilized to draw implications both for strategy instruction generally, and for evaluating strategy learning.

Strategic Awareness and Activation of Instructional Accommodations: A Promising Tier 2/Tier 3 Intervention

David Scanlon

Boston College

Allision Nannemann

University of New Mexico

Abstract

Three high school students with learning disabilities were taught an experimental strategy for utilizing accommodations. A mixed-methods comparative case study methodology was used to analyze their progress. Results indicate that they increased accommodations knowledge and proactive thinking and learned to utilize the strategy but on individual trajectories.

Introduction

Students with learning disabilities (LD) are increasingly taught in inclusive settings, accommodations are a fundamental means of providing their “appropriate” education. Furthermore, students who self-advocate for their educational needs, including accommodations, generally experience more success in the classroom and demonstrate more proactive academic behavior overall (Wood, Kelley, Test, & Fowler, 2010). Students with LD who learn to recognize situations in which they need accommodations and take steps to utilize them are, therefore, able to access the general education curriculum more effectively and independently.

Methods

An experimental self-accommodation strategy that follows Self-Regulation Strategy Development (SRSD) procedures was taught to three high school students with LD. Students met with the researchers multiple times to learn the strategy and to identify and understand the accommodations on their respective IEPs. Primary data sources included classroom observations and accommodations knowledge and skills interviews. Supplemental data were collected from the students’ teachers through a focus group. In a mixed-methods comparative case study methodology (Creswell, Plano Clark, Gurtmann, & Hanson, 2003), quantitative data from observations were analyzed for frequencies and trends of accommodation needs and actions, comparing means by percentage of nonoverlapping data analysis. Open-ended responses from the interviews were coded using open and axial coding, which were subjected to a consensual qualitative review process (Hill, Thompson, & Williams, 1997). The data were integrated to construct a case for each student, and the individual cases were synthesized to develop a collective case. The individual and collective cases each report on strategy acquisition and usage, as well as outcomes in terms of academic classroom engagement; in addition, the cases explain student and teacher social satisfaction.

Results

Results indicated that the students developed an increased awareness of the value of accommodations and began to initiate and utilize accommodations more independently and appropriately in their classrooms. They followed individual trajectories in learning and applying the strategy that had implications for the instructional approach. While all three were successful, they differed in which aspects of application they achieved the most.

Discussion

Strategy coaching is an effective approach for a strategy without explicit procedures to follow as it responds to individual learner differences. Findings indicate the necessity for Self-Regulated Strategy Development procedures.

The Effects of a Musical Mnemonics Intervention on the Multiplication Fluency of Three 6th Graders with Learning Disabilities

Matthias Grünke

University of Cologne

Jennifer Karnes

University of Cologne

Ellen Duchaine

Texas State University

Abstract

The purpose of this single-case study was to evaluate a musical mnemonics intervention to teach multiplication fluency skills to three 6th graders with learning disabilities (LD). A multiple-baseline design was applied to determine the effectiveness of the approach. Assessment prior to the intervention showed very low fluency skills. During the course of the treatment, the student's performance improved, reaching mastery.

Introduction

Fact fluency in addition, subtraction, multiplication, and division is essential for access to and success with higher-level mathematical concepts. It is important to reduce working memory overload to increase the amount of energy available for problem solving. In order to master complex tasks, it is necessary to execute basic arithmetic operations fast and accurately (Nelson, Burns, Kanive, & Ysseldyke, 2013). Thus, if students do not acquire sufficient math fluency during their elementary education, they will very likely continue to demonstrate difficulties in this respect throughout their lives (Gersten, Jordan, & Flojo, 2005). Automaticity of multiplication facts seems to be especially crucial in this context (National Mathematics Advisory Panel, 2008), as the inability to master multiplication tables has been found to have a very negative effect on long-term performance in mathematics instruction (Jordan, Hanich, & Kaplan, 2003).

Students with learning disabilities (LD) are at a heightened risk of falling behind in basic multiplication skills. However, several promising approaches have been found to remedy the problem of insufficient fluency. In a recent meta-analysis, Powell et al. (2021) identified six instructional components as especially effective in helping students to automate fundamental arithmetic operations like multiplication. An especially promising approach in this context seems to be mnemonic instruction. It allows the application of visual imagery and auditory clues to support struggling learners in recoding and relating information to an existing knowledge base. This technique has been evaluated numerous times (Boon, Urton, Grünke & Rux, 2019). However, little is known about the potential benefits of so called musical mnemonics (musical compositions designed to help organize and relate information in a person's memory).

Methods

In this study, we tested the effects of a short musical mnemonics intervention with three six graders with LD. All of them had at least a basic grasp of multiplication as a

mathematical process. However, they had not developed sufficient fluency, especially not for the 7s and 9s. We applied a multiple baseline design (AB) with between 10 and 12 intervention sessions. After finishing baseline, we taught the three participants two different songs in segments – one for the 7s and one for the 9s (e.g. “Seven, fourteen, twenty-one, look at me-I’m having fun!”). Each segment had to be repeated by a student before moving on to the next. The number of correctly solved multiplication problems within 2 minutes in response to different worksheets containing 10 randomly arranged problems from the 7s and 9s served as a dependent variable.

Results

The results suggest that all participants benefited greatly from the intervention. During baseline sessions, only one of them was once able to solve more than one of the multiplication problems. At the end of the treatment, all of them achieved a perfect score of 10 in a number of consecutive probes. All ways of determining the efficacy of the treatment (visual inspections, overlap measures, piecewise regression analyses) support the inference that even a simple musical mnemonics intervention can enhance the multiplication fluency in 6th graders with LD greatly.

Discussion

The musical intervention seems to be effective for students with LD. However, the findings from a small single-case study are certainly not sufficient to justify extensive conclusions on this subject.

Effectiveness of Cover, Copy, & Compare (CCC) on Orthographic Spelling Rules in a Transparent Orthography – A randomized controlled trial (RCT)

Michael Grosche, Jasmin Decristan, Michèle Paul, Marco Patzelt

University of Wuppertal

Karolina Urton

University of Münster

Anne Barwasser & Matthias Grünke

University of Cologne

Abstract

In a randomized controlled trial with N = 185 third graders with poor orthographic spelling skills, we evaluated a combination of strategy instruction (instructing consistent spelling rules in a transparent orthography) and direct instruction (the teaching method Cover, Copy, & Compare). Results show small intervention effects for standardized but not unstandardized spelling tests. The intervention seems to increase orthographic spelling skills in general.

Introduction

Cover, copy, & compare (CCC) is an evidence based intervention for teaching academic skills (Joseph et al., 2012; Stocker & Kubina, 2017). To teach spelling, students read a word, memorize it, cover it with their hand or a sheet of paper, copy (spell) the word

from their working memory, and then compare it with the correct spelling. Because English has a highly irregular orthography (Share, 2008), CCC is most often used to teach the spelling of irregular words. It is not surprising that students spell the trained words better (e.g., Erion et al., 2009), but it is not expected that they increase their spelling skills in untrained words. In more consistent transparent orthographies, most spellings follow certain orthographic rules. Thus we expect, however, that CCC can also be used in more transparent orthographies to teach not only the spelling of certain words but to train the underlying orthographic rule (Grünke, & Weber, 2015), which in turn should also increase the spelling skills even in untrained words as long as these words follow the same orthographic rule.

Methods

In a randomized controlled trial, N = 185 third graders with poor orthographic spelling skills either trained spelling with CCC including explicit orthographic rule instruction (experimental group) or trained in inductive reasoning for spelling (control group) for four weeks. In three measurement points (pretest, posttest, and follow-up test), we assessed their spelling skills for untrained words (self-developed word list test), and in addition with a standardized spelling test (HSP3+). Spelling fun and spelling self-concept were assessed with a standardized questionnaire.

Results

After the training, students in the experimental group outperformed the control group in both our word list test ($F = 4.4$, $p = .038$, $d = .26$) and the standardized spelling test ($F = 6.9$, $p = .010$, $d = .28$). In the follow-up test, the effects in our word list test diminished ($F = 1.2$, $p = .280$, $d = .13$), while the effects in the standardized test remained stable ($F = 9.5$, $p = .002$, $d = .29$). Additionally, spelling self-concept ($F = 9.1$, $p = .003$, $d = .44$), but not spelling fun ($F = 0.0$, $p = .862$, $d = .11$), increased.

Discussion

CCC can be used in transparent orthographies to teach not only spelling but orthographic spelling rules. However, the effect sizes were quite small, maybe due to the short intervention period of four weeks. Contrary to our hypothesis, training effects did not last in untrained words that could be spelled with the trained spelling rules. However, it seems the intervention increased orthographic spelling skills in general.

Symposium 5

Writing in the primary grades: Effective assessment and instruction for RTI multi-tiered systems of support

Participants

Britt Landis, Facilitator at HILL for Literacy, Branford, CT, USA

María Arrimada, Departamento de Psicología, Sociología Y Filosofía, Facultad de Educación, Universidad de León, León, Spain.

Raquel Fidalgo, Departamento de Psicología, Sociología Y Filosofía, Facultad de Educación, Universidad de León, León, Spain.

Mark Torrance, Department of Psychology, School of Social Sciences, Nottingham Trent University, Nottingham, UK.

Juan E. Jimenez, Departamento de Psicología Evolutiva y de la Educación, Facultad de Psicología y Logopedia, Universidad de La Laguna, Tenerife, Spain.

Discussant

Sylvia Linan-Thompson, University of Oregon

Abstract

Writing is a complex process that is critical to learning, thus, identifying students with writing difficulties in the early grades and providing interventions is essential to student success. Assessment and instruction are two critical components of response to intervention frameworks within a multiple-tiered systems of support. CBM of written expression (CBM-WE) has been examined extensively with monolingual populations both in Spanish and English but research with students learning English as a second language is scarce. Similarly, compared to writing interventions conducted in English, there is less research examining the effect of writing intervention in Spanish. This panel contributes to our understanding of the writing development of bilingual and monolingual students in primary school. Effective and appropriate assessment and instruction can reduce the inappropriate identification of students with written expression disabilities and identify effective interventions for students with WE disabilities.

Writing with different words: An exploration of vocabulary diversity indices in curriculum-based measures of written expression with second-grade English learners

Britt Landis

Facilitator at HILL for Literacy, Branford, CT, USA

Objective

Multilingual learners (MLs) in the U.S. have varying language histories and abilities and thus need varying levels of support to develop English literacy, including critical writing

skills (Goldenberg & Coleman, 2010). CBM of written expression (CBM-WE) is a useful assessment approach for identifying students that need supplemental literacy support because it is not only designed to be reliable and valid, but also instructionally useful, and brief (Deno, 2003; Romig et al., 2017). However, CBM-WE research that adequately includes MLs in study samples or addresses their particular needs is very limited (Smith & Lembke, 2020). For instance, none of the most well-established CBM-WE indices assess vocabulary. Assessing vocabulary within writing, in addition to the more common measures that assess spelling, is critical for MLs. They are in the process of acquiring two or more vocabularies and are more likely than their monolingual peers to need additional vocabulary support (August et al., 2005; Woolpert, 2016). This study explored measurement characteristics for two CBM-WE vocabulary diversity measures with a sample of Spanish-dominant second graders in bilingual Spanish-English classrooms. Vocabulary diversity indices measure the extent to which students use a range of vocabulary in their language output and have a long history of use within language assessment (Scott, 2009; Yu, 2010). The two indices explored were 1) Number of Different Words (NDW; total minus repeated words) and 2) Corrected Type Token Ratio (CTTR; corrected proportion of repeated to total words). NDW is a production-dependent measure and CTTR is production-independent (Olinghouse & Wilson, 2013; Read, 2000; Scott, 2009).

Methods

Participants were 175 second graders with a home language of Spanish, from eight Spanish-English bilingual classrooms in one school district in the northwestern United States. All students qualified as English learners (ELs) by the district, meaning they did not pass the state's English language proficiency (ELP) test the previous spring. Thirteen percent of students received special education services.

The teachers administered twelve experimental CBM-WE probes throughout the school year, once per month from October to March. They provided students with a standardized prompt about everyday life activities and then gave them one minute to plan and five minutes to write. A team of seven trained scorers then scored the students' writing for NDW and CTTR indices, after demonstrating reliability with a principal investigator (at least 85% absolute agreement). Twenty percent of assessments were double-blind scored by a second scorer. The writing domain score (scaled score) of the English Language Proficiency Assessment (ELPA-21) was used as a criterion measure (Oregon Department of Education-Office of Teaching, Learning, and Assessment, 2019). The ELPA-21 is used in many states to assess ELP and determine whether students qualify as ELs. Schools independently administered the ELPA-21 between late January and early March in accordance with their district procedures.

Results

Inter-rater reliability between scorers was estimated with an intra-class correlation coefficient and the resulting coefficient was .96. Alternate form reliability and criterion validity were estimated with Pearson's r correlations, after bivariate scatter plots demonstrated linearity. Coefficients between consecutively administered forms (one month apart) were mostly moderate for NDW ($r = .62-.72$) and consistently higher than for CTTR ($r = .51-.65$). Criterion validity coefficients between the vocabulary diversity measures (derived from each of the six forms), and the writing domain score on the

ELPA-21 were also estimated with Pearson's r correlations and very similar for NDW ($r = .24-.48$; $M = .36$) and CTTR ($r = .20 - .49$; $M = .37$). NDW coefficients were slightly lower on average than those for CTTR (using Fisher's Z to standardize the coefficients; Lenhard & Lenhard, 2014) but also more variable. For identifying students with low writing performance on the ELPA-21 (bottom 20% of the sample), Receiver Operating Characteristic (ROC) curve analyses were conducted and the resulting Area Under the Curve (AUC) values were interpreted using Youngstrom's (2014) guidelines. Results showed AUC values ranging between .60-.81 for NDW, which can be considered fair to good. AUC values for CTTR were consistently lower (.55-.80).

Conclusions

The moderate results from this study provide support for further exploration of vocabulary indices within a CBM-WE format and suggest that production-dependent measures such as NDW may be more appropriate for this population. Future research is needed to continue to develop and test new variations of this assessment approach, including with different populations. Formative assessments, such as CBM-WE, are integral to providing appropriate tiered systems of support. For MLs to receive appropriate support, assessment research must include them in studies and address their comprehensive literacy needs.

RTI Multi-tiered support for struggling first-grade writers: effects on the writing process and product

María Arrimanda, Raquel Fidalgo,

Departamento de Psicología, Sociología Y Filosofía, Universidad de León, Spain

Mark Torrance

Department of Psychology, School of Social Sciences, Nottingham Trent University, UK

Objective

Writing is a complex activity which involves, among other abilities, transcription (i.e, handwriting and spelling) and planning skills. Thus, it is not surprising that many students write below the expected level (Katusic et al., 2009). In Spain, prevalence of writing disabilities has been estimated around 8,2% (Jiménez et al., 2009). Schools, therefore, are responsible for framing writing intervention into models designed to prevent learning disabilities, such as the Response to Intervention Model (RTI). The preventive nature of RTI can be explained within two dimensions (Pullen & Kennedy, 2019): assessment and instruction. Regarding assessment, this model supports initial universal screening to detect students at risk of learning disabilities and continuous progress monitoring. Though writing assessment has traditionally been product-oriented (Gillespie & Graham, 2014) recent research emphasizes the use of online measures to assess the writing process (Odendahl & Deane, 2018), since these provide data on writing dynamics and how they change due to specific intervention. Regarding the instructional dimension, the RTI model supports multi-tiered and empirically-based interventions aimed at providing additional support for struggling learners (Barnes & Harlacher, 2008). Unfortunately, the RTI model has been mainly validated in reading. Thus, this study aims to provide preliminary evidence on the efficacy of a two-tiered

writing intervention in transcription and planning for first-grade students with low writing achievement.

Methods

The sample comprised 161 first-grade Spanish students divided in 8 classrooms. During the first half of their first-grade year, all students received researcher-designed and teacher-delivered Tier 1 classroom instruction in transcription and planning. Their progress was monitored through regular probe tasks. On the basis of these tasks, 36 students were identified as learning significantly slower than their peers. During the second half of first grade, struggling students were provided with additional Tier 2 instruction supported by families. Tier 1 instruction and progress monitoring continued for all 161 students. Next year, in second grade, all students came back to only Tier 1 instruction. This acted as a follow-up phase of the study. The intervention condition ($N = 36$ struggling writers) was compared to a comparison group (the remaining 125 average writers).

Assessment involved both progress monitoring and a more formal writing assessment. To keep track of their progress, students completed weekly composition tasks. The quality of their writing was assessed by means of a 6-point holistic scale. Besides, the students completed a more formal writing assessment four times throughout the study: at the baseline of the study, immediately after Tier 1, immediately after Tier 2 and after the follow-up phase. This assessment involved writing a narrative composition which was scored for both product and process. Regarding product measures, narrative texts were scored for text length, spelling and handwriting accuracy and text quality. Additionally, students write their texts using smartpens, which allowed collecting data on total writing time, number of pauses, fluency, understood as the ration between number of words and total writing time, and pause length. We also collected self-reported data from teachers delivering Tier 1 instruction and parents supervising Tier 2 remedial intervention on their experiences with the program, using a questionnaire for parents and an interview for teachers.

The study involved two instructional programs. Tier 1 instruction comprised 123 sessions delivered 3 times a week and lasting for 15-min each. Either transcription, sentence-combining or planning were addressed in each session. Tier 2 training involved 22 sessions presented in the form of homework writing tasks to be completed under parents' supervision. Tier 2 adopted different forms for each child, in an attempt to adapt activities, to some extent, to each student's specific needs.

Results

Analysis of the writing outputs was conducted through linear mixed effects models. Results from the progress monitoring probes, analyzed in terms of the written product, showed quicker learning of struggling students during Tier 2 and a smaller gap in performance between both conditions at the end of the study. The more formal narrative task was analyzed in terms of product and process. Results suggest significant gains in text quality, handwriting accuracy and text length for struggling students throughout the study. There were, however, no differences between conditions in any process measures. Additionally, we analyzed teachers' and parents' perceptions. In general, both reported positive views about the program, while teachers emphasized feeling sometimes overwhelmed.

Conclusion

This study points to the potential of multi-tiered interventions to support struggling students' writing and paves the way for larger and more controlled evaluations. In particular, more research is needed regarding the possible effects of a remedial intervention in students' writing process, since none were found in the present study.

Intervention for Transcription Skills for Students in Grades 1-2 Identified as At-Risk in Writing

Juan E. Jiménez

Departamento de Psicología Evolutiva y de la Educación, Universidad de La Laguna, Tenerife, Spain.

Objective

In Spain, the detection and early intervention of LD have been included as a main priority in the Spanish educational legislation (Ley Orgánica 8/2013, de 9 de Diciembre, Para La Mejora de La Calidad Educativa [Organic Law 8/2013, of December 9, for the Improvement of Educational Quality], 2013) (Ley Orgánica 8/2013, de 9 de Diciembre, para la Mejora de la Calidad Educativa [Organic Law 8/2013, of December 9, for the Improvement of Educational Quality], 2013). This recognition in the Spanish legislation opens up the possibility that in Spain the criteria for identifying LD could be addressed on the basis of models based on RtI model. In fact, recent studies in Spain have shown the effectiveness of Tier-2 or secondary intervention in early reading skills (Jiménez et al., 2021), and early math skills (de León et al., 2021). In both studies, the at-risk children in the intervention condition showed a higher growth compared to at-risk children in the control condition. In early writing skills, a study provides evidence that parent-supported Tier 2 intervention was effective in bringing struggling students' performance back into line with their peers (Arrimada et al., 2018; Arrimada et al., 2022).

In the present study, we investigated whether Spanish first to second graders at risk of writing failure benefited from a teacher implemented Tier 2 transcription.

Methods

Students from 12 schools (three subsidized schools and nine public schools) comprised a sample of 164 at-risk students (females = 77; males = 87; Mage = 6.86, SDage = .65), from 1st (subsidized schools n = 41; public schools n = 32) to 2nd (subsidized schools n = 43; public schools n = 48) grade. Students were classified into two groups: experimental (1st n = 24; 2nd n = 47) or control group (1st n = 49; 2nd n = 44). All students were assessed and identified as at-risk for writing failure with the CBM Indicators of Basic Early Writing Skills (IPAE, Jiménez & Gil, 2019). Ten intervention teachers implemented the Tier 2 intervention.

Teachers were enrolled in the Trazo WBT program (Jiménez et al., 2020). Trazo aims to provide teachers with knowledge and strategies to carry out the RtI model effectively in their classrooms when teaching writing skills. Trazo is a 120 hours WBT program

provided over 16 weeks (i.e., from September to December) that includes four modules: theoretical, intervention, assessment, and experiences. The theoretical module includes twelve tutorials around six themes (i.e., learning theories and beliefs in the teaching of writing, What is writing? handwriting/typing, spelling, and writing sentences and texts, Prevention and RtI Model). Likewise, basic principles of explicit instruction to deal with students at-risk of LD in writing are provided. The intervention module provides information about how to teach within the RtI Tier 2 and use the instructional activities for early writing improvement (IAEWI). The assessment module is based on the usage of the CBM IPAE. Finally, in the fourth module, experiences and video recordings are presented on implementing good teaching practices when teaching children about vocabulary, alphabetical knowledge, phonological awareness, handwriting, spelling, and text production.

Teachers used the RtI website (<http://webrti.ull.es/>) to identify students' risk status and monitor their progress. They introduced the raw score obtained for each student in each IPAE measure. The RtI website identifies students' risk status using the unweighted mean of the standardized measures and a specific cut-off (Gil et al., 2021). For ease of interpretation, the RtI website identifies students who are at-risk with a red dot, and those who are at low-achievement with a yellow dot.

The Instructional Activities for Early Writing Improvement (IAEWI, Jiménez et al., 2019) is a Tier 2 writing intervention based on the principles of systematic and explicit instruction and the use of modeling, scaffolding, and feedback (Gersten et al., 2009). It aims to help students at-risk achieve the skills needed for early success in writing. The materials have been designed both for students and teachers to guide teachers' instruction and guarantee that all teachers are conducting the same instructional methodology.

Results

Implementation fidelity was analyzed using direct observations and self-reports. All students were assessed three times during the academic year. Hierarchical linear growth modeling was conducted, and differences in the growth rate of transcription skills were analyzed between at-risk students who have received the intervention and those who did not.

Conclusion

A different scenario was encountered when we examined the effects of the intervention in the at-risk group, distinguishing between those who no longer were at risk and those who continued to be at risk after the intervention.

Symposium 6

Literacy education in a changing global world: Bearing in mind teacher knowledge, technology, handwriting and dyslexia assessment

Participants

Rui A. Alves, University of Porto
Malatesha Joshi, Texas A&M University
Kay Wijekumer, Texas A&M University
Emily Cantrell, Texas A&M University
Mariana Silva, University of Porto
Theresa Kalschauser, University of Porto
Karol Ann Moore, Texas A&M University
Jialin Lai, Texas A&M University
Juan Quinonez, Texas A&M University

Discussant

Rebeca Cerezo, University of Oviedo

Abstract

It is a constant, the world is continuously changing. But arguably, it has never changed at such a fast pace as today. Naturally, coping with these endless changes is a major challenge for education, and specifically for literacy education. In this symposium we identify four broad challenges, which a scientific approach can inform. How to best assure that teachers can have updated and accurate knowledge about literacy in multiple orthographies? How to best incorporate and wisely use technologies in handwriting instruction? Do the digital or analog qualities of early handwriting experiences matter for the development of early literacy skills? Which framework to use so to accommodate the diversity of orthographies and assessments of dyslexia around the world? In this symposium, Joshi et al., Silva et al., Kalchhauser et al., and Moore et al., respectively, will provide reasoned reflections and evidenced-based suggestions on how to partly address the aforementioned global challenges.

The importance of teacher knowledge in solving the reading puzzle

R. Malatesha Joshi, Kay Wijekumar and Emily Cantrell
Texas A&M University

Objectives of research

About 1 billion children in the world may have reading problems which has serious consequences like poverty, health issues, and societal problems. Hence, National Institute of Health has called 'illiteracy a national health issue.' While there might be several reasons for the riddle of illiteracy, perhaps reading teacher knowledge might be a major reason for this problem. Is this problem specific to U.S. or does this apply to

other countries? In this presentation, we summarize our work on teacher conducted in different countries.

Importance

Reading and writing skills are basic for human development and survival. About 1 billion individuals in the world may have reading problems (UNESCO, 2015) which may be because of various reasons such as poverty, language of instruction; many of the countries in Africa, children are taught in a language that they don't speak, and the gender of the child, like in Afghanistan girls are prohibited from going to schools. According to the most recent Nation's Report Card (National Assessment of Educational Progress, NAEP, 2019), one-third of fourth grade students in the U.S. have difficulty with literacy skills and cannot comprehend fourth grade level materials. This percentage may be as high as 66% or 2/3rds (2 students out of 3 students) of the students among inner-city and minority children. There are serious consequences of poor reading at all levels – individual, societal, and national. At the individual level, about 75% of students who drop out of high school have reading problems and about 85% of individuals in the juvenile court system are functionally illiterate. An important aspect of the value of literacy skills has been highlighted by the fact that when these juvenile delinquents are equipped with literacy skills, there is only a 16% chance that they will return to the prison system. However, when they are not equipped with literacy skills, there is a 70% chance that they will return to prison, which costs taxpayers approximately \$25,000 per year per inmate. Further, more than 50% of individuals on government sponsored welfare assistance and about the same percentage with substance abuse problems have difficulty with reading.

Various reasons have been postulated for this high incidence of literacy problems most notably, the socio-economic status (SES) of the family, oral language development, availability of reading materials at home, and language of instruction, as in many African countries the language of instruction is quite different than the language spoken at home or in the environment. However, the important reason attributed for the high incidence of reading problems is perhaps of the reading teacher's knowledge about reading the language.

Methods

A standardized survey about teacher knowledge was administered first to elementary teachers in the English-speaking countries USA, UK, Canada, Australia, and New Zealand. Subsequently, we cross-translated the survey constructed in English language to Mandarin-Chinese and Korean. All were classroom teachers with varying number of years of teaching experience and because of the nature of the profession, majority of the participants were females. The participants were notified of the purpose of the study and were then administered the survey. Only completed surveys were evaluated.

Results

Regression analyses showed that in general, the reading teachers lacked an understanding of the general concepts of the linguistic knowledge required to teach the concepts of reading. However, there were also differences among the samples in

different countries. For instance, while US teachers performed better on items relating to phonological awareness teachers from UK performed better on items relating to phonics. Further, teachers from China and Korea performed better on teachers from US on items relating to morphological awareness than phonological awareness.

Conclusions

While the importance of literacy in modern world for basic survival is well-known, the classroom teachers involved in teaching reading may lack the scientific foundation of teaching reading. This was found to be true in several countries even though there were differences in different countries depending on the training and the nature of orthography.

The impact of technology on the development of handwriting skills: A review of literature

Mariana Silva, Theresa Kalchhauser, Rui A. Alves

University of Porto

Objectives of research

Handwriting is a complex task that requires using cognitive and motor skills simultaneously (Dinehart, 2015). Nowadays children use technology daily not only to play games and watch videos (Chaudron et al., 2015), but also as the primary means of writing outside the classroom, sending text messages or writing on social media (Clark, 2016). While using touchscreens seems to promote children's motivation in educational activities, its impact on their writing skills needs to be further researched (Kucirkova et al., 2019).

The present study aims to review the current literature to understand the relationship between handwriting development and technology use in children from kindergarten to grade 6, through three research questions: (1) What writing tool (keyboard, stylus or touchscreen) is the best to promote the development of handwriting skills?; (2) Which age group benefits most from the use of technology-based writing interventions?; and (3) Are there gender differences in the impact of technology-based writing interventions?

Many studies found advantages associated with writing on keyboards. Children writing with a keyboard were able to: write faster and more than children writing on paper (Feng et al., 2017); perform better in word writing tasks than children writing on paper or with a stylus (Mayer, 2020); and improve their letter knowledge (Castles et al., 2013). Moreover, keyboarding may help younger children or children with sensory-motor difficulties, since the fine motor challenges associated with handwriting are bypassed, which allows them to focus on other cognitive processes involved in writing (Ray, 2022). Similarly, Beschorner and Hutchison (2013) found that even when preschoolers could not handwrite the letters, they were able to identify and write them on a keyboard. However, Alamargot and Morin (2015) found some limitations of typing compared to handwriting, namely: the need to shift the attention between the screen and the keyboard; the lack of graphomotor processing, given that letters are already present; and the need to actively search for the correct keys.

The use of styluses on glass, due to its very high or very low friction, may increase the motor challenges of handwriting (Mayer et al., 2020) and affect the legibility (Alamargot & Morin, 2015). Regardless, some studies found that preschoolers wrote the same number of words, with a stylus, as children who wrote on paper (Patchan & Puranik, 2016; Butler, 2019; Mayer et al., 2020).

Touchscreens, conversely, are more intuitive and suitable for children from very early ages (Beschorner & Hutchison, 2013). Using touchscreens helped children: with limited letter-shaping skills to write, by typing on a pop-up keyboard (Beschorner & Hutchison, 2013); to write more letters correctly, compared to children using a stylus (Patchan & Puranik, 2016); and to learn new words (Russo-Johnson et al., 2017). However, Russo-Johnson et al. (2017) found that touchscreens could be distracting since children would tap on the tablet even when it was not necessary.

Age seems to be a facilitator for tablet use since older children, with higher self-regulation skills, were able to tap on tablets only when instructed (Russo-Johnson et al., 2017). Older children were also able to read and write in tablets independently (Hutchison et al., 2012) and overcome the friction issues of styluses by writing faster or applying more pressure (Alamargot & Morin, 2015). Conversely, younger children had to pause for longer time periods between strokes (Alamargot & Morin, 2015). Younger children may benefit from writing with their fingers on tablets, even if writing with a stylus is more similar to handwriting (Patchan and Puranik, 2016).

Regarding gender, while girls seem to spend more time engaged in literacy and fine-motor skills related activities during their free playtime (Early et al., 2010), boys seem to be more engaged with technology (Chaudron et al., 2015). However, we did not find studies looking at gender differences in technology-based writing interventions in kindergarten.

Keyboarding seems to be a beneficial writing tool, even though research on styluses and touchscreens is still scarce. Future research could focus on comparing the impact of these three different writing tools on children's handwriting development. Given the seemingly positive impact of technology on children's writing skills, schools could benefit from providing explicit writing instruction based on digital devices (Feng et al., 2017), while still maintaining their nondigital-based practices, to support children's writing skills (Neumann & Neumann, 2015). Besides pre-school teachers have a key role in guiding students' handwriting development by providing different approaches, modelling, and feedback (Neumann & Neumann, 2015), since even when children succeed in the games, they may need further support to generalize their knowledge to everyday life (Troseth et al., 2016).

The influence of writing medium and gesture modality on the development of early literacy skills

Theresa Kalchhauser, Mariana Silva, Rui A. Alves.

University of Porto

State of the art

The process of becoming literate happens gradually relying not only on spoken language, but also on many skills, knowledge and insights about print that need to be

gained (Scarborough, 2002; Suggate et al., 2016). Written language production is more demanding than spoken language (Bourdin & Fayol, 1994) and writing requires the simultaneous coordination of many cognitive processes (Flower & Hayes, 1980). Equally, early reading achievement has been linked to children's knowledge of the alphabet (Whitehurst & Lonigan, 2001), and to their understanding of letters and speech sounds, called phonological awareness (Juel, 1988; Leppanen et al., 2006; Lindtner, 2017; Schneider, 2017). Bourdin and Fayol (2000) studied second and fourth graders and asked them to recall series of unrelated words. Recall was done orally, by handwriting or orally with concurrent tasks of tapping, drawing or sound categorization. In second graders, they found that the working memory load was higher in the handwriting condition compared to oral alone and oral with a concurrent task. Mayer et al. (2020) taught 16 letters to children, during seven weeks, in three different conditions. They measured word writing and word reading and found that using pen on paper was the most effective condition, followed by typing on keyboard, and lastly by the stylus on tablet condition. These results suggest that the easiness of the motor program involved in the writing medium (analogue or digital) might be an important factor to consider. On the one hand, research on technology in preschool classrooms in Australia, Greece and the US has showed that computers can be beneficial and can be used to improve a variety of skills, including early literacy skills (Shute & Miksad, 1997; Moxley et al. 1997; Vernadakis, 2005). On the other hand, researchers found detrimental consequences of digital use. For instance, Delgado and colleagues (2018) showed that paper-based reading comprehension is higher than that of digital devices and might even prevent children from developing these skills in the first place. From the findings outlined, the current study might add insights on the most effective writing medium and gesture modality to foster early literacy skills in pre-schoolers.

Methods

We are carrying a Randomized Controlled Trial (RCT) plus Control Group (CG) to examine the relation between different types of writing media (paper or tablet) and gesture modalities (handwriting or tapping) on decoding skills and early literacy skills. The intervention promotes learning of cursive letter strokes, using a 2 (media) x 2 (gesture) experimental design. One hundred and six pre-schoolers, aged between four and six years old, were randomly assigned into one of four intervention groups: handwriting on paper (HP); handwriting on tablet (HT); tapping on paper (TP); tapping on tablet (TP). Additionally, 35 children were taken as a business-as-usual CG. Three moments of assessment took place three months apart (pre-test, post-test, and three months follow-up). Four psychologists delivered the intervention to small groups of children over eight weeks. Every week three 30-minute sessions took place.

Three procedures were put in place to warrant treatment fidelity. Firstly, four psychologists were trained to deliver the intervention. Secondly, the psychologists filled in a checklist with all significant intervention steps. Thirdly, an independent researcher observed 75% of the sessions and filled in an observation checklist.

Throughout the intervention, the psychologists introduced 23 cursive letters of the Portuguese alphabet to the participants. Each session was guided by a storybook and one to two new letters were introduced. Depending on the experimental condition each child performed similar letter games varying only in writing medium and gesture

modality. The psychologists followed the same main structure in each session: reviewing the previous episodes of the storybook; a new episode of the story was told and children played letter learning games.

Expected results

At this very moment we are coding and processing study data. The main analytical approach is to apply analyses of variance to test for the effects of gesture modality and writing media on early literacy skills.

Regarding gesture modality, we expect differences in letter writing and concepts about print; but no differences are expected in phonological awareness and letter naming. Due to the fine motor requirement, we anticipate improvements across the handwriting conditions. Regarding writing medium, we do not expect significant differences in the five main outcome measures. At the time of the conference, we expect to present first results on the influence gesture modalities and writing media on the development of early literacy skills.

A Cross-Linguistic View of Dyslexia Identification

Karol Ann Moore, Jialin Lai, Juan Quinonez, R. Malatesaha Joshi

Texas A&M University

Summary

There is evidence that dyslexia occurs in many languages around the world. As many have attempted to develop theories that encompass the multidimensionality of dyslexia across languages, they fall short when accounting for variation due to orthographic depth while also focusing on European alphabetic languages. Many students with dyslexia demonstrate difficulties in languages that are not European, nor alphabetic. Therefore, a more comprehensive model is needed to provide consistency in understanding, identification, and intervention for a greater number of students. We present a cross-linguistic view of reading acquisition and dyslexia for alphabetic, Semitic, and morphosyllabic languages, as well as how the ten dimensions developed by Daniels and Share (2018) can serve as a framework to inform dyslexia identification for a number of stakeholders representing languages around the world. Implications for assessment, identification, and intervention, as well future directions, will be discussed.

Dyslexia has been studied in various languages and around the world (Goswami, 2003, 2006; Ziegler & Goswami, 2005). Much research has been published on dyslexia and factors that contribute to reading difficulties; however, the majority has been focused on predominantly European alphabetic languages (Daniels & Share, 2018; Share, 2021). Generally associated with a deficit in the phonological component of language, dyslexia is the most commonly identified reading disability, reported with a prevalence anywhere between 5-17% in the United States (Shaywitz, 1998). Snowling (2000) suggests that given the transparency of the language, the prevalence of dyslexia can decrease to approximately 5% in transparent orthographies like Spanish and Finnish. It is necessary to consider other features of an orthography that contribute to skilled reading across languages so that we may effectively provide adequate instruction to all

students who enter school. There is indeed evidence showing that a great number of students with dyslexia struggle to read in languages that are not European or alphabetic (e.g., Arabic, Chinese; Daniels & Share, 2018). Given this, it is necessary to consider other features of orthography that contribute to skilled reading across languages so that we may effectively provide accurate identification and adequate instruction to all students who enter school. Therefore, a broader framework is warranted to account for the complexities within an orthography that may contribute to difficulties in reading acquisition.

Dyslexia is commonly defined as a specific learning disability that is neurobiological in origin. However, the identification of dyslexia relies on behavioral measures related to reading accuracy and fluency (IDA, 2019). Until now, the variance in dyslexia between orthographies has only considered differences in transparency between languages (Seymour et al., 2003). There are other features that affect reading acquisition and can help as early markers to identify children at risk for dyslexia (Daniels & Share, 2018). This work proposes an alternative approach to dyslexia identification incorporating a cross-linguistic framework that can account for the various factors that contribute to reading development in an orthography. In recent years, models and theories of reading have been developed to account for the multitude of factors that play a role in reading acquisition (Brady, 1997; Coltheart, 1978; Coltheart et al., 1985, 1993, 2001; Frost et al., 1987; Ziegler & Goswami, 2005); however, these are focused primarily on the English orthography, appear too simplistic, and do not account for the interaction between phonology, orthography, and morphology and their varying contributions to reading difficulty in a language (Share, 2021).

In the current review, we employ the ten dimensions of orthographic complexity proposed by Daniels and Share (2018) to discuss how orthographic features (e.g., spoken-written distance, spatial arrangement and nonlinearity, historical change, and omission of phonetic elements) are associated with reading acquisition and difficulties. We will review and synthesize literature to provide a background of reading acquisition and dyslexia for alphabetic languages (e.g., Finnish, Spanish, German, Portuguese, French, and English; Seymour et al., 2003) that range from transparent to opaque in orthographic depth, as well as other languages that are Semitic (e.g., Arabic and Hebrew) and morphosyllabic (e.g., Chinese). We will also review current practices in the identification of dyslexia and propose ways in which the ten dimensions of orthographic complexity can be utilized in the future identification of dyslexia. In addition, we will suggest implications for assessment, identification, and intervention. As we become an increasingly global society, teachers' knowledge of reading acquisition and orthographic depth is essential as they work with diverse groups of students from around the world. Methods for building teachers' knowledge will also be discussed.

Employing the ten dimensions of orthographic complexity as a framework for dyslexia identification would bring congruence to the way we identify students with dyslexia globally, as well as provide insight into universals and language-specific features that would lead to a more accurate representation of the number of students that truly have dyslexia. Additionally, this approach could shift the perspective from being 'Anglocentric' and 'alphabetocentric' (Daniels & Share, 2018; Share, 2008, 2021) to a broader view that encompasses a wider variety of orthographies.

Interactive Poster Session Information

READING AND READING DISABILITIES

A.1

P007 Development of Spelling Ability in Greek Elementary School Students with and without Reading Problems

Angeliki Mouzaki, Sophia Giazitzidou (Department of Primary Education, University of Crete), **Panagiotis Simos** (School of Medicine, University of Crete)

Abstract

The purpose of this longitudinal study was to trace the developmental pathways and the interrelations of reading and spelling of elementary school students and to compare growth in spelling between students with and without reading problems studying a transparent orthography (Greek). Five hundred and seventy children of middle elementary grades were followed over a period of three years. Children were tested on word and pseudoword reading accuracy, spelling, and two subtests of the WISC-III (vocabulary and block design). Results indicated significant growth differences for spelling skill between the two groups. Furthermore, the vast majority of students with spelling problems maintained their status three years later and only a small portion of students with better word identification skills showed improvement in spelling achievement

A.2

P009 Influence of slower processing speed (PS) in children with high cognitive ability on parent- and teacher-reported psychosocial outcomes

Gina Forchelli (PhD, NCSP)

Vuijk, Pieter; Wolfe, Lauren; Beery, Clara; Koven, Maya (Center for Genomic Medicine, Massachusetts General Hospital, Boston, MA, USA)

Cederberg, Charles; Colvin, Molly; Doyle, Alysa; Braaten, Ellen (MGH Psychiatry Department, Harvard Medical School, Massachusetts General Hospital, Boston, MA, USA)

Abstract

Processing Speed (PS) weaknesses in children have been found to differentially impact psychosocial outcomes. The current study hopes to further explore how a relative weakness in PS in children with higher cognitive abilities may influence these outcomes. In a sample of clinically-referred children with high cognitive ability with and without a relative PS weakness, parent and teacher ratings of social and adaptive outcomes were reviewed. Results suggest that children with higher cognitive ability and a relative PS weakness show more challenges related to their approach to

academic work and school-related adaptive skills. Implications and areas for future research are discussed.

A.3

P010 Implicit learning of spelling – Effectiveness of an implicit training of a consonant doubling spelling rule

Sophie Schneemelcher, Gunnar Bruns, Jasmin Decristan, Michael Grosche (University of Wuppertal)

Matthias Grünke (University of Cologne)

Karolina Urton (University of Muenster)

Abstract

Most orthographic spelling rules are taught explicitly in school (Bredel, Fuhrhop & Noack, 2017). Research on spelling acquisition shows that many children are able to read and write before they enter school without having been exposed to explicit rules of the orthography (e.g. Bredel, Fuhrhop & Noack, 2017). Therefore, processes of implicit learning seem to play a role in the acquisition of spelling (Treiman & Kessler, 2014) and the question arises whether the acquisition could be stimulated through a specific training. We designed a digital implicit training of the doubling rule in the German orthography, which was evaluated from January to April 2022 with N = 174 second graders. First results of the effectiveness of this intervention will be presented and discussed.

A4

P015 Spanish children with dyslexia struggle with English as a Foreign Language

Paz Suárez-Coalla, Marina Vega Harwood (University of Oviedo)

Cristina Martínez-García (Universitat Oberta de Catalunya)

Abstract

Children with dyslexia show reading and spelling problems. In addition, other language difficulties were reported: word-retrieval, short-term-memory, language sequencing, and auditory perception. Accordingly, learning a Foreign Language is a challenge for them. Our objective was to investigate some of the difficulties that Spanish children with dyslexia experiment in English. Thirty-two Spanish children (9-12 years-old) participated (16 with dyslexia). They received reading, spelling, and translation tasks, which consisted of twenty-eight English words, manipulating lexical frequency and orthographic consistency. Results proved reading and spelling difficulties, and low vocabulary compared to the control group. Children with dyslexia showed some lexical frequency effect, while the control group also shows an orthographic consistency effect, suggesting a better domain of English regularities than the dyslexia group.

A5

P016 Rapid Naming Related to Visual Orienting of Attention and Phonology: Different Contributions for Reader Subgroups

B.J.A. (Barry) de Groot (University of Groningen, Department of Special Needs Education and Youth Care & Department of Neurolinguistics)

Abstract

This research addresses the issue of the still debated underlying mechanisms driving the link between rapid naming and word reading skill, considering orienting of attention as a highly relevant contributing component for different reader sub groups of children. The data presented provide behavioral and neurophysiological evidence to support the claim that orienting of attention can explain a substantial proportion of RAN variance above and beyond phonological processing, with different qualitative properties for poor readers as contrasted with normal reading controls.

A6

P017 The Importance of Oral Vocabulary in Longitudinal Prediction of Word Reading Fluency: Evidence from Typical and Poor Readers of a Transparent Orthography

Angeliki Mouzaki, Evgenia Korvesi, Sophia Giazitzidou, Panagiotis Simos (Department of Primary Education, University of Crete; Panagiotis Simos, School of Medicine, University of Crete)

Abstract

Reading fluency is gaining recognition as a major component of reading proficiency. In the context of investigating the extent to which linguistic factors contribute to reading fluency, oral vocabulary has emerged as a potential facilitator, especially for poor readers. However, the contribution of oral vocabulary to reading fluency is not well understood and differs among orthographic systems. The goal of this study was to examine the longitudinal contribution of lexical knowledge to reading fluency of Greek elementary school students with and without learning problems (N=570), controlling for the effects of age, non-verbal ability and rapid automatized naming (RAN). Structural equation modeling (SEM) and confirmatory factor analysis were conducted to address the objectives of the study. The results showed that oral vocabulary skills can both directly and indirectly promote reading development for all upper elementary readers and are critically important in the case of students with reading problems.

A7

P020 Prevalence of Learning Disabilities: Trends and Variability

Daniel P. Hallahan (Professor Emeritus, University of Virginia)

Paige Pullen (Literacy Officer and Research Professor, Lastinger Center for Learning and School of Special Education, School Psychology and Early Childhood Studies, College of Education, University of Florida)

Abstract

Learning disabilities (LD) are estimated to impact up to 10% of students in today's classrooms in the United States. Yet recent studies have shown a decrease in the prevalence of LD. This phenomenon will be explored to attempt to understand (a) the impact of preparation of teachers highly trained in the science of reading on reading outcomes, and (b) the use of progress monitoring data and intensive interventions informed by the science of reading to reduce inappropriate referrals and bolster progress in difficult to remediate students. Students are often placed in remediation programs, but a failure to make timely decisions, use evidence-based practices based on the science of reading, will often lead to stalled progress and inappropriate or hasty referrals for special education. Alternately, students that require special education are often stuck in a tiered system of supports that allow the students to demonstrate some progress, but not enough progress to close the achievement gap they are experiencing.

A8

P021 Complex Morphological Forms Used by Middle School Students with High-Incidence Disabilities

Brady, S., Owen, L. (George Mason University, Fairfax, VA EEUU)

Abstract

To develop competent literacy skills, students need support and experiences with a variety of types of print and nurturing of vocabulary, syntactic, and discourse skills that are involved in understanding written language (Hemphill & Tivan, 2008). The National Reading Panel (2000) recommended that vocabulary be taught through specific word instruction (e.g., selecting words to directly teach) and word-learning strategies (e.g., morphological analysis). Analyzing the morphological forms that students with disabilities use in their writing provides researchers and practitioners the knowledge required to develop appropriate vocabulary interventions to support students' reading and writing. Researchers have assessed students' vocabulary gains following MA intervention. These studies revealed gains in vocabulary using both standardized and non-standardized measures. Research that examines morphological forms provides information to support the development of morphological awareness interventions (Carlisle, 2010). For example, based on the research of by Kirk and Gillon (2009), Denston et al. (2018) completed a study with MA intervention for students in grades three, four, and five with literacy learning disabilities. Results indicated an effect size of

partial eta-squared = 0.64. Denston and colleagues noted positive changes in reading outcomes with upper elementary students with reading difficulties. The current study is the first study to examine the use of morphological forms in writing by middle school students with disabilities.

A9

P022 The investigation of vocabulary skills and reading comprehension for students with special learning disabilities

Faye Antoniou, Konstantina Fragkouli, Athanasios Papakostas (Department of Educational Studies, National and Kapodistrian University of Athens)

Abstract

Vocabulary has been consolidated as a key factor in reading achievement. The scope of the study was the evaluation of an intervention program which deployed the method of deriving the meanings of unfamiliar words through context for the enhancement of vocabulary skills across different grades (2nd and 3rd). The participant pool was composed of students with SLD or at risk for SLD from resources rooms of Attica ($N = 78$ for 2nd graders and $N = 74$ for 3rd graders). The 16-hour program was founded on the principles of direct instruction and implemented by the teachers. A pre- post-follow up control group design was followed in order to quantify its effectiveness. The obtained results revealed positive effects on vocabulary skills and reading comprehension.

WRITING AND WRITING DISABILITIES

B1

P001 Improving Written Expression in students with Learning Disabilities

V. Kokkali, F. Antoniou, D. Filippatou (Department of Educational Studies, National and Kapodistrian University of Athens)

Abstract

The development of written expression is an intricate process for students with Learning Disabilities (LD). The current study presents a novel intervention, which was based on the instruction of cognitive and metacognitive written expression strategies. The instructional approach, implemented by the resource room teachers, was the Self-Regulated Strategy Development. Participants were 80 LD 5th and 6th graders who were randomly assigned into the experimental ($N = 36$) and the control group ($N = 44$). The research design was a pre-post-follow up experimental study. All students were assessed with written expression and strategy knowledge atypical measures. The results obtained via ANCOVA demonstrated that the experimental group showed a statistically significant improvement in writing and metacognitive skills contrary to the

control, providing tangible evidence that writing can be taught effectively to LD students.

B2

P002 Writing Processes in Students with Learning Disabilities or Attention Deficit Hyperactivity Disorder

Olga Arias-Gundín, Paula López (University of León) and **Celestino Rodríguez** (University of Oviedo)

Abstract

The purpose of this study was to explore if there are differences in writing processes between students with LD or ADHD and their typically-developing peers.

In this study took part 124 upper-primary students with ages ranged between 9 and 12 years; 42 LD students, 42 age-matched students, 20 ADHD students, and 20 age-matched. All students with LD or ADHD had a prior diagnosis. This study was carried out in two sessions. Two raters scored the texts assessing the following variables: textual quality, planning and revising (location, diagnosis, and correction). It seems that the writing problems presented by ADHD students are directly related to attention span and not to lack of knowledge, while in LD students this does not happen.

B3

P011 Longitudinal associations between communication abilities and reading and writing performance in adolescents with Autism Spectrum Disorder without intellectual disability

Inmaculada Baixauli Fortea (Occupational Sciences, Speech Language Therapy, Developmental and Educational Psychology Department, Catholic University of Valencia)

Carmen Berenguer Forner, Belén Roselló Miranda y Ana Miranda Casas (Developmental and Educational Psychology, University of Valencia)

Abstract

Individuals with Autism Spectrum Disorder (ASD) show deficits in reading and writing skills, which are lower than what is expected on the basis of their cognitive functioning. In a recent study, adolescents with ASD without intellectual disability significantly underachieved in metacognitive processes involved in reading comprehension and in indicators of written performance (Baixauli et al, 2021). These impairments contributed significantly to their school outcomes. The present study aims to extend those findings by analyzing longitudinally the relationships between adolescents' reading and writing skills with estimates of their communication abilities, a core deficit of ASD, when they were at primary education. Based on models such as the Simple View of Reading (Hoover & Gough, 1990), research has shown a clear relationship between structural language difficulties and reading (Lindgren et al., 2009;

Lucas & Norbury, 2014; Norbury & Nation, 2011). However, no study so far has analysed the relationships between communicative competence and reading and writing performance.

B4

P012 Assessing Spanish Early Writers

Jennifer Balade; Juan E. Jiménez (Universidad de La Laguna; San Cristóbal de la Laguna, Santa Cruz de Tenerife, Canary Islands)

Abstract

The main target of this study was to validate a screening test named Early Grade Writing Assessment for kindergarten (EGWA-K). We analyzed technical features such as its validity and reliability. EGWA-K is composed of 12 tasks, however, the results of factorial analysis show that the best structure of this test is a bifactor structure composed of an oral language factor and an alphabetic knowledge factor. We analyzed predictive validity through the ROC curve, which achieved adequate specificity and sensitivity indices. The results showed a high diagnostic accuracy of the EGWA-K to detect children at-risk of writing difficulties.

SPECIAL NEEDS

C1

P003 The Student Self-Accommodation Strategy for Students with Visual Impairments and Concomitant Learning Disabilities

Allison C. Nannemann (Department of Special Education, University of New Mexico)

Abstract

Students with visual impairments (VI) and those with learning disabilities (LD) typically are passive accommodations users. Their similar experiences present an area of study for students with concomitant VI and LD. Approximately 14-65% of students with VI also have LD; however, research on this population is severely limited. Four students with VI and concomitant LD were taught the Student Self-Accommodation Strategy. A parallel multiple-case design was used to determine how they learned and used the strategy, including elements of metacognition and self-regulated learning (SRL). The participants' strategy learning varied. Recall and understanding strategy purpose supported strategy performance but not in-class use. Participants did not improve metacognition or SRL. Potential benefits of teaching accommodations strategies to this population were affirmed.

C2

P018 How noise affect cognitive performances of children with additional learning needs: A preliminary study

Gaia Spicciarelli, Flavia Gheller (Dipartimento di Psicologia dello Sviluppo e della Socializzazione, Università di Padova, Padova, Italia).

Barbara Arfé (Dipartimento di Psicologia dello Sviluppo e della Socializzazione, Università di Padova, Padova, Italia; Human Inspired Technologies Research Center-HIT, Università di Padova, Padova, Italia).

Abstract

The goal of the study is to investigate how background noise can affect children's cognitive performance, and whether it affects in similar way the cognitive performance of children without and with additional learning need, like a learning disability (LD) or an attentional deficit disorder (ADHD). Two visual attentional tasks, an inhibition task and a verbal WM task have been administered by a serious game App ("Cognitive Effort in Noise" – CoEN) to 62 typically developing children and to 17 children with a diagnosis of LD or ADHD, between 7 and 12 years of age. All tasks have been performed in both quiet and noise (multitalker babble at 60dB through headphones). The data analysis revealed a detrimental effect of noise on children's WM performance in both groups. However, noise had also a positive influence on the attentional performance of children with additional needs.

LEARNING DISABILITIES IN MATH

D1

P004 A qualitative analysis of calculation errors in primary and secondary school

Annamaria Porru, Sebastiano Pegorer, Riccardino LoRusso, Silvia Benavides-Varela, Carlo Semenza (Department of Developmental Psychology and Socialization - University of Padova) **Dora Tramarin, Martina Pedron, Daniela Lucangeli** (Polo Apprendimento, University of Padova)

Abstract

The present study evaluated the effectiveness of a specialized training program supported by qualitative error analysis to improve numerical skills in primary and secondary school children with Mathematical Difficulties. Participants (n = 44; age range= 8 - 12 years old) carried out a specific training adapted to the learning profile of each student on the basis of the qualitative and quantitative errors found during the first assessment. Measurements before and after training showed that the children had significantly greater improvement, particularly in Counting and Visuo-Spatial errors.

LEARNING DISABILITIES AND ADHD

F1

P005 Are spatial skills impaired in ADHD? A meta-analysis

Elizabeth Maria Doerr, Barbara Carretti, Chiara Meneghetti, Enrico Toffalini, Agnese Capodieci (Department of General Psychology [DPG], University of Padova)

Abstract

The following meta-analysis explored differences in individuals with and without ADHD across specific spatial measures. The majority of the literature supports the fact that people with ADHD encounter more difficulties in spatial tasks compared to verbal ones. For this analysis, the main measures in spatial cognition were considered, comparing performance in such tasks between people with ADHD and peers with typical development. A meta-analysis with random effects models was conducted for each spatial measure. Significant and negative relations were found in some of these domains, with a poorer performance of individuals with ADHD. However, the differences were small and most of the spatial skills explored included a limited amount of effects sizes, with the exception of visuospatial working memory.

F2

P006 Aberrant Responses in Students with LD: Cause for Concern?

Georgios D. Sideridis (BCH, Harvard Medical School)

Abstract

Since the early days of learning disabilities one major study reported that the provision of additional time could explain the quantitative difference between students with and without LD. The present study suggests that investigation of the response patterns and behaviors of students with LD is a salient contributor to our understanding of their academic behavior. Unexpected behaviors are linked to inaccurate and invalid measurement parameters and can lead to unexpected consequences for examinees. To this end we investigated a number of person fit statistics within Item Response Theory (IRT) to investigate the presence of aberrant response patterns in the LD. Participants were 68 typical students and 68 students with LD matched for age, gender and IQ. Using protocols of aberrant response patterns which include rates of guessing, carelessness and other unexpected responses, results indicated that students with LD displayed lower rates of successful guessing, higher rates of careless responses and a number of response patterns that not only could not be explained but were also nonconductive for measurement purposes. It is concluded that qualitative differences in the ways students with LD respond may explain their achievement levels.

F3

P008 School Facilitation of Student Involvement in Educational Planning and Selfdetermination

Wendy Cavendish and Deborah Perez (Department of Teaching and Learning, University of Miami)

Abstract

Student involvement in educational planning and the development of self-determination skills are both linked to improved school outcomes for students with Learning Disabilities (LD). This study examined student and teacher perceptions of student involvement in IEP planning in two urban high schools and the relationship of level of involvement to self-determination for students with LD. Rasch measure scores on both student and teacher Student Involvement Surveys (SIS) revealed differences between teacher and student perceptions of school efforts to involve students. We also examined the relationship between level of facilitation of student involvement and selfdetermination for the 34 high school students. Implications for school practice are discussed.

F4

P013 The Role of Anxiety in Self-Concept and Inattentive Symptomatology of ADHD

Laura M. Cañamero, Natalia Martín, Zara Suárez-García, Marisol Cueli, Débora Areces (Department of Psychology, University of Oviedo)

Abstract

Attention-deficit/hyperactivity disorder (ADHD) has been associated with low self-concept. The present work examined the effect of inattentive symptomatology on emotional, social, physical and academic self-concept, attending to the mediation and moderation of anxiety. A total of 167 students (70.7% boys and 29.3% girls) aged between 11 and 16 years participated in this study. The results suggest that for the emotional, social and physical self-concept to decrease, when inattention increases, the role of anxiety must be considered. However, there is a direct effect of inattentive symptomatology on academic self-concept. This indicates that the greater the inattentive symptomatology ADHD-students show, the worse the perception they will have of their own academic capacity.

F5

P014 Attention-deficit/hyperactivity disorder and parental educational styles

Laura M. Cañamero, Natalia Martín, Marisol Cueli y Paloma González-Castro
(Department of Psychology, University of Oviedo)

Abstract

The correlation between Parental Educational Styles (PES), norm setting, externalizing and internalizing variables, and vulnerability in students with a diagnosis of ADHD is analyzed. The study involved 101 families and 61 students (31 girls and 30 boys) between 6 and 14 years of age. The results show that parental educational styles based on criticism-rejection are associated with rigid and indulgent formulas and are related to the development of internalizing symptoms (anxiety), externalizing symptoms (inattention, anger) and vulnerability (emotional dysregulation, isolation). While the affection-communication parental educational styles are associated with inductive formulas, with no negative symptomatological linkage. Parental style conditions the symptomatology and associated difficulties of students with ADHD, being a variable to be taken into account in the intervention of the disorder.

F6

P019 Reading abilities in school-aged preterm children with ADHD

Bujnowska, A. M., Pasarín-Lavín T., Abín-Álvarez A., Rodríguez, C. (Department of Psychology, University of Oviedo, Spain)

Solís-Sánchez, G. (Área de Gestión Clínica de Pediatría, Neonatología, Hospital Universitario Central de Asturias, Oviedo, Spain)

Abstract

This study aimed to describe reading skills and naming speed abilities in very preterm children with attention deficit hyperactivity disorder (ADHD). Furthermore, we examined which specific reading skills were associated with prematurity independent of the effects of gender, socioeconomic status, and IQ. The Evaluation of Reading Processes for Children (PROLEC-R) was used to assess reading capacity and the Rapid Automatized Naming and Rapid Alternating Stimulus Tests (RAN/RAS) to evaluate naming speed. A sample of 112 preterm children (age range = 8-13 years) was divided into two groups: ADHD and control. There were statistically significant differences in RAN/RAS and PROLEC results between groups. The degree of prematurity was a significant predictor of processing speed and reading comprehension.

