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NAVIGATING THE EVERYDAY: INTERPLAYS BETWEEN ANXIETY, SELF-EFFICACY, RESILIENCE AND MOTOR CONTROL IN ADULTS WITH DCD

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Background: Previous research indicates that adults with DCD report lower wellbeing and higher anxiety than typically developing (TD) adults, suggesting that further research must build on preliminary insights into the impact DCD has on mental health and quality of life in adulthood.
Aims: To examine relationships between anxiety, confidence (self-efficacy and resilience) and motor control in adults with and without DCD to usefully inform strategies for managing psychosocial impacts of motor difficulties.
Methods: Phase one involved 74 adults with diagnosed DCD, 26 adults with suspected DCD and 79 TD adults aged 18-60. An online questionnaire comprised existent psychometric measures and novel scales. Phase two, currently underway, uses a lab-based everyday movement task to explore how anxiety, self-efficacy and resilience may interact with motor control to affect perception (perceptual judgments) and action (actual executed movements).
Results: General and movement-specific anxiety, self-efficacy and general resilience were poorer in adults with diagnosed and suspected DCD compared with TD adults. Higher resilience is related to higher self-efficacy and lower anxiety. Phase two will offer insights into whether and how these factors impact perceptual judgment and executed action in everyday movement tasks like navigating spaces between obstacles.
Conclusions: Interventions should target adults, along with children, with DCD and include a focus on building self-efficacy, resilience and lowering anxiety, particularly in movement-related domains. Resilience could have a protective role in strategies for managing emotional and practical impacts of motor difficulties. Relationships between these factors illustrate the importance of addressing multiple interlinking aspects of perception and experience in individuals with DCD.

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THE IDS-2: A NEW MEASURE OF MOTOR PERFORMANCE FOR CHILDREN AND ADULTS

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Background: Standardised motor tests are an important component of a diagnostic assessment for DCD. The Intelligence and Development Scales – 2nd Edition (IDS-2) has recently been adapted and translated into English, with the collection of UK norms for 5–20 year olds. The IDS-2 contains 30 subtests across six domains. The Psychomotor skills domain measures gross motor, fine motor and visual motor skills (other domains measure Intelligence, Executive Functions, Social-emotional skills, Scholastic skills, and Motivation and Attitude).
Aims: To describe the content of the IDS-2 Psychomotor skills domain and examine aspects of reliability and validity of this new tool.
Methods: Trained assessors collected data on the IDS-2 from 1367 individuals aged 5–20 years across the UK. Aspects of reliability and validity of the Psychomotor domain were examined.
Result. Reliability coefficients were .78 and .88 for 5–10 and 11–20 years respectively (.66–.89 for subtests). Differential validity was supported, with significantly poorer gross motor, fine motor and visual motor scores for 25 children with DCD compared to an age-matched typically developing group. Concurrent validity was supported by significant correlations between scores (.78, $p<.001$ for total scores) on the IDS-2 Psychomotor skills domain and the Movement ABC-2 test in a group of 50 children.
Conclusions: The Psychomotor skills domain of the new IDS-2 will be a useful addition to the toolkit of assessors working with children and young adults with DCD. The battery also offers a means of assessment across broader domains.

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DETERMINANTS OF MATHEMATICAL PERFORMANCE IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER

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Introduction: Developmental coordination disorder (DCD) is a condition characterized by motor coordination and planning difficulties and affects about 5% of school-aged children. Evidence suggests that DCD interferes with academic activities such as mathematics, which is a necessary skill to participate in many daily activities including driving, shopping and managing time or budget.
Objectives: We aim to describe the frequency and nature of mathematical difficulties of children with DCD and their determinants.
Methods: Mathematical capacity was assessed in 55 school-aged children with DCD using the KeyMath. Standardized assessments were completed to evaluate children's visual-motor integration (VMI) and visual perceptual (VP), motor, and attentional skills. Descriptive statistics were used to characterize the sample, and hierarchical multiple regression models identified the determinants of mathematical capacity.
Results: Children with DCD (n=55, 9.3±1.9 years of age, 45 males) performed significantly below the normative mean of overall mathematical capacity (d=0.62SD below mean, $p<.001$), with the measurements and geometry subtests particularly affected. Up to 35% of children with DCD (n=19) performed <15th percentile in mathematical capacity, indicating the presence of significant difficulties. Our hierarchical model included VP skills, inattention, VMI and motor impairments and explained 50.1% of the variance in overall mathematical capacity ($F(6,46)=7.685$, $p<.0001$).
Conclusions: Our findings suggest that mathematical difficulties are frequent in children with DCD. Due to the importance of mathematics in daily life activities, it is of the utmost importance that we pay more attention to these specific difficulties and address them as part of our interventions with children with DCD.

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ENHANCING HANDWRITING OF CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER (DCD) USING COMPUTERIZED VISUAL FEEDBACK

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Introduction: Recent studies have analyzed writing metrics using computerized systems. To date, the use of computerized visual feedback to improve handwriting has not been investigated.
Aims: To examine the effect of computerized visual feedback on handwriting performance in indices of time, spatial orientation, and pressure in children with Developmental Coordination Disorder (DCD).
Methods: Twenty-seven children with DCD aged 7-12 years assessed by the MABC-2 and DCDQ received one training session per-week over 8 weeks, in which they twice copied an excerpt on a tablet. Once, they received visual feedback where writing color alternated according to the degree of pressure on the writing surface, and once again without visual feedback. The first session was compared with the last session and with a new text in indices of time, spatial orientation, and pressure.
Results: Findings revealed a significant decrease in total and mean letter writing time, in-air and surface writing time, and an increase in capacity. In the spatial index, a significant decrease in the variance of the letter height was found. Pressure increased significantly throughout training with visual feedback while pressure variance decreased at post-test in both the visual feedback and no visual feedback writing task and maintained in the new text.
Conclusions: Visual feedback training can increase kinesthetic-haptic feedback required to regulate pressure during writing which promotes more efficient feedforward processes improving output quality and greater capacity. Training effectiveness was transferable, and intervention accessibility can increase student autonomy.

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"I KIND OF FOUND MY OWN WAY OF DOING IT" - INTERVIEWING ADULTS WITH MOTOR DIFFICULTIES AS CHILDREN

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Background: Developmental coordination disorder (DCD) was considered a childhood disorder, but studies have shown the disorder continues into adulthood in 30-70%. DCD in adulthood is sparsely studied. The aim of this study was to explore experiences of living and growing up with motor problems.
Method: Face-to-face or phone interviews were conducted with thirteen adults aged 30-34 years with a history of motor problems, but no concentration or social behavioural problems, at 6.5 years of age. Participants were recruited from a cohort of neonatal care recipients born at Uppsala University Children's Hospital, Sweden, 1986-1989. Data was analysed using Systematic Text Condensation.
Results: Two themes emerged, each divided in three categories: (1) Motor skills in daily life – Motor activities as a part of the culture, Basic things require a certain level of motor skills, support from my surroundings; (2) My journey – The emotional toll and growing past it, It is not my motor skills that cause me trouble, I can do everything I want to do.
Conclusion: Participants experienced having motor difficulties differently. Few knew about their previous motor problems and what consequences they could have. Regardless of manifesting motor problems, other difficulties or using strategies to manage daily life, the participants did not feel limited in their everyday activities. Support from the surroundings seemed important to managing well and not feeling limited in daily life. Further studies are needed to increase knowledge of the transition from child to adult.

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TOWARDS A HOLISTIC PSYCHOSOCIAL OFFER OF SERVICE FOR CHILDREN AND YOUTH WITH DCD

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Introduction: According to recent best practice guidelines on DCD, interventions should consider psychosocial factors. Children and youth with DCD present not only motor difficulties, but are at risk of psychosocial distress, including depression and anxiety. Furthermore, self-concept and auto-determination impact how DCD affects mental health.
Objective: The Lethbridge-Layton-Mackay Rehabilitation Center (LLMRC) in Montreal is striving to optimize participation of children with DCD and families. The interdisciplinary team is enhancing its holistic offer of service, in which both motor and psychosocial needs are integral and according to best practices.
Methods: We will provide an in-depth presentation of our current service offer and preliminary results of our program evaluation to further improve our offer. We proceeded with a literature review of best practices in DCD, and benchmarking in Quebec and beyond, and conducted a survey to receive feedback from our clientele.
Discussion: Children and Youth with DCD aged 5-24 in the Montreal area are serviced by LLMRC's interdisciplinary team comprised of occupational therapists, physiotherapists, psychologists, social workers, special care counselors, and a kinesiologist. Although the main offer of service is OT based and participation focused, the team has integrated a psychosocial approach by supporting the youth and families' understanding of the impact of DCD on participation; focused on the promotion of well-being and community integration.
Conclusions: We want to move towards a partnership of care approach that emphasizes better awareness of living with DCD in an effort to empower children, youth and families for active and meaningful participation throughout their lifespan.

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A SOCIOECONOMIC PERSPECTIVE ON DEVELOPMENTAL COORDINATION DISORDER: THE IMPACT ON EDUCATIONAL LEVELS

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Introduction: Developmental Coordination Disorder (DCD) is known to impact on educational outcomes during childhood and adolescence. Despite this, there is a paucity of studies examining if this association persists into adulthood. Therefore, we set out to investigate if having DCD as children is associated with poorer educational outcomes and if these were affected by sex or a co-occurring attention deficit.
Participants and methods : This observational register-based study investigated data from 185 neonatal intensive care recipients (men: 108, 58%) born at Uppsala University Hospital, Sweden, 1986-1989. At 6.5 years of age, 46 (24%) children fulfilled the diagnostic criteria for DCD. Data on: i) age at graduation from Upper Secondary School (USS), ii) if they had graduated from USS at 19, 24 and 29 years, and iii) their highest completed level of education at 28 years, were collected from national registers. Logistic regression analyses were used to explore the association between DCD and educational outcomes, and whether sex or a co-occurring attention deficit impacted on this association.
Results: Participants with DCD showed statistically significantly poorer outcomes than those assessed without DCD for age at graduation from USS ($p = 0.022$) and for graduation rates from USS at age 19 ($p = 0.002$) and 24 ($p = 0.044$). Although not statistically significant, participants with DCD and a co-occurring attention deficit consequently exhibited the poorest educational outcomes. A non-significant trend pointed towards females being especially negatively affected by a DCD diagnosis.
Conclusions: DCD was associated with poorer educational outcomes in adulthood.

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WEARABLE TECHNOLOGY FOR EVALUATING PEN-GRIP KINETICS AND HANDWRITING PRESSURE IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER (DCD)

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Background: Writing is a complex sensorimotor and biomechanical process of operating the writing tool with the fingers and applying regulated pressure on the writing surface. To date, limited quantitative measurement has distinguished between the pressure on the writing surface and the hand grip pressure exerted on the writing tool and how they vary over time during a handwriting task.
Aims: To evaluate pen-grip kinetics and handwriting pressure in children with Developmental Coordination Disorder (DCD).
Method: Fifty-four children aged 7-12 years recruited from regular classrooms, 27 of whom were assessed with DCD by the MABC-2 and DCDQ, and a matched control group of 27 typically developing (TD) children copied a passage of 30 words. A computerized tablet assembled with a wearable device measured spatio-temporal and kinematic information from pen pressure on the tablet and grip pressure on the pen.
Results: Total writing time and mean letter time were significantly lengthier, and letter height, width and variance, letter spacing, letter and word area, and the number of erasings were significantly greater in children with DCD. No significant difference was found in pressure applied on the writing surface nor maintaining it throughout writing. Contrastingly, the wearable device revealed significant weaker grip pressure on the pen with greater variability, in children with DCD.
Conclusions: Children with DCD demonstrated weaker grip force dynamics during writing, which may be related to lesser legibility and form, and extended time. These findings shed light on the underlying processes of handwriting, specifically grip force, which may help accurately guide clinical interventions.

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EXCESS HEALTH CARE COSTS ASSOCIATED WITH DEVELOPMENTAL COORDINATION DISORDER IN CHILDREN: A LONGITUDINAL REGISTER-BASED COST COMPARISON STUDY

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Introduction: Developmental Coordination Disorder (DCD) is a neurodevelopmental disorder that affects 5-6% of children. In 30-70% of cases, DCD persists into adulthood. Very little has been done on the socioeconomic impact of DCD. This study investigated the excess health care costs related to DCD over 25 years.
Participants and methods: This observational register-based study investigated data from 185 neonatal intensive care recipients (men: 108) born at Uppsala University Hospital, Sweden, 1986-1989. At 6.5 years of age, 46 children fulfilled the diagnostic criteria for DCD. Data on inpatient care, specialized outpatient care and medication were retrieved from national registers. Costs were estimated using a mixed costing approach. The excess cumulative mean costs were explored using two-part models, adjusted for sex and gestational age.
Results: Individuals with DCD spent significantly more in inpatient care (€8,158) in the unadjusted models. In the adjusted models, although still spending more, the excess cost was not significant. In both models, individuals with DCD spent less in specialized outpatient care and medication. Individuals with DCD had, in both models, higher total health care costs, although not statistically significant (unadjusted € 1,397; adjusted € 1,863).
Conclusion: Although there was no statistical significance in most costs, except inpatient care costs, individuals with DCD are costlier to the healthcare system than individuals without DCD. While there could be a true non-existing difference in health care cost, our results could have been impacted by the small sample size, the lack of primary health care data, and this being a high-risk population.

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THE EFFECT OF SHORT-TERM OCCUPATIONAL THERAPY INTERVENTION ON SENSORY-MOTOR ABILITIES AND PARTICIPATION OF PRESCHOOLERS WITH MILD DISABILITIES

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Introduction: Preschoolers with mild developmental disabilities are referred to occupational therapy (OT) due to their decreased participation in daily life occupations. However, there is a paucity of studies evaluating the effectiveness of OT interventions on children's participation in daily activities.
Objectives: To evaluate the improvement in preschoolers' sensory-motor aspects as a result of a short-term OT intervention, and to examine the contribution of the intervention's foci and the improvement of the children's sensory-motor aspects to their participation.
Method: Thirty-eight children aged 4.6-6 years and their parents participated in a prospective cohort study with Interrupted Time-Series design, including assessments at three-time points: a) baseline; b) pre-intervention; c) post-intervention. Children were evaluated with the Developmental Test of Visual-Motor Integration; sub-tests of Balance and Fine Motor Precision of the Bruininks-Oseretsky Test of Motor Proficiency. Parents completed the Children's Participation Questionnaire; the Child Performance Skills Questionnaire. Children received between 9-12 weekly individual sessions that were documented by the therapists using the Documentation of Occupational Therapy Session Intervention.
Results: Results show improvements in children's sensory-motor skills, balance ($F=9.811$ (2,74), $P<.001$), visual-motor integration ($F=10.194$(2,74), $P<.001$), and fine motor precision ($F=13.667$(2,74), $p<.001$), post-intervention. The improvement in the children's performance skills explained 24% of the parental satisfaction improvement. The intervention foci on the child's performance skills explained 19% of the improvement in the participation intensity and 23% of the child's independence.
Conclusions: OT intervention provided to preschoolers with mild disabilities improves the child's sensory-motor abilities and contributes to their participation.

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MOTOR IMPAIRMENTS IN CHILDREN WITH AUTISM SPECTRUM DISORDER: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Children with autism spectrum disorder (ASD) often have motor deficits, yet motor concerns are not part of the diagnostic criteria for the disorder, nor are they typically the target of therapy. While a dual diagnosis of ASD and developmental coordination disorder (DCD) has been permitted since the publication of DSM-5 in 2013, we hypothesize that DCD is under-diagnosed in this population.
Objectives: (1) To determine the prevalence of motor impairments (consistent with DCD) in children with ASD; and (2) to determine if the term DCD was used after 2013.
Methods: This systematic review included articles from four databases if they studied motor function of children (5-12 years) with ASD and were published between 2010-2020. Motor difficulties that could be explained by other conditions were excluded. Two independent reviewers selected articles and rated study quality.
Results: The majority of articles (92%) reported that children with ASD had significant motor impairments on standardized motor assessments and/or functional questionnaires. The prevalence of motor problems ranged from 50-87%. However, only 3/19 papers published from 2014 identified these motor difficulties as DCD, with one study reporting that only 15% of children with ASD with motor difficulties had been given a co-occurring diagnosis of DCD.
Conclusion: Functional motor difficulties are highly prevalent in children with ASD, but most children are not receiving a DCD diagnosis. Identifying DCD in children with ASD is important so that they can receive evidence-based therapy to address motor skill deficits, which can also improve the core deficits associated with ASD.

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BRAIN SIMILARITIES AND DIFFERENCES IN CHILDREN WITH AUTISM SPECTRUM DISORDER, DEVELOPMENTAL COORDINATION DISORDER, AND/OR ADHD

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Introduction: Children diagnosed with a neurodevelopmental disorder often have one or more other neurodevelopmental conditions. Commonly co-occurring conditions include autism spectrum disorder (ASD), developmental coordination disorder (DCD), and attention deficit hyperactivity disorder (ADHD). While altered brain development is suspected across conditions, how the brain differs between conditions has not been systematically evaluated.
Objective: To explore similarities and differences in brain structure and function in children with ASD, DCD, and/or ADHD.
Methods: This systematic review included articles from four databases meeting the following criteria: (1) peer-reviewed studies published in English; (2) children ≤ 18 years of age with one or more diagnoses of ASD, DCD, and/or ADHD compared to children with one or more of these neurodevelopmental conditions; (3) brain MRI involving structural MRI, diffusion tensor imaging (DTI), and/or resting-state fMRI.
Results: Twenty-nine included articles compared brain structure and function of children with the following conditions: DCD to ADHD (n=6), DCD to ASD (n=1), ASD to ADHD (n=15), and various combinations of co-occurring conditions (n=7). Structural neuroimaging was the most commonly reported MRI modality (n=14), followed by resting-state (n=8), DTI (n=4), and multi-modalities (n=3). Evidence suggests that the neural correlates of co-occurring conditions were more widespread and distinct compared to a single diagnosis. The majority of findings indicate that each neurodevelopmental disorder had more discrete than common neural correlates, suggesting that each disorder is distinct despite commonly co-occurring with each other.
Conclusion: While neurodevelopmental disorders often result from altered brain development, findings suggest that brain structure and function differ across disorders.

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MOTOR IMPAIRMENT IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER: A SYSTEMATIC REVIEW

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Introduction: A systematic review of papers (1996-2013) reported that more than half of children with attention deficit hyperactivity disorder (ADHD) had motor skill deficits (Kaiser et al., 2015). Further, many children on stimulant medication continued to have motor challenges, suggesting that the functional motor difficulties are not directly related to inattention and/or impulsivity. Thus, motor deficits in children with ADHD may be due to an unidentified co-occurring diagnosis of developmental coordination disorder (DCD). Since the DSM-5 published in 2013, both DCD and ADHD have been classified as neurodevelopmental disorders and their co-occurrence has been recognized; thus, an updated synthesis of evidence is warranted.
Objectives: Our primary objective is to determine the evidence of motor impairment, consistent with DCD, among school-age children with ADHD. Our secondary objectives are to determine if: (1) the prevalence of a co-occurring DCD diagnosis increased after publication of DSM-5; (2) motor difficulties are still under-recognized in children with ADHD; (3) use of ADHD medication improve elements of motor control; and (4) there is a relationship between ADHD type and motor profile of DCD.
Methods: A systematic review of four databases (CINHAL, PsychInfo, Pubmed, EMBASE) is underway with the following inclusion criteria: (1) papers published in English between 2013-present; (2) participants aged 6-18 years with ADHD as per DSM-5 criteria; and (3) studies included a standardized motor assessment and/or measure of functional motor difficulties.
Conclusion: Findings will provide up-to-date evidence regarding the co-occurrence of DCD and ADHD and whether DCD is better recognized in children with ADHD.

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CHILDREN WITH POOR MOTOR SKILLS HAVE LOWER HEALTH-RELATED FITNESS COMPARED TO TYPICALLY DEVELOPING CHILDREN

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Most of the current empirical evidence regarding the relationship between health-related fitness and level of motor performance is based on children from high-income countries. Yet, children from low-resource areas may have fewer opportunities to develop their fitness skills. The aim of the study was to determine if South African children from both low- and middle-income areas scoring below the 16th percentile on the Movement Assessment Battery for Children-2 (probable-Developmental Coordination Disorder (p-DCD)) have lower health-related fitness levels than typically developing (TD) children. We hypothesized that children with p-DCD would have lower overall health-related fitness than TD children. A sample of 146 participants aged 10 to 11 (10.05 years (SD = 0.41)) was collected from schools in the NorthWest Province of South Africa, on the basis of their poverty classification.
Children were tested for anaerobic capacity and strength using the Bruininks–Oseretsky test of motor proficiency second edition (BOT-2) and aerobic capacity using the Progressive Aerobic Cardiovascular Endurance Run (PACER). Body composition was evaluated using body mass index corrected for age and sex (BMI-z), body fat (BF), and waist circumference. The data was analyzed using Spearman correlations and chi-squared tests. Statistically significant differences ($p < 0.05$) were found between groups for running and agility, strength, and aerobic capacity. No significant differences were found between p-DCD and TD groups in terms of body mass (36.1 kg vs. 33.3 kg), waist circumference (62.2 cm vs. 59.8 cm), BMI-z (19.7 vs. 17.6), and fat percentage (20.2 vs. 18.1%). Overweight and obesity prevalence was 15% in those with low socio-economic status (SES) and 27% in high SES. In conclusion, children with p-DCD had lower muscular strength, aerobic capacity, and endurance than TD children. Although it has been reported that children with p-DCD have a higher risk for overweight/obesity than TD children, this is not (yet) the case in 10–11-year-old children living in rural areas in South Africa (North West Province).

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A LONGITUDINAL INVESTIGATION OF DEVELOPMENTAL COORDINATION DISORDER (DCD) CHARACTERISTICS OF CHILDREN WITH CHILDHOOD APRAXIA OF SPEECH (CAS)

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Purpose: Children with childhood apraxia of speech (CAS) evidence a high rate of co-occurring fine and gross motor deficits. This longitudinal study aimed to determine the extent to which motor deficits in this population are consistent with developmental coordination disorder (DCD), a neurodevelopmental disorder categorized by poor motor proficiency and functional limitations.
Method: Children with CAS were recruited (n =16) at Time Point 1. Children were tested with the Movement Assessment Battery for Children, 2nd ed. (MABC-2) and parents answered the Developmental Coordination Disorder Questionnaire (DCDQ) and a developmental history questionnaire to determine if their child met criteria for DCD diagnosis as specified in the DSM-5 (2013). Two years later (Time Point 2), 11 of the original participants underwent comprehensive speech and language assessment and a repeat of the motor testing they completed at Time Point 1.
Results: At Time Point 1, 11/16 participants met criteria for DCD based on the MABC-2 and/or the DCDQ. At Time Point 2, 10/11 met DCD criteria based on these criteria. Of the 11 children who were reassessed, 7 continued to meet the diagnostic criteria for CAS while 4 demonstrated symptoms consistent with residual CAS.
Conclusion: Consistent with previous research, the majority of participants demonstrated motor deficits and 68-91% met criteria for DCD. Despite this high rate of motor deficits, only 43% had previously undergone a physical/occupational therapy evaluation. Findings suggest that formal movement assessments are essential for children with a CAS diagnosis.

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ELICITING END-STATE COMFORT PLANNING IN CHILDREN WITH AND WITHOUT DCD USING A HAMMER TASK

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Background: The end-state comfort (ESC) effect refers to the consistent tendency of healthy adults to end their movements in a comfortable end posture. In children with and without developmental coordination disorder (DCD), the results of studies focusing on ESC planning have been inconclusive, which is likely to be due to differences in task demands.
Objectives: The present pilot study focused on the question whether children with and without DCD were able to change their planning strategy and were more likely to plan for ESC when demanded by complex object manipulations at the end of a task.
Methods: ESC planning was examined in 9 children with and 9 without DCD (aged 5–11 years) using the previously used sword-task and the newly developed hammer-task. In the sword-task, children had to insert a sword in a wooden block, which could be relatively easily completed with an uncomfortable end-posture. In the hammer-task, children had to strike down a nail in a wooden pounding bench, which required additional force and speed demands, making it relatively difficult to complete the movement with an uncomfortable end-posture.
Results: In line with our hypothesis, the results demonstrated that children with and without DCD were more likely to plan for ESC on the hammer-task compared with the sword-task.
Conclusions: While children with and without DCD show inconsistent ESC planning on many previously used tasks, the present pilot study shows that more of them are able to take into account the end-state of their movements if required by task demands.

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A QUALITATIVE PHOTO ELICITATION RESEARCH STUDY TO ELICIT THE PERCEPTION OF YOUNG CHILDREN WITH DEVELOPMENTAL DISABILITIES SUCH AS DCD AND/OR ASD ASD/OR ADHD ON THEIR PARTICIPATION

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Participation is a well-recognized construct and critical indicator of quality of life. It has become an important outcome measure in child rehabilitation. Little is known about the level of participation of young children with Developmental Disabilities (DD). The aim of this study was to capture their subjective experiences of participation. An adapted informed consent based on a comic strip was used to get children's assent. A Photo Elicitation study was used, in which photographs were taken by the children when they were involved in meaningful activities. The photographs were then used to facilitate communication with the children and to initiate in depth-interviews. Forty-seven interviews with 16 children between five and nine years were conducted based on their photographs. This method generated rich data, confirming that young children with DD were able to inform us accurately on their experiences of participation. Results showed that children perceived their participation as satisfying when they can play, learn and join in family gatherings resulting in feelings of inclusion, recognition and belonging. When there are - on occasions - moments that their participation was obstructed, the children used two strategies to resolve it. Or they walked away from it and choose not to participate, or when autonomously motivated for the activity, they relied primarily on their context (i.e. mothers) as enabling their participation. Related to the data, children discussed themes related to their person, activities, connections and mediators between those themes. These themes fit well within earlier and current research on the subject of participation.

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PARENT'S PERSPECTIVE ON PARTICIPATION OF YOUNG CHILDREN WITH DEVELOPMENTAL DISABILITIES: A SYSTEMATIC SCOPING REVIEW

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Background: During the early years of a child's life, participation is essential for learning and development. Children with disabilities are at risk for decreased participation. The interplay between environment and participation is identified as one of the most important factors influencing successful participation. The objective of this scoping review was to synthesize peer-reviewed literature about barriers and facilitators of participation according to the perspective of parents of children younger than six years with Attention Developmental Hyperactivity Disorder, Autism Spectrum Disorder and/or Developmental Coordination Disorder.
Methods: The scoping review followed Arksey and O'Malley's framework. Relevant studies were identified by a comprehensive search of scientific databases (PubMed and Web of Science). Studies describing perspectives of parents regarding their child's participation, written in English, published between 2001 - September 2017 were included.
Results: A total of 854 articles were retrieved with 13 meeting the criteria. Elements contributing to perceived barriers and facilitators were identified and organized according to the International Classification of Functioning, Child-Youth (ICF-CY) framework. Concepts contained in these studies were linked to 'activities and participation' (general tasks and demands such as bedtime and dinner routines and social, civic life such as play and leisure). Environment-focused factors identified were situated on 'support and relationships', 'attitudes', 'services, systems and policies'.
Conclusion: The review revealed guidelines focusing on family-centered care, communication with and providing information to parents with young children with Developmental Disabilities (ADHD, DCD and/or ASD).

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PARTICIPATION ACCORDING TO CLINICIANS WORKING WITH YOUNG CHILDREN WITH DEVELOPMENTAL DISABILITIES: A LONG WAY TO GO

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Background: The widespread adoption of 1) family-centered practice concerning child and family health settings and 2) the focus on providing interventions in naturally occurring routines (i.e., mealtimes; bedtime) or activities (i.e., playing on a playground; shopping) has challenged therapists' traditional ways of relating to and working with parents of children with disabilities. Despite the importance of participation, promoting participation in young children with DD does not appear to be well integrated into the current clinical practice.
Aim: This study aims to extend the current studies concerning participation and gathering stakeholders' ideas on their beliefs and current practices about participation-based interventions. This information could help in developing guidelines to enable therapists to shift from a more traditional way of providing health care to a more participation-based approach.
Method: This study garnered information on clinicians' perspectives regarding perceived facilitators and barriers when rendering participation-based interventions using a qualitative research design. Semi-structured interviews of clinicians (Ns=12, 25-57 years) were conducted and evaluated via an inductive thematic analysis.
Results: Results denote that current mechanisms of providing participation-based interventions resembled traditionally focused interventions; thus, resulting in a knowledge-to-practice gap. Clinicians desired more opportunities to communicate with caregivers and to be able to influence the children' s natural environments. They also identified shortness of time, resources, and rigid health care regulations as barriers hampering the efficacy of participation-based services.
Conclusion: This evidence seeks to bridge research to practice by offering data-based recommendations derived from scientific research for the participation-based approach serving children with DD.

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MOTOR LEARNING IN TROUBLE! RESEARCH INTO NEUROPLASTICITY OF PEOPLE WITH DCD

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Background: While the motor problems demonstrated by people with Developmental Coordination Disorder (DCD) indicate compromised motor learning, we know surprisingly little about the motor learning process and the underpinning neurological mechanisms in this group. This dearth of knowledge limits our understanding of the aetiology of DCD and insight into this matter may lead to optimised motor training programs for this target audience.
Aims: Therefore, this study aims to (1) examine brain structure/function in young adults with DCD, and (2) evaluate the effect of 6-weeks balance training on the brain.
Methods: Thirty adults with DCD (18-35 years) and 30 typically developing adults will be recruited. All participants will learn a novel whole-body dynamic balance task for 6-weeks (3 times 0.5h/w). To measure the extent and location of structural neuroplasticity, an MRI-scan will be taken prior to, after 6-weeks of practice, and after a retention period of 3 months. In addition to behavioural measurements, such as balance skill performance, brain morphology (T1-weighted imaging), brain activity (resting state fMRI) and the organisation of white matter (diffusion weighted imaging) in regions related to motor learning will be assessed.
Results: Since the data collection will start in January 2022, we do not have data yet to include in this abstract. At the conference we wish to share our first results with the DCD-community.
Relevance: Insight into the deviant brain structure is essential in order to improve the diagnostic process and to optimise therapeutic practice for people with DCD.

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LOCOMOTOR COORDINATION WHEN WALKING AND RUNNING IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER

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Intro / Background: Developmental Coordination Disorder (DCD) is characterized by deficits in motor coordination. Children with DCD show frequent falls and their gait is described as awkward. Despite the reported differences in spatiotemporal parameters, no study has explored coordination in children with DCD during walking or running, vital for participation in leisure activities.
Aims / Objective: This research aims to investigate coordination by the phase coordination index (PCI), during walking and running in children with DCD compared to typically developing children (TDC).
Methods / Approach: Children with a diagnosis or probable DCD from 8 to 12 years and age-and-gender matched TDC participated. Children walked and ran level-ground for 3minutes in a 20x15meters oval-path. Physilog5GaitUp® sensors were used to quantify PCI, and the mean and coefficient of variation (CoV) of spatiotemporal parameters (stride-length, cadence).
Results / Discussion: To date, 7DCD and 10TDC have been included. When walking, children with DCD walked with significant larger CoV of cadence (CoV%: 4.53) than TDC (CoV%:3.60; p=0.0218). During running, children with DCD displayed significantly poorer coordination (meanPCI(%): 9.33) than TDC (meanPCI(%):7.92; p=0.0097). Besides, the CoV of stride-length (p=0.045) and cadence (p=0.0029) was significantly higher in children with DCD (CoV stride-length: 9.76; CoV% cadence: 3.74) than TDC (CoV stride-length:6.82 ; CoV% cadence: 2.56).
Conclusion / Relevance: Preliminary results suggest that children with DCD have poorer coordination than TDC and an increased variability in stride-length and cadence when running. These differences might suggest that children with DCD have greater difficulty to coordinate running compared to walking.

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THE HLS SCALE FOR DETECTING THE RISK OF POOR HANDWRITING/DYSGRAPHIA IN TWO ITALIAN SAMPLES

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In Italy poor handwriting/dysgraphia is recognized as a specific learning disorder; therefore, valid assessment tools are essential.
The present study aims to evaluate the feasibility of the Handwriting Legibility Scale (HLS) when applied to Italian children's free writing task.
The HLS examines 5 different components of handwriting legibility: global legibility (overall text readability on first reading), effort to read the script, layout on the page, letter formation, and alterations to writing (attempts made to rectify written work); it also records handwriting speed.
Two groups aged 9-14 years were recruited: 193 typically developing children and 39 with a diagnosis of learning disorder (I.Q. within the normal range; reading, writing, handwriting and math abilities assessed with national standardized tests).
Results from the typical development sample revealed acceptable internal consistency (Cronbach's alpha=0.78) and inter-rater reliability (Kappa=0.67); the construct validity was also demonstrated with the principal component analysis revealing that a single factor solution was appropriate and explained 53% of the variance.
The clinical group (mean=12.36) was significantly worse than controls (mean=9.79) in the total HLS score (U=465, z=-2.967, p=0.003) and in most of the HLS components, except for the effort to read the script.
The overall findings suggest that, even if further refinement of instructions is needed to improve the scoring reliability, the HLS can be a useful tool to identify poor handwriting legibility in Italian writing scripts. Further, the HLS scores profile could be examined to evaluate the possibility to differentiate between different learning disorders, including DCD, in order to plan best handwriting supports.

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THERAPISTS' USE OF INSTRUCTIONS AND FEEDBACK IN MOTOR LEARNING IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER

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Background: To optimize motor learning in children, recommendations on the use of instructions and feedback are needed. As a first step, insights could be gained into the current use by therapists. This qualitative study aims to explore physiotherapists' use of instructions and feedback in therapy sessions of children with Developmental Coordination Disorder (DCD).
Methods: Standardized video observations were made of a physiotherapy session of a child with (probable) DCD aged 5-12 years. Each therapist, with at least one year of experience in treatment of children with DCD, provided one video. A newly developed five-step protocol was used for video analysis. All steps were analyzed by two researchers independently, afterwards the output of each step was discussed until consensus was reached. Data was collected until saturation (10 videos).
Results: Four hours of footage were analyzed. Different tasks were practiced such as jumping, throwing and writing. Therapists used verbal, visual and/or manual instructions and feedback with an internal, external and/or motion rule focus. Questions were used to guide the child to the correct movement solution. In addition, a variety of compliments and choices (e.g. what ball to use) were given to improve motivation. Mostly, the therapist, and not the child, determined when instructions and feedback were provided.
Discussion: Large variability was seen in physiotherapists' use of instructions and feedback to enhance motor learning. Further research is necessary to explore how instructions and feedback are adapted to specific task and child characteristics.

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THE DEVELOPMENT OF A PROTOCOL TO ANALYZE THERAPISTS' USE OF MOTOR LEARNING PRINCIPLES IN CHILDREN

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Background: Current observation tools to analyze therapists' use of motor learning principles in children mainly focus on verbalizations. However, in practice a variety of motor learning principles is used, including instructions, feedback and practice conditions. This study aims to develop a protocol to gain insights in all motor learning principles used by physiotherapists in children.
Approach: Based on literature, clinical experience and pilot video observations, a first draft of the protocol was developed. After data-collection in eight videos of children with Developmental Coordination Disorder, the protocol was discussed and refined.
Results: The protocol consists of 5 steps: 1. scoring general items on a 4-point Likert scale, 2. cutting the video into smaller relevant fragments, 3. assigning a motor learning label to these fragments to indicate the type of motor learning (e.g. implicit or explicit motor learning), 4. selecting fragments for further analysis and 5. open coding of the selected fragments. All steps were performed by two reviewers independently, afterwards the output of each step was discussed until consensus was reached. Although cutting the fragments of serial practiced tasks and assigning the motor learning label in step 2 was challenging, all reviewers reached consensus. The protocol was feasible to observe therapists' use of motor learning principles in detail.
Discussion: With this newly developed protocol, researchers and clinicians are able to gain more insights into therapists' use of motor learning principles. Further research is needed to investigate the reliability and validity of this protocol.

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THE EFFECT OF VISUAL-MOTOR ILLUSION ON MOTOR EXECUTION IN CHILDREN WITH NEURODEVELOPMENTAL DISORDERS

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Objective: In the treatment of motor difficulties in children with neurodevelopmental disorders, model videos are sometimes shown. While Visual-motor illusion (VMI) type videos are reported to improve motor performance in adults, there are no reports for children. This study's aim is to investigate whether VMI is effective for improving motor learning in children with neurodevelopmental disorders.
Methods: Twenty-six right-handed children with neurodevelopmental disorders, ages of 7 to 12 and diagnosed with ASD or ADHD, participated in this study and were divided into three groups: VMI group, observation group and no video group. First, they performed a ball rotation task and a finger coordination task for 30 s(Pre-task). Then, the VMI group watched videos of each task for 30 s × 5 times on the iPad with the iPad positioned so that it overlapped their right hand. The observation group watched videos with their right hand next to the iPad to avoid the illusion. After watching the videos, the degree of sense of body ownership and sense of agency was measured based on the 5-point Face scale test. All groups then performed the two tasks again (Post-task).
Results: The VMI group's sense of body ownership and agency was significantly higher than the observation group, and in ball rotation, the number of ball rotations increased significantly in the VMI group compared to the other groups.
Conclusions: Results suggest VMI can improve complex motor performance movement in children with neurodevelopmental disorders. VMI may be useful for therapy in children with developmental disorders.

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BALANCE PERFORMANCE OF DCD ON A CONTINUUM BETWEEN CP AND TD: A COMPARATIVE CASE STUDY

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Background: Children with Developmental Coordination Disorder (DCD) show a large heterogeneity in balance performance deficits. These deficits may be either the result of a delayed development, leaning more towards their TD peers or of a deviant development, like cerebral palsy (CP).
Aim: We aimed to identify whether balance performance of DCD is on a continuum between CP and TD.
Methods: In this comparative case study, we compared the Balance Evaluation Systems Test for Children (Kids-BESTest) in three boys: one with DCD (9y1m), one with CP (8y6m) and one TD child (9y0m). The Kids-BESTest consists of five balance domains, each related to specific underlying neurological systems.
Results: The boy with DCD scored 76% in total on the Kids-BESTest which is an intermediate score between CP (70%) and TD (94%). Both boys with DCD and CP scored below TD age-expectations on each balance domain. The boy with DCD scored lower than the CP boy on the domains assessing stability limits (11/21vs.13/21) and sensory orientation (12/15vs.15/15), but higher on anticipatory (14/18 vs.11/18), reactive (15/18vs.13/18) and walking balance (16/21vs.8.5/21).
Conclusion: On the continuum of balance performance, the DCD child showed an intermediate score, however more closely to that of the CP boy, suggesting deviant development. The problems in finding its stability limits and in sensory orientation tasks suggests that in DCD the internal modeling deficit hypothesis can be further explored as these domains are related to sensorimotor pathways including the parietal cortex. These first findings need to be verified in a bigger sample.

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CORTICAL BRAIN AND MUSCLE ACTIVITY TO UNDERSTAND BALANCE PERFORMANCE IN DCD: A PROTOCOL

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Background: Balance deficits are heterogeneous in Developmental Coordination Disorder (DCD). Balance performance consists of different balance domains, each associated with specific underlying neurological systems. In DCD, any of these domains can be affected, but the control mechanisms are poorly understood. To understand these control mechanisms underlying the actual balance performance, simultaneous registration of cortical brain and muscle activity while performing functional balance tasks are required.
Aim: To describe a protocol for combining real-time registration of muscle and cortical mirror neuron system (MNS) activity during functional balance tasks in children with DCD, CP and TD.
Methods: Children with DCD, CP and TD (n=108) aged 5-10yr will perform preselected tasks of the Kids-BESTest, representing specific balance domains. Simultaneously, both functional Near-Infrared Spectroscopy (fNIRS) and surface electromyography (sEMG) are recorded. The selected tasks are: leaning with eyes closed (stability limits/verticality), single-leg-stance and alternate stair touching (anticipatory balance), in-place response and compensatory stepping backward (reactive balance) and walking over obstacles (gait stability). Outcome measures of fNIRS are: (de)oxygenated hemoglobin concentration changes in MNS: premotor, inferior and superior parietal cortex and supplementary motor area. For sEMG following outcome measures are determined: co-activation patterns and onset latencies of the lower limb muscles.
Results: The protocol was already feasible in 19 children
Relevance: Simultaneous registration of cortical MNS activity (fNIRS), muscle activity (sEMG) and Kids-BESTest scores will help increase the understanding of the control mechanisms underlying the heterogeneous balance problems in DCD. Consequently, first steps will be made to confirm whether DCD shows deviant or delayed development.

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ACTION OBSERVATION NETWORK ACTIVITY DURING ACTION OBSERVATION AND PRODUCTION IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER

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Introduction: There is emerging evidence that the Action Observation Network (AON) might contribute to the motor impairments characteristic of Developmental Coordination Disorder (DCD).
Aim: This study aimed to identify whether the AON is disrupted in DCD during action observation or action execution, or whether both processes are affected.
Methods: Electroencephalography (EEG) was used to measure mu power (a measure of AON) in 8-12-year-old children either with (n=23) or without (n=24) a diagnosis of DCD. EEG was recorded during five conditions: observation (1) gross and (2) fine motor; production (3) gross and (4) fine motor; (5) non-biological movement (kaleidoscope). To address whether potential deficits in these systems were unique to DCD or related to co-occurring traits of other neurodevelopmental disorders, parents reported on their child's attention and social communication skills.
Results: A priori comparisons of each condition between groups determined that the only condition on which the groups differed was for non-biological movement. Within each group, we were interested in desynchronisation (non-biological movement as baseline relative to biological movement). As expected, the non-DCD group showed some desynchronisation for observation conditions and increased desynchronisation for execution conditions. However, the DCD group showed low mu power across all conditions, including non-biological movement. There were significant correlations between children's attention and motor skills and AON activity.
Conclusions: Results suggest that the AON activates differently in children with DCD. Due to low mu power observed for non-biological movement for the DCD group, the AON may be more generalised in DCD.

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A RELIABLE AND VALID PROTOCOL FOR ASSESSING ACTION OBSERVATION AND IMITATION ABILITIES IN CHILDREN WITH DCD

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Background: Action observation (AO) and imitation abilities are considered fundamental for learning and consolidating motor skills,but are often impaired in children with DCD.
We recently developed a novel protocol for the assessment of AO and imitation abilities.
Aims: (1) To confirm the psychometric properties of the protocol. (2) To compare AO and imitation abilities in children with DCD and age-matched typically developing (TD) children. (3) To correlate AO and imitation abilities to motor performance.
Method: 23 children with DCD (mean age 7,8y, SD 1,4) and 21 TD children (mean age 7,8y, SD 1) were included. The imitation test includes 12 meaningful (MF) and 20 meaningless gestures (NMF). The AO test consists of observation and execution of two assembly tasks. Items of both tests are rated on a 4-point scale. For construct validity, the mABC-2 test was used.
Results: For inter-rater reliability, excellent intraclass correlation coefficients were reported in all the tests (ICC > 0.92). A significant difference between DCD and TD group was found for AO abilities (p=.03) and for NMF and MF tests (p<0.0001). For construct validity, significant correlations were reported between all tests and mABC-2 test (total score and manual dexterity domain, r between 0.32 and 0.60).
Discussion and Conclusion: The results support the psychometric properties of the protocol. AO and imitation abilities are impaired in children with DCD and related to lower motor competence. The study encourages the use of the protocol for clinical work and research.

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HOW TO ASSESS PROCEDURAL PERCEPTUAL-MOTOR LEARNING COMPETENCIES OF DCD IN THE REAL WORLD?

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Background: Procedural perceptual-motor learning (PPML) refers to motor sequence learning and visuomotor adaptation. Although PPML seems to be deficient in DCD, there is currently no clinical tool to assess it and it remains to establish whether experimental tasks properly reflect actual PPML competencies involved in real life.
Aims: This study aims to assess (1) correlations between PPML performance in experimental and ecological tasks (2) correlations between performance from experimental tasks and the objective and subjective levels of motor skills (3) reproducibility of results of experimental tasks.
Approach: We have created two computerized experimental tasks and six ecological tasks that will be proposed to 110 healthy adults. Motor sequence learning will be assessed with a Serial Reaction Time Task and tasks aiming to learn a word in French language sign, a knot, and a piano sequence. Visuomotor adaptation will be assessed with a Target Jump Task and tasks requiring adaptation to pour water into glasses, to keep a ball on a racket while walking and to draw a star with a mirrored feedback. Manual dexterity (M-ABC2) and subjective motor skills' levels (questionnaire) will be evaluated. Experimental tasks will be proposed twice. An accuracy index and speed are measured for each task.
Results: Data is being collected to be presented at congress.
Conclusion: If correlations are significant and reproducibility confirmed, we will be able to create a clinical tool reflecting PPML competencies in real life. Additionally, we propose a survey for clinicians to measure their intention to use this tool.

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CO-OP intervention effects in children with developmental coordination disorder

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Background: Children with traits but diagnostic threshold of developmental coordination disorder (DCD trait) might have a performance skill problem. However, they are less likely to be noticed and may not receive adequate support. The Cognitive Orientation to Daily Occupational Performance (CO-OP) has been shown to have an intervention effect in DCD. The purpose of this study was to test the hypothesis that the CO-OP has an intervention effect on the performance and motor skills of older kindergarten children with DCD trait.
Methods: This study was designed as an unblinded randomized controlled trial. Children with total score of less than 40 points of DCDQ, or M-ABC2 total score of 5 to 16 percentiles were defined as DCD trait. The intervention group received interventions using CO-OP for 3 months. The school-assessment of motor and process skills (S-AMPS) and the movement assessment battery for children- second edition (M-ABC2) were used as assessments.
Results: Of the 181 children, who were recruited, 103 children were assessed and 28 children, who met the inclusion criteria, were randomized into two groups (n = 14 each). After using CO-OP, the performance skills and motor skills significantly improved.
Conclusions: Our results suggest that it would be possible to improve performance and motor skills of children with DCD trait, by analyzing the process skill using S-AMPS and carrying out intervention using cognitive strategies of the CO-OP approach.

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DCD AND/OR DEVELOPMENTAL DYSLEXIA IMPAIR AUDIO-VERBAL BUT NOT VISUO-VERBAL SYNCHRONIZATION DURING LEARNING OF TEMPORAL SEQUENCES

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Background: Recent results suggest that during learning of a non-regular temporal sequence, children with DCD present a deficit in audio-verbal, but not in visuo-verbal, synchronization. However, DCD is frequently associated with developmental dyslexia (DD) which is another neurodevelopmental disorder (NDD) impairing both auditory and visual temporal processing.
Aim: The present study investigates learning with auditory and visual stimuli in DCD, DD and DCD+DD compared to typical-development (TD). We hypothesize that contrary to DCD, DD (with and without associated DCD) may impair synchronization and learning of both auditory and visual temporal verbal sequences.
Method: 20 children with isolated DD, 11 with isolated DCD, 12 children with DCD+DD and 16 TD children practiced verbal non-regular temporal sequences with either auditory or visual stimuli (10 blocks of 3 observation trials and 1 practice trial). Neuropsychological measures of attention and verbal working memory were also collected.
Results: Results reveal that the three groups of children with NDD (DCD, DD and DCD+DD) present less stable audio-verbal synchronization than visuo-verbal synchronization during the whole learning, that is not the case for the TD group. Correlations with neuropsychological measures are still under analyses.
Conclusion: All these results suggest that children with DCD or DD present similar procedural learning of temporal verbal sequences and that comorbidity do not deteriorate procedural learning. Moreover, the NDD groups present impaired audio-verbal coupling during procedural learning suggesting a common deficit in translating temporal auditory information into vocalizations.

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FROM A REAL WORLD TO A VIRTUAL WORLD: DEVELOPING AN ONLINE OT DCD PARENT COACHING GROUP

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This poster explores the development of a virtual parent coaching group, by a UK based community children's occupational therapy team, for parents of children with a recent DCD diagnosis.
It is recognized that parents' and families' understanding of a DCD diagnosis can greatly impact a young person's occupational performance. Empowering families to take an active role in supporting their child's occupational performance through task-analysis and problem-solving challenges with daily occupations was identified as a potential gap in this DCD service. A virtual parent coaching group was then developed in response to the COVID-19 pandemic to enable continued support for these families with a recent DCD diagnosis.
Group structure involves 3 weekly sessions providing education to families with the following aims: 1) To provide education and enhance families' understanding of DCD and how it impacts on participation in daily occupations 2) To help develop and understand factors that impact occupational performance using Person-Environment-Occupation (PEO) model as a conceptual guide 3) To enable families to develop their skill in task analysis to support occupational performance and 4) To coach families in establishing their own strategies to support their child's participation in daily occupations.
Ongoing outcomes are collected using Canadian Occupational Performance Measure (COPM) alongside feedback collected from families via an online survey platform. These feedbacks provide the basis of reflection for this OT service and how a virtual service impacts on a family with DCD to access occupational therapy support, and benefits and gaps that may help shape our service delivery.

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NEURAL CORRELATES OF MOTOR IMAGERY IN CHILDREN WITH DCD

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Introductory statement: Developmental Coordination Disorder (DCD) is characterized by a deficit in acquisition of motor abilities affecting execution of daily life skills. This motor deficit is often linked to difficulties in internal representation of movement. Motor Imagery (MI), a major component of internal modal, is defined as the mental rehearsal of a movement without concomitant physical execution. Studies confirm difficulties of children with DCD in performing MI skills and link these difficulties to poor motor performance. In this study we aim to investigate neural correlates of MI in children with DCD and pinpoint potential differences with typically developing (DT) children.
Basic Methodology: So far, 8 right-handed children were recruited for this study (7 TD, mean age 10 years old ± 1.4). After an explanatory preparation session, children who approved to participate in the study underwent a 10-minute fMRI session requiring them to perform and imagine performing a finger tapping task.
Preliminary results: Preliminary results of this study reveal activations in motor and parietal areas (Supplementary motor area, pre-motor cortex, primary somesthetic cortex, posterior parietal cortex and right cerebellum) during motor task, in TD children. During MI, activations of lesser intensity are also noted in the right and left supplementary motor area and in the left posterior parietal cortex in TD children. These results are preliminary to be compared later with the results of children with DCD.

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VISUAL-SPATIAL SKILLS AND DEVELOPMENTAL COORDINATION DISORDER (DCD): ENHANCEMENT ACTIVITIES

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Introduction/Background: Children with developmental coordination disorder (DCD) portray motor coordination and perceptual difficulties which can hamper daily activities and academic tasks execution. Academic problems in children with DCD are associated with visual integration skills, visual functioning and visual processing skills.
In the neuropsychological diagnostic protocol should always be inserted a battery of tests for perceptual and cognitive skills related to vision (Muzio and Tacconella, 2003). Not an eye examination, almost in norm, but of visuospatial skills that, as Mammarella et al. emphasize, "are involved in graphomotor skills, mathematics and geometry, drawing, reading tables and graphs, science, text comprehension, geography and orientation, and social competence."
Aims/Objectives: The aim of the work is to analyze the use of specific visual rehabilitation in order to enhance visual integration and visual processing skills in subjects with DCD.
Method: Ten subjects were recruited in this study. The incoming was motivated by difficulties in school-work (learning, adaptation and emotional). Neurological and neuropsychological abilities were assessed; M-ABC-2 and M-ABC-2 Checklist were performed.
The visuospatial areas that have an influence on neuropsychological development (spatial organization, visual perceptual analysis, visual visuomotor and verbal integration, visual memory and spatial and selective visual attention) were investigated in order to perform a specific enhancement.
Results: Preliminary analysis of data reveals improvement in investigated visuospatial areas and academic tasks.
Discussion and Conclusion: Preliminary findings confirm that children DCD evidenced visuospatial difficulties. Although, specific enhancement in visuospatial areas produces an improvement in teaching skills, especially in reading and writing.

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Transcultural Validation of the French-Canadian version of the Little Developmental Coordination Disorder Questionnaire

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Introduction/Background: Screening of motor coordination challenges in preschool years can hasten early intervention and mitigate possible long-term social, psychological, and behavioural consequences for children at risk for Developmental Coordination Disorder (DCD). The Little DCD Questionnaire (Little DCDQ) was developed for this purpose but is not available in French, leaving the French-speaking minority population underserved in Canada.
Aims/Objectives: The study aimed to complete a cross-cultural validation of the French-Canadian translation of the Little DCDQ (Little DCDQ-FC) and evaluated its equivalency to the English Canadian version.
Methods/Approach: Vallerand's (1989) methodology for transcultural validation and Haccoun's single-group technique to assess the reliability and validity of translations were used. Following translation, bilingual parents of children with typical development (n=35) and children at risk for motor coordination problems (n=15) were recruited from the provinces of Ontario and Quebec to complete the questionnaire in both languages. A subgroup was tested with the Movement Assessment Battery for Children to determine concurrent validity. Psychometric properties were examined overall as well as per province.
Results/Discussion: Test-retest reliability (r= .975 (ON); .948 (QC); .961(overall), and internal consistency (Cronbach's alpha=.974 (ON); .952 (QC); .961 (overall)) were high. The French-Canadian questionnaire correlated well (r=.497,) with the MABC-2 total test scores, and correlations were comparable to the Canadian English version (r=.529). Sensitivity and specificity of the French-Canadian version were respectively 89% and 67%.
Conclusions/Relevance: The Little DCDQ-FC is shown to be a valid translation, equivalent to the Canadian English version, for use with a French-Canadian population in French majority or minority-speaking provinces.

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MOTHERS' PERCEPTION OF THE EVERYDAY PERFORMANCE OF BRAZILIAN 6-8-YEARS-OLD PRETERM CHILDREN

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Introduction: Preterm birth is associated with Developmental Coordination Disorder (DCD), however, the motor deficits of these children performing daily life and school activities may not be recognized and little is known about the mothers' perception regarding their children´s everyday performance.
Objective: describe the maternal perception of the current functional performance of Brazilian school age preterm children.
Methods: Qualitative study with mothers of children born prematurely. We are recruiting 82 preterm children, ages 6-8 years old, born in a major public hospital in Belo Horizonte, Brazil. Due to the COVID-19 pandemic, data collection started with online interviews, using the PEDI-CAT, DCDQ-BR, sociodemographic questionnaire and open-ended questions regarding the child´s daily performance. Motor skills will be assessed when pandemic restrictions are lifted.
Results: Content analysis was performed using data obtained from interviews of five mothers from middle income households, children's mean age 6.6 years (SD=0.5) with suspected DCD based on the DCDQ-BR. These mothers identify their children as smart, intelligent, loving and sweet, although at the same time clumsy, messy and inattentive. Mothers report their children find it hard to pour liquids from a jar into the cup, use scissors and liquid glue in schoolwork, riding a bicycle and dressing - they often wear clothes inside out, have trouble putting legs inside their pants or tying shoelaces. Moreover, these children do not participate in sports activities.
Conclusion: The mothers perceive their children's struggle with motor tasks, but they believe kids are just careless and inattentive. More information regarding DCD is needed.

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THE BALANCE EVALUATION SYSTEMS TEST FOR CHILDREN (THE KIDS-BESTEST): THE NEED FOR AGE-SPECIFIC SCORING CRITERIA

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Background: Of all children with Developmental Coordination Disorder (DCD), 60–87 % present with balance deficits. In 2017, the Balance Evaluation Systems Test for children (Kids-BESTest) was translated from an adult to a pediatric version. The instructions and testing materials have been tailored for children. However, the scoring criteria remained, reflecting adultlike performance. Due to their ongoing development, until at least age 12, typically developing children (TDC) of different ages perform dissimilar on balance tasks. It is therefore reasonable to assume that not all TDC can reach the adult-reference, indicating age-specific scoring criteria would be needed to identify balance deficits in DCD.
Objectives: By comparing the actual balance performance of TDC with the predefined scoring criteria of the Kids-BESTest, its sensitivity for identifying age-specific performance in children was investigated.
Approach: The Kids-BESTest was administered in 42 TDC (age 5-10). Age-sensitive items were selected: reaching forward (RF), reaching lateral (RL), rise-to-toes, one leg stance (OLS), standing on foam with eyes closed (FEC), level walking and the Timed Up and Go test (TUG) with(out) dual task.
Discussion: Almost all children met the scoring criteria for the TUG, FEC and rise-to-toes, indicating adultlike performance (Table 1). OLS and level walking improve with increasing age until the age of 9, where the adult-reference is met. The adult-reference for RF, RL and TUG with dual task was too difficult for all children.
Relevance: We need age-specific normative data to identify deviation in balance performance of children with coordination difficulties.

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PROFILES OF MENTAL HEALTH IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER: A LATENT CLASS ANALYSIS

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Purpose: The present study aimed to identify profiles of mental health in children with Developmental Coordination Disorder (DCD) using a Latent Class Analysis (LCA) and to analyze the associations between those profiles and child characteristics.
Methods: 119 (90 males and 29 females) within ages of 4 and 16 years (8.41 ± 2.50) diagnosed with DCD participated in the study. Their parents completed the Strengths and Difficulties Questionnaire (SDQ).
Results: Results indicated that a four latent class was the best model for allocating cases to profiles in the sample. Profile 1 was defined was "no" mental health problems (n=28; 24%), Profile 2 was defined as "hyperactivity" problems (n=53; 43.3%), for children with clinical indications for hyperactivity, Profile 3 was defined as "internalizing" problems (n=8; 7.3%), for children with clinical indication for emotional symptoms and peer problems, and Profile 4 was defined as mental health problems (n=30; 25.4%), for children with clinical indications for problems in all areas. In addition, having a co-occurring disorder, accommodation plans, and making use of medications were associated with the mental health profiles.
Conclusion: The profiles show a trend consistent with previous literature that says that about half of the children with DCD also have Attention Deficit Hyperactivity Disorder (ADHD). Clinicians can use these profiles to understand and potentially classify children with DCD, in order to provide adequate services or support if mental health difficulties are present.

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DCD IN THE VIRTUAL AND REAL WORLD: AN IRISH OCCUPATIONAL THERAPY STUDENT LED TELEHEALTH SERVICE

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Introduction/Background: The COVID-19 pandemic impacted healthcare services throughout Ireland, negatively affecting availability of traditional practice education placements for occupational therapy students at University of Limerick. In response, the practice education team developed a new telehealth service in collaboration with Dyspraxia/DCD Ireland, a national organization who deliver supports and services to young people and adults with dyspraxia/DCD, their families, and supporters.
Aims/Objectives: The aims were to facilitate occupational therapy students' practice education, and to support Dyspraxia/DCD Ireland access much needed Occupational Therapy intervention in a sustainable, accessible manner.
Methods/Approach: A telehealth Occupational Therapy service was established, developed, and continues to provide support to individuals with DCD. Dyspraxia/DCD Ireland acted as gatekeeper for all referrals. Direct and in-direct interventions occurred with children, adolescents, and adults through one-to-one interventions, group interactions, and webinars. Continuity and sustainability of service delivery was actualized through the development of occupational therapy resources.
Results/Discussion: This placement model alleviated the demands on traditional practice education placements. It facilitated a contemporary and unique learning experience for students. It provided goal directed, occupational focused, sustainable, evidence-based interventions for the client group who availed of this placement.
Conclusions/Relevance: Operating a virtual service in the real world of DCD, was not without challenges but student and client feedback was predominantly positive. Students reported preparedness for future practice, especially in being contemporaneous with practice during Covid-19, creative and resourceful, and using telehealth as a form of intervention and service delivery.

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POSTURAL CONTROL DURING MAINTAIN STABILITY LIMITS IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER (DCD)

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Eighty-five percent of children with DCD have postural deficits. However, it is unclear whether DCD also impact on their stability limits (SL). We compare center of pressure (COP) displacements during SL of children with DCD (n=41) to those of typical children (n=20) (9-13 years old). Children stood on an AMTI force plate, arms crossed on the chest. Children were asked to lean as far as possible during 10 sec. in forward, backward, rightward and leftward (separated trials). The statistical analysis revealed that DCD children had larger COP ranges amplitude and larger root means square compared to typical children, suggesting that DCD children had stability impairments. Furthermore, DCD groups had significantly smaller maximal COP excursion than typical children indicating that they had smaller SL. That could interfere with children's performance during daily and physical activities and even negatively impact social inclusion.

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DEVELOPING A NEW MEASURE TO SUPPORT THE DIAGNOSIS OF DCD IN BRAZIL: TEACHER´S' PERSPECTIVE

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Introduction: Various instruments for motor assessment can be used to support the diagnosis of Developmental Coordination Disorder (DCD), but their use is still limited in Brazil, due to the cost or lack of validated translation. The creation of assessment resources, adapted to the local reality, is necessary, and the perspective of teachers is important, as many difficulties appear in the classroom.
Objectives: Assess the reliability, internal structure and validity of the ACOORDEM Teachers' Questionnaire for children ages 4-8 years old.
Methods: Methodological study with data analysis of 374 (191/51,1% boys) Brazilian children ages 4 (74/19.8%), 5 (49/13.1%), 6 (84/22.5%), 7 (86/23%) and 8 (81, 21.7%) years old. The Questionnaire has 30 items, divided into motor and behavior scales. Rasch model was used to reveal the internal structure, targeting of items, reliability, validity and impact of age and gender on the measures.
Results/Discussion: Both scales showed adequate item reliability (.80-.83). Going up and down stairs was the easiest motor item and keeping good posture was the hardest. Keeping attention on task was the hardest behavioral item and behaving well in outings was the easiest. Both scales were easy for the participants, but they divide the children in at least two performance levels. Two items with inconsistent scoring should be dropped or revised. Age and gender were relevant for motor but not behavioral items.
Conclusion: ACOORDEM's Teachers Questionnaire needed adjustments, but presented adequate measurement qualities, showing good potential to facilitate the identification of the functional impacts of DCD in the school context.

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#DCD: MOTOR PROBLEMS IN THE DISCOURSE AND IDENTITY OF TWITTER USERS

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Little is known about adults' experiences of Developmental Coordination Disorder (DCD) relative to children's experiences. There is a critical need for community-informed research on this topic, given that DCD symptoms persist beyond childhood and change in response to experience, physical maturation, and intervention. Community visibility of DCD in adulthood is low in many countries. However, social media affords an international opportunity for those who identify as dyspraxic or as having DCD to share experiences. In doing so, they provide valuable insight into the lifespan impact of DCD on functional ability, participation, compensatory strategies, and well-being. In this mixed-methods study, we used the Twitter research API to identify 7212 unique users who used terms related to DCD (e.g., Developmental Coordination Disorder, #dyspraxia) in their tweets over a 6-month period from May 2021 to November 2021. We then analyzed their Twitter bio information to determine the proportion of users who self-identified as dyspraxic or having DCD as part of their profile data. Results suggest that while many users (n=7212) employ terminology related to DCD in the content of their tweets when discussing motor problems, a much smaller number of users self-identify with these terms in their profile descriptions (n=269). We analyzed thematic differences in the content of a subset of tweets from users in these two groups. Results are discussed with respect to the potential benefits of social media communities for strategy sharing and support among adults with DCD, and the role of identity in online discourse for adults with DCD.

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INTERDISCIPLINARY EARLY INTERVENTION TO SUPPORT THE INCLUSION OF CHILDREN WITH DEVELOPMENTAL DISABILITIES

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Introduction: Children with developmental disabilities, such as DCD, ASD, and ADHD face significant barriers to participation in early years opportunities due to their unique challenges and needs. These barriers make it difficult for parents of young children to access the programming and professionals their children need to support their development.
Aims: To bridge this gap, we are piloting an early years parent-participation preschool program that brings together early years researchers, SLPs, OTs, BIs, ECEs and kindergarten teachers to create an inclusive program where children work with a range of professionals. The program focuses on key areas important for young children's development including speech and language, early literacy and numeracy, social skill building, and motor skill development.
Discussion: The program pilot is currently serving 18 young children and their families with a wide range of developmental disabilities, offering parents opportunities to connect, consult with, and be supported by early years professionals working with their children in an inclusive group setting. Through their participation in the program, parents gain a deeper understanding of their child's strengths and stretches, and strategies that support their participation and integration into group educational settings.
Relevance to "DCD in the Real World": Feedback from parents and other service providers suggests that integrating OT and DCD focused screening and support into an interdisciplinary early intervention program is addressing a significant area of need for parents with young children with developmental disabilities who face barriers to participating in programs and services that meet their needs.

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PARENT SUPPORT AND PHYSICAL ACTIVITY ACROSS EARLY CHILDHOOD AMONG CHILDREN WITH AND WITHOUT DEVELOPMENTAL COORDINATION DISORDER

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Introduction: Developmental Coordination Disorder (DCD) is a neurodevelopmental disorder affecting 5-6% of children. Children with DCD are consistently shown to engage in less physical activity (PA) compared to typically developing (TD) children. As such, efforts should be made to determine strategies to increase PA among children with DCD. Parental support for PA is a robust determinant of PA among children with and without disabilities, but very few studies have examined how this relationship evolves over time, and no studies of children with DCD. The purpose of this study is to examine the impact of parent PA support behaviour on device-measured PA across early childhood for children with and without DCD.
Methods: Participants (N = 589, 250 girls, Mage = 4.93±0.59 years) in the current study are part of a larger, longitudinal cohort study with 144 (70% boys) children that are classified as having probable DCD (pDCD). Parent PA support behaviour was measured using a 5-item measure and PA was measured using ActiGraph accelerometers worn for 7 days each wave. Multivariate growth curve modeling will be conducted to examine the interplay between parent PA support behaviours and patterns of children's activity across early childhood.
Discussion and Relevance: The analyses for this study are currently ongoing; however, findings will provide further insight into the role of parents in supporting PA among young children and whether support is more important for PA for those with DCD. Such evidence will help to inform PA interventions within this population.

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INVESTIGATING PARENTAL COGNITIONS ON PHYSICAL ACTIVITY PATTERNS OF CHILDREN WITH AND WITHOUT DEVELOPMENTAL COORDINATION DISORDER

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Introduction: Despite the compelling research showing children with Developmental Coordination Disorder (DCD) engage in less physical activity than their typically-developing (TD) peers, there is very little in the research literature, however, which examines physical activity behaviours and the psychosocial factors related to physical activity in young children with motoric difficulties. The purpose of this current study is to examine how parental physical activity cognitions and behaviours during the early childhood period impacts the patterns of physical activity among children with and without DCD.
Methods: Participants (N = 589, 250 girls, Mage = 4.93±0.59 years) in the current study are part of a larger, longitudinal cohort study with 144 (70% boys) children that are classified as having probable DCD (pDCD). Parents completed a questionnaire measuring their perceived importance of physical activity, enjoyment of physical activity, and perceptions of their child's competence. Additionally, each child wore an ActiGraph accelerometers for seven consecutive days during each year of data collection. Mixed effects models to examine the relationships between parental cognitions and behaviours on their child's PA over time.
Discussion and Relevance: The analyses for this study are currently ongoing; however, findings will provide further insight into how parental perceptions of physical activity more broadly impacts the behaviours of children, and how it may inform intervention efforts for children with DCD.

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UPDATED PSYCHOMETRIC EVIDENCE OF THE LITTLE DEVELOPMENTAL COORDINATION DISORDER QUESTIONNAIRE (LDCDQ): ENSURING APPROPRIATE CLINICAL USE

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Introduction: International Developmental Coordination Disorder (DCD) practice guidelines advise monitoring of motor difficulties before the diagnostic age of 5, to ameliorate longer-term outcomes. Psychometrically sound, culturally appropriate instruments to identify young children at risk of DCD are needed. The Little Developmental Coordination Disorder Questionnaire (LDCDQ) is a 15-item functional parent/carer screening questionnaire intended to identify markers for DCD amongst 3- and 4-year-old children.
Objectives: Originally developed in Hebrew, initial validation of the LDCDQ (n=146) demonstrated sound psychometric properties. This study reports on updated psychometric properties based on an expanded validation sample.
Method: The Hebrew LDCDQ was administered to 399 children (233 boys; 36-59 months; mean age=48.45+6.7 months) including 269 typically developing children (mean age=47.65+6.7 months; 128 boys) and 130 children with suspected motor difficulties (mean age=50.01+6.4 months; 105 boys). A sub-set of 77 children (typically developing: n=22) completed the Movement Assessment Battery for Children (MABC2).
Results: Updated test-retest reliability, internal consistency, and construct validity will be reported. To verify the existing questionnaire sub-scores, confirmatory factor analyses will be employed. Criterion validity, sensitivity and specificity will be reported and optimal cut-off scores for the Hebrew LDCDQ suggested.
Conclusions: Originally developed in Hebrew nearly a decade ago, the LDCDQ has since been widely translated and validated across multiple cultures. Continual exploration of commonly used instruments' psychometric properties is vital to ensure accurate support for the occupational needs of young children. As a free, short, functional tool, this update contributes to ensuring timely identification and support of young preschools with motor difficulties.

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UTILIZING NEED FOR COGNITION, BODY DISSATISFACTION, GAMING, AND SELF-ASSESSED MOTOR COMPETENCE TO PREDICT PHYSICAL ACTIVITY

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Introduction/Background: It has been clear for some time that perceived motor competence and body dissatisfaction are important contributors to physical activity levels. Research has also shown that humans possess many traits that influence their physical activity level, including the need for cognition.
Aims/Objectives: A study was conducted to determine whether physical activity could be predicted based on the construct's need for cognition, self-assessed motor competence, gaming duration, and body dissatisfaction. Methods/Approach. Two hundred ninety-one adolescents (14.1 ± 2.28 years of age, 140 boys, 151 girls) were submitted to self-reported questionnaires: Body Image Dimensional Assessment (BIDA), Need for Cognition (NFC), Adolescent Motor Competence Questionnaire (G-AMCQ), and physical activities in organized and unorganized sports.
Results: Significant higher durations for organized and unorganized sports, a higher need for cognition, and lower body dissatisfaction, as well as lower gaming durations, were found in adolescents with high motor competence than those with low motor competence. A structural equation model was tested and fitted the data well ($\chi 2 = 38.3$, $df = 13$, $p < 0.001$, RMSEA = 0.082, CFI = 0.906, TLI = 0.740). The path analysis revealed that NFC and G-AMCQ were significant predictors of physical activity. Furthermore, the NFC-physical activity relationship was shown to be mediated by G-AMCQ.
Conclusions/Relevance: Attention should be paid to methods of increasing perceived motor competence and methods of making students more likely to enjoy and seek out physical activities but not gaming skills.

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VALIDATION AND PSYCHOMETRIC PROPERTIES OF THE GERMAN VERSION OF THE ADOLESCENT MOTOR COMPETENCE QUESTIONNAIRE(AMCQ)

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Introduction/Background: Timler and colleagues (2016) developed in Australia the Adolescent Motor Competence Questionnaire (AMCQ) with 26 items to assess motor competence in adolescents between the ages of 12 and 18 years of age comprising of three distinct domains: Participation in Physical Activity and Sports, Activities of Daily Living, Public Performance and Peer Comparison.
Aims/Objectives: Currently, no validated German-language self-report screening instrument exists for the assessment of motor competence in adolescence. This study aimed to validate the German version of the G-AMCQ.
Methods/Approach: The German translation's factor structure and psychometric properties were analyzed based on a community sample of 414 healthy adolescents between 10 and 18 years of age (14.1 ± 2.28 years, 140 boys, 151 girls) and healthy young adults between 19 and 30 years of age (22.1 ± 3.22 years, 57 men, 66 women).
Results: The mean AMCQ score was 86.2 (SD = 8.06), with significant differences between males and females (Cohen's d=0.20) and adolescents and young adults (Cohen's d=-0.65). Exploratory factor analysis revealed clear evidence for a three-factorial structure with the factors Physical Activity and Sports, Activities of Daily Living, and General Clumsiness (with an explained variance of 35.2%). Reliability for all scales was excellent, with a McDonalds of at least 0.66. The AMCQ was positively correlated with age and participation in organized club sports. It was negatively correlated with BMI and the school grade in physical activity.
Conclusions/Relevance: Our rigorous validation protocol has generated a remarkable reproduction of the AMCQ in German.

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DCD AND ASD: HOW, WHEN AND WHY THEY BECAME LINKED AND THE IMPLICATIONS OF THIS RELATIONSHIP

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Many academics, researchers, clinicians and the American Psychiatric Association (APA) report that DCD and ASD are related. Yet, the how, when and why of this relationship is seldom offered. Recent research reveals this information.

Background: As an experienced school-based clinician who specializes in DCD, I noticed that autism/ASD diagnoses were rising steadily; yet very few students were diagnosed with Developmental Coordination (DCD). This trend did not match the current or previously reported APA prevalence rates for ASD and DCD -- nor the statistical prediction rule (SPR) (Swets, Dawes, Monahan, 2000). Although not permitted prior to 2013, the APA's position suddenly changed so that DCD and ASD could co-occur. Professionally, these situations created confusion. Therefore, the unexplained relationships between DCD and ASD were investigated.

Using numerous historical documents and employing a scientific method, interested audience members will be given first-time access to some unconventional and unexpected research data. That is, particulars show how, when, and why DCD and ASD became linked. And, the ways in which DCD mimics ASD. This evidence reveals that certain assumptions and research flaws have created the current situation as it pertains to DCD and ASD. More importantly, this presentation also explains the concerning impact of these historical situations on individuals who have DCD. To improve awareness of and advocacy for DCD, this information must be shared widely.

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THE PRESENCE AND IMPACT OF ATYPICAL SENSORY PROCESSING IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER

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Introduction: Unusual patterns of sensory processing can have a significant impact on children's participation in play, education and activities of daily living, this is particularly the case for children with neurodevelopmental conditions. However, there has been limited investigation of sensory processing in children with Developmental
Coordination Disorder (DCD). Moreover, little attention has been paid to the impact of any sensory processing differences for children with DCD.
Aims: The aim of the current study was to investigate the presence and impact of atypical sensory processing in children with DCD.
Methods: Parents of children aged 8-12 years with (n= 23) and without (n= 33) DCD reported on their children's sensory processing using the Sensory Experiences Questionnaire (Baranek, 2009). To control for the potential influence of autistic traits, parents also completed a measure of social communication abilities (Social Communication Questionnaire; Rutter et al., 2003) and all children completed the test component of the Movement Assessment Battery for Children (MABC-2; Henderson et al., 2007).
Results/Discussion: Children with DCD were more likely to show increased hyperresponsiveness,hyporesponsiveness, and sensory interests, repetitions, and seeking behaviours (SIRS), relative to children without a diagnosis of DCD. Only a significant difference in hyperresponsiveness remained between the two
groups after controlling for social communication abilities. Parents of children with DCD were more likely to report that their children's sensory sensitivities, avoidances, and cravings interfered with their daily living. Significant associations were observed between aspects of children's sensory processing and their MABC-2 standard scores.
Conclusion: Children with DCD are more likely to experience atypical sensory processing relative to typically developing peers. These sensory experiences may have a significant impact on their activities of daily living, beyond difficulties associated with the motor characteristics of DCD.

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THE ROLE OF DCD AND ADHD IN EXCLUSIVE BREASTFEEDING: A COHORT PROSPECTIVE STUDY

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Background: Although exclusive breastfeeding is recommended for the first six months of life, breastfeeding rates are low. Motor skills and ADHD-related characteristics have not yet been examined as breastfeeding barriers.
Aims: To explore whether mothers' and infants' motor skills and mothers' ADHD-related characteristics are associated with exclusive breastfeeding at 6 months. Methods: Participants were 164 mothers and their infants recruited 2 days after birth. Mothers completed a demographic-delivery information questionnaire, the Infant-Feeding-Intention-Scale and the Iowa-Infant-Feeding-Attitude-Scale. At 6 months, mothers completed the Adult-DCD (Developmental-Coordination-Disorder)/Dyspraxia-Checklist, the Adult-ADHD (Attention-Deficit-Hyperactivity-Disorder) Self-Report-Scale-Symptom-Checklist-v1.1 and provided information about their breastfeeding status. They were then divided into two groups accordingly: EBF (Exclusive-Breastfeeding) and NEBF (Non-Exclusive-Breastfeeding). Infants were observed using the Test-of Sensory-Functions-in-Infants and the Alberta-Infant-Motor-Scale.
Results: At 2 days after birth, mothers with DCD reported more negative attitudes toward breastfeeding ($t=2.42$, $p=.017$, $d=1.01$) and reduced breastfeeding intentions ($t=2.61$, $p=.010$, $d=.936$) compared to non-DCD mothers; similarly, mothers with ADHD ($t=-1.69$, $p=.092$, $d=.415$; $t=-2.14$, $p=.034$, $d=.480$ respectively). Furthermore, at 6 months, NEBF mothers had higher prevalence of DCD (10.2% vs. 1.9%, $\chi2=5.561$, $p=.018$) and higher prevalence of ADHD (20.3% vs. 8.6%, $\chi2=4.680$, $p=.030$) compared to EBF mothers. EBF infants demonstrated better motor coordination ($t=2.47$, $p=.016$, $d=.511$), but no gross motor development differences compared to NEBF infants.
Conclusions: Maternal DCD, ADHD and poor infant's motor coordination are associated with non-exclusive breastfeeding and may become exclusive breastfeeding barriers. These findings highlight the importance of early identification of women with DCD and ADHD and encourage tailoring intervention for achieving effective and prolonged breastfeeding.

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MOTOR AND COGNITIVE DUAL-TASK PERFORMANCE UNDER LOW AND HIGH TASK COMPLEXITY IN CHILDREN WITH DCD

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Background: In everyday life, multiple tasks often need to be performed simultaneously, which seems to be more difficult for children with developmental coordination disorder (DCD) compared to their typically developing (TD) peers.
Objectives: To examine the effect of a concurrent task on a manual dexterity task in children with and without DCD.
Methods: Participants were 32 children with DCD and 32 gender- and age-matched TD children (aged 7-14 years old). All children completed two manual dexterity tasks: the box and block task (low complexity) and the pegboard task (high complexity). Furthermore, there were two concurrent tasks: a cycling task (motor task) and a word listening task (cognitive task). All tasks were completed both under single-task conditions as well as under dual-task conditions. Finally, to examine the experienced level of effort, children were asked how tired they felt before and after the experiment on a scale ranging from 1 to 10.
Results: Preliminary results indicated that children with DCD performed worse than TD children on the manual dexterity tasks under all task conditions, but this performance was affected in the same way in both groups of children when completing the concurrent tasks. It was found that children with DCD reported a higher increase in tiredness compared to TD children.
Conclusions: The effect of attentional interference on the manual dexterity tasks was similar for children with DCD and TD children, but it seems that it took children with DCD more effort to perform these tasks compared to TD children.

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A THERAPEUTIC BALANCE CAMP IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER - A PILOT INTERVENTION PROTOCOL

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Introduction: Up to 87% of children with Developmental Coordination Disorder (DCD) experience balance control problems(1), limiting participation in activities with typically developing peers(2). Current intervention studies mainly focus on one or two systems of the multi-systemic framework of balance control to improve and evaluate balance deficits in DCD(3). However, all systems should be implemented to train and assess balance control comprehensively(3).
Objectives: Investigating the feasibility and effectiveness of a comprehensive balance training camp on balance control, cortical brain and muscle activity in DCD. Methods: Children with DCD (n=4-12; 5-12 years) receive 22.5 hours of therapy during five days. Therapy is individualised, targeting the entire multi-systemic framework of balance control including movement strategies, sensory strategies, control of dynamics, orientation in space and cognitive processing(3), and situated in a 'circus/virtual-reality' theme. Outcome measures for effectiveness are: balance control (Kids-BESTest), haemoglobin concentration changes in premotor, inferior and superior parietal cortex and supplementary motor area (functional Near Infrared Spectroscopy) and co-activation patterns and onset latencies of lower limb muscles (superficial electromyography) measured before and after the camp. Feasibility is evaluated by enjoyment scales (VAS) and qualitative interviewing.
Results: The camp takes place in April 2022. The protocol and preliminary results on its effectiveness and feasibility will be presented during the conference.
Relevance: Results on the feasibility and effectiveness of this comprehensive treatment to improve balance deficits in DCD will provide novel insights into the balance control mechanisms in DCD. Consequently, this pilot study is a stepping stone towards future training programs.

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ASD AND DCD SHOW BOTH OVERLAPPING AND UNIQUE PATTERNS OF SOCIAL AND MOTOR SKILLS

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Background: While DSM-5 criteria for ASD include social-communication impairments and restricted-repetitive behaviors, motor performance is not considered. In comparison, diagnostic criteria for DCD include motor but not social impairments. Increasingly research shows that DCD and ASD have impairments in both motor and social domains although few studies have compared them.
Purpose: To identify unique and overlapping social and motor skills in ASD and DCD.
Methods: Participants. 96 youth, ages 8-17 (n=33 ASD, n=28 DCD, n=35 TD) with average IQ.
Procedures: Motor measures: Motor skills (MABC-2) and praxis skills (Florida Apraxia Battery for Children (FAB-2) (subsections Gesture to Command (GTC), Gesture to Imitation (GTI) Meaningful and GTI Meaningless, and Tool Use (GTU)) and Postural Praxis (PPr) test (SIPT). Social measures: Theory of Mind (NEPSY-II), cognitive and emotional empathy (IRI-SCI), and Social Responsiveness Scale-2 (SRS-2).
Results/Discussion: Both DCD and ASD groups scored more poorly than TD on MABC-2 and PPr but did not differ from each other. ASD performed more poorly than DCD on GTC and GTU-Meaningful. On social measures, ASD and DCD showed elevated SRS-2 and SCI subscale scores compared to TD, however, only ASD showed reduced cognitive empathy (ToM) compared to TDs. The clinical groups diverged in praxis impairments, cognitive empathy, and ToM, with ASD performing more poorly. When controlling for both motor and social impairments including ToM, ASD scored significantly lower than DCD on GTI- meaningful and GTC, indicating a prominent deficit in these praxis skills in ASD.
Overall, the clinical groups showed some similar patterns of social and motor impairments but diverged in praxis impairments, cognitive empathy, and Theory of Mind (ToM) ability where the ASD group scored more poorly than the DCD group.
Relevance: Motor and social skills are important for children's interactions within their physical and social environments. ASD and DCD show both overlapping and unique patterns of social and motor skills. Identification of specific strengths and challenges is critical for developing precision intervention.