11th European Conference on psychological theory and research on Intellectual and Developmental Disabilities

Yannick Courbois (Ed)

Programme and abstracts
Welcome To Lille

We are very pleased to invite you to attend to the 11th European Conference on psychological theory and research on Intellectual and Developmental Disabilities, taking place at the University of Lille (France) from Thursday, July 7, until Saturday, July 9, 2016.

ECIDD was first established in 1996 in Aix-en-Provence (France) under the name PTRMR. The main themes of this conference are psychological aspects of intellectual and related developmental disabilities. This biennial conference offers a forum for the exchange of findings in psychological fundamental and applied research on intellectual and developmental disabilities. The conference aims at extending our understanding of causes and conditions of intellectual disabilities, advancing our knowledge on successful prevention and intervention procedures, and promote collaboration among researchers.

The meeting will include individual paper sessions, a symposium and a poster session. Each day, the conference will begin with a keynote address. On Thursday, Debbie Riby, University of Durham (UK), will address the issue of social behaviours in William syndromes and autism. On Friday Gaia Scerif, University of Oxford (UK), will talk about early developmental trajectories in genetic disorders. On Saturday, Marc Tassé, The Ohio State University, Nisonger Center (USA), will speak about adaptive behavior.

We hope this conference will be an intellectually exciting and enriching experience, as well as a pleasant social event.

MESHS, Maison Européenne des Sciences de l’Homme et de la Société
2 Rue des Canonniers,
59000 Lille
Committees

Organizing Committee
Christine Humez, Université de Lille, France
Yannick Courbois, Université de Lille, France
Gauthier Billiet, Université de Lille, France

Scientific Committee
Gerhard Büttner, Goethe-University Frankfurt, Germany
Yannick Courbois, Université de Lille, France
Henrik Danielsson, Linköping University, Sweden
Lucy Henry, City University London, UK
Marco Hessels, University of Geneva, Switzerland
Claudia Mähler, University of Hildesheim, Germany
Silvia Lanfranchi, University of Padua, Italy

With the support of the MESHS, PSITEC EA4072 and CNSA
The scientific programme will include, invited keynote lectures, oral presentations, symposia and posters presentations.

The Keynote Speakers are:

Debbie Riby  
University of Durham, UK

Gaia Scerif  
University of Oxford, UK

Marc Tassé  
The Ohio State University  
Nisonger Center, USA
Program

Thursday July 7: Morning programme

8:15 - 9:00  Registration
9:00 - 9:30  Welcome
9:30 - 10:30 Keynote by Debbie Riby, Durham University, Atypical social behaviours in Williams syndrome and Autism
10:30-11:00 Coffee & Tea
11:00-11:30 Can we improve eyewitness memory in child witnesses with autism spectrum disorder? Lucy Henry & Laura Crane, City University London
11:30-12:00 Attitudes of French secondary school teachers including students with autism spectrum disorders in their classrooms. Sabine Zorn & Minna Puustinen, INS-HEA
12:00-14:00 Lunch

Thursday July 7: Afternoon programme

14:00-15:30 Poster session
15:00-15:30 Coffee & tea
15:30-17:30 Symposium

Atypical Development of Social Cognition, Language and Memory
Laure Ibernon & Beatrice Bourdin, Université de Picardie Jules Verne (UPJV)

Microanalysis of joint visual attention sequences in ASD children
Loic Deschamps, Federica Cilia & Luc Vandromme? Université de Technologie de Compiègne & UPJV

Linguistic and social abilities in French participants with Williams syndrome
Claire Touchet, Luc Vandromme & Laure Ibernon? UPJV

Words referring to emotional concepts understanding in children and adolescents with Down syndrome: a comparative study.
Christelle Declercq & Régis Pochon? Université de Reims Champagne Ardenne

Working memory and attention in gifted children with dyslexia
Alexandre Aubry & Béatrice Bourdin? UPJV

18:00 Welcome reception
Friday July 8: Morning programme

8:45 - 9:00  Registration

9:00 - 10:00  Keynote by Gaia Scerif, University of Oxford
Early developmental trajectories in genetic disorders: How does attentional control matter?

10:00-10:30  Coffee & Tea

10:30-11:00  Borderline Intellectual Functioning in 4- to 7-year-old children, Francesca Pulina, Silvia Lanfranchi, Renzo Vianello, University of Padova

11:00-11:30  Learning, Motor and Emotional Profiles: a comparison among children with Borderline Intellectual Functioning and Average Intellectual Functioning Marianna Alesi, Gaetano Rappo & Annamaria Pepi, Università di Palermo

11:30-12:00  Environment knowledge acquisition in individuals with Down syndrome: The role of descriptions and maps. Silvia Lanfranchi, Chiara Meneghetti, Barbara Carretti, Enrico Toffalini, University of Padova

12:00-12:30  Providing a novel framework to measure the key components of executive function in Down syndrome, with applications for efficient early clinical diagnosis of dementia. Liz Smith & Chris Jarrold, University of Bristol

12:30-14:00  Lunch

Friday July 8: Afternoon programme

14:00-14:30  Prevalence of autism spectrum disorder in Sotos syndrome Chloe Lane, Elizabeth Milne & Megan Freeth, University of Sheffield

14:30-15:00  Cognitive profile of Sotos syndrome Chloe Lane, Elizabeth Milne & Megan Freeth, University of Sheffield

15:00-15:30  Parental effects of an intensive family competence intervention for families of children with rare diseases David Norlin & Malin Broberg, University of Gothenburg

15:30-16:00  Coffee & tea

16:00-16:30  Evidence of a phonological similarity effect after rehearsal training in adolescents with intellectual disability Jérôme Clerc & Yannick Courbois, Université de Lille

16:30-17:00  Prospective memory in persons with intellectual disability: reduced load on episodic memory due to the link between what to do and when to act. Anna Leven, Linköping University & Swedish Institute for Disability research

17:00-17:30  Assistive Technologies for Cognition are not sufficiently supporting children with cognitive disabilities in making plans of everyday life; they are only used for executing the plan Lisa Palmqvist & Henrik Danielsson, Linköping University & Swedish Institute for Disability research

18:00  Guided city walk
Program

Saturday July 9: Morning programme

8:45 - 9:00  Registration

9:00-10:00  Keynote by Marc Tassé, The Ohio State University, Nisonger Center
The importance of adaptive behavior for the diagnosis of intellectual disability and for the global assessment of the person.

10:00-10:30  Coffee

10:30-11:00  Exploring support quality experiences of persons with intellectual disabilities, their families and direct support staff.
Wil Buntix, Sofie Kuppens, Joost Tan & Leopold Curfs, Maastricht University
Medical Center & Research Institute for Work and Society – KU Leuven

11:00-11:30  Barriers and facilitators of goal attainment effectiveness in supports for people with intellectual disabilities
Marjolein Herps, Wil Buntix & Leopold Curfs, Maastricht University

11:30-12:00  Individual support plans of people with intellectual disabilities in residential services: content analysis of goals and resources in relation to client characteristics.
Marjolein Herps, Wil Buntinx, Robert Schalock, G. van Breukelen & Leopold Curfs, Maastricht University, Hastings College (USA)
To function successfully in our ever-changing social world, we must quickly and accurately make social evaluations of others and adapt our own behaviour accordingly. Individuals with some disorders of development find these skills particularly difficult and often struggle to manage the demands of everyday social functioning. Williams syndrome (WS) and Autism represent two such disorders. Due to characterisations of hyper-sociability (WS) versus social isolation (Autism), it has previously been suggested that these groups represent ‘polar opposites’ in terms of social functioning. I will discuss the social profiles associated with these disorders of development, drawing on empirical evidence from our studies of social attention and social functioning. I will especially emphasise the social vulnerability presented by both disorders and will illustrate these groups are associated with a range of social atypicalities. Finally, I will discuss future research directions that can build on our current knowledge and contribute to the advancement of theory and the development of applied work.
With the increased availability of genetic testing, multiple genetic alterations have been associated with atypical developmental outcomes. These outcomes were at least initially classified as “generalised developmental delay”. However, as a growing number of individuals receive diagnoses, there is both the clinical imperative and the research opportunity to find ways to implement deeper phenotyping, to reveal both general and more specific cognitive outcomes for these individuals.

Today I will focus on evidence suggesting that an understanding of individual differences in attentional control, for these groups, may provide some clues to understanding their variable developmental trajectories. First, I will discuss longitudinal data from young children with fragile X syndrome, a group associated with high risk of attention deficits in childhood. A series of longitudinal findings, using methods that allow for deep phenotyping, suggests that early group-level and individual differences in attentional processes predict differences in later behavioural difficulties. The second line of research focuses on children with Williams syndrome and Down's syndrome, to suggest that differences in attentional control between and within these supposedly homogeneous syndrome groups, as well as individual differences in domain-specific skills, predict variable classroom outcomes in emerging literacy or numeracy.

A number of general conclusions emerge. First, links between genes, brain and cognition need to be situated in a developmental context, even in these relatively simple genetic disorders. Second, the increase in early diagnoses offers the opportunity to study developmental trajectories of risk and resilience for complex behaviourally-defined disorders that are in the main diagnosed much later in childhood, and their comorbidity. Finally, these findings suggest that the developmental outcome of these genetic differences is malleable, and understanding good outcomes, as well as weaknesses, may help guide more syndrome-specific and effective intervention.
The importance of adaptive behavior for diagnosis of intellectual disability and for global assessment of the person

Marc Tassé
The Ohio State University, Nisonger Center
Marc.Tasse@osumc.edu

Adaptive behavior is a construct that has long been at the center of our conceptualization and understanding of human functioning. It plays a pivotal role in defining a number of conditions originating during fetal development, childhood as well as associated with aging-related diseases. This presentation will provide an overview of the construct of adaptive behavior, its definition and conceptualization, a brief history of its development, and discuss its relevance and role in the diagnosis of intellectual disability and related neurodevelopmental disorders. We will also present an overview of its use in current diagnostic systems (AAIDD, DSM, ICD). We also review the role of adaptive behavior as an important outcome variable in human research, education, and habilitation interventions. We will close by presenting recent work on the development of the Diagnostic Adaptive Behavior Scale, a new standardized measure of adaptive behavior.
Conferences
Learning, Motor and Emotional Profiles: a comparison among children with Borderline Intellectual Functioning and Average Intellectual Functioning

Marianna Alesi
Dipartimento di Scienze Psicologiche, Pedagogiche e della Formazione, Università di Palermo, Italy
✉ marianna.alesi@unipa.it

Gaetano Rappo
Dipartimento di Scienze Psicologiche, Pedagogiche e della Formazione, Università di Palermo, Italy
✉ gaetano.rappo@unipa.it

Annamaria Pepi
Dipartimento di Scienze Psicologiche, Pedagogiche e della Formazione, Università di Palermo, Italy
✉ annamaria.pepi@unipa.it

Key words
Abstract

To date, insufficient literature has been produced addressing the study of the Borderline Intellectual Functioning in school-aged population. Epidemiological studies revealed in children and adolescents with B.I.F. high rates of school complaints, motor impairments and mental health disorders.

This study aims at comparing learning, motor and emotional profiles showed by pupils with Borderline Intellectual Functioning (BIF) and pupils with Average Intellectual Functioning (AIF). We speculated that pupils with BIF would have lower scores on learning profile (reading comprehension, reading decoding and mathematical tests) and lower gross-motor skills than their typically developing peers. Concerning the emotional profile, we speculated that BIF pupils would show higher levels of anxiety, depressed mood and insecurity as well as lower self-esteem level than AIF pupils.

Participants were 38 children (chronological mean age= 9.28): 19 pupils with BIF and 19 pupils with AIF.

Learning, motor and emotional profiles were measured by a battery of multiple tests: 1. Reading Comprehension and Decoding Tests (Cornoldi & Colpo, 2001) and AC-MT test (Cornoldi, Lucangeli, & Bellina, 2002); 2. Test of Gross-Motor Development (Ulrich, 1985); 3. TMA - Multidimensional Test of Self-esteem (Bracken; 1992) and the Self Administered Psychiatric Scales for Children and Adolescents (Cianchetti & Fancello, 2001).

Our results show that pupils with BIF show lower learning and motor abilities than their typically developing peers. Specifically they reveal lower comprehension and decoding reading abilities as well as lower mathematical abilities. Moreover they show lower locomotion skills and lower Quotient of Gross-Motor Ability. Nevertheless, at the age of 9 ys., they don’t show a different emotional profile. The only difference is in the depression subtest. On the whole, these findings document the high risk of comorbidity among Borderline Intellectual Functioning and poor school performance/diseases in motor development. Moreover they highlight the importance to find multifaceted educational and clinical interventions to reduce or limit the risk of comorbidity in this population from school-age.
The past twenty years have seen increasingly rapid interest in the Borderline Intellectual Functioning (B.I.F.). To date, insufficient literature has been produced addressing the study of this issue in school-aged population. Epidemiological studies revealed in children and adolescents with B.I.F. high rates of school complaints such as Attention Deficit Hyperactivity Disorders (ADHD) and Learning Disabilities (LD) (Fernell and Ek, 2010; Vianello, Di Nuovo and Lanfranchi, 2014). Nevertheless, Karande, Kanchan and Kulkarni (2008) documented the academic history of 55 children with Borderline Intellectual Functioning and found high rates of comorbidity with poor school performance (89.1%), difficulties in writing (92.7%) and mathematics (76.4%). An impaired processing speed can be identified as a main factor which limits “the amount of information that can be processed in a given time interval” (Bonifacci and Snowling, 2008). Consistently, important correlations have been discovered between long reaction times (RTs) in cognitive tasks and slow intellectual functioning.

Researchers have shown an increased interest in the study of motor impairments in children with BIF (Hartman et al., 2010). Specifically, children with BIF were observed to show delays in walking, diseases in fine motor skills, deficits in ‘speed and accuracy of each hand separately or eye–hand coordination.

Finally, a variety of authors documented children with Borderline Intellectual Functioning as a population at high risk of mental health disorders (Cooper et al 2007; Einfeld et al, 2006: Emerson and Hatton, 2007). A large amount of children with B.I.F. are more likely to show higher rates of anxiety and depression as well as to develop neurotic and personality disorders than typically developing peers.

This study aims at comparing learning, motor and emotional profiles showed by pupils with children Borderline Intellectual Functioning (BIF) and pupils with Average Intellectual Functioning (AIF). The following hypotheses will be tested:

Hypothesis 1. Pupils with Borderline Intellectual Functioning (BIF) would have lower scores on reading comprehension, decoding and mathematical tests than pupils with Average Intellectual Functioning (AIF);

Hypothesis 2. Pupils with Borderline Intellectual Functioning (BIF) would have lower gross-motor skills than pupils with Average Intellectual Functioning (AIF);

Hypothesis 3. Pupils with Borderline Intellectual Functioning (BIF) would have higher levels of anxiety, depressed mood and insecurity as well as lower self-esteem level than pupils with Average Intellectual Functioning (AIF).

Participants were 38 children, whose mean age was 9.28 yrs., subdivided into two groups. Group 1 was composed of 19 children with Borderline Intellectual Functioning (BIF) and Group 2 was composed of 19 children with Average Intellectual Functioning (AIF).

Learning profile was measured by a battery of multiple tasks involving: the Reading Comprehension test (Cornoldi & Colpo, 2001), the Reading Decoding Test (Cornoldi & Colpo, 2001) and AC-MT test (Cornoldi, Lucangeli, & Bellina, 2002).

Gross-motor skills were measured by the Test of Gross-Motor Development composed by three evaluation parameters: locomotion, object control and Quotient of Gross-Motor Ability (Ulrich, 1985).

Emotional profile was measured by a battery of tests involving: the TMA - Multidimensional Test of Self-esteem (Bracken; 1992) and the Self Administered Psychiatric Scales for Children and Adolescents (SAFA) (Cianchetti & Fancello, 2001). In our study, only SAFA A (anxiety) and SAFA D (depression) subtests were administered.

One-Way ANOVAs were performed to analyze differences among BIF and AIF groups.

Firstly, we found significant differences among our two groups in learning profile: reading comprehension \((F_1, 37 = 5.638; p < .05)\), reading decoding \((F_1, 37 = 7.505; p < .05)\) and mathematical abilities \((F_1, 37 = 5.071; p < .05)\).

Secondly, we found significant differences among BIF and AIF groups in locomotion \((F_1, 37 = 4.403; p < .05)\) and Quotient of Gross-Motor Ability \((F_1, 37 = 6.210; p < .05)\).

Finally, concerning the emotional profile, we found significant differences among our two groups only in the depression \((F_1, 37 = 5.518; p < .05)\).

Our results confirm that pupils with Borderline Intellectual Functioning show lower learning
and motor abilities than their typically developing peers. Nevertheless, at the age of 9 ys., they
didn’t show a different emotional profile. The only difference was found in the depression. On
the whole, these findings document the high risk of comorbidity with poor school performance
and disease in motor development.

Moreover the evidence from this study suggests the crucial importance of the prevention
programs aimed at identifying at an early age high-risk cases showing lower learning profiles
and increased levels of depression in children with Borderline Intellectual Functioning. These
programs would result in positive significant effects to train learning strategies and limit or
reduce depressive behaviors.

Finally, our findings highlight the potential role of movement in cognitive development from
school-age. The benefits of regular exercise are also becoming to be increasingly recognized
as relevant for children with Intellectual Disabilities and Borderline Intellectual Functioning.

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Exploring support quality experiences of persons with intellectual disabilities, their families and direct support staff

Wil Buntinx
Governor Kremers Center – Maastricht University Medical Center
wil@buntinx.org

Sofie Kuppens
Research Institute for Work and Society – KU Leuven
sofie.kuppens@kuleuven.be

Joost Tan
Maastricht University
j.tan@alumni.maastrichtuniversity.nl

Leopold Curfs
Governor Kremers Center – Maastricht University Medical Center
leopold.curfs@maastrichtuniversity.nl

Key words
supports quality
quality improvement in ID services
As part of service quality surveys in 15 organizations offering professional supports to persons with ID in the Netherlands, both clients themselves and their families or representatives were separately invited to answer two open questions and report in their own wording about (1) what they perceive as 'good' or 'strengths' in the professional supports the client is receiving as well as (2) what they perceive as 'weak' or 'should be improved' regarding the supports the client is receiving from direct support staff. Additionally and in the same way, support staff was invited to report their own perceptions of the supports that they are offering to their clients. Data were collected through independent individual interviewing (clients), by a paper survey (family and representatives) and by web based survey (staff).

In this way, a database of 18,377 statements from 6,850 respondents was obtained. Each statement was coded using a three dimensional framework of performance including: (1) outcome related staff performance in terms of quality of life domains that staff are addressing (8 domains); (2) facilitators related statements (8 domains); and (3) statements related to the direct support staff’s service relationships (5 domains).

Results were analyzed using descriptive statistics to exploring patterns of support quality perceptions in the three respondent groups, both along the ‘strengths’ (satisfaction) and ‘should improve’ (dissatisfaction) questions.

Results show that frequencies in the three dimensions and 21 domain categories clearly differ. Each of these groups has different expectations about support service performances. Particular support organizations also show particular profiles of client satisfaction. Profiles of service quality experiences can be used for service quality improvement. Examples of procedures that lead to improvement evidence will be presented.
As part of quality enhancement policy, support providers in the Netherlands are mandated to survey client experiences at least once every 3 years. In this context, data were collected through a survey that included two open-ended questions to ask respondents about positive respectively negative experiences with the provider’s supports. Answers to the first question were short written statements in the respondent’s own wording reflecting what according to his or her experiences was perceived as ‘good’ or as ‘strengths’ in the performance of the provider’s direct supports team that the respondent had experience with. Answers to the second question were short written statements reflecting what was seen as ‘bad’, a ‘weaknesses’ or as ‘issues that should be resolved’.

In this way, a collection of quality perceptions became available from (1) clients with ID, (2) contact family (client representative, significant other) and (3) support staff who were directly involved with these clients and their contact persons. The present study reports on the content analysis of such statements. The general aim was to explore what sort of items would be more reported than others and how positive and negative experiences would be distributed in the groups of clients, contact persons and direct support staff of the service providers. The researchers were also interested to explore if content analysis results could be useful as a backdrop or benchmark for comparing quality experiences from different service providers.

A database of 18,377 statements from 6,850 respondents was obtained. Each statement was coded using a three dimensional framework of: (1) supports outcome in terms of quality of life domains (statement related to one of the eight quality of life domains: Personal Development, Self-determination, Interpersonal relations, Social inclusion, Rights, Emotional well-being, Physical well-being, Material well-being); (2) facilitators (statement related to one of eight support organization facilitators: Staff competence, ISP, Staff continuity, Transparency of organization, Team efficacy, Safety, Management, Staff availability); and (3) perceived service relationships (statement related to one of five Servqual domains: Responsiveness, Reliability, Personal information, Commitment, Empathy).

Four research questions were formulated. First, what is the relative frequency with which quality experience items are mentioned in the general response of each group of clients, representatives and direct support staff? Second, what is the relative frequency of items in the ‘strengths’ respectively in the ‘should improve’ statements of the three respondent groups? Third, do profiles of answers differ between ‘on campus’ and ‘in community’ accommodation. Fourth, is the present content analysis method suitable for comparing relative strengths and weaknesses between service providers?

Outcomes were analyzed by descriptive and non-parametric statistics to exploring patterns of support quality perceptions in the three groups, both along the ‘strengths’ (satisfaction) and ‘should improve’ (dissatisfaction) aspects.

Results show that frequencies in the three quality dimensions clearly differ for each of the stakeholder, reflecting the relative importance of such dimensions in their quality perceptions. Of the total of all clients’ answers (to the two questions), 75% reflect content- or outcome-related statements (regarding Quality of Life); 10% related to Facilitating conditions of supports; 15% relate to the experience of the supports Relationship with staff. As for client representatives (family), 40% of all statements were outcome related; 26% was related to facilitating conditions and 34% was related to the quality of relationships with staff. This reflects a greater interest of family in service relationships compared with clients’ responses. Staff themselves reported 23% of their statements in the outcome dimension; 57% in the facilitator’s dimension; and 20% in the relationship dimension. When looking at the distribution of answers within each dimension, even more subtle differences appear although the domains of Material well-being and Social inclusion appear to be important both to clients and client representatives.

Particular support organizations also show particular profiles of client satisfaction; such a profile seems to show interesting stability over time reflecting a ‘fingerprint’ of the particular organization.

Profiles of service quality experiences can be used for service quality improvement.

Note: at the time of submission of the present abstract, data analysis is still in progress and more results are expected.
Evidence of a phonological similarity effect after rehearsal training in adolescents with intellectual disability

Jérôme Clerc
Univ. Lille, EA 4072 - PSITEC - Psychologie : Interactions Temps Émotions Cognition, F-59000 Lille, France
✉ jerome.clerc@univ-lille3.fr

Yannick Courbois
Univ. Lille, EA 4072 - PSITEC - Psychologie : Interactions Temps Émotions Cognition, F-59000 Lille, France
✉ yannick.courbois@univ-lille3.fr

Key words
phonological similarity effect
verbal recoding
rehearsal training
Abstract

Phonological similarity effect (PSE) in adolescents with intellectual disabilities (ID) has been shown with auditory stimuli. In the case of visually-presented items, PSE requires verbal recoding before it appears. Using visual items, we trained fifteen participants with ID to use memory strategies, and especially cumulative rehearsal. Another group of thirteen participants took part in non-strategic training. In both groups, PSE was tested before and after training. Participants in the strategy-training group, who showed no PSE at pre-test, began to show such an effect during training and maintained it until post-test. Thus, participants with ID showing no PSE with visual material can be trained to do so through extensive use of cumulative rehearsal. Such training would lead them to verbally recode items in a systematic way, which in turn would make phonological similarities more salient, leading to a PSE.
Aims

A classical effect in verbal working memory that involves phonological coding is the phonological similarity effect (PSE). A PSE consists of a decrease in the recall of phonologically similar items compared with items that are not similar. Evidence of phonological similarity effect (PSE) in people with intellectual disabilities (ID) has been given in several studies. Yet two limitations exist, since a) not all studies show a PSE in these people and b) so far, all studies showing a PSE used auditorily presented items, whereby phonological material directly enters the phonological store. Yet, the modality of presentation is a factor of great importance. In TD children, the PSE has been shown with the auditory-verbal presentation of items or with visual presentation. In the latter case, visually presented items must be phonologically recoded before they enter the phonological store, which in turn allows a PSE to occur. These two modalities for presenting the to-be-remembered items –auditory-verbal vs visual– have different effects on the processes that can be considered responsible for a PSE. Auditorily presented items directly access the phonological store, which allows any PSE that occurs with such a material to be attributed to the intrinsic quality of the phonological store. On the contrary, visually presented items, which create a PSE because of the phonological similarity of the names of the items, must be phonologically recoded before entering the phonological store: in such cases, the PSE has to be considered to reflect the quality of the phonological store, to be a consequence of the phonological recoding process, or both. Furthermore, according to several researchers, the phonological recoding of visual material is achieved using a rehearsal process. Therefore, in the case of visual presentation, a PSE is likely to be the consequence of rehearsing the phonologically similar names of the items rather than a manifestation of the quality of the phonological store.

Our first aim was to test the occurrence of a PSE in adolescents with ID, using a serial recall task with visually presented items. Based on previous research, we made the hypothesis that certain participants only would show a PSE. A second aim of the study was to train the adolescents who did not spontaneously show a PSE, to make use of verbal rehearsal in order for them to verbally recode visual items repeatedly, ultimately showing a PSE. Our second hypothesis was thus that trained adolescents with ID would ultimately show a PSE after rehearsal training whereas PSE was absent before training. To date no such study exists, which would show that rehearsal training causes a PSE in people with ID who spontaneously do not show any PSE.

Methods

Twenty-eight adolescents with ID of undetermined causes (10 females, 18 males) participated in the study, with a mean age of 16 years (ranging from 13 years, 7 months to 17 years, 4 months; M=16 years, SD=1 year). The participants with ID were recruited from four special schools surrounding the city of Lille, France. All had either an IQ score between 50 and 70 or a developmental age between 7 years, 6 months and 8 years, 7 months according to institutional records and standardized tests (NEMI-2, WISC-4 and WAIS-4). No participants presented visual or auditory impairments. We also included 45 typically developing children as a control population, including 13 8-year-olds (eight females, five males), 13 11-year-olds (seven females, six males) and 19 16-year-olds (four females, fifteen males).

We tested the occurrence of a PSE with visual items sharing phonological similarity, visual similarity or no similarity (control condition). The three groups of typically-developing children and adolescents only participated in the pre-test. Adolescents with ID took part in four to eight additional training sessions and in a post-test with exactly the same visual items used throughout the study. Half of this group (fifteen participants) showed no PSE at pre-test and thus were trained to apply three memory strategies including labelling, single rehearsal and cumulative rehearsal (strategy-trained group). This way, these participants were expected throughout the training to build their rehearsal on the phonological codes that
arose from the labeling strategy, which should eventually lead them to show a decreased recall of phonologically similar items - that is, a PSE - at post-test. Participants with ID who spontaneously showed a PSE at pre-test (thirteen participants) were asked to repeat the task the same number of times, and with the same material, in order to test the strength of the PSE (repetition-trained group). In brief, the no-PSE participants were trained in cumulative rehearsal for four to eight sessions whereas the participants already showing a PSE at pre-test had to follow non-strategic training for the same amount of task repetitions.

**Findings of the study:**

At pre-test, all four groups of participants showed a PSE (.01). Further analyses allowed us to constitute the strategy-trained group (no PSE) and the repetition-trained group (PSE at pre-test, p=0.058). Strategy-trained participants showed a PSE as soon as the second training session (.05) and maintained it during four out of the six following training sessions (.05 or .01) as well as at post-test (.01). Repetition-trained participants showed a PSE at pre-test but it vanished during training with only two training sessions showing a PSE (.05 and .01), and had totally disappeared at post-test.

**Conclusions**

First, the presence of a PSE at post-test indicates that the strategy-trained participants, who did not seem to verbally recode visual items at the beginning of the study, learned to do so during training. Furthermore, the PSE appeared relatively early in the training cycle and was then maintained in almost all of the subsequent training sessions. Therefore, we can consider that the PSE that appeared at post-test was not an artifact. Second, our results confirm many studies showing that rehearsal strategies can be developed in people with ID with appropriate training.
Can we improve eyewitness memory in child witnesses with autism spectrum disorder?

Lucy A. Henry  
City University London, London, UK  
✉️ lucy.henry.1@city.ac.uk

Laura Crane  
City University London, London, UK  
✉️ laura.crane.2@city.ac.uk

Rachel Wilcock  
University of Winchester, Winchester, UK  
✉️ Rachel.Wilcock@winchester.ac.uk

Key words

autism spectrum disorder, eyewitness memory
Children with autism spectrum disorder (ASD) have been noted to be as accurate as typical children when recalling a witnessed event, but their recall often contains less information. The current study compared four different interview conditions in order to determine whether recall could be increased in 6-11-year-old children with ASD. A baseline interview (based on current police practice) was compared to a Verbal Labels interview (in which verbal prompts were given to recall key aspects of the event), a Sketch Plan Mental Reinstatement of Context interview (in which the child drew a picture of the event prior to the interview), and a Registered Intermediary supported interview (in which a trained professional facilitated communication between the child and the interviewer). After witnessing a short event involving two male actors, children were semi-randomly allocated to interview condition, and interviewed using one of the four interview protocols one week later. From a larger sample, 64 children with ASD were matched to 64 typically developing children for age, receptive vocabulary, IQ and (broadly) gender (n=16 in each subgroup).

For children with ASD, there were no significant differences across the four interview conditions in the amount of correctly recalled information. By contrast, typical children showed a marked improvement in the amount of information they recalled when they were assisted by an Intermediary. There were no ASD versus TD group differences in the Baseline, Verbal Labels and Sketch Plan interview conditions, but TD children recalled significantly more information in the Intermediary supported interview. These findings have important implications for the Criminal Justice System in England and Wales, and other jurisdictions that are considering introducing intermediary support for vulnerable witnesses.
Aims

Poor memory for events has consistently been noted in children with Autism Spectrum Disorder (ASD) (e.g., Bruck, London, Landa, & Goodman, 2007; Goddard, Dritschel, Robinson, & Howlin, 2014; Millward, Powell, Messer, & Jordan, 2000). Using staged event paradigms, the first experimental examinations of eyewitness memory in ASD (Bruck, et al, 2007; McCrory, Henry, & Happé, 2007) demonstrated that children with ASD were as accurate as typical children when recalling details of an event, but that their free recall contained less information. It is, therefore, important to develop effective strategies to increase the amount of information recalled by child witnesses with ASD, without a corresponding decrease in accuracy.

In the current research, we explored the efficacy of three interventions designed to improve the amount of information that children (with and without ASD) recall, without a subsequent decrease in accuracy.

(1) The Verbal Labels Procedure (Brown & Pipe, 2003a, 2003b) involves children free recalling details of an event before they go on to free-recall further information about different prompted categories of the event (e.g., actions, people, settings). This technique improves recall in typical children, but there is no research on children with ASD.

(2) The Sketch Plan Mental Reinstatement of Context (Dando, Wilcock & Milne, 2009) is a succinct, uncomplicated drawing technique that can be used to aid the recall of an event. Witnesses are asked to draw a detailed plan (or sketch) of an event, including as much detail as they wish to aid their recall. Mattison, Dando and Ormerod (2015) have shown this technique to be effective at increasing the amount of information children with ASD recall without increasing errors.

(3) Registered Intermediary support. An intermediary is an impartial, trained professional who facilitates understanding and communication between vulnerable witnesses and members of the Criminal Justice System. An intermediary conducts an initial assessment of the witness, prepares a report, and advises how best to enable that child/adult to understand and respond at all the different stages of a criminal investigation (e.g., questions during an interview, identification parade, and at a trial) (Plotnikoff & Woolfson, 2015). There is no empirical evidence to date on whether intermediaries increase the amount recalled by children with ASD or typical development.

(4) Baseline interview. An interview based on current police practice for interviewing witnesses in England and Wales was used as the comparison interview condition.

Predictions: We predicted that all three interventions may increase the amount of information recalled by children with ASD and typical children relative to the Baseline interview. We also predicted that children with ASD may recall less detail than typical children.

Methods

We initially recruited a large sample of typical children 6-11 years (n=200) and a smaller sample of children with ASD (n=72). Children were semi-randomly allocated to the four interview conditions and witnessed a short event with two male actors talking about school in the nineteenth century. They received a ‘brief’ interview on the same day (as a first response police officer would do), followed by a full Investigative Interview one week later (by a trained interviewer). All interviews had seven discrete phases: (1) Greet and personalise the interview;
(2) Rapport building; (3) Truth or lie exercise; (4) Explain the purpose of the interview; (5) Free recall (recall attempt 1); (6) Questioning (recall attempt 2); and (7) Closure. Interviews varied according to the interventions described earlier, i.e., we added to this protocol accordingly.

Group matching. Children with ASD in each of the four interview conditions were group matched to a subsample of typical children based on IQ, receptive vocabulary, age (and as far as possible, gender). This resulted in 64 children with ASD and 64 matched typical children across the four interview conditions, with 16 children in each sub-group, i.e. 128 participants in total.

Each interview was coded for the total number of correct details recalled: e.g., “The man (1) with the blonde hair (1), Alex (1), stole (1) the man (1) with the brown hair’s (1) keys (1)” = 7 units of correct information.

Findings

A $2 \times 4$ ANOVA for the total number of correct details recalled on the Investigative interview revealed significant effects of group, $F(1, 120) = 18.34, p<.001$, and condition, $F(3, 120) = 2.76, p=.04$, which were qualified by a significant interaction effect, $F(3, 120) = 4.87, p=.003$. Bonferroni-corrected within-samples ANOVAs exploring the effect of condition revealed there to be a significant effect of interview condition in the TD group, $F(3, 60) = 6.16, p=.001$, but not in the ASD group, $F(3, 60) = 1.71, p=.17$.

A further series of Bonferroni-corrected between-samples ANOVAs exploring differences between the ASD and TD groups revealed there to be no significant group differences for those receiving the Baseline, $F(1, 30) = 1.47, p=.23$, Verbal Labels, $F(1, 30) = 1.37, p=.25$, or Sketch Plan, $F(1, 30) = .65, p=.43$, interviews. There was, however, a significant group difference in the Intermediary condition, $F(1, 30) = 33.99, p<.001$. This was due to the assistance of an intermediary facilitating correct recall in the TD group (mean = 51.06, SD = 15.77), but not in the ASD group (mean = 17.56, SD = 16.72).

Conclusions

For children with ASD, there were no significant differences across the four interview conditions in the amount of correctly recalled information. This suggests that there was no particular benefit in using different types of interview interventions. By contrast, typical children showed marked improvement in the amount of information recalled when they were assisted by an Intermediary. There were no ASD versus TD group differences in the Baseline, Verbal Labels and Sketch Plan interview conditions, but TD children recalled significantly more information than children with ASD in the Intermediary supported interview. These findings have important implications for the Criminal Justice System in England and Wales, and other jurisdictions that are considering introducing intermediary support for vulnerable witnesses.
Barriers and facilitators of goal attainment effectiveness in supports for people with intellectual disabilities

Marjolein Herps
Vilans, Utrecht
Gouverneur Kremers Centre, Maastricht University
✉ m.herps@vilans.nl

Wil Buntinx
Governor Kremers Center – Maastricht University Medical Center
✉ wil@buntinx.org

Leopold Curfs
Governor Kremers Center – Maastricht University Medical Center
✉ leopold.curfs@maastrichtuniversity.nl
Abstract

Aim
Individual support plans (ISPs) are important instruments to improving personal outcomes for people with intellectual disabilities. According to regulations in the Netherlands, an ISP needs to be evaluated and reviewed yearly. The aim of the present study was to gain insight in the mechanisms of goal setting and goal attainment in the context of individualized support planning for people with ID in the Netherlands. Research questions probe into barriers and facilitators of goal attainment effectiveness.

Methods
Data were collected by using semi-structured interviews with persons with ID (N=14), their direct support staff (N=35) and significant others (N=15). The interviews evaluated the attainment of support goals as described in the individual support plan that was formulated one year earlier. The persons with ID all received support from one service provider in The Netherlands. The interviews were analysed both quantitatively and qualitatively.

Results
Results indicate that approximately two third of the goals in ISPs are not achieved within the intended time horizon of one year. As an explanation for not achieving goals, respondents report that these regard long-term, general support agreements that need continuous attention and do not have fixed ends. Further, barriers for goal attainment were found at the level of the individual (e.g. disability related), staff attitudes (e.g. not taking the goal as serious as they should) or were related to the goal itself (e.g. not specific enough). The facilitators in goal attainment were, according to our respondents, mostly found at the level of the person with ID and their strengths and determination.

Discussion
Goal attainment is an indicator for the effectiveness of ISPs for people with ID. According to goal setting theory, the effectiveness is dependent on certain conditions. In the present study, goals were often found to lack some of these conditions, such as specificity. Also, the current policy in The Netherlands demands that support goals need to be revised on a yearly basis. Though the requirement of a formal, yearly meeting and evaluation of support goals is useful, more flexibility is needed in cases where more complex and long term goals apply.
Aims

The individual support plan (ISP) is the document that describes personal goals and objectives of people with intellectual disabilities (ID) and the supports that are needed to achieve them. Goals and objectives relate to the expected personal outcomes in terms of quality of life and are defined as ‘the object or aim of an action, for example, to attain a specific standard of proficiency, usually within a specified time limit’. Several authors have studied the relationship between goals in ISPs and personal outcomes of people with ID, but found no relation between the quality of plans and personal outcomes.

Though goals and the quality of goals may play a role in the attainment of goals, there are also other factors that can influence goal attainment and, with that, personal outcomes. In the present study, factors influencing goal attainment in ISPs of people with ID in a residential setting were studied. The aim of the research to gain insight in the mechanisms of goal formulating and goal attainment in the context of individualized support planning for people with ID and to study the barriers and facilitators in goal attainment. The results of the study can be used to improve policy and practice on working with ISPs in The Netherlands. The study addresses the following questions:

1. To what extent are goals in ISPs for people with ID being achieved?
2. What are barriers and facilitators in achieving goals in ISPs?
3. Is there a relation between good quality goals and goal attainment?

Methods

A case study was done within a service provider organization in The Netherlands. Within this organization, individuals with ID, their legal representative and their direct support professional (DSP) participated in the study. Individual, structured interviews were held with the DSP (N=33-36). Individual semi-structured interviews were done with the people with ID (N=14) and with the legal representatives of these people (N=11-17). Within this organization, the ISP consists of a digital document that describes the individual goals. An annual meeting is held in which the (implementation of the) goals of the previous year are evaluated. The measurement in this study concerned the past year and goals.

Part of the interview with the DSP consisted of the interviewer asking the respondent to evaluate each goal using a set of indicators that was developed for this study, based on goal setting theory and previous research.

Both quantitative and qualitative analyses were done. Descriptive statistics were used to analyse the frequency with which goals were achieved for people with ID. Further quantitative analyses were conducted with goal attainment as dependent variable.

Transcripts of the interviews with people with ID, their legal representatives and the open ended-answers of the DSPs were coded to get a deeper understanding of the data.

Findings

At the time of preparing this abstract, data collection has not yet been finished. This means that at this point, the analysis of the data has not been completed. Preliminary results, however, show that about two-third of the goals is not being achieved within the time frame of one year. Results seem to indicate that the greatest barrier in achieving goals is found in the (complexity of the) problems that the individual with ID faces. There seems to be no relation between the quality of goals and the result of goals, nor between characteristics of staff or resources and the results of goals.
Conclusions

Again, as the analysis has not yet been finished, these conclusions are based on our current findings and probably will change when data collection and analysis will be finished. The results of the study seem to indicate that goal setting as a means of enhancing personal outcomes for people with ID can be questionable. Though policy makers in The Netherlands stress the importance of goal setting for everyone, the results of this study show that it would probably be better if more flexibility was observed. In this study, people state that they set goals because it is required by regulations, rather than expecting goals to be truly of value for the people with ID. A second conclusion is that goals are set according to available resources, rather than finding the right resources to achieving goals. In fact, only goals that are expected to be achieved are included in ISPs. The fact that most goals are not met, is due to the mechanism that what is described as a goal, is in fact a structural support agreement.
Individual support plans of people with intellectual disabilities in residential services: content analysis of goals and resources in relation to client characteristics.

M. A. Herps
Governor Kremers Centre, Maastricht University Medical Centre, Maastricht, the Netherlands
Vilans, Utrecht, the Netherlands
✉️ m.herps@vilans.nl

W.H.E. Buntinx
Governor Kremers Centre, Maastricht University Medical Centre, Maastricht, the Netherlands

R.L. Schalock
Hastings College, USA

G.J.P. van Breukelen
Department of Methodology and Statistics, CAPHRI School for Public Health and Primary Care, Maastricht University, Maastricht, The Netherlands

L.M.G. Curfs
Governor Kremers Centre, Maastricht University Medical Centre, Maastricht, the Netherlands

Key words
individual support planning; intellectual disabilities; content analysis; Quality of Life
Goals and objectives as mentioned in 209 Individual Support Plans (ISPs) for people with ID were analysed to explore what domains of quality of life they are associated with, what support resources are referenced for achieving the goals, and how domains and resources are related to clients age, gender and intellectual disability (ID) level.

Mixed linear regression analyses were conducted to examine the relations between client characteristics and the content of goals and support resources. Results showed that ISPs of people with mild and moderate ID had significantly more goals related to independence and social participation as compared to the ISPs of people with severe and profound ID. ISPs of clients with profound ID addressed quality of life factors related to ‘well-being’ more than ISPs of all other clients. ISPs of people aged 20–34 years had significantly more goals on independence than the two other age groups. ISPs of people under the age of 50 had significantly fewer goals with respect to well-being than found in ISPs of older people. Regarding the use of resources, 42.6% of the ISP goals were associated with resources from specialised services, 31.5% associated with natural resources and 25.9% associated with a combination of both natural and specialised services. In ISPs of people with mild ID, natural resources are more often mentioned, and specialised service-based resources are less often mentioned than for other people.

This study offers empirical feedback on ISP practices in the field of ID in the Netherlands. In light of current ISP practices, results suggest that attention should be paid to: (1) distinguishing between a ‘service contract’ and an ISP; (2) keeping a focus on the whole person in all age groups and levels of functioning and (3) involving the service recipient in ISP development and implementation.
Aims of the study

Though ISPs are mandated in Dutch law, little is known about ISP practices in the Netherlands. The current study is part of a larger project that highlights different aspects of ISPs in the Netherlands, to improve the quality and processes of ISPs. The focus of the present study is on goals and resources that are found in ISPs. Its’ purpose was to explore what domains of QOL are associated with ISP-referenced goals and objectives, what support resources are referenced for achieving the goals and objectives and how domains and resources are related to demographic characteristics such as a client’s age, gender and ID level. The following questions were addressed:

1. What does the ISP look like in terms of size and number of goals?
2. What support goals are mentioned in IPSs in terms of Quality of Life domains and factors?
3. What resources are being used in the achievement of support goals?
4. Is there a relationship between the client’s gender, age and level of intellectual functioning and goals domains and factors in their ISP?
5. Is there a relationship between the client’s gender, age and level of intellectual functioning the resources mentioned in their ISPs?

Methods

Eight service provider agencies participated in the study. These organisations are geographically spread over the Netherlands and vary in size. All organisations provide 24-h residential care to people with all levels of ID. Participating agencies were asked to provide a proportional number of ISPs corresponding with prevalence characteristics with respect to age group, gender and level of intellectual functioning of the Dutch population of persons with ID over 20 years. A total of 209 ISPs of individuals with ID were included in the study. Participants were 104 males and 105 females, aged 20 to 83 (M=41.8;SD=14.2), within the broad range of level of intellectual functioning.

Descriptive statistics were used to analyse the frequency with which QOL domains, and resources were mentioned. Mixed linear regression analyses were conducted to examine the relations between client characteristics as predictors and the content of goals and support resources as outcomes. The eight domains on QOL were reduced to three factors: independence, social participation and well-being. The resources were also reduced to three categories: natural resources, service-based resources and combined natural and service-based resources. Dependent variables were the three QOL factors and the three categories of resources. Independent variables were the client characteristics gender, age and level of intellectual functioning.

Findings

Goals were found in 180 (86.1%) ISPs. A total of 645 goals were identified (M=3.6;SD=2.0). The number of goals in ISPs varied from 1 to 11. The most often stated goal was in the domain of physical well-being. In 114 ISPs (63.3%) this domain was addressed at least once, and a total of 202 goals addressed physical well-being. In only five ISPs was the rights domain addressed, with a total of five goals addressing rights.

Resources were specified in 121 of the ISPs analysed (67.2%), for a total of 495 (76.9%) goals. Service-based resources were mentioned in 84 ISPs (46.7%), and specified in 211 goals (42.6%). In 37.2% of the ISPs, the person’s competences were mentioned as playing a role in achieving the goals. Informal supports were least often found to be resources in achieving goals, described in only 5 (2.8%) ISPs, and in 1.2% of the goals. In just over a quarter of the goals, a combination of different resources was used, (e.g. the person’s competences and his or her social network and generic agencies).
Mixed linear regression analyses showed that younger people (20–34) and people with mild to moderate ID have significantly more goals related to the factor of independence than older people (35–49 and >50), respectively, than people with more severe or profound disabilities (Table 4). Social participation. Mixed linear regression analyses showed that people with mild or moderate ID have significantly more goals related to social participation than people with severe or profound ID. Well-being. Mixed linear regression analyses showed that the ISPs of the oldest clients (>50) and clients with profound ID have significantly more goals related to well-being than the ISPs of younger clients respectively clients with a less severe ID.

Results of the mixed linear regression analysis with resources as dependent variables found that clients with mild or moderate ID use natural resources more often, and service resources less often, than clients with severe or profound ID natural sources, although this difference was significant only for mild ID, not for moderate ID. No effects were found of age and gender on resources.

Conclusions

The study has at least three implications for ISP-related policies and practices. First, there is a need for service providers to understand what constitutes an ISP. It is remarkable that in 14% of all ISPs analysed, no goals were specified. These ISPs contained a vast amount of descriptive and administrative information about the individual and his or her functioning, but did not reference desired outcomes of support. A point of focus for enhancing ISP practice should be to separate the components of a service contract from the ISP that aligns personal goals and assessed support needs with specific support strategies that focus on enhancing human functioning and personal outcomes.

A second implication of the present study is the need to focus on the whole person. Goals most often referred to the domain of physical well-being. However, other domains of the QOL framework such as personal development, self-determination and interpersonal relations are as important to persons with profound intellectual and multiple disabilities as to persons with mild or moderate ID.

A third implication of the present study relates to the role of the individual in a horizontally structured support team. The findings of the present study are congruent with a shift being made from a predominant specialised services approach in which these services are ‘used to the maximum extent’ to an approach in which different resources are blended into an individualised strategy of supports.
Prevalence of autism spectrum disorder in Sotos syndrome

Chloe Lane
Department of Psychology, University of Sheffield, Western Bank, Sheffield, United Kingdom
✉ clane2@sheffield.ac.uk

Elizabeth Milne
Department of Psychology, University of Sheffield, Western Bank, Sheffield, United Kingdom
✉ e.milne@sheffield.ac.uk

Megan Freeth
Department of Psychology, University of Sheffield, Western Bank, Sheffield, United Kingdom
✉ m.freeth@sheffield.ac.uk

Key words
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Abstract

Autism spectrum disorder (ASD) has been reported in a number of congenital syndromes, including Fragile X, Cornelia de Lange and Angelman. Investigation of ASD symptomatology in congenital syndromes is valuable in understanding the genetic mechanisms underlying ASD. Sotos syndrome is a congenital overgrowth disorder with an incidence of approximately 1 in 14,000. Previous research has identified increased prevalence of ASD in individuals with Sotos syndrome. The aim of the present study was to identify the prevalence of ASD in Sotos syndrome, using a quantitative measure of ASD symptomatology. A total of 70 individuals with Sotos syndrome (mean age = 12.25 years, SD = 9.34) were assessed for ASD symptomatology, as measured by the Social Responsiveness Scale, second edition (SRS-2). The SRS-2 is a two-factor questionnaire that is consistent with the DSM-5 criteria for ASD. The questionnaire was administered online and was completed by either the parent, caregiver or spouse of the individual with Sotos syndrome. As measured by the SRS-2, 81.43% (n = 57) of participants met clinical cut off for ASD (total T-score ≥60). Of these, 36 were in the severe range (T-score ≥76). There was no significant difference between total T-scores for male and female participants, indicating that within the Sotos population, severity of ASD symptomatology is not affected by gender. Consistent with the profile of scores within an ASD population, scores on the repetitive behaviours and restricted interests subscale were significantly higher than scores on the social communication impairment subscale (p <.001). The findings suggest that there is a high prevalence of ASD within the Sotos population.
Previous research has identified that a number of individuals with Sotos syndrome display behavioural characteristics associated with ASD. The aim of this study was to identify the prevalence of autistic features within a cohort of individuals with Sotos syndrome. It was hypothesised that a significant number of participants would score above clinical cut-off for ASD symptomatology.

The Social Responsiveness Scale, second edition (SRS-2) is a 65 item questionnaire designed to assess symptoms associated with ASD. The SRS-2 has been used to investigate ASD symptomatology in a range of clinical groups, including tuberos sclerosis and neurofibromatosis type 1. A total score indicates severity of ASD symptomatology, with higher scores indicating greater severity. As well as a total score, the SRS-2 also provides scores for two subscales (social communication impairment and repetitive behaviours and restricted interests) which are compatible with the DSM-5 criteria for ASD. Licensing was received from the publishers of the SRS-2 to allow online administration of the questionnaire.

The study was advertised via the Child Growth Foundation (CGF; a UK charity that supports families of individuals affected by growth disorders) and advertisements on Sotos syndrome support groups on social media. The sample comprised of 70 individuals with a diagnosis of Sotos syndrome and 41.43% (n = 29) were female. The mean age of the sample was 12.25 years (SD = 9.34), with an age range of 2.5 – 50 years. Age-appropriate versions of the questionnaire were used (pre-school, school age and adult) and the questionnaire was completed by either the parent, caregiver or spouse of each individual with Sotos syndrome.

For the purpose of analysis, raw scores on the SRS-2 were converted to T-scores. A total T-score ≥60 was considered to be clinically significant. Total T-scores above clinical cut-off were classified as mild (T-score of 60 – 65), moderate (T-score of 66 – 75) or severe (T-score ≥76). As measured by the SRS-2, 81.43% (n = 57) of participants met clinical cut-off for ASD. Of these clinical scores 10.00% (n = 7) were in the mild range, 20.00% (n = 14) were in the moderate range (T-score of 66 – 75) and 51.43% (n = 36) were in the severe range. Total T-scores ranged from 44 – 109 with a mean T-score of 75.44 (SD = 15.72).

In order to investigate the profile of scores on the DSM-5 compatible subscales, differences between scores on these subscales were compared. A paired samples t-test found a significant difference between scores on the social communication impairment (M = 74.13, SD = 15.02) and restricted interests and repetitive behaviours subscales (M = 78.23, SD = 16.33) (t(69) = 4.51, p <.001). This was a large effect (d = 1.08) and suggests that individuals with Sotos syndrome display greater difficulty with restricted interests and repetitive behaviours, compared with social communication impairment. This is consistent with the profile that is found in individuals with ASD.

Total T-scores for male and female participants were compared in order to determine whether there were any significant gender differences. An independent samples t-test found no significant difference in total T-scores for male (M = 75.68, SD = 17.34) and female (M = 75.10, SD = 18.24) participants. This is not consistent with findings from individuals with ASD, which indicate that males are more likely to have ASD than females. This suggests that within the Sotos population, there are no gender differences in ASD symptom severity.

The relationship between age and total T-scores was investigated in order to establish whether there was a significant effect of age on ASD symptom severity. In an ASD population, SRS-2 total scores have been found to be consistent over the course of development and symptom severity is not affected by age. The participants were categorised into one of five categories, based on age in years: 0 – 5 (n = 15); 5 – 10 (n = 21); 10 – 15 (n = 13); 15 – 20 (n = 8); 20 and over (n = 13). A one-way ANOVA found a significant difference between total T-scores between the five age categories (F(4,69) = 13.51, p <.001). Specifically, this analysis identified a significant quadratic model, indicating an inverted U-shaped pattern of total T-scores. This
suggests that individuals with Sotos syndrome display ASD symptomatology which is less severe in early childhood and adulthood, compared with childhood.

The findings from this study indicate a high prevalence of ASD in Sotos syndrome. Specifically, the findings suggest that individuals with Sotos syndrome display a similar behavioural profile to individuals with ASD. As Sotos syndrome is associated with a mutation of the NSD1 gene, this study provides evidence for a potential biomarker for ASD.
Cognitive profile of Sotos syndrome

Chloe Lane
Department of Psychology, University of Sheffield, Western Bank, Sheffield, United Kingdom
✉ clane2@sheffield.ac.uk

Elizabeth Milne
Department of Psychology, University of Sheffield, Western Bank, Sheffield, United Kingdom
✉ e.milne@sheffield.ac.uk

Megan Freeth
Department of Psychology, University of Sheffield, Western Bank, Sheffield, United Kingdom
✉ m.freeth@sheffield.ac.uk

Key words
Sotos Syndrome
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Sotos syndrome is a congenital overgrowth disorder with an incidence of approximately 1 in 14,000. Intellectual disability is one of the cardinal features of Sotos syndrome. Previous research has identified that the majority of individuals with Sotos have intellectual disability (IQ < 70) and verbal IQ scores are consistently higher than performance IQ scores. To date, the cognitive profile has not been fully specified. The aim of the present study was to establish whether there is a unique cognitive profile associated with Sotos syndrome. The British Ability Scales, third edition (BAS3) is a standardised battery of tests, designed to assess cognitive abilities. The early years battery was administered to participants under the age of 8 years and all other participants completed the school age battery. Participants were 23 individuals with Sotos (mean age = 19.07 years, SD = 11.56; range of 6 – 50 years). Two participants were excluded from the analyses as they were unable to complete most of the tasks. The BAS3 provides a general conceptual ability score (GCA) which indicates general level of intellectual functioning (100 is the population average). Mean GCA score of the participants was 62.57 (SD = 16.18) and ranged from 39 – 97. Verbal ability scores (M = 77.14, SD = 3.53) were significantly higher than spatial ability scores (M = 68.57, SD = 3.39) (p < .001) and non-verbal reasoning ability scores (M = 61.71, SD = 2.76) (p < .001). Spatial ability scores were significantly higher than non-verbal reasoning ability scores (p < .001). In addition, scores on a short-term visual memory task were significantly higher than scores on a spatial visualisation task (p = .002). The findings provide a preliminary indication of the cognitive profile of individuals with Sotos syndrome, suggesting a relative strength in verbal ability and a relative weakness in non-verbal reasoning ability.
Intellectual disability is one of the four cardinal features of Sotos syndrome and previous research has identified that the majority of individuals with Sotos have an intellectual disability (IQ < 70). Findings from a small number of studies have identified that verbal IQ scores are consistently higher than performance IQ scores. However, the relative cognitive strengths and weaknesses of individuals with Sotos syndrome have not yet been identified. The aim of this study was to establish whether there is a unique cognitive profile associated with Sotos syndrome. It was hypothesised that individuals with Sotos syndrome would show a consistent profile of performance on the tasks, indicating relative cognitive strengths and weaknesses.

The British Ability Scales, third edition (BAS3) is a standardised battery of tests, designed to assess cognitive abilities. An early years battery is used for children aged 3 – 7 years 11 months and a school age battery is used for children aged 8 years and older. The BAS3 has been normed up to age 17 years and 11 months but out-of-age-range testing can be used when a participant has an intellectual disability, so it is appropriate to use the school age battery with adults with Sotos syndrome. A general conceptual ability (GCA) score is derived from performance on the core scales. Scores on these scales also provide a verbal ability score, non-verbal reasoning ability score and spatial ability score. The diagnostic scales are designed to measure abilities in numeracy and literacy and include tasks that measure specific cognitive skills such as problem-solving, auditory memory and visual discrimination.

The study was advertised via the Child Growth Foundation (CGF; a UK charity that supports families of individuals affected by growth disorders) and advertisements on Sotos syndrome support groups on social media. A meeting was arranged to visit participants and administer the BAS3. This was either in the participant's school, family home or at the psychology department at the University of Sheffield. Participants were recruited from across the UK and the experimenter travelled to each of the participants. The experimenter administered all of the core scales and diagnostic scales from the BAS. These were age-appropriate and administered in accordance with the guidelines included within the BAS3 manual.

The sample comprised of 23 individuals with a diagnosis of Sotos syndrome (mean age = 19.07 years, SD = 11.56; range of 6 – 50 years). Nine participants were female. Two participants were excluded from the analyses as they were unable to complete a number of the tasks. Data collection is ongoing but preliminary findings are reported below.

For the purpose of analysis, T-scores were used. Mean GCA score of the participants was 62.57 (SD = 16.18) and ranged from 39 – 97. This suggests that the majority of participants have an intellectual disability, although 3 performed within average range (90 – 109). In order to investigate the profile of cognitive abilities, performance on the three subscales were compared. Paired samples t-tests identified that verbal ability scores (M = 77.14, SD = 3.53) were significantly higher than spatial ability scores (M = 68.57, SD = 3.39) (p <.001) and non-verbal reasoning ability scores (M = 61.71, SD = 2.76) (p <.001). Spatial ability scores were significantly higher than non-verbal reasoning ability scores (p <.001). This suggests that individuals with Sotos syndrome have a relative strength in verbal ability and a relative weakness in non-verbal reasoning ability.

Scores on each of the three subscales is derived from performance on two separate tasks (verbal ability: word definitions and verbal similarities; non-verbal reasoning ability: matrices and quantitative reasoning; spatial ability: recognition of designs and pattern construction). Performance on each of the tasks should be relatively consistent as the tasks are designed to measure the same construct (e.g. verbal ability). In order to investigate the cognitive profile in more detail, scores on the two tasks for each construct were compared. The analysis was conducted using scores from the school age battery (n = 18). T-scores on the individual tasks have a mean of 50 and range from 20 – 80. A paired samples t-test found no significant difference between performance on the word definitions (M = 35.17, SD = 9.18)
and verbal similarities (M = 35.83, SD = 9.56) tasks (p = .592) and no significant difference between scores on the matrices (M = 26.56, SD = 7.59) and quantitative reasoning (M = 27.83, SD = 9.75) tasks (p = .592). A paired samples t-test found a significant difference between performance on the recognition of designs (M = 35.94, SD = 9.22) and pattern construction (M = 30.78, SD = 8.28) tasks (p = .002). This suggests that individuals with Sotos syndrome display a relative strength in short-term visual memory but a relative weakness in spatial visualisation ability.

The findings from this study suggest that individuals with Sotos syndrome have a relative strength in verbal ability and a relative weakness in non-verbal reasoning ability. Performance on individual tasks has not yet been explored in detail but preliminary analysis indicates a relative strength in visual memory. Overall, the findings from this study provide preliminary evidence for the cognitive profile of Sotos syndrome.
Environment knowledge acquisition in individuals with Down syndrome: The role of descriptions and maps.

Silvia Lanfranchi
Department of Developmental Psychology and Socialization, University of Padova, Padova, Italy
silvia.lanfranchi@unipd.it

Chiara Meneghetti
General Psychology Department, University of Padova, Padova, Italy
chiara.meneghetti@unipd.it

Barbara Carretti
General Psychology Department, University of Padova, Padova, Italy
chiara.meneghetti@unipd.it

Enrico Toffalini
General Psychology Department, University of Padova, Padova, Italy
enrico.toffalini@yahoo.it

Key words
Down syndrome, Environment learning, spatial descriptions
Learning environmental information from descriptions is an everyday activity that influences the ability of individuals with Down syndrome (DS) to adapt to life, especially considering their weak verbal skills and relatively well-preserved visuo-spatial skills. Studies on DS have focused mostly on small-scale spatial tasks and only recently begun to explore large-scale environment learning.

The aim of the present study was to examine spatial learning in individuals with DS, focusing on: i) using spatial descriptions from survey and route perspectives as input; and ii) the role of external cues (such as sketch maps) in influencing the environment representation. Twenty-eight individuals with DS (mean age: 15.63 years) and 28 typically-developing (TD) children (mean age: 5.73) took part in the study. The DS and control groups were matched one-to-one on their raw scores in the Primary Mental Ability test (K1; Thurstone & Thurstone, 1962). They listened twice to spatial descriptions from a survey or route perspective, presented alone (Description condition; D) or in association with a graphical cue (Description + Map condition; D+M). After each hearing description they performed landmark recognition and location tasks. The results showed that individuals with DS: i) performed as well as controls in recognizing the landmarks, but with more intrusion errors (recognizing landmarks that were not presented); ii) located landmarks better in the D+M than in the D condition, but the control group benefited more from seeing the map. Overall, these results showed that individuals with DS can learn from spatial descriptions and benefit, albeit to a lesser extent than TD children, from seeing a graphical representation of an environment they hear described.
Introduction

The ability to learn environmental information is important in everyday life and its analysis in individuals with Down syndrome (DS) can be particularly useful with a view to developing their autonomy. How individuals with DS represent environments has attracted interest because they are known to have relatively well-preserved visuo-spatial abilities but weaker verbal skills than children of comparable mental age (MA) (e.g. Silverman, 2007). Most studies on DS have focused on small-scale spatial tasks (Yang et al., 2014), while a few have begun to explore large-scale environment learning in DS (Courbois et al., 2013).

Studies on typically-developing (TD) children show that they represent environments (acquired from descriptions) from an egocentric viewpoint by 6-7 years old, and with map-like features by the time they are ten, but external cues such as sketch maps prompt them to represent an environment with map-like features already from 6-7 years of age (Uttal, 2000; Uttal et al., 2006) - a MA reached by most individuals with DS. Starting from these theoretical premises, the aim of the present study was to compare environment learning from verbal descriptions presented from an egocentric (route) or allocentric (survey) perspective, and whether external cues (sketch maps) prompted a better quality of environment representation in individuals with DS and TD controls matched for MA. Survey and route descriptions were heard alone (description condition, D), or in association with a map (description + map condition; D+M). We expected to find a general advantage of the D+M over the D condition in both groups, and differences between the DS and TD groups’ performance.

Method

Participants

Twenty-eight individuals with DS (16 males; mean chronological age: 15.63 years, SD = 2.37) and 28 TD children (16 males; mean chronological age: 5.73 years, SD = 0.28) took part in the study. The two groups were matched one-to-one on their raw scores in the Primary Mental Ability test K1 (Thurstone & Thurstone, 1962); the performance in the PMA-K1 was comparable (F < 1, p = .74 η²p = .002).

Material

Square and landmarks. A 20x20 cm green square reproducing the layout of an environment and cards showing 20 landmarks that were mentioned in the descriptions and 12 that were not (5 and 3, respectively, for each environment).

Descriptions. Eight spatial descriptions of four environments: 4 from a survey and 4 from a route perspective. They were similar in length (126-171 words) and each described the location of 5 landmarks, presenting spatial information from an egocentric view (route) or a map view (survey).

Procedure

Participants was assessed individually. First they performed the PMA-K1, then the four learning tasks. Participants listened to each description twice with the square placed in front of them. In the D condition, each time a landmark was introduced the corresponding card was shown; in the D+M condition, the landmark card was also positioned appropriately in the square so as to reflect the description (forming a sketch map).

After hearing each description, participants performed: i) a landmark recognition task (they were asked whether the landmarks shown on the cards had been presented in the description); and ii) a location task (they were asked to put the landmark cards in the right place in the square).
Results

Recognition task. A 2 (Perspective: survey vs route) x 2 (Learning condition: D vs D+M) x 2 (Landmark: present vs absent) x 2 Group (DS vs TD) ANOVA showed a main effect of Learning condition, F (1, 54) = 4.22 p = .045 η2 = .07 (D+M higher than D), and Group, F (1, 54) = 7.81 p = .007 η2 = .13 (TD higher than DS). The Group x Landmark interaction was significant, F (1, 54) = 4.66 p = .035 η2 = .08; post-hoc comparisons (considering p ≤ .01 as significant) showed that individuals with DS recognized more absent landmarks than controls (p = .01), while they recognized the landmarks actually mentioned in the description as well as controls.

Location task. A 2 (Perspective) x 2 (Learning condition) x 2 (Group) ANOVA showed a main effect of Learning condition, F (1, 54) = 258.99 p < .001 η2 = .83, (D+M higher than D). The Learning condition x Group interaction was significant, F (1, 50) = 12.53 p = .001 η2 = .20; post-hoc comparisons showed that the two groups had a similar performance in the D condition (DS: M = 2.02 SD = 1.32; TD: M = 1.84 SD = 0.91; p =.56), the TD group (M = 4.88 SD = .37) performed better than the DS group (M = 3.90, SD = 1.38; p =.001) in the D+M condition.

Organizing the environment. A 2 (Perspective) x 2 (Learning condition) x 2 (Group) ANOVA showed a main effect of Learning condition, F (1, 54) = 50.77 p < .001 η2 = .48 (D+M higher than D). The Learning condition x Group interaction was significant, F (1, 54) = 16.71 p = .001 η2 = .24; post-hoc comparisons showed that the DS group organized the environment equally well in the two learning conditions (D: M =.75, SD = .35; D+M: M = .87, SD = .27; p =.036), whereas the TD group did so better in the D+M (M =.54, SD = .34) than in the D (M =.96, SD = .13; p =.001) condition.

Conclusions

Our results indicate that individuals with DS: i) recognized landmarks actually described as well as TD children of the same MA, but they made more intrusion errors; ii) located landmarks better in the D+M than in the D condition, but the control group benefited more from seeing the sketch map. Overall, these results show that individuals with DS can manage verbally-conveyed spatial information and also benefit from the presence of external cues such as sketch maps, albeit to a lesser extent than TD controls.
Prospective memory in persons with intellectual disability: reduced load on episodic memory due to the link between what to do and when to act.

Anna Levén
Department of behavioural sciences and learning, Linkoping University, Sweden
Swedish Institute of disability research, Linkoping University, Sweden
✉ anna.leven@liu.se

Björn Lyxell
Department of behavioural sciences and learning, Linkoping University, Sweden
Swedish Institute of disability research, Linkoping University, Sweden
✉ bjorn.lyxell@liu.se

Mats Granlund
Swedish Institute of disability research, Linkoping University, Sweden
Jönköping University, Jönköping, Sweden
✉ mats.granlund@hhj.hj.se

Patrik Arvidsson
Swedish Institute of disability research, Linkoping University, Sweden
✉ patrik.arvidsson@lg.se

Key words
Prospective memory, intellectual disability, episodic memory
Abstract

Background

Persons with intellectual disability express frequently poor prospective memory. Prospective memory loads on limited capacity resources for episodic memory, working memory and attention. Load occurs both from encoding, storage and retrieval of prospective, retrospective and ongoing tasks which involve top down attentional control processes or automatic bottom up processes.

Methods

23 individuals with intellectual disability and a control group of 25 individuals performed a prospective memory game (Levén et al., 2013) with an ongoing episodic memory task and a working memory task. The game included prospective memory tasks with a low and high demand on top down attentional control processes. The groups differed in raven scores.

Results

The intellectual disability group committed frequent omissions and were outperformed by the control group on both prospective memory, episodic memory and working memory tasks. Both groups performed significantly better in tasks with low demand on top down attentional processes. A link between the intended task and target improved cued recall performance only in the intellectual disability group, likely because of near ceiling performance in the control group. Contrary to previous results (Levén et al., 2008; Levén et al., 2011), working memory correlated with prospective memory with high load on episodic memory only in the control group. On the other hand, as in previous studies, different memory processes were correlated to a higher extent and varied more in the intellectual disability group.

Conclusions

As assumed, persons with intellectual disability can manage prospective memory tasks with a high load on bottom-up processing, however, performance is reduced if more top-down processing is required. High episodic memory performance for persons with intellectual disabilities with a link between targets and prospective memory action to perform, did not correspond with higher prospective memory performance as would be expected due to reduced load on episodic memory.
Purpose of the study

Previous studies have shown prospective memory (PM) errors in persons with intellectual disability (adults, Levén et al., 2007, 2008, 2011, 2013, adolescents, Meilan et al., 2009). Load occurs both from prospective, retrospective and ongoing tasks. A link between targets and the intentions to perform are assumed to reduce the load on episodic memory, for instance, to buy bread at the bakery. This project used two prospective memory tasks differing in episodic memory load. PM retrieval either results from top down attentional control processes or automatic bottom up processes. Re-occurring targets, and intention to perform required less top-down processing than unique targets and intentions to perform.

Method

Persons with moderate intellectual disability were recruited from the municipal day activity centres. These persons were matched with participants without intellectual disability for chronological age (intellectual disability (23) = 30.53, SD = 10.55; control group (25) = 28.36, SD = 10.34) and gender (intellectual disability: 8 men and 15 women; control group: 9 men and 16 women). Raven’s scores differed between the groups (intellectual disability (23) = 15.8, SD = 6.2; control group (25) = 33.52, SD = 1.39).

The Prospective Memory Game. The PM Game (Levén et al., 2013) measured PM, either with a low or a high load on episodic memory.

How to play. The game is about collecting points in the computerised PM Game. A “trace” (red footprints) is left behind as the participant advances along the trail.

Prospective Memory tasks. The PM task with a low load on episodic memory includes a target in 10 positions on the virtual board. The PM task with a high load on episodic memory was based on 10 different PM targets. Each of these targets is linked with different intended tasks to perform.

Episodic Memory tasks. Nouns (2 syllables in Swedish, word frequency .0000050’-.001000, GP-04) were presented verbally and as pictures at four positions in the trail. Free recall of these words in random order was used as episodic memory task. Cued recall of items with no obvious link between the targets and intended tasks formed the demanding condition as opposed to the low demand condition with items with a link between targets and tasks.

Working Memory. The Picture Position Span Task (range: 0-60; Levén et al., 2011) was used to measure working.

Results

PM errors were more frequent in the intellectual disability group compared to the control group regardless of the episodic memory load (table 1). Performance on working memory, cued recall and free recall was poorer in the intellectual disability group than in the control group. Performance above floor level on the PM task with a high load on episodic memory was related to better cued-recall performance. Contrary to previous results (Levén et al., 2008; Levén et al., 2011), working memory correlated with PM only in the control group ($r$ (25) = .42). The relation between PM and episodic memory processes has been found previously in the intellectual disability group (Meilan et al., 2009).
Table 1. Group performances on prospective memory, working memory and episodic memory

<table>
<thead>
<tr>
<th>Task</th>
<th>With intellectual disability</th>
<th>Without intellectual disability</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 25 m SD min max</td>
<td>N = 25 m SD min max</td>
<td></td>
</tr>
<tr>
<td>Prospective Memory Game</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular task *</td>
<td>67 .28 0 100</td>
<td>98 6 0 100</td>
<td>5.17 *</td>
</tr>
<tr>
<td>Irregular task *</td>
<td>28 .28 0 100</td>
<td>88 15 0 100</td>
<td>8.93 *</td>
</tr>
<tr>
<td>Episodic Memory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cued recall</td>
<td>2.35 2.33 0 9</td>
<td>8.84 1.11 6 10</td>
<td>11.34 *</td>
</tr>
<tr>
<td>Cued recall with a link (0-5)</td>
<td>1.66 .35 0 5</td>
<td>4.60 .58 3 5</td>
<td>7.85 *</td>
</tr>
<tr>
<td>Cued recall without link (0-5)</td>
<td>1.47 .51 0 5</td>
<td>4.24 .93 2 5</td>
<td>12.97 *</td>
</tr>
<tr>
<td>Free recall (0-20)</td>
<td>3.52 2.63 0 9</td>
<td>9.16 3.47 3 15</td>
<td>6.30</td>
</tr>
<tr>
<td>Working Memory</td>
<td>Picture Span</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13.26 9.50 3 32</td>
<td>51.56 6.19 56 60</td>
<td>16.40 *</td>
</tr>
<tr>
<td>Non-verbal intelligence</td>
<td>Raven's</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.78 6.20 8 33</td>
<td>38.52 1.38 31 35</td>
<td>13.41 *</td>
</tr>
</tbody>
</table>

Discussion

The prospective memory performance of the intellectual disability group was higher in the condition with low demand on episodic memory as assumed. This result supports intellectual disability being interpreted as a delay in development in line with the development in children without intellectual disability. All participants performed the PM task with a low episodic memory load. Complete omissions were the most frequent PM error in the intellectual disability group. These errors are likely to depend on self-initiation difficulties in the intellectual disability group (cf. Meilán et al., 2009). However, good cued recall performance only for targets associated with the PM tasks suggests that persons with intellectual disability rely primarily on bottom up processes.

Selected References

Parental effects of an intensive family competence intervention for families of children with rare diseases

David Norlin, PhD student
University of Gothenburg, Department of Psychology, Gothenburg, Sweden.
✉ david.norlin@psy.gu.se

Malin Broberg, Professor
University of Gothenburg, Department of Psychology, Gothenburg, Sweden.
✉ malin.broberg@psy.gu.se

Key words
Parent intervention, family competence, rare diseases
Knowledge is crucial for parents’ competence to make informed and rational decisions about their child with special needs and to gain self-efficacy in the parenting role. Previous research indicates that parents of children with disabilities benefit from psychoeducational group interventions. However, to our knowledge, there is a lack of research on group interventions for parents of children with rare diseases. The aim of the present study was to assess the effects of a brief intensive family competence intervention for families of children with rare diseases, on parents’ empowerment, stress and psychological symptoms. The intervention is offered by the Swedish national competence center for rare diseases, on each occasion with a specific target diagnosis. Families stay together for five days and parents participate in workshops and group discussions about medical, psychological and family aspects of their child’s diagnosis. A separate age- and functionality-appropriate programme is arranged for the children and siblings. Survey self-report data before and three months after the intervention was obtained from 67 mothers and 41 fathers of 84 affected children, representing 23 different rare diseases, mainly genetic syndromes or congenital disorders. Parents rated their level of stress, empowerment, anxiety- and depression-related symptoms, and, after participation, what aspects of the intervention they perceived as most important. Mothers reported higher levels of anxiety and family empowerment than did fathers. Mothers and fathers reported increased psychological empowerment and increased child-related marital stress after the intervention. Important to parents were: the sharing of experiences with other parents, meeting other children with the same diagnosis, and knowledge about the diagnosis. We conclude that even a brief intervention may promote parents’ empowerment and hypothesize that the increase in marital stress after intervention may be related to a process of renegotiation of family roles.
Parents of children with a disability or chronic health condition often experience more stress than parents of typically developing children. Although a majority of parents of children with disabilities display psychological well-being in the normative range, for mothers especially, there is an elevated level of symptoms related to depression or anxiety. Parents of children with disabilities describe contact with other parents as helpful, and parent networks are used as a source of information as well as social and emotional support. The limited previous research on group interventions to reduce the distress of parents of children with disabilities indicates that they are beneficial to parents, at least in the short term. For parents of children with rare diseases, lack of information and knowledge is a significant stressor. It is not uncommon to encounter professionals who have never heard of the diagnosis, and parents may need to act as educators. Getting access to the right care and services is difficult and puts high demands on parents as information coordinators and experts on their child’s diagnosis. Knowledge is crucial for parents’ competence to make informed and rational decisions about their child, to cater for their child’s needs, and to gain self-efficacy in the parenting role.

Aims

The aim of the present study is to assess the effects of a brief intensive family competence intervention for parents of children with rare diseases. It was hypothesized that the intervention would increase parents’ empowerment, and decrease their levels of stress and depressive- and anxiety-related symptoms. Given that previous research indicates that mothers and fathers often give differing descriptions of their process of adaptation to the role as parent of a child with a disability, a secondary aim was to investigate whether mothers and fathers differed with respect to the variables studied, before and/or after the intervention.

Methods

The Swedish national competence centre for rare diseases offers the intervention regularly, each occasion targeting a specific diagnosis. For five days, around ten families with an affected child stay together, offering the opportunity to engage with and receive mutual support from other families in a similar situation. Parents receive medical information from experts on the diagnosis and participate in workshops and discussions about the psychological, social and relational aspects of caring for an affected child. Children take part in a programme adapted to their age and abilities.

A baseline survey was mailed to 554 parents (294 mothers and 260 fathers) prior to the intervention. Parents who completed this survey also received a follow-up survey three months after the intervention. Those who did not return the follow-up survey within three weeks, received a reminder and a new copy. Completed surveys at both times were sent in by 108 parents (67 mothers and 41 fathers), indicating a response rate of 19.5% (22.8% for mothers and 15.8% for fathers). These participants were the parents of 84 children, representing 23 different rare diseases. The largest diagnostic groups were: narcolepsy following H1N1/09 vaccination (n=28), dyskinetic cerebral palsy (n=7) and acondroplasia (n=6). The remaining 43 children had various genetic syndromes or congenital disorders. Children were between 9 months and 19 years old at the start of the intervention, with mean age 9.11 years (SD=4.73), and 43 (51.2%) of them were girls.

Parents’ symptoms of depression and anxiety were measured using the Hospital Anxiety and Depression Scale (HADS). Parental stress was measured using the Negative Impact subscale of the Family Impact Questionnaire (FIQ). Child-related marital stress was measured using the Marriage subscale of the FIQ. Empowerment was measured using the Family Empowerment Scale (FES; Singh et al., 1995), and the Psychological Empowerment Scale (PES; Akey et al., 2000). Each of the empowerment scales has four subscales, and in each of them one subscale
was omitted, since its items were not applicable to Swedish law and healthcare system.

In the follow-up survey, in addition to the above scales, parents were asked to indicate the perceived importance of the following aspects of the intervention: knowledge about the diagnosis; knowledge of available supports; sharing experiences with other parents; meeting other children with the same diagnosis as my child; extending my network; finding strategies to cope with daily life; finding strategies to handle contacts with service providers; finding strategies to handle contacts with school; finding strategies to handle other contacts with society; and greater confidence in my parenting. The parents indicated their level of agreement on a scale with four steps from 1 (not at all) to 4 (fully).

Mixed ANOVAs were used to compare levels of study variables, with parent gender as a between-subjects factor, and time as a within-subject factor. The significance level was set at p=0.05.

Findings

Mothers reported higher levels of anxiety and family empowerment than did fathers. Mothers and fathers reported increased psychological empowerment over time, and increased child-related marital stress over time. Interaction effects between gender and time were nonsignificant for all study variables.

The three aspects of the intervention that were rated highest, by mothers as well as fathers, were: sharing experiences with other parents, meeting other children with the same diagnosis, and knowledge about the diagnosis. The top two aspects were scored at least 3 (fairly) by all parents.

Conclusions

Even a brief family competence intervention may have positive results for parental empowerment, and be perceived as beneficial by parents. As expected, mothers reported higher levels of distress than fathers. A possible interpretation of the surprising increase of marital stress after the intervention, is that an intervention involving both mothers and fathers may disturb previously stable interaction patterns within the family system, necessitating renegotiations of family roles and responsibilities, which possibly increases friction until equilibrium is regained. Parents in this intervention valued the opportunity to share and engage with other families where a child has the same disease. The results must be interpreted with some caution in light of the low response rate. Qualitative research would be warranted to further explore the experiences of mothers and fathers who participate in the intervention.
Assistive Technologies for Cognition are not sufficiently supporting children with cognitive disabilities in making plans of everyday life; they are only used for executing the plan.

Lisa Palmqvist
Department of Behavioural Sciences and Learning, Linköping University
Swedish Institute for Disability research
Linköping, Sweden
✉ lisa.palmqvist@liu.se

Henrik Danielsson
Department of Behavioural Sciences and Learning, Linköping University
Swedish Institute for Disability research
Linköping, Sweden
✉ henrik.danielsson@liu.se

Key words
Assistive cognitive technology; Intellectual disability; Attention deficit hyperactive disorder
Abstract

There are many commercially available Assistive Technologies for Cognition (ATCs) aiming to support everyday planning, some made for the general public and others specifically manufactured for individuals with cognitive disabilities. Nevertheless, evaluations of whether the ATCs are successful in supporting the planning abilities have not yet been done. The aim of this study was to study how ATCs are used among children with Intellectual Disability (ID), Attention Deficit Hyperactive Disorder (ADHD) and children without cognitive disabilities. The diagnosis ID is explicitly included in the Swedish regulations concerning support and services, whereas the diagnosis ADHD is not. However, earlier research has found equally low adaptive functioning in children with mild ID and children with ADHD, suggesting an equal need for support. In the current study, answers from 139 parents collected from an online survey concerning everyday planning, was analysed using thematic qualitative analysis. The results show that, even though many ATC are facilitating family’s everyday life, it is the parents who makes the plans and the children just execute them. This finding was consistent in all three group. The four main reasons for why the ATCs were not used by the children were: (1) the ATCs’ poor usability, (2) the ATC had too high demands on the children’s cognitive abilities, (3) the children did not want to use it, and (4) the parents did not want the to child to use it, stating that it was easier and faster to do the planning themselves. It is concluded that it is needed to both develop ATCs that enables the children to make plans themselves, as well as training the children’s planning ability.
Aims

There are many commercially available Assistive Technologies for Cognition (ATCs) aiming to support everyday planning. Some made for the general public and others specifically manufactured for individuals with cognitive disabilities. Nevertheless, evaluations of whether the ATCs are successful in supporting the cognitive abilities have not yet been done. Gillespie, Best, and O’Neill (2011) states in a meta-analysis that new ATC devices are only briefly tested and then left unstudied, resulting in weak evidence for their effectiveness. The current study aimed to study how ATCs are used among children with, and children without cognitive disabilities. Two groups with cognitive disabilities were included in this study. One being Intellectual Disability (ID) and the second was Attention Deficit Hyperactive Disorder (ADHD), both the combined-type with hyperactivity and the inattentive-type often referred to as ADD, in this study both types are noted as ADHD. In addition, a typical developing group (TD) without cognitive disabilities where included. The diagnoses ID is explicitly included in the Swedish regulations concerning support and services, whereas the diagnosis ADHD is not (1§, SFS1993:387). Research comparing ID with ADHD is limited (Lindblad et al., 2013). However, Lindblad and colleagues found equally low adaptive functioning in children with mild ID and children with ADHD, suggesting an equal need for support.

Methods

An online survey answered anonymously by parents to children from the three groups: ID, ADHD, and TD. The survey consisted of both open and closed questions. This abstract is presenting the response to the following questions (translated from Swedish): ‘What ATCs is being used in your child’s everyday planning?’, ‘Please, state what works well with each reported ATC respectively,’ ‘Please, state what doesn’t work well with each reported ATC respectively,’ ‘Did you choose not to use an ATC, why?’ and ‘Are there any ATCs you are missing?’. Parents were recruited on a social media platform. To confirm the child’s diagnosis, the parents were requited from interest groups for each of the research groups respectively, the online survey also included questions regarding if their child had a cognitive disability or not. The criteria for inclusion were to have a child between the age of 6-19. The child should either be diagnosed with ADHD or ADD for the ADHD group, ID for the ID group, and for the TD group not have ADHD or ID. Exclusion criteria was if a child had a combination of ID and ADHD. A total of 214 parents answered the survey, two had to be excluded for not answering any of the questions, and 21 did not meet inclusion criteria and a total of 139 respondents answered at least one open-ended question. These 139 reported that their child had a mean age of 11.2 (SD=5.2) years and 39 % of the parents reported that they had a daughter. The distribution of the three groups and the average number of reported ATCs per child is presented in Table 1. The difference between the three group on the number of ATCs used per child was compared in an ANOVA. The overall effect was significant, F(2,136) = 21.52, p<.001. Post Hoc tests with Bonferroni correction, revealed that TD had significantly less ACTs than children with ADHD (p<.001), which in turn had significantly less ATCs than children with ID (p<.001). The 139 respondents were analysed using a qualitative thematic text analysis. The text was analysed by first translating each responds to concepts. Concepts describing similar things were grouped together into themes. Kindred themes were then grouped together into categories.

Table 1. Descriptives of the groups. TD = typical developing, ADHD = Attention deficit hyperactive disorder, ID = Intellectual disabilities.

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>N</th>
<th>Mean (and SD) of no. ATC/child</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD</td>
<td>23</td>
<td>1.7 (1.5)*</td>
</tr>
<tr>
<td>ADHD</td>
<td>87</td>
<td>4.0 (2.3)*</td>
</tr>
<tr>
<td>ID</td>
<td>29</td>
<td>6.0 (3.0)*</td>
</tr>
</tbody>
</table>

*p<.001 (Bonferroni correction)
Results

Parental reports stated it was the parents themselves who were using the ATC to make the plan, the child then uses the already set-up ATC for executing it. The child who made the plan with the ATC. The answers show that many ATC are facilitating family’s everyday life, but no parent from either group reported it being the children themselves who were making the plans.

The parents stated different reasons for why the child could not use the ATC themselves. The four main reasons were:

1. the ATCs' poor usability for the children, i.e. the ATC presented an overload of information, creating a clutter for the child who could not distinguish what was important and not,
2. the ATC had too high demands on children's cognitive abilities; the child got distracted by the ATC or forgot to bring it altogether,
3. the children did not want to use it, feeling embarrassed or stressed, and,
4. the parents did not want the child to use it; it was easier and faster to do the planning themselves.

Finally, the ATC does not train their child's cognitive ability in how to make a plan. Rather the ATC supports it, which sometimes resulted in an addiction to the ATC.

Conclusions

There are many ATCs aimed for supporting planning commercially available, some made for anyone and others specifically manufactured for individuals with cognitive disabilities. Nevertheless, results from the qualitative analysis show that parents are using the ATC to setup the plan for their child and the child is only executing the already made plan. For different reasons the child is not able or allowed to use it themselves. Future research should focus both developing ATCs that enables the child to make plans themselves, as well as training the child’s planning ability to make plans for everyday activities.

References

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Borderline Intellectual Functioning in 4- to 7-year-old children

Francesca Pulina
Department of Developmental Psychology and Socialization, University of Padova, Padova, Italy
✉ francesca.pulina@unipd.it

Silvia Lanfranchi
Department of Developmental Psychology and Socialization, University of Padova, Padova, Italy
✉ silvia.lanfranchi@unipd.it

Renzo Vianello
Department of Developmental Psychology and Socialization, University of Padova, Padova, Italy
✉ renzo.vianello@unipd.it

Key words
Borderline Intellectual Functioning; cognitive profiles; socioeconomic disadvantage
Abstract

Borderline intellectual functioning (BIF) is a clinical condition characterized by an IQ 1-2 standard deviations below average and an impaired adaptive functioning that negatively affects daily life (see DSM-IV TR and DSM-5 [APA, 2000, 2013]).

On a Gaussian distribution of intelligence, the prevalence of BIF seems to near 13.6% of the population, but this figure does not take into account the criteria of deficit in adaptive functioning, and it is not always confirmed in studies on BIF. Despite its high prevalence, BIF occupies little space in the literature, having attracted more attention only in recent years. The body of knowledge on BIF is consequently still fragmented and inadequate, and this has negative effects on the related clinical and educational practices.

The aim of the present contribution was to explore BIF in 4- to 7-year-old children, in terms of prevalence, causes and profiles, focusing particularly on working memory and executive functions. As expected, when both intellectual and adaptive functioning were considered, the prevalence of BIF was lower than the Gaussian curve of the distribution of intelligence might lead us to expect. Our results also show that socio-economic and cultural disadvantages often coincide with BIF, suggesting that they may have a negative influence on intellectual and adaptive functioning by limiting affected individuals' potential already early in their development. The verbal and visuospatial components of working memory, and activities requiring more mental flexibility seem to be particularly affected in children with BIF.
Characterized by an IQ between 71 and 84, and adaptive functioning problems (APA, 2000, 2013), borderline intellectual functioning (BIF) is a clinical condition often associated with behavioral and psychiatric disorders, and with negative effects on daily life. Judging from the Gaussian distribution of intelligence, individuals with BIF would account for 13.6% of the population, but this is not always confirmed in the literature and its prevalence is probably lower, as suggested by some authors (e.g. Ninivaggi, 2001).

The prevalence of BIF and the problems often associated with this condition are far from negligible, however, but there is a paucity of research on BIF in the Italian and international literature. BIF thus remains a relatively unknown phenomenon, not only in research, but also in the clinical and educational settings.

A condition often associated with BIF is socioeconomic disadvantage. In the nature versus nurture debate, and starting from the idea that intelligence is changeable, it is easy to imagine that living in an environment lacking in positive stimuli could reduce an individual’s potential. Such an effect could be evident early on, and the provision of adequate support and opportunities could lead to better outcomes, especially if BIF is recognized promptly.

The aim of the present contribution was to explore BIF in terms of its prevalence, causes and cognitive profiles, among children between 4 and 7 years of age enrolled at Italian kindergarten and primary schools. The results of our exploratory analysis on this phenomenon are briefly outlined below.

Three studies were conducted at mainstream schools and did not initially focus only on children who already had a diagnosis of BIF. Based on the DSM, we analyzed not only intellectual, but also adaptive functioning – aspects just as relevant as IQ in defining the condition of BIF.

A first study concerned 100 children aged 4 and 5 years attending kindergarten. The Logical Operations test (LO; Vianello & Marin, 1997) was administered in a first phase to identify the children with a below-average IQ. The LO assesses logical thinking in children with a mental age between 4 years and 7 years and 11 months by means of 18 tasks that analyze areas of seriation, numeration, and classification, with a lower influence of the verbal component. Thirteen of the 100 children revealed an IQ below the first standard deviation and were considered in the second phase of the study. The aim of the second phase was to analyze the children’s adaptive development and socio-demographic characteristics by means of an interview with their teachers and, where possible, with their parents concerning the children’s development, the family’s socioeconomic characteristics, and the children’s adaptive functioning, using the Vineland Adaptive Behavior Scale (VABS; Sparrow et al., 1984). Based on the outcome of the interview, the number of children confirmed as cases of BIF dropped to 6-7. In at least 5 cases, BIF was associated with socio-cultural disadvantages.

In another study, aimed at analyzing working memory (WM) and executive functions (EF) in BIF, teachers of the children in their last year of kindergarten were asked to indicate which children they felt were struggling. The teachers identified 58 of 213 schoolchildren (about 5 years old), and 7 of them revealed characteristics supporting a diagnosis of BIF in the LO test, WPPSI (Wechsler, 1973) and VABS. These children were consequently administered the WM and EF tasks. They were all impaired in the WM tasks (both spatial and verbal components), and had particular difficulty in the dual task. As for EF, almost all of these children showed specific impairments in cognitive flexibility, shifting and planning, whereas their sustained attention seemed to be preserved. In this second study, most of the cases of BIF were again associated with socioeconomic/cultural disadvantages.

A study was also devised to analyze WM, EF and metamemory in 140 Italian primary school children aged 6 and 7 years. Pupils were first administered the LO test to screen the sample for intellectual functioning issues. Twenty-eight of the children had IQ scores more than one standard deviation below the mean and were administered the dynamic version of the LOC test (Vianello et al., 2012) and the WISC-IV (Wechsler, 2003). In the latter test, which provides more detailed information on intellectual functioning, 9 children revealed an IQ from 71 to 84. Combined with the results of the VABS administered to the parents and/or teachers of these 9 children, BIF was confirmed for 8 of them (amounting to almost 6% of the original sample), who were then administered WM, EF and metamemory tasks. The results revealed impairments in the verbal and visuospatial components of WM, and in metamemory development. The results regarding EF varied between
different individuals, but selective and sustained attention, inhibition and mental flexibility appeared to be the most impaired. Here again, the domestic environment was characterized by socioeconomic disadvantage in 5 of the 8 cases.

Although our results can hardly be considered definitive, these studies provide some insight on BIF in Italian schools. Though it is lower than might be expected from the Gaussian distribution of intelligence, the prevalence of BIF is quite high (6-7% in our first and third studies) and warrants specific attention and intervention. Our studies also confirmed that socioeconomic disadvantage is very often associated with BIF, leading to hypothesize that living in a scarcely stimulating environment can restrict children's potential, influencing their early intellectual and adaptive functioning, and leading to BIF in children who were originally functioning normally. Finally, although the cases seen in our studies had different strengths and weaknesses in their profiles, they were all impaired in the verbal and visuospatial components of WM, and had major difficulties in tasks requiring mental flexibility. The most evident difference between the two age groups considered here concerned sustained attention, which was relatively well preserved in the preschool children, and more severely impaired in almost all the BIF cases in primary school – though this difference may be due to different tasks being administered to the two age groups.
Providing a novel framework to measure the key components of executive function in Down syndrome, with applications for efficient early clinical diagnosis of dementia

Liz Smith
University of Bristol, Bristol, UK
✉ Liz.Smith@bristol.ac.uk

Chris Jarrold
University of Bristol, Bristol, UK
✉ C.Jarrold@bristol.ac.uk

Key words
Down syndrome, Executive function, Baseline measure.
Down syndrome (DS) is associated with a greatly increased risk of developing early onset Alzheimer's disease (AD). One of the most consistent early signs of AD in those with DS is executive function (EF) decline. Detecting meaningful decline in EF in those with DS is complicated as individuals are expected to have cognitive performance below average prior to AD. Further to this, there are an array of components under the umbrella term of EF, and various different tasks are used to test these functions. With 20 adults with DS (aged 25-45) and 20 typically developing (TD) children matched for non-verbal mental age, we extract measures of three core components of EF using one simple framework, allowing for controlled comparisons of performance across these key components. Specifically, we measure individuals’ ability to deal with the memory updating, inhibitory, and temporal components of EF. We additionally retested participants with DS 4 weeks after the first session. Preliminary results show a significant effect of memory load, with reaction times (RTs) increasing as memory load increases in both populations. RTs were significantly faster on ‘proactive response’ trials for both populations, and this benefit for proactive responses relative to immediate responses was greater with increasing memory load. For the individuals with DS, effects of inhibition occur only with no memory load. However, the trend in TD children shows an increase in inhibitory cost when memory load is present. RT difference costs for those with DS showed high test-retest reliability, indicating that this framework has potential with respect to the development of a regular baseline measure for DS individuals. The potential to use this framework to provide a simplified, fast screening measure to assess decline in DS, and the implications of this for allowing increased efficiency in early detection of AD in those with DS will be discussed.
Individuals with Down syndrome (DS) are at a greatly increased risk of developing dementia, specifically early onset Alzheimer’s disease. Executive function decline is one of the most consistent early signs of dementia in individuals with DS, as opposed to predominantly episodic memory declines that are often the earliest signs of dementia in the typical population. Detecting decline in executive functions in those with DS is complicated as individuals are expected to have cognitive performance below average prior to dementia. It is vital to obtain baseline measures of executive function for individuals with DS such that it is possible to determine meaningful decline. There are, however, an array of components under the umbrella term of executive functions, and a number of different tasks are used to test these different functions; such differences can lead to different results. The findings regarding executive function in the DS population are very mixed.

**Method:**

Participants in this study include 20 adults with DS (aged 25-45) and 20 typically developing (TD) children matched for non-verbal mental age. A further twenty typically developing adults were included to provide pilot data. We present a methodology that extracts measures of three core components of executive function using one simple framework, allowing for controlled comparisons of performance across the components of executive function. Specifically, in this single framework we measure individuals’ ability to deal with the memory updating, inhibitory, and temporal components of executive control. As shown in Figure 1.

![Figure 1. The three levels of memory load, two levels of inhibition and two levels of temporal load](image)

We tested participants with Down syndrome on two occasions separated by approximately 4 weeks to determine the reliability of this measure as a baseline for this clinical population.

**Preliminary Analyses:**

Preliminary analyses have been carried out for 14 individuals with DS and for 11 typically developing children. The preliminary results indicate a significant main effect of memory load (p < .01), common to both populations. As memory load increases reaction times are slower (see Figures 2a and 2b). There was a significant main effect of delay, as expected, with faster responses on ‘proactive’ trials for both populations (p < .01), there was also a
significant interaction of delay x memory load (p < .01), common to both populations, such that the difference between reaction times in the proactive (delay) vs immediate response (no delay) conditions was greater for both the low and high memory load conditions, relative to the no memory load condition. A main effect of inhibition was bordering significance in preliminary analyses for the TD group (n = 11, p = .051), with a non-significant trend toward greater inhibition costs under an increase in memory demands. In contrast, preliminary analyses of the DS group indicate no main effect of inhibition (p = .20), however a significant inhibitory cost in the no memory load condition was present (p = .04); this reflected a 70ms – 80ms incongruency cost.

Test-Retest reliability of Down syndrome individuals' scores:

The overall inhibitory cost appeared to vary considerably from one participant with DS to the next, however the preliminary data from these 14 individuals with DS does indicate high test-retest reliability from time 1 to time 2 for the measure of inhibitory cost (r = .83, p < .01), as shown in Figure 3a. Test-retest reliability was also calculated for the memory load cost. The cost of a low memory load relative to no memory load upon DS participants' reaction times did not correlate significantly from time 1 to time 2 (r = .28, p = .34), however, the reaction time cost of high memory load relative to low memory load was reliable from time 1 to time 2 (r = .62, p = .02) as shown in Figure 3b. The validity and reliability of this framework based on the full data set will be presented.

Summary and conclusions:

It appears so far, that effects of inhibition occur only when the individuals with Down syndrome do not have a memory load, and are thereby making faster responses. These adults with Down syndrome are much faster at responding when they do not have memory load. Reaction times increased with increasing memory load, as also observed for TD children of similar non-verbal mental age. However from the currently small sample of TD children tested the trend appears to show an increase in inhibitory cost when the memory load is present. Reasonable correlations were observed from time 1 to time 2 for the inhibition cost in the immediate response (no delay) condition (this was also apparent in the proactive response (delay) condition), and for the memory load cost (high load minus low load). These findings so far suggest these measures capture reliable individual differences. This framework could be adapted to provide a simplified, fast baseline screening measure to assess decline in executive functions in those with DS.
Figure 2a and b. Reaction times (Left panel: Down syndrome, Right panel: Typically developing children)

Figure 3a and b. Correlations between reaction time costs at time 1 and time 2. Left panel: Inhibition cost. Right panel: memory load cost (High memory load minus low memory load).
Attitudes of French secondary school teachers including students with autism spectrum disorders in their classrooms

Sabine Zorn
EA 7287 Grhapses, INS HEA, 58-60 avenue des Landes, 92 150 Suresnes, France
✉ sabine.zorn@inshea.fr

Minna Puustinen
EA 7287 Grhapses, INS HEA, 58-60 avenue des Landes, 92 150 Suresnes, France
✉ minna.puustinen@inshea.fr

Key words
inclusive education, teachers’ attitudes, ASD
Despite the law of 2005 on accessibility for people with disabilities, the number of students with autism spectrum disorders (ASD) attending regular schools, especially at the secondary school level, remains small in France. Yet, even though many international studies have analyzed teachers’ attitudes towards students with ASD and have revealed the key role played by the teachers in the inclusion of students with ASD in mainstream education (Chung et al., 2015; Humphrey & Symes, 2013; McGregor & Campbell, 2001; Robertson et al., 2003; Soto et al., 2012), the few existing French studies on this topic mainly focus on primary education. Our aim was to fill this gap, by interviewing French secondary school teachers who include students with ASD in their classrooms, in order to better understand their conceptions of ASD and inclusive education in general, as well as their attitudes towards students with ASD, their training and school context. Furthermore, given that difficulties in social interaction are a central characteristic of ASD (Wing & Gould, 1979), we were particularly interested in the teachers’ conceptions and practice of social interactions (especially help interactions) with their students with ASD. Sixteen teachers (9 general education teachers, and 7 special education teachers) teaching a scientific school subject (e.g., mathematics, physics) in a mainstream secondary school (in a regular classroom or in a resource classroom) in the Ile-de-France region in France, and including at least one student with ASD in their classroom, were interviewed. A qualitative content analysis showed that most teachers’ conception of inclusive education was reminiscent of the notion of integration (rather than inclusion). Most of them mainly focused on avoiding stigmatization of their students with ASD rather than on providing them with specific help or assistance.
Inclusive education for children with disabilities is an emerging research topic in the field of educational psychology in France. In fact, despite the 2005 law on accessibility for people with disabilities, only 20% of school-aged children with autism spectrum disorders (ASD) attend regular schools (Direction générale de l’enseignement scolaire, 2012) for example. In addition, the higher you move up in the French school system, the less students with ASD there are.

Many studies on teachers’ attitudes towards pupils with ASD exist in the literature (Chung et al., 2015; Humphrey & Symes, 2013; McGregor & Campbell, 2001; Robertson et al., 2003; Soto et al., 2012), revealing the key role played by teachers in the inclusive education process of these students. In particular, these studies have shown the importance of teachers’ attitudes and training, the school context in which they teach as well as their conception of ASD and inclusive education in general. In France, only few studies have investigated teachers’ attitudes towards teenagers with ASD. In addition, the few existing studies mainly focus on primary education (Observatoire régional de la santé des Pays de la Loire & Centre régional d’études et de ressources pour l’autisme des Pays de la Loire, 2012).

To fill this gap, we chose to interview French secondary school teachers who currently include at least one student with ASD in their classrooms. The interviews focused on the factors emphasized by previous studies, in particular, teachers’ conceptions of ASD and inclusive education in general, their attitudes towards students with ASD, their training and school context. In addition, given that difficulties in social interactions are considered one of the key characteristics — and one of the two diagnostic criteria — of people with ASD (American Psychiatric Association, 2013; Wing & Gould, 1979), we were also interested in the teachers’ conceptions and practice of social interactions (especially help interactions) with their students with ASD. Different definitions of help interactions, reflecting different theoretical approaches, can be found in the literature. In the present study, we focused on help provided by the teachers to their students with ASD, whether the interaction is initiated by the teacher (cf. research on tutoring or scaffolding; e.g., Wood et al., 1976) or by the student (cf. research on student help seeking; e.g., Puustinen, 1998). In other words, our interview also contained items concerning the help teachers provide their students with ASD, and the help their students with ASD possibly seek in the classroom.

We interviewed a total of 16 teachers (9 general education teachers, and 7 special education teachers) teaching a scientific school subject (e.g., mathematics, physics) in a regular secondary school (in a regular classroom or in a resource classroom) in the Ile-de-France region in France, and currently including at least one student with ASD in their classroom. Each semi-structured interview lasted about an hour. Transcripts of audio recorded interviews were analyzed using a thematic content analysis.

Our first results showed that even though the definitions of ASD given by the teachers were, globally, quite close to the scientific definition, most teachers had only a limited understanding of the consequences of ASD on students’ behavior in the classroom. As far as the conception of inclusive education is concerned, a majority of the teachers remained vague and did not mention the law of 2005. For example, their conceptions of inclusive education were reminiscent of the notion of integration (rather than inclusion). As for their training, a majority of the teachers (even in the special education teachers’ group) reported not having had any specific training on ASD. Regarding help interactions, our preliminary results showed that most teachers mainly focused on not stigmatizing students with ASD in their classrooms, and declared not providing any specific help to these students, apart from simplifying the tests’ content. Those teachers who proposed specific help cited strategies such as reducing their verbal output, staying next to the student, or sequencing task procedures for example, and claimed they spent more time with these students than with the others. As far as students’ help seeking is concerned, most teachers said that students with ASD did seek help, especially for organizational issues (e.g., how and when to use classroom material).
References


Atypical Development of Social Cognition, Language and Memory

Laure IBERNON
Université de Picardie Jules Verne
Laboratoire CRP-CPO (EA 7273) - Axe Processus Cognitifs et Handicap
Amiens, France
✉ laure.ibernon@u-picardie.fr

Béatrice BOURDIN
Université de Picardie Jules Verne
Laboratoire CRP-CPO (EA 7273) - Axe Processus Cognitifs et Handicap
Amiens, France
✉ beatrice.bourdin@u-picardie.fr

Key words
Communication, Cognition, Atypical développement
Abstract

Communication is an essential feature of cognitive and social development. From early interactions to scholar learning, the way children interact with each other, understand emotions, take the context into account, use memory and attention are all prerequisites for efficient communication. How do these skills function in children with atypical and/or delayed development?

The aim of this symposium is to provide a better understanding of cognitive and socio-emotional development in children and adolescents with atypical development. To this end, we investigate the processes involved in social cognition, language and memory development.

Oral presentations are going to address the issue of the underlying processes of communication development, taking as challenging insights the specific processes involved in Gifted Children or in cases of genetic (Williams and Down syndromes) and socio-cognitive disorders (Autism Spectrum Disorders, ASD). Therefore, the first oral presentation is about “Microanalysis of joint visual attention sequences in ASD children” (Deschamps, Cilia & Vandromme), the second concerns “Linguistic and social abilities in French participants with Williams syndrome” (Touchet, Vandromme & Ibernon), the third deals with “Words referring to emotional concepts understanding in children and adolescents with Down syndrome” (Pochon & Declercq), while the fourth relates to “Working memory and attention in gifted children with dyslexia” (Aubry & Bourdin).

This symposium will provide a space for exchanging information concerning the developmental links between the investigated cognitive processes, as well as the identification of the main factors responsible for difficulties in atypical development. In particular, we will discuss different manners of taking into account the developmental trajectories of children and adolescents with atypical development, in order to expose ways which will assure the best care for them.
Microanalysis of joint visual attention sequences in ASD children

Loïc DESCHAMPS
Université de Technologie de Compiègne
Laboratoire COSTECH (EA2223) - Equipe CRED
Compiegne, France
✉ loic.deschamps.upx@free.fr

Federica CILIA
Université de Picardie Jules Verne
Laboratoire CRP-CPO (EA 7273) - Axe Processus Cognitifs et Handicap
Amiens, France
✉ cilia.federica@gmail.com

Luc VANDROMME
Université de Picardie Jules Verne
Laboratoire CRP-CPO (EA 7273) - Axe Processus Cognitifs et Handicap
Amiens, France
✉ luc.vandromme@u-picardie.fr

Key words
Joint attention;
Autism Spectrum Disorders (ASD);
Interactive visual patterns
Abstract

An impairment of joint attention is a cardinal feature of Autism Spectrum Disorders (ASD). Therefore, understanding the nature of that impairment is central to developmental research. For instance, some fruitful insights may come from the objective investigation of interactive behaviors (such as the co-organization of gazes or pointing gestures).

We conducted a microanalysis of interactive visual patterns unfolding in a subset of 55 joint visual attention sequences, extracted from the videotaped semi-structured situations of 5 ASD children with severe cognitive and communication deficits. We compared this data to 68 joint visual attention sequences extracted from 5 children with typical development, matched on gender and developmental age.

The total number of identified joint visual attention sequences from which we extracted our subset is significantly lower in ASD. Within the investigated subset, we cannot conclude to a difference in the number of Mutual Gazes between ASD and controls, but ASD’s Mutual Gaze durations were significantly lower. In addition, we find a greater number and duration of Shared Attention. These results confirm the avoidance of other’s gaze during an interactive session and the attentional preference for objects. We have also investigated what comes after Mutual Gaze and Shared Attention patterns during the joint visual attention sequences. Results show no difference between both groups for none of the patterns following Mutual Gaze. However, significantly higher proportion of Attentional Disengagement after Shared Attention is found in ASD children compared to controls.

Our findings suggest that joint attention impairments in ASD originate from their difficulties in engaging in joint visual attention sequences, rather than from their difficulties to participate in interaction.
Introduction

Joint attention is the ability to coordinate attention with a partner allowing to share an experience about another person, an object or an event (Mundy et al., 2009). An impairment of that skill is known as a core marker of Autism Spectrum Disorders (ASD) (ibid.). The Early Social Communication Scale (Seibert & Hogan, 1982), translated into French (ECSP, Guidetti & Tourette, 2009), can assess joint attention skills in children, with or without ASD. It consists in a videotaped observation of semi-structured situations designed to encourage interactions between an adult and a child, coded to get a developmental age for social interaction, joint attention, and behavior regulation (ibid.). In ASD children, social interaction and joint attention are significantly altered compared to typical children, whether matched by chronological or developmental age (Girardot et al., 2009).

While joint attention skills used to be assessed quantitatively, using mostly non-ecological situations (Aubineau et al., 2015), the methodological challenge of our study is to investigate the qualitative structure of visual patterns occurring in interactive sequences involving a shared object, to better understand the very nature of that impairment in ASD.

Method

We used the annotation software ELAN (Lausberg & Sloetjes, 2009) to conduct a microanalysis of visual patterns unfolding during ECSP. We investigate the sequences involving the interaction of both partners with a shared object. We considered such a sequence as an instance of joint visual attention when we detect a combination of 4 mutually exclusive visual patterns: Mutual Gaze (MG), Shared Attention (SA), and two patterns of divided attention (when the child looks at the target while the adult gazes at the child, CT&AC; and when the child gazes at the adult while the latter looks at the target, CA&AT) (see Figure 1). All other patterns are considered as Attentional Disengagement (AD).

A selected subset of 123 joint visual attention sequences has been extracted from the videotaped ECSP of 5 ASD children (M=84.25 months, SD=26.02), with severe cognitive and communication deficits (as attested by BECS, PEP3 & ECSP scores) and 5 typical children without any story of ASD or communication impairments (M=20.30 months, SD=4.09). Both groups were matched on gender (4 boys and 1 girl) and ECSP’s global developmental age (M=21.10 months, SD=3.26 for ASD children and M=21.01 months, SD=5.14 for typical children; U=12.5, p>.05).
The subset of sequences includes the 5 first identified sequences of joint visual attention of each child, plus those occurring during the “poster session” (which is dedicated to the assessment of joint attention). All in all, 55 sequences of ASD children were compared to 68 sequences of controls.

Here, we focus our analysis on the Mutual Gaze and Shared Attention patterns. While the distribution of our data doesn’t fit with a normal curve, we used non-parametric statistical procedures.

**Results and discussion**

Taking the whole data, the number of identified joint visual attention sequences is significantly lower in ASD compared to typical children (U=1.5, p<.05). However, their duration does not discriminate both groups (p>.05). Nonetheless, typical children are significantly more frequently engaged in joint visual attention sequences than ASD children, which highlights, at least quantitatively, the impairment of that skill in ASD (Girardot et al., 2009).

If we detail the selected subset of sequences, no difference was found between both groups regarding the number of Mutual Gaze patterns (p>.05). However, the well-known difficulty of ASD to watch others is expressed here in the duration of these patterns, which is lower than in controls (U=962, p<.05). In addition, the Shared Attention patterns are more frequent in ASD than in controls (U=1284.5, p<.05), and last longer (U=1382, p<.05). These results may be explained by the tendency of ASD to look more at objects than at partners.

We later investigated what comes after a Mutual Gaze pattern during the joint visual attention sequences (see Figure 2).

![Figure 2: Distribution of gaze patterns after Mutual Gaze.](image)

In 70% of cases, ASD children remain engaged in the sequence (SA, CA&AT, and CT&AC). Furthermore, results show no difference between both groups for none of the patterns following Mutual Gaze (p>.05).

The same analysis for the Shared Attention pattern reveals greater differences between both groups, especially for the patterns involving a gaze from the ASD child towards the adult (MG and CA&AT) and for the percentage of attentional disengagement (AD) (see Figure 3).
Figure 3: Distribution of gaze patterns after Shared Attention.

However, the difference is significant only for the AD part, with a greater percentage of disengagement for ASD children than for the controls (U=1183, p<.05).

Therefore, the dynamical structure of joint visual attention sequences in ASD is not statistically different than those of controls, except for AD following SA. This suggest that the impairment in joint attention of ASD is not a matter of interaction skills per se, but refers more to a difficulty in engaging in joint visual attention sequences.

Conclusion

Quantitative differences are found between ASD and typical children as regards to the number and/or duration of Mutual Gaze and Shared Attention patterns. However, the combination of interactive visual patterns is quite similar, which suggests an effective participation of ASD children in the joint visual attention sequences.

References
Linguistic and social abilities in French participants with Williams syndrome

Claire TOUCHET
Université de Picardie Jules Verne
Laboratoire CRP-CPO (EA 7273) - Axe Processus Cognitifs et Handicap
Amiens, France
✉ claire.touchet@u-picardie.fr

Luc VANDROMME
Université de Picardie Jules Verne
Laboratoire CRP-CPO (EA 7273) - Axe Processus Cognitifs et Handicap
Amiens, France
✉ luc.vandromme@u-picardie.fr

Laure IBERNON
Université de Picardie Jules Verne
Laboratoire CRP-CPO (EA 7273) - Axe Processus Cognitifs et Handicap
Amiens, France
✉ laure.ibernon@u-picardie.fr

Key words
Williams syndrome,
Cognitive development
Abstract

Individuals with Williams Syndrome (WS) were initially described to exhibit impressive social and linguistic abilities. In particular, WS participants would perform well on three areas: language, theory of mind and face recognition (for a review, see Brock, Einav, & Riby, 2008; Karmiloff-Smith, Klima, Bellugi, Grant, & Baron-Cohen, 1995). However, recent studies have led to conflicting findings and interpretations and described a more conservative portray of WS cognitive profile (e.g. Brock, 2007).

The current research provided additional description of the social and linguistic profile of individuals with WS using a multi-measure approach. The aim of our study is to investigate face recognition, theory of mind and language skills in the same WS group. Twelve WS children, adolescents and young adults (14;11 years, range 6;3 to 27;2) were administered 4 tasks testing face recognition, theory of mind, structural aspects and pragmatic aspects of language. Their intellectual functioning as measured by the Ravens Progressive Colored Matrices (RCPM, (Raven, Court, & Raven, 1998) was 16.59 (range 9 to 25).

Results showed two performance profiles. Six WS participants have homogeneous results, they display a relatively good level in the whole tasks. However the six other WS participants present an heterogeneous profile with a relatively good level at face recognition and structural aspects of language but poor performances at theory of mind and pragmatic.

We argue that the three investigated domains can not be considered as intact. Our findings corroborate hypotheses suggesting that WS performance is no better than one would predict on the basis of their overall cognitive abilities (e.g. Brock, 2007).
Theoretical background and aim of the study

Williams syndrome (WS) is a rare neurodevelopmental disorder of genetic origins that has been popularized by the pioneering study of Bellugi, Marks, Bihrl, and Sabo (1988) in which they describe an uneven cognitive profile: many non-linguistic domains are impaired (e.g. drawing, number) but language skills seem relatively spared in spite of a mild to moderate mental retardation. Despite this original claim, a series of recent studies conclude that WS cognitive profile is more complex: some non-linguistic domains are spared (e.g. face recognition) but some aspects of language (i.e. pragmatic) seem impaired (for a review see e.g. Brock, 2007). In particular, WS individuals would perform well on language, theory of mind and face recognition (Brock et al., 2008; Karmiloff-Smith et al., 1995). However several researches that analyzed only one of these abilities in different WS groups portray a contrasting sets of conclusions (e.g. Brock, 2007; Isaac & Lincoln, 2011; Van Herwegen, Dimitriou, & Rundblad, 2013).

The aim of our study is to analyze individual WS performance on face recognition, theory of mind and language tasks. We hypothesize individual competency profiles and investigate the link between language and social abilities.

Method

Twelve individuals with WS were tested. There were five male and seven female participants. They had a mean chronological age (CA) of 14 years 11 months (range 6;3 to 27;2 years). Their mean score was 16.59 (range 9 to 25) on the Ravens Progressive Colored Matrices (RCPM, (Raven et al., 1998).

Four tasks were administered to each WS participant. We used the Benton Facial Recognition Test (henceforth BFRT) (Benton, Hamsher, Varney, & Spreen, 1983) to assess face recognition ability. The Theory-of-Mind-Test-Revised (henceforth TOM-Test-R) (Steerneman & Meesters, 2009) allowed us to estimate theory of mind development from prerequisites to second-order beliefs. Structural aspects of language (lexical production and comprehension, phonological production, morphosyntactic production and comprehension) were appraised by the short version of the test “Instruments for the screening and the detailed assessment of the child’s language dysfunctions" (henceforth ISADYLE) (Piérart, Comblain, Grégoire, & Mousty, 2009). Pragmatic aspects of language was elicited using an original narrative task based on short cartoons directly inspired from Forgeot D’Arc and Ramus research (Forgeot d’Arc & Ramus, 2011). This task puts forth narrative production skills through the spontaneous speech produced by the participant and narrative comprehension skills through the participant’s answers to questions following cartoons narrative structure.

Results and Discussion

On a preliminary analysis we first inspected group scores and noticed a mean level of performance. Therefore our results are consistent with studies considering that WS perform no better than one would predict on the basis of overall cognitive abilities (Brock, 2007). We then inspected age effect: no significant difference was found except in BFRT (F(1,10) = 7.85, p = 0.02). We further established individual competency profiles linking verbal and nonverbal cognitive abilities. Our results allow us to highlight two performance profiles, so WS participants were divided in two groups of six participants. Given the small number of participants and the non-normal distributed data, we conducted nonparametric tests (Mann-Whitney U test) to compare the scores obtained from the two groups.
The first WS group (6 females, CA: 16;4 years, RCPM: 18.7) has an homogeneous profile, participants achieve at a relatively good level in the whole tasks. Conversely, the second WS group (1 female / 5 males, CA: 13;8 years, RCPM: 14.5) exhibits a heterogeneous profile: a relatively good level at BFRT and ISADYLE but poor performances at TOM-Test-R and narrative task. Comparative analyses show that group 1 perform better than group 2 on TOM-Test-R, U = 2.33, p = .02 (Group 1 m = 22.17, sd = 2.64; Group 2 m = 15.33, sd = 4.93) and on narrative task, U = 2.56, p = .01 (Group 1 m = 5.81, sd = .95 ; Group 2 m = 4.48, sd = 1.41). Further, it should be noted that WS individuals of the first group are older and score better than individuals of the second group. This again tends to prove that WS performance depend on overall cognitive abilities.

**Conclusion**

We propose two performances profiles in individuals with WS: homogeneous versus heterogeneous. Our study shows that WS abilities seem to be correlated with their overall cognitive level and therefore they can not be considered as intact. Face recognition, theory of mind and language are probably a strength in WS individuals but only if compared to other particularly impaired domains (e.g. number, drawing) or to other neurodevelopmental (e.g. Down syndrome) or socio-cognitive (e.g. Autism Spectrum Disorder) disorders.

**References**


Words referring to emotional concepts understanding in children and adolescents with Down syndrome: a comparative study

Christelle DECLERCQ
Laboratoire C2S (Cognition, Santé, Socialisation), EA 6291
Université de Reims Champagne Ardenne, 57 rue Pierre Taittinger, 51096 Reims Cedex, France
✉ christelle.declercq@univ-reims.fr

Régis POCHON
Laboratoire C2S (Cognition, Santé, Socialisation), EA 6291
Université de Reims Champagne Ardenne, 57 rue Pierre Taittinger, 51096 Reims Cedex, France

Key words
Down syndrome, emotion recognition, emotional lexicon
Abstract

The purpose of this communication is to present our research concerning the relation between emotion recognition and vocabulary acquisition in children with Down Syndrome (DS). Studies about social cognition prerequisites in these children show a similar development to those of typical children (TD) in terms of onset sequence. However, subtle differences were reported in the subsequent development of more complex capacities such as emotion recognition, theory of mind or empathy (see Fidler & Nadel, 2007, for a review). Thus, recent studies showed deficits in emotional facial expression recognition in children with DS (see Cebula, Moore, & Wishart, 2010, for a review). In a first longitudinal study (Pochon & Declercq, 2013), we examined emotion recognition abilities of children and adolescents with DS. The participants encountered no particular difficulties to recognise faces expressing six basic emotions. In a second longitudinal study (Pochon & Declercq, 2014), we investigated emotion recognition with a task employing verbal labels of emotion. Participants with DS encountered more difficulties than TD children of the same developmental age. Taken together, these results led us to conclude that the use of the emotional lexicon negatively impacted the ability of children with DS to identify emotions. A third study we are conducting directly tests this hypothesis. Children and adolescents with DS are presented sets of four pictures depicting three kind of word: words referring to concrete concepts, to non-emotional abstract concepts and to emotions. They are asked to point the picture corresponding to a word pronounced by the examiner, the pronounced word referring to one of the three kind of concepts studied. The results of DS participants will be compared to the results of younger TD children and groups will be matched on verbal developmental age measured using the British Picture Vocabulary Scale Revised (Dunn, Dunn, Whetton, & Burley, 1997).
Theoretical background and aim of the study

The purpose of this communication is to present our research concerning the relation between emotion recognition and vocabulary acquisition in children with Down Syndrome (DS). Studies about social cognition prerequisites in young children with DS showed that the development of these abilities is very similar to those of typical children in terms of onset sequence. However, subtle differences were reported in the subsequent development of more complex capacities such as emotion recognition, theory of mind or empathy (see Fidler & Nadel, 2007, for a review). Thus, recent studies showed deficits in emotional facial expression recognition in children with Down syndrome (Kasari, Freeman & Hughes, 2001; Williams, Wishart, Pitcairn, & Willis 2005; Wishart, Cebula, Willis, & Pitcairn, 2007; De Santana, de Souza, & Feitosa, 2014, Moore Channel, Conners, & Barth, 2014) and in adults with DS (Hippolyte, Barisnikov, Van der Linden, & Detraux, 2009; Carvajal, Fernandez-Alcaraz, Rueda, & Sarrion, 2012). Our hypothesis is that these deficits are related to the way emotion recognition was assessed, namely with a design relying on emotional vocabulary knowledge. In a first study (Pochon & Declercq, 2013), we examined emotion recognition abilities of children and adolescents with DS aged between 6 and 16 years in a non-verbal task. In this longitudinal study, the participants encountered no particular difficulties to recognise faces expressing six basic emotions. In second longitudinal study (Pochon & Declercq, 2014) with the same participants and the same visual material, we investigated emotion recognition with a task employing verbal labels of emotion. Children and adolescents with DS had difficulties in this task compared to typically developing (TD) children of the same developmental age. Taken together, these results led us to conclude that the use of the emotional lexicon negatively impacted the ability of children with DS to identify emotions. A third study we are conducting directly tests this hypothesis in comparing the emotional lexicon of children and adolescent with DS with those of TD younger children of the same verbal developmental age (VDA). We anticipate that we will observe (a) a significant deficit in understanding words referring to emotional concepts in participants with DS in comparison with TD children of the same VDA; (b) no significant difference between participants with DS and TD children of the same VDA in understanding words referring to abstract concepts; (c) no significant difference between participants with DS and TD children of the same VDA in understanding words referring to concrete concepts.

Method

Participant

Twenty children and adolescents with DS participate to this study. They are aged between 8 and 18 years. Sixty TD children aged between 4 and 12 years also participate. The children with DS are drawn from mainstream schools (inclusion) or from specialised institutions, and the TD children are recruited from kindergarten and primary schools. Participants with DS having sensory disorders or with ASD were not included in the study and TD children who participated were in a regular class at the expected grade level, and had no psychological, learning, or behavioural disorders. All participants' verbal developmental age is measured using the French version of the British Picture Vocabulary Scale Revised (BPVS-R; Dunn, Dunn, Whetten, & Burley, 1997). Their non-verbal abilities is assessed by mean of the Raven’s Coloured Progressive Matrices (PM 47; Raven, Court, & Raven, 1998).

Experimental tasks

Participants are presented to sets of four pictures depicting three kind of word: words referring to concrete concepts, to non-emotional abstract concepts and to emotions. Pictures are colour images or colour photographs which are displayed on screen in two rows of two. In a same set, images and photographs are never mixed. The sets of four pictures are presented on a laptop.
computer with a 17-in. monitor (resolution of 1280 by 1024 pixels). There is 16 sets for each kind of concepts, for a total of 48. The administration of the task is in two parts comprising each 24 sets, and each part comprise 8 sets of pictures for each kind of words (concrete, non-emotional abstract, emotional). The sets are always presented in the following order: a concrete concept set is followed by a non-emotional abstract concept set which is followed by an emotional concepts set. When a set is displayed on the computer, the child is required to point to the correct answer, in response to an instruction always formulated as follows “Show me acrobat”, for example, for a concrete concept; “Show me fantasy”, for example, for a non-emotional abstract concept; “Show me worried”, for example for an emotional abstract concept. The French words referring to emotions comprised 4 words for the concept of joy (joie, bonheur, plaisir, content), 4 words for the concept of fear (peur, crainte, frayeur, panique), 4 words for the concept of anger (colère, furieux, rage, mécontent) and 4 words for the concept of sadness (triste, chagrin, malheur, peine).

Statistical analysis

The results will be analysed according two approaches: first with individual matching, second using developmental trajectories.

Comparison of VDA-matched groups

The results of DS participants will be compared to those of younger TD children. DS and TD groups will be matched on verbal developmental age (VDA) measured using the French version of the PBVS-R (Dunn et al., 1997). A repeated-measures ANOVA will be performed on the results of the experimental task, with group as a between-participants factor (DS, TD) and words as a within-participants factor (concrete, non-emotional abstract, emotional). A second ANOVA will be performed to compare the emotional results with group as a between-participants factor (DS, TD) and emotions as a within-participants factor (joy, fear, anger, sadness).

Developmental trajectories

Two developmental trajectories will be constructed. First the developmental trajectories for the four kind of words (concrete, non-emotional abstract, emotional) for each group, plotted against the raw score obtained using the French version of the BPVS-R. Second, the developmental trajectories for the four kind of words (concrete, non-emotional abstract, emotional) for each group, plotted against the raw score obtained using the Raven’s PM 47.

References


Working memory and attention in gifted children with dyslexia

Alexandre AUBRY
Université de Picardie Jules Verne
Laboratoire CRP-CPO (EA 7273) - Axe Processus Cognitifs et Handicap
Amiens, France
✉ alexandre.aubry@u-picardie.fr

Béatrice BOURDIN
Université de Picardie Jules Verne
Laboratoire CRP-CPO (EA 7273) - Axe Processus Cognitifs et Handicap
Amiens, France
✉ beatrice.bourdin@u-picardie.fr

Key words
Gifted Children, Dyslexia, Working Memory
Abstract

The aim of our study is better understand the relationship between working memory and attentional processes in gifted children with dyslexia. The gifted children defined by an IQ superior or equal to 130 at an intelligence test like Wechsler Intelligence Scale for Children (WISC-IV). They often have a heterogenous profile at WISC-IV: Working Memory (WMI) and Processing Speed Indexes (PSI) are often less than Verbal Comprehension (VCI) and Perceptual Reasoning (PRI) Indexes. Many studies showed that gifted children have a higher working memory capacity than children matched chronological age. Some gifted children have a learning disability. These children are also called twice-exceptional. Dyslexia is a learning disability often present in twice-exceptional children. This learning disability is characterized by serious difficult of the reading acquisition. Children with dyslexia have low capacity in working memory. What about gifted children with dyslexia?

We compared the performance of 12 gifted children with dyslexia, 12 gifted children without dyslexia and 12 children with a typically development. On the one hand, we assessed the working memory with three automatized complex span tasks: reading span, symmetry span and operation span. On the other hand, the attentional capacities are measured by the Attention Network Test. The data are currently being processed. We analyzed for the moment only the data for gifted children. The results show that the working memory capacity is inferior in gifted children with dyslexia compared to gifted children. However, the differences of working memory performance between gifted children with or without dyslexia haven’t been involved by the attentional performance. The findings will be interpreted in a theoretical and clinical perspective. Their implications will be further discussed.
The gifted children defined by an IQ superior or equal to 130 at an intelligence test, like Wechsler Intelligence Scale for Children (WISC-IV). The cognitive profile of gifted children is often heterogeneous. Working Memory (WMI) and Processing Speed Indexes (PSI) are often less than Verbal Comprehension (VCI) and Perceptual Reasoning (PRI) Indexes. Among gifted children, some can have a learning disability (LD). These children are called twice-exceptional (Foley-Nicpon, Allmon, Sieck, & Stinson, 2010). In order to identify LD in gifted children there is a discrepancy between intellectual capacity and academic achievement. Twice-exceptional children (TEC) count around 2% to 5% of the population of children with LD (Nielsen, 2002).

Dyslexia is a LD often present in TEC. This LD is characterized by serious difficulties in reading acquisition. De Clercq-Quaegebeur et al. (2010) analyzed the profile of children with dyslexia by using WISC-IV subtests to measure working memory performance: Letter-Number Sequence (LNS) and Digit Span (forward and backward). The author showed that these children have a low working memory capacity but their language and reasoning capacities are preserved. The working memory capacity is measured by two subtests: letter-number sequencing (LNS) and backward digit recall (BDR). However, BDR would have a low attention demand for higher ability participants and therefore would not consist of a working memory measurement (St-Clair-Thompson, 2010). Gifted children have a higher working memory capacity that typically developed children in a chronologically matched age (Alloway & Elsworth, 2012). What about gifted children with dyslexia? To our knowledge, there are few empirical research about the comprehension of working memory in this population.

In a previous study, we compared the profile of 5 gifted children and 5 gifted children with dyslexia with the use of WISC-IV. The findings showed that there was no significant difference in WMI. However, TEC have a lower performance in the LNS subtest, but not in the BDR subtest, than gifted children. Van Viersen, Kroesbergen, Slot, & de Bree, (2014) found that verbal performance in working memory are lower in gifted children with dyslexia than in gifted children. However these performance in gifted children with dyslexia are higher than those in children with dyslexia and control children matched by age. Moreover, gifted children with dyslexia have a higher performance in visual working memory task than children with dyslexia and control children, but lower than gifted children. The author concluded to the presence of a compensational mechanism between reading disabilities and other cognitive abilities, like working memory. However, one of limitation of these studies is the assessment of working memory performance only in the verbal modality. Also, the subtests evaluating working memory performance with WISC-IV request fewer attentional resources with age (St-Clair-Thompson, 2010). Consequently, they correspond to a simple span task which measures the short-term memory capacity.

So, the first aim of our study is to evaluate working memory capacities across several modes with the use of a short complex span task in gifted children with or without dyslexia. The second goal is to better understand the relationship between working memory and attentional processes in this population.

**Method**

We compared the performance of 12 gifted children with dyslexia, 12 gifted children without dyslexia and 12 children with a typical development. Working memory capacities were measured by three automatized complex span tasks: reading span, symmetry span and operation span. The task is labeled Composite Complex Span (Gonthier, Thomassin, & Roulin, 2015) adapted for children (CCSC). This battery is composed of 3 types of content: numeric, visuospatial and verbal. The testing period takes approximately 25 minutes. All 3 tasks have the same procedure; during the first part, children are asked to solve a number of processing problems such as deciding if a phrase is true or false. Then they have to memorize unrelated stimuli which are later presented one by one after each problem. At the end of each trial, the children have to click on the case on a grid corresponding to the stimuli they have seen. The recalled stimuli can be a figure (for reading span), a consonant (for operation span) or a spatial location within a grid (for symmetry span). The score corresponds to the sum of all stimuli recalled in the correct order.
The attentional capacity is assessed by the Attention Network Test (Rueda et al., 2004). The task assesses three attentional networks: alert, orienting and executive systems. The session takes approximately 25 minutes. Children have to press the right or left arrow on the keyboard. Accuracy and reaction time are recorded. Then, we compute three scores from the reaction time corresponding to the conditions where the child answered correctly.

**Results**

The data are currently being processed. We analyzed for the moment only the data for gifted children. The results show that the working memory capacity is inferior in gifted children with dyslexia compared to gifted children. In the same way, the speed of treatment is slower in children with dyslexia than in the children of the other groups. On the other hand, the attentional network seems to be identical in the two groups of gifted children.

**Conclusion**

As de Clercq-Quaegebeur et al. (2010), we highlight the discrepancy between language, reasoning abilities and verbal working memory efficiency. Furthermore, with the use of our present results, we hypothesize that the results deriving from the global treatment of our data would be in agreement with van Viersen’s. This author showed that gifted children with dyslexia have lower working memory capacity than gifted children without dyslexia. We underline that dyslexia intervenes in low working memory performance in all modalities. However, the differences of working memory performance between gifted children with or without dyslexia are not explained by their attentional performance.

The findings will be interpreted in a theoretical and clinical perspective. Their implications will be further discussed.

**References**


Posters
Tools to train self-determination and civic engagement for adults with an intellectual disability (ID)

Barbara Fontana Lana
Institut de Pédagogie spécialisée, Université de Fribourg, Rue St-Pierre Canisius 21, 1700 Fribourg (Switzerland).
✉ barbara.lana@unifr.ch

Prisca Angéloz Brügger
Institut de Pédagogie spécialisée, Université de Fribourg, Rue St-Pierre Canisius 21, 1700 Fribourg (Switzerland).
✉ prisca.angelozbruegger@unifr.ch

Isabelle Petragallo Hauenstein
Institut de Pédagogie spécialisée, Université de Fribourg, Rue St-Pierre Canisius 21, 1700 Fribourg (Switzerland).
✉ isabelle.hauenstein@unifr.ch

Lisiane Gobet
La Cité du Genévrier, Fondation Eben-Hézer, 1806 Saint-Légier (Switzerland)
✉ lisiane.gobet@eben-hezer.ch

Key words
Implementation self-determination & citizenship
This research project focuses on the effects of training for self-determination and civic engagement designed for adults with an intellectual disability (ID). It has been conducted over two years. Following the invitation to participate the research was divided into four stages: 1) initial assessment of self-determination ability, communication and inductive reasoning skills of individuals with ID and evaluation of the representations from educational care professionals; 2) self-determination and citizenship training, in small groups, then 3) in a full session involving all the participants and 4) an evaluation of how effective the intervention had proved. The intervention, which took place over one year over the course of 25 sessions, each lasting 1½ to 3 hours, was aimed at 16 people with mild to moderate ID living in an institutional environment (divided into two groups), and a group of educational care professionals (13 participants). The three groups belonged to the same establishment in French-speaking Switzerland. Specific tools were developed for the training.

The statistically processed results confirm that the training procedures developed and the associated tools are an effective means of implementing good practices in the field of self-determination and civic engagement in adults having a mild or moderate ID in an institutional environment. At an individual level, the effect of the training was evident in self-regulation skills, that is to say the ability of participants with ID to set objectives and to resolve problem situations, whereas in terms of context, the participants saw changes in their environment, in particular a significant increase in opportunities for making choices in everyday domestic activities. The study has also enabled us to confirm that the collaboration and presence of educational care professionals in the training process significantly enhances the effectiveness of the implementation of self-determination practices, in particular practices of self-regulation. The research also had a number of knock-on effects on the institution concerned.
The purpose of the “Our Institution, our Life, our Voice” research project was to prepare professionals and individuals having a mild or moderate ID for the introduction of principles of self-determination and a sense of citizenship in everyday life and to raise their awareness, acting mainly through the creation of opportunities for individual and collective expression in the place in which they live. The objective of our research was:

- firstly, to develop training resources designed to promote the exercise of self-determination and civic engagement in individuals having an ID in an institutional environment and to test the effectiveness of these resources.
- secondly, to pinpoint the contextual and didactic conditions that favour this practice in the place where people live.

We had established the following hypotheses:
- the proposed training and the tools developed promote the enhancement of self-determination skills in individuals with a mild or moderate ID living in an institutional environment,
- the presence of educational care professionals, their involvement and their collaboration in the programme for training individuals with ID, helps the latter to acquire the essential principles of self-determination.

**Method**

The research was conducted in several stages. The 1st stage involved forming teams made of sixteen residents and thirteen educational care professionals. The 2nd stage involved measuring the existing skills of the participants (individuals with ID and educational care professionals) as regards self-determination and civic engagement. The residents were tested using the LARIDI self-determination scale applicable to adults (Wehmeyer et al., 2000) and the Choice Questionnaire (Stancliffe & Parmenter, 1999). The educational care professionals completed the questionnaire for representations from an educational care perspective as regards decision-making in the case of ID (Fontana-Lana, 2001). Furthermore, to promote a better understanding of the participants with ID, we also measured their vocabulary skills (Picture Vocabulary Scale Peabody, Dunn & Thériault-Whalen 1993), their capacity for inductive reasoning (Raven’s Coloured Progressive Matrices, Raven, 1998), their social communication skills (Social Communication Questionnaire-SCQ, Rutter, Bailey & Lord, 2003; Communication Checklist-Adults-CC-A, Whitehouse & Bishop, 2009).

During the intervention stage, the residents and the educational care professionals followed a training programme (Fontana Lana, Angéloz Brügger & Petragallo Hauenstein, in preparation) in which the first module provides training in self-determination and the second focuses on civic engagement. The training was conducted in 3 groups, 1 group made up solely of professionals, another group made up solely of residents and a mixed group of residents and professionals.

The educational social care establishment in which the research took place accepts people having ID of varying degrees of severity, offering residential services as well as work placements in workshops in a sheltered environment or on the mainstream labour market. Those taking part in the training were all residents of the establishment and attended the “Integration Skills Centre”:
- 2 of them (2 men) were living in integrated apartments located in the town centre
- 8 of them (3 women and 5 men) were living in one of 7 community living groups, each having their own bedroom
- 2 of them (1 woman and 1 man) were living in self-contained studios integrated within the community living groups
The purpose of the “integration skills centre”, consisting of 7 groups, all represented in the sample, is to promote integration and autonomy in people’s normal environment, offering them support and specifically adapted learning programmes. Whether they focus on leisure, work, sport or health, the idea is for each individual to attain the highest level of social engagement according to his or her potential.

The 4th stage consisted of reviewing the proceedings in a full session, in the presence of the participants having ID and the educational care professionals who took part in the research, as well as the management of institution. This meeting enabled everyone to plan together how to follow up the measures in order to extend and guarantee the sustainability of the initiatives to promote self-determination and civic engagement within the establishment.

The 5th stage was devoted to measuring the skills and knowledge acquired by the participants and their impressions of the programme. So the LARIDI self-determination scale applicable to adults (Wehmeyer et al., 2000) and the Choice Questionnaire (Stancliffe & Parmenter, 1999) were resubmitted to the residents and the questionnaire for representations from an educational care perspective as regards decision making in the case of ID (Fontana-Lana, 2001) was submitted to the educational care professionals.
The data, analysed using the Wilcoxon, Mann Whitney statistical tests and Spearman simple correlation, show that:

• The intervention was significantly effective as far as self-regulation was concerned. This means that between the pre-test and the post-test stages the participants improved their ability to resolve the problems put forward, to formulate objectives and to adjust their actions according to the goals (Z= 67.5, p < .05).

• The group of residents having had the benefit of the presence of educational care professionals during the training made significantly more progress in terms of self-regulation than the group that did not have this benefit (U= 21.00, p < .05).

• Between the pre-test and post-test stage, a significant increase in the opportunities for choices within the sphere of everyday domestic activities was also recorded for a majority of participants (Z= 55.5, p < .05).

Finally, our results (r = -.333, p > .05) confirm what has already been observed in other studies, i.e. that a high level of self-determination does not indicate a higher cognitive capacity (Chambers, 2007) and that with specifically adapted measures and enabling environments the implementation of practices of self determination and civic engagement is not exclusively reserved for individuals with advanced cognitive levels.

**Conclusion**

The proposed training and the tools developed are effective resources for teaching good practices in self-determination and civic engagement in an institutional environment. Significant skills gains could be observed in the educational care staff and the individuals with a mild to moderate ID who attended the course.

The results of this research show that in order for more favourable practices to develop, coordinated thinking is required at all levels of institutional life (board of trustees, management, teaching and care professionals) and in the different resident networks (proxies, social and occupational therapists, various specialists).
Self-regulation in adolescents with intellectual disability: impact of executive functioning.

Marine Ballé
Univ. Lille, EA 4072 - PSITEC - Psychologie : Interactions, Temps, Émotions, Cognition, F-59000 Lille, France
✉ marine.balle@univ-lille3.fr

Yannick Courbois
Univ. Lille, EA 4072 - PSITEC - Psychologie : Interactions, Temps, Émotions, Cognition, F-59000 Lille, France
✉ yannick.courbois@univ-lille3.fr

Key words
intellectual disability, self-regulation, executive functions.
Self-regulation is a response system that allows a person to evaluate their environment to make decisions about how to act in a specific situation (Whitman, 1990). Self-regulation involves executive function processes (Hofmann, et al., 2012), which are a set of high cognitive abilities that control and regulate behaviours and make the adaptation to new environments easier (Meulemans, et al., 2004). Moreover, studies had shown that language is linked with self-regulation development both in typically children and children with intellectual disability (Bronson, 2000; Nader-Grosbois, 2007).

The aim of this study was to investigate the relationships between self-regulation, language and executive functions among 63 young people with intellectual disability (ID) aged from 16 to 20 years old. Self-regulation was assessed with the LARIDI questionnaire (Wehmeyer et al., 2001). Receptive and expressive vocabulary (ELO; Khomsi, 1999) and following executive functions, inhibition, updating and shifting were also assessed. Results showed that expressive vocabulary, inhibition and updating predicted self-regulation's performance in our sample. These studies highlighted the significant involvement of language and executive functions in self-regulation, a key dimension of self-determination. Nevertheless, further research is required to define the relationship between these dimensions. Training focusing on executive functions could be efficient to improve self-regulation in people with ID.
Introduction

Self-regulation is defined as « a complex response system that enables individuals to examine their environments and their repertoires of responses for coping with those environments to make decisions about how to act, to act, to evaluate the desirability of the outcomes of the action, and to revise their plans as necessary » (Whitman, 1990). In typically development, it has been shown that self-regulation development was linked to executive functioning (Blair & Ursache, 2011; Garner, 2009; Hofmann, Schmeichel, & Baddeley, 2012).

Executive functions are a set of high cognitive abilities that control and regulate behaviours and make the adaptation to new environments easier (Meulemans, Colette, & Van der Linden, 2004). They include, inhibition, updating and shifting (Miyake et al., 2000). Shifting is the ability to switch between multiple operations on mental sets. This process “involves the disengagement of an irrelevant task set and the subsequent active engagement of a relevant task” (Miyake et al., 2000, p.55). Updating corresponds to the central executive component of working memory. According to Baddeley and Jarrold (2007), working memory is a limited capacity system that maintains and manipulates information to carry out complex thought and learning. Finally, prepotent response inhibition is the ability to deliberately inhibit a dominant or automatic response when necessary (Miyake et al., 2000).

Impact of executive functioning in people with intellectual disability’s self-regulation has never been assessed but was suggested by several authors (Akhutina, 1997; Hooper et al., 2008). Moreover, studies had shown that language is linked with self-regulation development both in typically children and children with intellectual disability (Bronson, 2000; Nader-Grosbois, 2007). The aim of this study was to investigate the relationships between self-regulation, language and executives functions among young people with intellectual disability (ID).

Methods

The participants were aged from 16 to 20 years old and came from special education institute in the North of France (n=63). All participants and their parents (only for the minors) gave written informed consent before participation in this study.

In this study, intellectual functioning was estimated with the Ravens, a non-verbal fluid intelligence task (Raven, Court, & Raven, 1990) and self-regulation was estimated with the LARIDI (self-regulation’s subscale; Wehmeyer et al., 2001). Moreover, verbal shifting ability was assessed with a verbal shifting task (Henry, Messer, & Nash, 2012), verbal inhibition with the CAT-A (Costanzo et al., 2013) and updating with the French adaptation of Carretti, Belacchi, and Cornoldi’s task (2010). Language ability was assessed with receptive and expressive vocabulary tasks (ELO; Khomsi, 1999).

For self-regulation, we obtained a global score and sub scores corresponding to specific scales (Interpersonal cognitive problem-solving and Identify goals). For Ravens, receptive and expressive vocabulary tasks and for updating task we obtained only global scores. For verbal inhibition we computed an inhibition time score which is the difference between time that participant took to complete the inhibition block and time that he took to complete the copy block (reversed score). Finally, for shifting task we computed a cost-shifting score (Carney, Brown, & Henry, 2013) both for correct responses and repetitions.

The data were analysed using several statistical analysis. First, we used correlation analysis to observe the link between intellectual functioning, language and executive functions with the self-regulation’s score and sub-scores. Then, we used regression analysis to determine the involvement of each individual factor in the development of self-regulation.

Results

Correlation analysis showed that self-regulation global score was significantly linked with inhibition time score (r = -.31, p < .05), cost-shifting score for correct responses (r = .30, p < .05) and updating score (r = .39, p < .001). Self-regulation global score was also linked with intellectual functioning (r = .27, p < .05), receptive vocabulary (r = .28, p < .05) and expressive vocabulary (r = .48, p < .001). Interpersonal cognitive problem-solving subscale score was significantly linked with inhibition time score (r = -.37, p < .05), updating score (r = .40, p < .001), intellectual functioning (r = .32, p < .05), receptive vocabulary (r = .29, p < .05) and expressive vocabulary (r = .50, p < .001). Identify goals subscale was only linked with expressive vocabulary (r = .28, p < .05). Linear regression analysis (stepwise) showed that self-regulation global score was predicted by expressive
vocabulary ($\beta = .43, p < .001$) that could account for 28% of the variance in self-regulation and updating ($\beta = .30, p < .05$) that could account for 8% of the variance in self-regulation. Interpersonal cognitive problem-solving subscale score was predicted by expressive vocabulary ($\beta = .45, p < .001$) that could account for 27% of the variance and inhibition time score ($\beta = -.27, p < .05$) that could account for 7% of the variance. Identify goals subscale score was only predicted by expressive vocabulary score ($\beta = .26, p < .05$) that could account for 6.7% of the variance.

Discussion

Our results highlighted the link between self-regulation and executive functioning processes among young people with intellectual disability. Nevertheless, in this study we only assessed verbal component of each executive function. Further studies would be necessary to evaluate the impact of executive function on self-regulation regardless of domain-specific task by using both verbal and non-verbal task for each executive function.

Moreover, this study confirmed the significant role played by language in self-regulation. Indeed, self-regulation score was primarily predicted by expressive vocabulary score. Finally, these results could promote the use of remediation of executive function in clinical practice in order to improve self-regulation among people with intellectual disability and to help them to better adapt their behaviours to new environments. Further studies, would be required to evaluate the efficacy of this type of remediation on the development of self-regulation.

References


The Time Line Task: An instrument for examining lifespan stage recognition in people with intellectual disability.

Claudio Straccia, PhD
University of Fribourg
Department of Special Education
Rue St Pierre Canisius, 21 - 1700 Friboug - Switzerland
✉ Claudio.straccia@unifr.ch

Francois Bernasconi, MA
Früherziehungsdienst des Kantons Bern
Frankenstrasse 1 - 3018 Bern - Switzerland
✉ Francois.bernasconi@fed-be.ch

Aline Tessari Veyre, MA
University of Fribourg
Department of Special Education
Rue St Pierre Canisius, 21 - 1700 Friboug - Switzerland
✉ Aline.tessari@unifr.ch

Geneviève Petitpierre, Full professor
University of Fribourg
Department of Special Education
Rue St Pierre Canisius, 21 - 1700 Friboug - Switzerland
✉ Genevieve.petitpierre@unifr.ch

Key words
intellectual disability, self-regulation, executive functions.
The subjective representation of lifespan stages in people with intellectual disability is an important process for a number of theoretical and practical reasons. However, this topic is “extremely under-researched” in people with intellectual disability and there are no standardized tools for measuring this ability, either in the general population or in people with intellectual disability. In this light of this, we have designed the Time Line Task to fill this gap. The task focuses on three lifespan stages (childhood, adulthood and older age) using different types of material (e.g. nine photographs of persons from different age groups, direct questions, such as “how old are you”, a graduated line). This study is a first attempt at standardizing this task and aims to test the material on adults from the general population (n = 39). The participants were asked to estimate the age of each person represented in the nine photographs as accurately as possible. The results show that the expected age order based on the actual age of the individuals appearing on the photographs is well recognized by participants. However, two of the photographs belonging to two different lifespan stages do not produce significant differences in the age estimations. This suggests that it would be more appropriate to use only six photographs (two photographs per lifespan stage) that make clear distinctions between the three lifespan stages being considered. This clearer differentiation will be useful for interpreting the performance of adults with intellectual disability completing this task. A number of suggestions relating to the task administration experience and aiming to improve the material will be also discussed.
Introduction

As recently highlighted by Veyre and colleagues (2014), the subjective representation of lifespan stages in people with intellectual disability (ID) is an important process for a number of theoretical and practical reasons. The ability to recognize lifespan stages is part of the individual social and psychological adaptation process. Indeed, this ability helps people to develop their identity continuity (“I was”, “I am”, “I will be”; Arrana, 2006) as well as an understanding of what is expected at different ages in terms of social roles and adapted behaviors (Tavoillot, 2010). Therefore, difficulties in recognizing lifespan stages can result in a number of identity and behavioral problems (Bell & Espie, 2000).

Most of the research in this field has centered on typically-developed children, while less attention has been paid to adults from the general population. According to Bell and Espie (2000), this topic is “extremely under-researched” in people with ID and there are no standardized tools for measuring this ability either in the general population or in people with ID.

The Time Line Task

The time line has been designed on the basis of evidence which indicates that people mentally organize time by associating the left-hand space with the past and the right-hand space with the future (Bonato, Zorzi & Umiltà, 2012). Accordingly the time line is composed of a graduated line ranging from one (top left) to 80 years (top right). A birthday cake with a different number of candles appears above each multiple of ten. Two pawns, three pictograms and nine photographs depicting people from three age groups (three children, three adults and three seniors) complete the task material. This task has been used as one of the inclusion criteria in a study which aimed to examine the representations of adults with ID with regard to the ability to learn over the entire lifespan (Petitpierre, Gremaud, Veyre & Bruni, 2014).

The administration of the task consists of five stages (Veyre et al., 2014).

1. Introduction. The task administrator shows the graduated line to the participants, explaining that each grade represents one year and that the birthday cakes correspond to multiples of ten.
2. Placing one’s age on the time line. The task administrator places one pawn on the time line according to his age. Then he asks the participant to do the same, using the second pawn.
3. Placing the age of other people on the time line. The task administrator invites the participant to place the nine photographs on the time line and to group the photographs showing people of a similar age.
4. Using the time line with pictograms. The participant is asked to place the three pictograms according to the age groups that he chose at Stage 3.
5. Lexicon. The task administrator invites the participant to name each age group, he records the first term used for each age group.

Aim of the study

The aim of this study is to test the nine photographs on typically-developed adults. This would form an important stage in the development process of the time line task. The main objective is to verify that the photographs of each age group are different enough to be placed in distinct age groups.

Method

Thirty-nine adults from the general population took part in the study. Two of them were excluded from the study because their ages (69 and 72 years old) were considered to be extreme compared with the age of the sample retained in the analysis (n = 37; age mean = 29.16 years old; sd = 9.66). Women were over represented in the sample (n = 30, 81.1%).
The participants were asked to estimate the age of each person represented in the nine photographs as accurately as possible. Accordingly, we recorded nine variables containing the age estimations relating to the nine photographs. The order of the actual age of the persons represented in the nine photographs was used to organize the one-to-one comparisons: the youngest person was compared with the next youngest and so on, producing eight comparisons.

Results

Table 1. Age estimations for each photograph.

<table>
<thead>
<tr>
<th></th>
<th>M (sd)</th>
<th>Min</th>
<th>Max</th>
<th>Wilcoxon test (Z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1</td>
<td>13.24 (1.38)</td>
<td>10</td>
<td>16</td>
<td>- .866a</td>
</tr>
<tr>
<td>Child 2</td>
<td>13.49 (1.41)</td>
<td>11</td>
<td>16</td>
<td>-5.314***</td>
</tr>
<tr>
<td>Child 3</td>
<td>20.22 (2.64)</td>
<td>16</td>
<td>28</td>
<td>-5.305***</td>
</tr>
<tr>
<td>Adult 1</td>
<td>40.59 (5.77)</td>
<td>31</td>
<td>57</td>
<td>-4.267***</td>
</tr>
<tr>
<td>Adult 2</td>
<td>46.85 (5.47)</td>
<td>35</td>
<td>60</td>
<td>-4.941***</td>
</tr>
<tr>
<td>Adult 3</td>
<td>54.97 (6.33)</td>
<td>40</td>
<td>65</td>
<td>-6.12b</td>
</tr>
<tr>
<td>Senior 1</td>
<td>55.76 (5.91)</td>
<td>42</td>
<td>65</td>
<td>-5.306***</td>
</tr>
<tr>
<td>Senior 2</td>
<td>73.08 (5.38)</td>
<td>62</td>
<td>81</td>
<td>-4.967***</td>
</tr>
<tr>
<td>Senior 3</td>
<td>81.43 (3.59)</td>
<td>72</td>
<td>88</td>
<td></td>
</tr>
</tbody>
</table>

Notes: * Each line is compared with the next one (Child 1 is compared with Child 2). b Since the two variables were distributed normally a t-test was conducted. *** p < .001.

Table 1 presents the descriptive and inferential results of the study. The initial main result is that the participants placed the nine photographs in the expected order, corresponding to the actual age of the persons depicted in the photographs. Childhood and adulthood appear to be well differentiated. In fact, the highest age estimation for Child 3 is lower than the lowest age estimation for Adult 1. By contrast, adulthood and older age seem to overlap more frequently. In fact, there is no difference between the estimations for Adult 3 and Senior 1 in statistical terms.

Discussion

The results of this study show that adults from the general population correctly estimate the order, from the youngest to the oldest, of the nine persons represented on the photographs used in the time line task. This suggests that this material may be representative of the actual situation. However, two photographs from two different age groups do not produce statistically different estimations of age. One possible solution would be to remove the photographs of Child 3, Adult 3 and Senior 1 from the material, so that the material would be composed of six photographs (2X3 age groups) with no overlap in the age estimations. The clearer differentiation thus achieved would be useful for producing a more accurate interpretation of the performance of adults with ID participating in this task.
Effects of short-term training in social cognition in typically developing children and with externalizing behavior disorders or intellectual disabilities

Jacobs Emilie
Université Catholique Louvain
Institut de Recherche en Sciences Psychologiques
Chaire Baron Frère en Orthopédagogie, Louvain-La-Neuve, Belgique
✉ Emilie.Jacobs@uclouvain.be

Nader-Grosbois, Nathalie
Université Catholique Louvain
Institut de Recherche en Sciences Psychologiques
Chaire Baron Frère en Orthopédagogie, Louvain-La-Neuve, Belgique
✉ Nathalie.Nader@uclouvain.be

Léonard, Charline
Université Catholique Louvain
Institut de Recherche en Sciences Psychologiques
✉ Chaire Baron Frère en Orthopédagogie, Louvain-La-Neuve, Belgique

Key words
Social cognition, Training, Atypical children
At preschool age, the most common reason of psychological counselling is externalizing behavior problems. Therefore, it is essential to detect and to intervene early in order to limit the risk of social maladjustment for the children in different life environment. Regarding children with intellectual disabilities, they present deficits in adaptive functioning, including social adjustment and they are at risk to develop externalizing or internalizing behavior problems. In these two populations, two postulates of deficits in social cognition could explain these maladjustments. The first one applies an impaired Theory of Mind (ToM) and the second postulates a deficit in Social information processing (SIP). Our research focus on how social cognition can contribute to explain the diversity of profile of social maladjustment in children with externalizing behavior (EB) or with intellectual disabilities (ID) in comparison with typically developing (TD) preschoolers. In an experimental and exploratory study, we test the effects of a short-term training in ToM or SIP in TD, EB or ID children, by group of 3. During pretest and post-test sessions, the researchers evaluate the children’s competences in ToM (ToM-emotions et ToM-beliefs, Nader-Grosbois & Thirion-Marissiaux 2011 ; ToMI-vf, Houssa, Mazzone & Nader-Grosbois, 2014), in SIP (RES, Barisnikov et al., 2004) and in social adjustment (EASE, Hughes & Soares-Boucaud, 1997). These results allow us to examine the differentiate effects of each training for the both populations. We present our preliminary results obtained by a comparison pre- post-test. Finally, we discuss improvement of ToM or SIP competences in the experimental groups and between the populations. Implications in terms of causal factor of the social cognition in the social adjustment and of intervention will be presented.
Preschool age is a critical period for the development of social cognition that could induce social adjustment. Yet, children with externalizing behavior (EB) and with intellectual disabilities (ID) have some deficits in social cognition. In fact, literature shows that EB children have some deficits in social cognition and some maladjusted behaviors. These difficulties prevent them to have social experience, what impairs the development of social cognition and of adjusted behaviors. Regarding ID children, literature attests deficits in adaptive functioning, including social adjustment. Moreover, ID children are at risk to develop externalizing or internalizing behavior problems. Therefore, it is essential, in these two populations, to detect and to intervene early in order to limit the risk of social maladjustment for the children in different life environment. Two postulates of deficits in social cognition could explain these maladjustments. The first one applies an impaired Theory of Mind (ToM) and the second postulates a deficit in Social Information Processing (SIP). The ToM competences is the capacity to attribute mental states in others: beliefs, intentions, desires, emotions,… (Flavell, 1999; Nader-Grosbois, 2009) whereas the SIP is a process used by children when they are faced with social interactive situations and composed of five steps: encoding of other people’s social cues, interpretation of social cues, clarification of goals, response access and response decision (Dodge & Crick, 1990; Dodge & Pettit, 2003; Mize & Pettit, 2008).

In this experimental study, we test whether social cognition could be improved in typically developing (TD) and preschoolers with EB and in children with ID by means of a short term training, in referring to theoretical models of SIP or of ToM. Moreover, we test whether SIP training and ToM training induce different positive effects on social cognition depending on the population, namely EB or ID, TD children matched on chronological age (CA), developmental age (DA) and on the received training. This would contribute to explain the diversity of profiles of social maladjustment.

We recruited 12 preschoolers with EB, 12 children with ID and 12 TD preschoolers from French-speaking Belgian area. Those children have a DA between 3 and 6 years old. All of the subjects were assigned to an experimental group. One group received a short-term training on ToM – the ToM group – and the other received a short-term training on SIP – the SIP group. There was 6 groups (population x experimental group).

Before and after the training, children participated in a pretest and a post-test session evaluating ToM (ToM-emotions and ToM-beliefs, Nader-Grosbois & Thirion-Marissiaux 2011; ToM-beliefs, Houssa, Mazzone & Nader-Grosbois, 2014), SIP (Social problem solving task, RES, Barisnikov et al., 2004) and social adjustment (EASE, Hughes & Soares-Boucaud, 1997). During the pretest session, we evaluate the children’s DA (verbal and non-verbal) obtained with the “EDEI-R” (Perron-Borelli, 1996), in order to insure that children meet inclusive criteria.

The ToM training aims to improve the children’s abilities to talk and to infer mental states (emotions and beliefs), to understand people’s perspective, the causes and consequences of mental states (Howlin et al., 2011). Whereas, the SIP training points to improve the children’s abilities displayed in five steps of this process (Crick & Dodge, 1994).

In these two trainings of one session of 45 minutes, some similar routines are used such as feedback provided after each response, asking children’s explanation for each of their response or explanation by the experimenter of the correct response and of the general principle. However, when using routines such as open-ended questions or conversations, the experimenter will target either social situations linked emotions and beliefs in ToM training or critical social situations in SIP training. Finally, the experimenter tries to make connections with social situations seen in training and real life events. The material for the two trainings was quite similar. In ToM training, cartoons or picture cards on social situations such as those on “What are they thinking?”, “Feeling”, “Mental Simil” are used whereas in SIP training, scripts illustrated by short videos from STEP-P (Schultz et al. 2010) and social stories from SIPI-P (Ziv & Sorogon, 2010) are applied.
The results show that after a short-term training in ToM, preschoolers with EB improve in ToM-emotions and SIP whereas ID children improve in ToM-beliefs and SIP. After a short-term training in SIP, EB children improve in ToM-emotions, ToM-beliefs and SIP, ID children improve in ToM-beliefs and SIP, and TD children improve in SIP. Thanks to this procedure, positive effects of ToM- and SIP-trainings have been shown. However, the efficiency differs depending on the population (EB, ID or TD). In fact, all ToM-groups can, surprisingly, show better social problem solving skills in post-test. Whereas, the EB-ToM group improves in comprehension of emotions (ToM-emotions) and the ID-ToM group, improve in comprehension of beliefs (ToM-beliefs). Likewise, all SIP-groups improve their social problem solving skills and their comprehension of beliefs (ToM-beliefs). The EB SIP-group increases their comprehension of emotions (ToM-emotions). These results support the efficiency of these one-shot trainings and encourage the pursuit of future researches that should test the modifiability of the social cognition in these populations. This type of research could give guidelines to optimize intervention focusing on emotional and social competences in these children.
Parent-child conversations about emotions and ToM competences in children with an Autistic Spectrum Disorder

Stéphanie Mazzone
Catholic University of Louvain
Psychological Sciences Research Institute
Chair Baron Frère in specialized education, Belgium
✉ stephanie.mazzone@uclouvain.be

Emilie Jacobs
Catholic University of Louvain
Psychological Sciences Research Institute
Chair Baron Frère in specialized education, Belgium
✉ emilie.jacobs@uclouvain.be

Nathalie Nader-Grosbois
Catholic University of Louvain
Psychological Sciences Research Institute
Chair Baron Frère in specialized education, Belgium
✉ nathalie.nader@uclouvain.be

Key words
Parent-child conversations about emotions, validation measure, ToM abilities
Our research project aims to study whether “Parental Socialization of Emotions” (PSE, Eisenberg, Cumberland & Spinrad, 1998) could have an impact on Theory of Mind competences in typically developing (TD) children and in children with an Autistic Spectrum Disorder (ASD). Amongst PSE variables, this study focuses on parent-child conversations about emotions. In previous studies, these emotion-related parental behaviors have been assessed by means of an observational design and an application of a coding grid. This study presents the validation of an original parent-reported questionnaire on these conversations (study 1) and examines whether ToM development in TD and ASD children is linked with parental conversations on causes and on consequences on emotions (study 2).

The participants of the study 1 are 300 parents of TD children. For the study 2, the participants include 20 TD and 20 ASD children. Their ToM is assessed by ToM-emotions and ToM-beliefs tasks (Nader-Grosbois & Thirion-Marissiaux, 2011) and by The Theory of Mind Inventory (ToMI, Hutchins, Prelock & Bonazinga, 2010) completed by their parents. Parents filled the Questionnaire of Parent-Child Conversations about Emotions (QPCCE, Mazzone & Nader-Grosbois, 2013). The teacher filled the bipolar rating scales of children’s personality derived from the Five-Factor-Model (EBMCF, Roskam, de Maere-Gaudissart & Vandenplas-Holper, 2000). The validation results of QPCCE revealed good psychometric quality: internal consistency, factorial structure, convergent validity and test-retest reliability. The results emphasized variability of mothers’ and fathers’ conversations about emotions according to child’s age, developmental age and personality, and the links with their child abilities in ToM.
The heuristic model of the Parental Socialization of Emotions (PSE model) was developed by Eisenberg, Cumberland and Spinrad (1998, p.320) in order to explain how parents learn to their children to understand emotional situations and adjust their emotional regulation in daily life. In reference to this model, several studies investigated the impact of emotion-related socialization behaviors (ERSBs) on children’s social and emotional development. The authors distinguished three parental ERSBs: reactions to child’s emotions, emotion-related conversations and emotional expressiveness. Parents may display supportive strategies such as helping to solve the problem that caused the child’s distress (problem-focused responses) or showing their acceptance of the child’s emotional displays by encouraging him/her to express emotions (encouragement). On the contrary, parents could display non-supportive strategies such as denying the seriousness of emotional reactions or devaluing the problem (minimizing) or feeling embarrassed by their child’s emotional display (discomfort). Based on the theoretical model developed by Eisenberg et al. (1998), we propose an adapted heuristic model of PSE components which can be used with typically developing (TD) children and in children with an Autistic Spectrum Disorder (ASD).

The present research focuses specifically on parental emotion-related conversations toward preschoolers. In most studies, parental emotion-related conversations are typically assessed by means of an observational design in which the parent and the child interact together. However, the use of an observational design to measure a parent – child interaction has some limitations. As for example, the need of video recording could influence parent’s and child’s behavior and thus it could inhibit spontaneous behavior or induce a social desirability bias. Another problem is that the variety of methodological design (material, length of the session, etc.) and of coding categories through studies may complicate the comparison of inter-studies results. To overcome these limitations, we developed a parent-report measure to evaluate the parent – child emotion-related conversations that could be useful for researchers and clinicians. The results of the validation (factorial structure, internal consistency and test-retest reliability) of this measure are presented in study 1. These parent – child interactions could support the children’s emotional development, and notably their Theory of Mind (ToM). The results examining whether ToM abilities in TD and ASD children is linked with parental conversations on causes and consequences of emotions are presented in study 2.

The participants of the study 1 are 300 parents (168 mothers and 132 fathers) of TD children from French-speaking Belgian area. All parents filled the Questionnaire of Parent-Child Conversations about Emotions (QPCCE, Mazzone & Nader-Grosbois, 2013). The participants of the study 2 include 20 TD and 20 ASD children matched for global developmental age, and their parents. Children and their parents were recruited in French-speaking Belgian schools and specialized schools for ASD children. Children’s ToM abilities are assessed by direct measures (ToM-emotions and ToM-beliefs tasks, Nader-Grosbois & Thirion-Marissiaux, 2011) and by a questionnaire completed by mothers (The Theory of Mind Inventory, Hutchins, Prelock & Bonazinga, 2010). Mothers and fathers independently completed the QPCEE. The teacher filled the bipolar rating scales of children's personality derived from the Five-Factor-Model (EBMCF, Roskam, de Maere-Gaudissart & Vandenplas-Holper, 2000).

In study 1, data were submitted to varimax rotation to exploratory factorial structure. We obtained two factors that explained 46.24% of the total variance. The first factor, labelled “supportive strategies”, accounted for 35.76% of variance in the data (Eigenvalue of 12.52). Items composing this factor refer to parental supportive strategies such as explain emotional causes or consequences, explain emotional problem solving, ask questions about the emotions, etc. The second factor, labelled “non-supportive strategies”, accounted for 10.47% of variance in the data (Eigenvalue of 3.67). Items composing this second factor refer to parental non-supportive strategies such as avoiding, embarrassment during the conversation, etc. Reliability analysis, used Cronbach alpha, indicated a good consistency of the two factors (Factor 1 \( \alpha = .95 \); Factor 2 \( \alpha = .77 \)) and a very good consistency for the total score (\( \alpha = .92 \)) with reversed items for the second factor. The short-term stability was assessed by the correlation between parents’ scores obtained at two-week interval (n = 53 parents). The Pearson’s correlation indicated a strong stability (r = .73, p < .01) and the scores at time 1 explained 52% of the variation in scores at time 2. The stability of each factor was also demonstrated (Factor 1, r = .65, p < .00; Factor 2, r = .39, p < .01).
In study 2, the Independent sample t-test comparisons revealed no significant difference between groups for supportive strategies. However, we found a significant difference indicating that parents of ASD children used more non-supportive strategies during their emotion-related conversations than parents of TD children. To analyze the relations between parental emotion-related conversations and their children’s ToM abilities, several linear regressions were tested for each group separately. In TD group, mothers’ supportive strategies are positively (R² = .349, p < .05) related to children’s ToM abilities. In ASD group, we did not found any significant relation.

Results showed that the QPCCE has very good psychometric properties. The factorial analysis revealed two factors that are consistent with PSE theories: supportive and non-supportive strategies. These results suggest that the QPCCE is a valid parent-report measure for evaluate parent-child conversations about emotions in typically developmental population. Future studies have to examine the validation and applicability of the QPCCE in various atypical populations. Moreover, the study 2 revealed that mothers of ASD children use more non-supportive strategies during conversations about emotions with their child than mothers of TD children. Maybe, mothers of ASD children are more likely to be directive, to minimize or to avoid conversation about emotional states because they perceive lower abilities in understanding of emotions or in verbal comprehension and expression in their child. Contrary to our expectations, we did not find any link between mother-child conversations about emotions and ASD children’s ToM competences. However, mothers’ supportive strategies predict their perception of TD children’s ToM abilities.
Recognition of emotional prosody children with ASD and typical children

Sabrina Loquette
University of Rouen, Mont-Saint-Aignan, France
✉ sabrina.loquette@etu.univ-rouen.fr

Katia Rovira
University of Rouen, Mont-Saint-Aignan, France
✉ katia.rovira@univ-rouen.fr

Philippe Brun
University of Rouen, Mont-Saint-Aignan, France
✉ philippe.brun@univ-rouen.fr

Key words
Autism Spectrum Disorders
Emotion Recognition
Prosody
The recognition of the tone of voice contributes to emotion understanding and this aspect of emotion perception is still poorly documented. In particular, the role of social experiences may play an important role in the perception of different emotions and their links with a social context. In this line, it was hypothesized that chronological age could be an important factor to account for differences between children with Autism Spectrum Disorders (ASD) and Typically Developing (TD) children. Focusing on chronological age rather than on developmental age may bring interesting elements to our knowledge about the specific deficits of children with High Functioning Autism (HFA). Following this option, we have presented eight audio clips to 11 HFA children and to 30 TD children matched on Chronological Age (CA) of 9 years (mean CA: 9 year 1 month). The clips were designed so as to combine two factors: prosody (with and without semantic context) and emotional valence (happiness, anger) thus constituting 2 clips of each 4 combinations. ANOVA did not detect a significant difference between the group of HFA and the group of typical 9 year-olds. However, within-group analyses revealed significant difference related to prosody and emotional valence for both groups. More precisely, at age of 9 years, the recognition of prosody in both groups was facilitated by the presence of a semantic content. Results are discussed in terms of integrity of perception of sounded emotional signals in contrast with the well documented impairment in the perception of seen emotional signals.
People with Autism Spectrum Disorders (ASD) (DSM V, 2013) are frequently considered as impaired in their emotion understanding (Hobson, 1993; Jones et al., 2011; Loveland, 2005). This large variety of impairments has been mainly investigated through facial expression stimuli (Da Fonseca et al., 2009; Sato et al., 2013; Tremblay et al., 2005) and recently, several studies have investigated the auditory processing of emotion including receptive prosody and emotional intonation (for review, Boucher et al., 2000; O’Connor, 2012). However, these studies have given controversial results. Some studies have found an impaired recognition of emotional prosody in adolescents with ASD compared to Typical Development (TD) adolescents (Lindner and Rosén, 2007; Peppé et al., 2011; Rutherford et al., 2002). These difficulties in the emotional prosody understanding suggest that the tone of voice may not be perceived by adolescents with ASD as an important cue of emotional states of others (Rutherford et al., 2002; Lindner and Rosén, 2006; Kujala et al., 2005).

These previous results have not been systematically confirmed by other studies. Several research found no significant differences in the emotional prosody recognition between adolescents with ASD and typical adolescents (Grossman et al., 2010; Brennand et al., 2011; Le Sourn-Bissaoui et al., 2013).

Recently, Matsuda and Yamamoto (2013) suggested that these controversial results in the emotion prosody recognition in people with ASD may be due to differences in methodological procedures (auditory versus visual-auditory stimuli; sentences with semantic content versus pseudo-sentences).

The present study aims to assess whether children with ASD are able to identify emotions based solely on a speaker’s emotional prosody without any assistance of semantic content. In this perspective, considering that socio-emotional experience is tightly related to age, we will test children with ASD younger than those examined in previous studies. Our main goal is to test the emotional prosodic identification of children with ASD (mean age = 9 years) matched with TD children. Children with ASD were recruited on the basis of diagnostic criteria used by Mazefsky and Oswald (2007) and Peppé et al. (2011). In addition, we explored the role of the semantic content as it may help identify prosody using a cognitive rather than an emotional processing.

We hypothesized that both groups should show higher accuracy scores for emotional sentences with semantic content than for those without. We also expected that children with ASD should perform at a level equal to that of their TD peers on a task using sentences that have been modified to eliminate verbal content but maintain prosodic contours.

Two samples of children were recruited: 11 children with ASD (M=9;1 [years; months]) and 30 TD children (M=9;3). In the clinical sample, 9 children received a diagnosis of Asperger Syndrome (AS) and 2 a diagnosis of High Functioning Autism (HFA), according to the DSM-IV-R (APA, 2000), using the Autism Diagnostic Interview-Revised (Rutter et al., 2003) and the Autism Diagnostic Observation Schedule (Lord et al., 2003). They were also assessed using the Childhood Autism Rating Scale (Schopler et al., 1989).

Procedure was based on those proposed by Mazefsky and Oswald (2007) and completed with sentences with semantic content. So, DANVA test was adapted to French prosody and played by two male actors were designed. From those 20 sequences, 4 sequences with a joyful prosody and half with an angry prosody were selected by two judges not concerned by the study. The agreement between judges was of .87. For each emotion, 2 sequences were accompanied by two significant sentences and 2 had pseudo-content. The Significant Content (SC) was the French translation of the DANVA sentence: « I am going out of the room now. I will be back later ». For the pseudo-content -or no Significant Content (noSC)-, the actors were asked to pronounce and tone only the vowels of the sentence. After listen the sentence, the children responded to the question « How does the person feel? » and explain their answer. Only if the good emotion was named, the respond is correct.

The performance of ASD children compared with those of TD children matched for chronological age of 9. Analyzes have taken into account two modalities of prosody (SC and noSC) and emotion (happy vs anger). The data were analyzed using SPSS software.

In global sample, a significant main effect of prosody with better performance on SC \[t(40) = 7.54, p<.0001\] was observed. No significant difference between groups \[F(1,39) = 0.010,\]
p=.923] and no significant main effect of emotion [t(40) = -1.71, p=.09] were found.
For the both groups, a significant effect of prosody with better performance on SC was noted (ASD sample: [F(1,10) = 28.82, p<.0001]; TD sample: [F(1,29) = 36.2, p<.0001]). No significant difference appeared between groups when prosody was provided with SC [F(1,39) = 0.15, p>.05] and noSC [F(1,39) = 0.026, p>.05].
In SC condition, a significant effect of happy prosody on the performance on the performance of children with ASD [F(1,10) = 8.33, p <.01] and in the TD children [F(1, 29) = 10.54, p <.0005] was observed. However, no significant difference between the performance of ASD and TD children was noted. Same results were observed for anger prosody.
As expected, both groups were significantly more accurate on the SC task than on the noSC task. However, we noted that TD children scored relatively poorly on the noSC task. Two possible explanations: large age range of our TD participants (7;6 -18) and the unnatural presentation of language in noSC sentences.
The secondary hypothesis is also confirmed. Children with ASD, as their TD peers, are able to use semantic information to improve their performances on SC sentences. Same results are found in Boucher et al., 2000 and Paul et al. (2005).
Emotion recognition is based on SC comprehension and emotional prosody recognition. However, recognize emotional environments tend to differ across individuals. These differences appear to be determined by differences in personality or temperament. A principal perspective of this research is to ask the influence of this individual characteristic on emotion recognition.
An Analysis of Restricted Interests in Autism Spectrum Disorder with Versus without Speech Onset Delay: The Importance of Perceptually Versus Thematically Organized Interests

L. Chiodo
Université de Liège, Belgium
chio@hotmai.be

S. Majerus
Université de Liège, Belgium

S. Eusèbe
Université de Liège, Belgium

L. Mottron, M.D.
Centre d'excellence en Troubles envahissants du développement de Montréal, QC, Canada

Key words
autism spectrum disorder, restricted interests
Recent findings indicate that autistic people with/without speech delay can be differentiated on the basis of the perceptual vs. non-perceptual nature of their ability peaks. The present study investigated whether this distinction is also reflected in the nature of restricted interests observed in these two autistic populations. 20 adult participants with autism spectrum disorder (based on ADI-R / DSM-4 criteria) participated in this study, and were allocated to AS-SOD (speech onset delay; N=10) or AS-NoSOD (no speech onset delay; N=10) subgroups, while being matched for non-verbal IQ and age. 15 typically developing controls, also matched for age and non-verbal IQ, were recruited on the basis of presenting specific interests while being free of symptoms of autism spectrum disorder. Information about restricted interests was obtained by having participants answer to 19 questions based on the Yale survey of special interests (Klin & Volkmar, 1996) and the semi-structured interview by Mercier et al. (2000). Data were qualitatively analyzed with NVivo 10 textual analysis software in order to segment and categorize the content of the verbal reports provided by the participants. We observed that the proportion of thematically organized interests (interests with a rich semantic organization) was significantly higher in AS-NoSOD participants relative to both AS-SOD participants and controls. Conversely, the proportion of perceptually organized interests (interests based on accumulation of factual information such as historical dates, car license plates) was significantly higher in AS-SOD participants relative to both AS-NoSOD participants and controls. We conclude that restricted interests in AS-SOD are characterized by perceptually organized structures while these interests present a conceptual organization in AS-NoSOD individuals.
Aims:

Recent findings (Bonnel et al, 2010; Barbeau et al, 2013) indicate that autistic people with/without speech delay can be differentiated on the basis of the perceptual vs. non-perceptual nature of their ability peaks. Neuroimaging findings support this hypothesis: autistic people with or without speech onset delay can be contrasted by the perceptual versus linguistic nature of the cortical areas displaying overactivation during the presentation of visual and auditory material (Samson et al, 2013, 2015). In the light of these findings, the present study aims at exploring the nature of restricted interests in these two autistic subgroups, by examining whether autistic people with/without speech delay can be differentiated on the basis of the perceptual versus thematic nature of their interests.

Methods:

20 adult participants with autism spectrum disorder (based on ADI-R/ DSM-4 criteria) between 18 and 41 years of age participated in this study. Diagnoses followed the Diagnostic and Statistical Manual of Mental Disorders, fourth edition criteria, completed by Autism Diagnostic Interview-Revised (Lord, Rutter, & Le Couteur, 1994). Based on the ADI-R information, participants were allocated to AS-SOD (speech onset delay; N=10: 7 males, 3 females) or AS-NoSOD (no speech onset delay; N=10: 6 males, 4 females) subgroups, while being matched for QIP (> 70; Raven’s Progressive Standard Matrices, 1981) and age. 15 typically developing controls, also matched for age and QIP, were recruited on the basis of presenting specific interests while being free of symptoms of autism spectrum condition. Information about restricted interests was obtained by 19 questions based on the Yale survey of special interests (Klin & Volkmar, 1996) and the semi-structured interview by Mercier et al. (2000). Data were analyzed using NVivo 10 for Windows software, a qualitative analysis tool allowing to collect, organize and analyze content such as surveys. Percentages of themes averages were computed for each group. Repeated measures ANOVA were conducted to determine the possible interaction between the specific interests and the respective groups.

Findings:

Averaged percentages of themes revealed that the proportion of thematically organized interests (interests with a rich semantic organization) was significantly higher in AS-NoSOD participants relative to both AS-SOD participants and controls. Conversely, the proportion of perceptually organized interests (interests based on accumulation of factual information such as historical dates, car license plates) was significantly (p=0.001) higher in AS-SOD participants relative to both AS-NoSOD participants and controls.

Conclusions:

Restricted interests in AS-SOD are characterized by perceptually organized structures (regular patterns like dates or designs) while these interests present a rich, language-based conceptual organization in AS-NoSOD individuals. This difference may result from their contrasted speech history: AS-SOD differ from the AS-NoSOD in their development at the beginning of the speech, with AS-No SOD developing early speech abilities, and AS-SOD being usually delay in their speech development. Differences in the nature of restricted interests may provide important clues with respect to the mechanisms of information processing characterizing autism with speech delay as opposed to autism without speech delay. Our findings may also have implications for the definition of optimal and differentiated educational learning tracks in these two subgroups of autism spectrum disorders.
Local bias in visuospatial tasks in Autistic Spectrum Disorder: central mechanism or specific property of each subsystem?

Ramona Cardillo  
ramona.cardillo@gmail.com

Silvia Lanfranchi  
silvia.lanfranchi@unipd.it

Irene C. Mammarella  
irene.mammarella@unipd.it

Key words

Autism Spectrum Disorder (ASD), Visuospatial abilities, Perceptual Cohesiveness (PC).
One of the features of the cognitive and behavioral phenotype of Autism Spectrum Disorder (ASD) is the presence of an atypical perception. Shah and Frith (1993), using a modified version of the Block Design subtest (BDT) of the Wechsler Intelligence Scales (Wechsler, 1994), showed that ASD participants performed better than controls when presented with unsegmented designs, suggesting that they need less of the normally required effort to segment a gestalt. This result supports the hypothesis of Weak Central Coherence (WCC) (Shah & Frith, 1993). However, good performances of individuals with Autism in tasks requiring global processing appears inconsistent with the global-deficit-driven WCC hypothesis (Caron et al., 2006; Kana, et al., 2013).

In order to better explain the mechanisms responsible for the visuospatial performance in ASD and to analyze the presence of an atypical visuo-perceptual profile in this syndrome, a group of individuals with ASD, aged from 14 to 21 years, performed the modified BDT tasks (Caron et al., 2006) assessing visuo-constructive and perceptual skills and tasks specifically devised for this study, measuring visual processing speed, global perception and visuospatial short term memory, at various levels of Perceptual Cohesiveness (PC). The aim of the present study was to contribute in analyzing whether the local bias typical of the ASD affect their performance as a single central mechanism or may differ among the different domains examined.

Results shows an heterogenous visuospatial profile for ASD group, characterized by strength and weakness and affected differently by the PC compared to the domain considered. These results revealed that, the local bias typical of the ASD cognitive profile could be considered as a specific property for each sub-system rather than as a central mechanism.
Aims

The present research aimed to investigate the effect of perceptual cohesiveness (PC) analyzing visuospatial abilities by comparing performances of individuals with Autistic Spectrum Disorder (ASD) or typical development (TD). For this reason, visual perceptual, visuoconstructive abilities, processing speed and visuospatial short term memory were examined. Modified versions of the BDT tasks used by Caron, et al. (2006), assessing visuoconstructive and perceptual skills were administered, together with tasks specifically devised for this study, in which PC was manipulated. PC is a figures' property describing the extent by which different parts of a figure may be easily interconnected and ranges from a low (favoring a local processing) to a high (favoring a global processing) level.

Our objective was to analyze whether 1) PC affects the performance in all visuospatial tasks administered, 2) participants with ASD present weaknesses or superior performances in some of the tasks compared to TD and 3) participants with ASD are differently affected by PC in the various tasks.

Concerning the effects of PC, we predicted a diminished detrimental influence of PC on ASD performance rather than TD, as suggested by previous researches (Caron et al., 2006; Happé & Frith, 2006). We also predicted that the ASD group would shows a better performance than TD group in the visuoconstructive and perceptual task, in agreement with previous studies (Caron et al., 2006; Shah & Frith, 1993) but not necessarily in the visual processing speed task and visuospatial short term memory task in which conflicting results emerged (see Calhoun & Mayes, 2005 and Caron et al., 2006 regarding processing speed; and Griffith et al., 1999; Mammarella, et al.,2014; Ozonoff & Strayer, 2001; Steele et al., 2007 regarding spatial memory).

Methods

Participants

ASD group: 14 (13 M, 1 F) individuals from 14 to 21 years old, with average IQ scores that met DSM 5 diagnostic criteria for ASD (APA, 2013). The diagnosis was verified using the ADI-R (Lord et al., 1994) and the Theory of Mind subtest of NEPSY-II (Urgesi et al., 2011).

TD Group: 14 normally developing individuals matched for chronological age, Perceptual Reasoning Index of the Wechsler Intelligence Scales (Wechsler, 2003, 2008) and gender were recruited. Participants were interviewed to ensure that there was no history of symptoms associated with autism, or other neurodevelopmental disorders.

Materials and Procedure

Participants were tested in two single sessions lasting approximately 40 minutes. The following tasks were administered:

- Visuoconstructive BDT: a modified version of the block design subtest of the Wechsler Intelligence Scale; participants had to reproduce configurations at different level of PC using a series of cubes. Two versions were administered (unsegmented and segmented);
- Perceptual task: a matching computerized task consisting of two parts, the first required to match an unsegmented figure to a corresponding segmented target figure presented among three segmented distractors. Vice versa the second required to match a segmented figure to a corresponding unsegmented target figure.
- Visual processing speed task: Meaningless visual patterns consisting of 7x7 grids were presented. Participants were asked to look at the target figure and then choose the same configuration presented among four distractors, as speed as possible.
- Visuospatial short term memory task: Participants were presented with a block configuration for few seconds, with high or low PC, and then they had to reproduce it on a blank matrix.
Findings

Mixed ANOVAs and post-hoc analyses by using Bonferroni’s correction were performed. Response times (RT) were analyzed for the visuoconstructive BDT. Both groups showed faster performance at the segmented version compared to unsegmented (p<.001). A main effect of PC (p<.001) emerged revealing slower performance at High PC level than minimum and intermediate levels. The significant interaction PC x Group (p=.042) showed differences between PC level only for TD, while no significant differences emerged between PC levels for the ASD group. Lastly a Group x BDT version effect emerged (p=.05) showing a slower performance of ASD compared to TD at unsegmented version (p=.009).

RT were analyzed for the perceptual task. The main effect of PC emerged (p<.001): meaning faster performance at high PC level than intermediate and minimum levels. Comparing the segmented and unsegmented versions, longer RT for the segmented target version then unsegmented (p=.038) were observed on the TD group. On accuracy a main effect of group was found: the ASD group was more accurate than TD (p=.05).

Accuracy and RT were analyzed for visual processing speed task, the main effect of PC level emerged (p<.001). No group differences emerged. Accuracy was analyzed for visuospatial short term memory task and no differences between groups were found. The main effect of PC emerged (p=.001): both groups showed better performance at High PC level than other levels.

Conclusions

The first aim of the present study was to analyze the effect of PC on the performances of ASD and TD groups. Considering the visuoconstructive domain the ASD group was characterized by a diminished detrimental influence of PC, in fact no differences in RT between PC levels emerged in the BDT only for ASD group. In contrast, the effect of PC affects the performances of both groups in all other tasks assessing perceptual abilities, visual processing speed and visuospatial short term memory.

The second objective was to analyze group differences in different domains. Results highlighted no differences among groups in visual processing speed and visuospatial short term memory tasks. Instead higher performances for ASD group emerged in the perceptual task: the TD group showed longer RT for the segmented target version compared to the unsegmented, on the contrary ASD children showed no differences between the two versions. Differently, in the visuoconstructive task our TD group showed faster performance then ASD in the unsegmented version.

In conclusion, an heterogenous visuospatial profile for ASD group was observed, characterized by strengths and weaknesses and differently affected by the PC compared to the domain considered. These results seem to encourage the assumption that, the local bias typical of the ASD cognitive profile could be considered as a specific property for each sub-system rather than as a central mechanism.
Intellectual disabilities and spatial cognition: Differences between active exploration and passive exposure during route learning in a virtual environment among teenagers with intellectual disabilities

Gauthier BILLIET
Univ. Lille, EA 4072 - PSITEC - Psychologie : Interactions Temps Émotions Cognition, F-59000 Lille, France
✉ gauthier.billiet@gmail.com

Yannick COURBOIS
Univ. Lille, EA 4072 - PSITEC - Psychologie : Interactions Temps Émotions Cognition, F-59000 Lille, France
✉ yannick.courbois@univ-lille3.fr

Mickael Molet
Univ. Lille, EA 4072 - PSITEC - Psychologie : Interactions Temps Émotions Cognition, F-59000 Lille, France
✉ mikael.molet@univ-lille3.fr

Key words
Intellectual Disabilities, Spatial Navigation, Virtual Environment
Abstract

Studies regarding spatial cognition have benefitted from technological progress for many years. The use of virtual environments (VE) aims to respond to both the lack of control when evaluating spatial cognition in real conditions as well as the lack of ecological validity in classical tests. Studies have shown the complexity of learning and spatial navigation among people with intellectual disabilities (ID). It is therefore important to better understand the effects of different conditions in which this population learns itineraries. The aim of this research was to evaluate the comparative effects of active exploration and passive exposure in the context of learning an itinerary within a VE among adolescents with an ID. Effectively, no research has been realized comparing the impact of these types of learning among people with ID’s, either in a VE or a real environment (RE). Moreover, a number of studies concerning the spatial orientation capacities in this population refer to these different types of learning without explicitly addressing this issue. To this end, we compared the performances on a wayfinding task in twenty adolescents with a mild to moderate ID. A significant effect of the type of learning (active/passive) on wayfinding performance was found. Specifically, the number of errors after learning an itinerary was lower for the group in the passive exposure condition than for the group in the active exploration condition. These results relating to a negative effect of active learning are discussed in terms of the effect of a double task as well as the different effects of cognitive difficulties associated with ID.
Aims

The aim of this research was to evaluate the comparative effects of active exploration and passive exposure in the context of learning an itinerary within a Virtual Environment (VE) in adolescents with ID. Recent studies have looked at the relationship between sensorimotor activities and spatial cognition in elderly participants. These studies have shown that spatial memory performance in elderly participants (as opposed to younger participants) was weaker following an active learning condition than following a passive learning condition.

Hypotheses

Based on the data from the scientific literature and taking into account the difficulties encountered by people with an ID (limited working memory, impaired executive functions), our hypothesis was that the active learning condition would not be favorable to learning an itinerary. Indeed, the use of the command system permitting displacement during active exploration might interfere with the cognitive dimension and alter spatial learning performance. If the number of errors made following active exploration was greater than that made following passive observation, our hypothesis would have been verified.

Methods

Setting

We elaborated a VE in the form of a maze. After a learning phase, which differed according to the group (active or passive), we measured the impact of the learning phase during a test phase (based on route knowledge).

Participants

20 participants with a mild to moderate ID took part in our study. The participants were students at a special needs school, the Institut Médico-Educatif « La Vie Active » in Rang-Du-Fliers. All the participants gave their informed consent to participate in this study. In order to test our hypothesis, we constituted two groups of individuals with ID matched on the Raven’s Colored Progressive Matrices (RCPM) raw scores.

• The active group (AC Group) was composed of 10 adolescents aged between 15 and 19 years with a mean chronological age of 17.75 years (SD = 1.13) and a mild to moderate ID, with a mean IQ of 57.5 (SD = 4.84). The active group had a mean raw score of 7 (SD = 2.83) for RCPM.

• The passive group (PA Group) was composed of 10 adolescents aged between 16 and 19 years, with a mean chronological age of 17.84 years (SD = 1.3), presenting a mild to moderate ID, with a mean IQ of 56.5 (SD = 4.55) and a mean raw score of 7 (SD = 2.58) for RCPM.

Intervention

The first part of the experiment consisted of a phase of familiarization with displacement in a VE. The second part consisted of a learning phase followed by a test phase. The learning phase differed according to the group (AC or PA). We chose to use a strict matching procedure: Yoked Control. Each participant in the passive group was associated with a participant in the active group. The passive participants viewed the displacements as they were realized by the participants with whom they were paired in the active condition. This allowed the groups to
be matched in terms of the amount of time spent in the VE as well as the quantity of visual information perceived. During the learning phase, the participants in the active group had to memorize the route with the help of a command system allowing displacement within the VE. The participants in the passive group simply had to view a video showing the route that had to be memorized. The video presented corresponded with a video recorded during the learning phase of the preceding participant in the active condition.

**Statistical analysis**

Nonparametric comparisons were carried out because the variables were not normally distributed.

**Results**

The difference between the number of errors made by the active group and the number of errors made by the passive group was significant [Mann-Whitney U(9.5) = 3.02, p = .0013]. The number of errors was inferior for the passive group (M=1.9; SD=1.52) in comparison with the active group (M=4.8; SD=1.62).

**Conclusions**

The results of this study show a negative effect of active exploration on performance in a wayfinding task. Indeed, the performances of the AC group were weaker than those of the PA group. These results are concordant with studies realized with elderly participants and with studies including younger participants. That active exploration failed to improve the efficacy of route learning might be interpreted as a double task effect. During the learning phase the participants of the AC group had to control the input device in order to “walk” in the VE while directing their attention to landmarks. Given the cognitive limitations associated with ID’s, they may have not had enough cognitive resources to do both tasks.
Study of quotient of gross motor ability in children with Down syndrome

Giuseppe Battaglia
Dipartimento di Scienze Psicologiche, Pedagogiche e della Formazione, Università di Palermo, Italy
✉ giuseppe.battaglia@unipa.it

Marianna Alesi
Dipartimento di Scienze Psicologiche, Pedagogiche e della Formazione, Università di Palermo, Italy
✉ marianna.alesi@unipa.it

Daniele Benedetto Amato
Dipartimento di Scienze Psicologiche, Pedagogiche e della Formazione, Università di Palermo, Italy
✉ danielebenedetto.amato@virgilio.it

Marsia Scirè
Dipartimento di Scienze Psicologiche, Pedagogiche e della Formazione, Università di Palermo, Italy
✉ marisia.scire@gmail.com

Annamaria Pepi
Dipartimento di Scienze Psicologiche, Pedagogiche e della Formazione, Università di Palermo, Italy
✉ annamaria.pepi@unipa.it

Antonio Palma
Dipartimento di Scienze Psicologiche, Pedagogiche e della Formazione, Università di Palermo, Italy
✉ antonio.palma@unipa.it

Key words
Exercise, APA, QSGM
Several studies documented a more sedentary lifestyle in subjects with Down syndrome compared with typically developing peers. In turn, this sedentary lifestyle increases the risk to exacerbate actual clinical disease and develop health-related complications such as obesity and motor functional deteriorations (Alesi et al., 2014). The aim of this study was to assess the quotient of gross motor ability (QSGM) in sedentary children with Down syndrome. The participants were eighteen children with Down syndrome (age: 8.22±2.82 years; weight: 31.05±10.66 kg; height: 1.19±0.18 m), of whom thirteen were boys and five were a girl. All subjects had been engaged in structured speech therapy and psychomotor activity from early childhood. The children did not attend any additional physical activity programs in or out of school. All subjects were from average socioeconomic backgrounds and attended primary school. They were recruited through Villa Sofia - Cervello General Hospital of Palermo (Sicily, Italy), schools and not-for-profit associations that provides support and community resources for people with Down syndrome and their families.

The subjects were assessed for locomotor ability and object control skills using a gross motor development test (Ulrich, 1992).

The grossmotor and fine motor skill composite scores were significantly lower in the children with Down syndrome compare to normative sample. For this reason it is necessary improving an active lifestyle in subjects with Down syndrome by a structured adapted physical activity program. However, little information is available on the structure of intervention programs aimed at increasing motor and cognitive skills. Shin and Park (2012) undertook a meta-analysis to examine the effects of motor programs in individuals with intellectual disabilities showing that short-duration interventions (31–60 minutes) and programs running four times per week appeared to be effective.
Several studies documented an increased sedentary lifestyle in subjects with Down syndrome compared with typically developing peers. In turn, this sedentary lifestyle increases the risk to exacerbate actual clinical disease and develop health-related complications such as obesity and motor functional deteriorations (Alesi et al., 2014). The aim of this study was to assess the quotient of gross motor ability (QSGM) in sedentary children with Down syndrome. The participants were eighteen children with Down syndrome (age: 8.22±2.82 years; weight: 31.05±10.66 kg; height: 1.19±0.18 m), of whom thirteen were boys and five were a girl. All subjects had been engaged in structured speech therapy and psychomotor activity from early childhood. The children did not attend any additional physical activity programs in or out of school. All subjects were from average socioeconomic backgrounds and attended primary school. They were recruited through Villa Sofia - Cervello General Hospital of Palermo (Sicily, Italy), schools and not-for-profit associations that provides support and community resources for people with Down syndrome and their families. Members of the organization were invited to meet with researchers to become familiar with the goals of the study and its procedures. Prior to the start of the study, appropriate local ethics committee approval was obtained from the University of Palermo and written informed consent was provided by each participant’s caregiver.

Height and body weight were measured according to the standard practices recommended at the Airlie conference. Height was assessed using a stadiometer (maximum height recordable, 220 cm; resolution, 1 mm) with the subjects barefoot and standing upright. Body weight was measured using a Seca electronic scale (maximum weight recordable, 300 kg; resolution, 100 g; Seca Deutschland, Hamburg, Germany). Body mass index was calculated as body weight divided by height squared (kg/m²).

The subjects were assessed for locomotor ability and object control skills using a gross motor development test. This test investigates two different aspects of gross motor development, i.e., locomotion (requiring subjects to run as fast as possible for 15 meters, gallop for ten meters, hop on one leg for five meters, jump forward, do a long jump, and take little jumps forward and laterally) and object control (requiring subjects to catch a ball with a tennis racket, bounce off the ball, catch a ball, kick the ball running, and throw a ball with the hand). The two subtests combined give a quotient of gross motor ability (QSGM). Participants’ performances were videotaped with a digital video camera that allowed us to analyze movement sequences separately and to assign scores. To obtain a higher validity, according to the handbook, the participant was required to repeat the trial three times and a score of 1 was assigned if the subject performed well twice or 0 if the subject was not able to perform the test. The sum of scores obtained for each criterion (maximum total score 48) was transformed into standard scores according to the age level of the child. We evaluated the gross motor development level based on QSGM scores suggested by the manual’s instructions, i.e., 35–69 (very low motor ability, VL-MA); 70–79 (low motor ability, L-MA); 80–89 (under average motor ability, UA-MA); 90–110 (average motor ability, A-MA); 111–120 (over average motor ability, OA-MA); 121–130 (high motor ability, H-MA); and 131–165 (very high motor ability, VH-MA). With regard to gross motor abilities, based on QSGM scores suggested by the manual’s instructions, we found that studied subjects showed a very low QSGM (56.66±9.66) and locomotor ability (1.77±1.55) and object control (1.55±1.78) standard scores.

The gross motor and fine motor skill composite scores were significantly lower in the children with Down syndrome compared to normative sample. For this reason it is necessary improving an active lifestyle in subjects with Down syndrome by a structured adapted physical activity program. However, little information is available on the structure of intervention programs aimed at increasing motor and cognitive skills. Shin and Park (2012) undertook a meta-analysis to examine the effects of motor programs in individuals with intellectual disabilities showing that short-duration interventions (31–60 minutes) and programs run-ning four times per week appeared to be effective.
References

Contribution of visuospatial abilities in learning to read: case of Williams Syndrome

Anne-Sophie Pezzino
Psychology, Cognition and Communication Research Center (EA 1285), University of Rennes 2, Place du recteur Henri Le Moal, CS 24307, 35043 Rennes, France

Nathalie Marec-Breton
Psychology, Cognition and Communication Research Center (EA 1285), University of Rennes 2, Place du recteur Henri Le Moal, CS 24307, 35043 Rennes, France

Agnès Lacroix
Psychology, Cognition and Communication Research Center (EA 1285), University of Rennes 2, Place du recteur Henri Le Moal, CS 24307, 35043 Rennes, France

Key words
learning to read,
Visual-spatial abilities,
Williams syndrome
Williams syndrome (WS) is a rare genetic disorder caused by a microdeletion in the long arm of chromosome 7 (7q11.23). At cognitive level, people with WS have an Intelligence Quotient (IQ) ranged between 40 and 70. They have a unique neuropsychological profile characterized by an apparent dissociation between cognition and language (e.g. Karmiloff-Smith, Thomas, Annaz & al., 2004). Deficits in capacities of memory and visuospatial processing are also discussed in the literature (e.g. Fayasse & Thibaut, 2003). Despite this specific profile, very few studies have investigated the learning abilities to read in this population. Building on the dual-path model, reference model for understanding in reading disorders (Carbonnel, Gilet, Martory & Valdois, 1996), we seek to characterize WS reading procedures and specify what their installation of reading depends on their particular neuropsychological profile.

Twenty-eight individuals with WS (aged 7; 07-34; 0) were faced with testing to determine, firstly, reading levels (accuracy and speed) and, secondly, their phonological skills (phonological awareness) and visuospatial (copying figures and dam bells). In order to a better understanding of factors involved in reading acquisition in WS, we compare their performance on these tasks to those of individuals with no intellectual disabilities but with the same reading level.

Data confirmed the installation difficulties of reading in WS. Analysis of mistakes in reading shows an automatization default about reading procedures even in subjects faced with writing for over 8 years. The data also suggests that automatization would be more impaired because of their visual-spatial processing difficulties than their levels of manipulation of phonological units of language.
The aim of our project is to study the learning to read of children, adolescents and young adults with Williams' syndrome (WS). Williams' syndrome is a genetic disease (1 in 20,000 births) due to a microdeletion in the long arm of chromosome 7 (7q11.23) which leads to loss of 16-25 genes. Based on questionnaires completed by families, we could estimate that just 50% of people with WS access to reading. Readers, in turn, would have a difficulty of installation of reading automatization, characteristics of expert reading (Barca, Bello, Volterra & Burani, 2010; Levy, Smith & Tager-Flusberg, 2003). The authors suggest that WS rely less on lexical procedure than controls to which they are compared. This immediate recognition ability of spelling instances stored in memory is however necessary to reach a fast and easy reading. However, despite a specific neuropsychological profile of WS, very few studies have focused on the learning abilities to read this population.

To characterize more precisely the reading procedures used by WS of our study, we took support on the dual-path model (Coltheart et al., 2001). Different research confirms its relevance in understanding the reading performance of children, adolescents and young adults with different levels of learning to read (Barca et al., 2010; Carbonnel, Gilet, Martory & Valdois, 1996; Castles, Bates, Coltheart, 2006; Gombert, Colé, Valdois, Goigoux, Mousty & Fayol, 2000; Ziegler et al., 2008).

At cognitive level, individuals with WS have an Intelligence Quotient (IQ) which is ranged between 40 and 70. However, they present a unique neuropsychological profile characterized by an apparent dissociation between cognition and language: the language is relatively well preserved compared to the memory field (especially working memory) and visuospatial is more disturbed (e.g. Costanzo et al., 2013; Karmiloff-Smith, Thomas, Annaz, et al., 2004; Menghini et al., 2010). Actually, based on the search about the ordinary teaching of reading, research conducted on the origin of the causes of learning difficulties were mainly interested in metaphonological skills of individuals with WS (e.g. Majerus et al. 2001 ; Menghini, Verucci & Vicari, 2004). This work confirms the difficulties in handling the phonological units. However, it is unclear whether the phonological difficulties in WS are responsible for installation of reading difficulties. Studies on children without intellectual disabilities have shown that learning difficulties reading could affect the development of phonemic awareness. The specific neuropsychological profile of WS leads us to study more precisely the contribution of visuospatial processing. Various authors (e.g. Fayasse & Thibaut, 2003) suggest that people with WS present deficits at this level. Dessalegn, Landau and Rapp (2012) in their study of two teenagers with WS, observe that despite intellectual efficiency, and phonological awareness equivalent reading level of their subjects differ by more than 5 grades. They explain this discrepancy by differentiated visuospatial processing capabilities: the reader with the most difficulties massively failing to visuospatial tasks. In continuation of this study, our work has the objective to clarify the role of visuospatial skills in learning to read in WS.

To this end, we met twenty-eight individuals with WS (ages 7; 07-34; 0) in order to offer standardized tests measuring reading efficiency (Alouette-R of Lefavrais, 1967), their visuospatial and visuo-attentional skills (ODEDYS-2: Bells test of Gauthier et al, 1989; L2MA2: Copy geometric figure test of Chevrie-Muller et al., 2010), their phonological and memory skills (L2MA2: Phonological awareness and memory tests of Chevrie-Muller et al., 2010). We have chosen to match each WS involved at a control subject with the same reading age. The comparison of WS group performance to the control group allows us to have a better understanding of the weight of visuospatial deficits in the development of reading skills. We chose to assess each participant with WS about a control subject even reading age. The comparison of WS group performance than the control group allows us to better understand the weight of visuospatial deficits in the development of reading skills.

Our analyzes reveal first of all, an automatization failure of even reading procedures in WS subjects faced with writing for over 8 years. We also note that subjects who have recourse to the non-lexical process are also those with the most difficulties in visuospatial tasks. Indeed, regression analyzes confirm that automatization would be more impaired because of their visuo-spatial processing difficulties than their levels of manipulation of phonological units of language. These results will be discussed in the referred to a more appropriate care. Currently, WS have a monitoring target on the establishment phonological training. Our results suggest that visuospatial remediation could also be profitable.

The transferability of these results to other atypical populations will also be discussed.
Do children with intellectual disabilities acquire the meaning of words the same way as typically developing children?

Dr. Arnaud WITT
L.E.A.D., CNRS 5022
Pôle AAFE, Esplanade Erasme
BP 26513
21065 Dijon Cedex, France
✉ arnaud.witt@u-bourgogne.fr

Pr. Jean-Pierre THIBAUT
L.E.A.D., CNRS 5022
Pôle AAFE, Esplanade Erasme
BP 26513
21065 Dijon Cedex, France
✉ jean-pierre.thibaut@u-bourgogne.fr

Key words
intellectual disability, self-regulation, executive functions.
Children with intellectual disabilities (ID) start to acquire the meaning of words at the same mental age than children without ID (Glen & Cunningham, 1982). However do they acquire the meaning of words the same way as typically developing children? Children with mild and moderate intellectual disabilities and their mental-age matched typically developing (TD) counterparts participated in a novel relational words learning task. Capitalizing on Gentner et al. (2011), two learning pairs of stimuli were introduced with a novel relational word. In a given trial, the set of pairs was composed of either two close or two far pairs (e.g., close pairs: knife1-watermelon and knife2-orange; far pairs: knife1-watermelon and cleaver-piece of meat, for the “cutter for” relation). At test, children were presented with either a close or a far generalization situation (e.g., close generalization: scissors-sheet of paper; razor-beard). We observed which learning condition led to better generalization performance, comparison between close or far learning exemplars, and whether it interact with the intellectual status of the learners. Educational applications for lexical and conceptual learning are discussed regarding learners' intellectual abilities.
Context

Relational categories are notoriously difficult to learn because they are not defined by intrinsic stable properties. In typically developing children, comparisons have been shown to favor generalization for object relational words (Gentner, Anggoro, & Klibanoff, 2011). In addition, conceptual distance between the learning exemplars to compare led to better generalization performance (Thibaut & Witt, 2015). Regarding conceptual learning in children with intellectual disabilities, Hupp & Mervis (1982) showed that children with ID also benefited from multiple comparisons. However, this benefit is observed only when exemplars are typical exemplars of the categories but not when children with ID were presented with heterogeneous (typical and peripheral) exemplars. We can thus wonder whether the conceptual distance between the learning exemplars affect generalization performance differently in children with and without intellectual disabilities? For this reason, we decided to study the impact of comparisons on relational concept learning with a novel word learning task in children with and without intellectual disabilities. In the comparison paradigm used in Gentner et al. (2011), we systematically manipulated the conceptual distance between the learning exemplars and the generalization situations. The results of such an experiment should permit to formulate pedagogical recommendations to promote conceptual leaning in children with and without intellectual disabilities.

Methods

Participants. Forty-eight children participated in the experiment. Twenty-four of them were TD preschoolers and twenty-four were children with mild and moderate ID. Common measure for matching children with and without ID on mental age was obtained by administrating the Raven’s Coloured Progressive Matrices (RCPM; Raven, 1965).

Material. Materials were adapted from Gentner et al. (2011). Different sets of pictures were built. Each set corresponded to one relational category (cutter for, home for, food of, baby of, etc.) and was composed of 14 pictures, 6 learning pictures and 8 test pictures. The 6 learning pictures were composed of an initial learning pair, a close learning pair, and a far learning pair. As mentioned above we manipulated the conceptual distance (close or far) between the two learning pairs presented in the comparison paradigm. For each relational category (e.g., cutter for), the close pairs were composed of conceptually similar items (e.g., knife1-watermelon, knife2–orange), while the far pairs were composed of less conceptually similar pairs (e.g., knife1-watermelon, cleaver-piece of meat). The 8 test pictures consisted of two sets of 4 pictures for the close and the far generalization conditions: the entity (e.g., respectively, sheet of paper; bearded face1), a taxonomic choice (e.g., respectively, pile of sheets of paper; bearded face2), a thematic choice (e.g., respectively, pencil; toothbrush), and a relational choice (e.g., respectively, scissors; razor). Figure 1 depicts the close and far pairs used to instantiate the “cutter for” relation during the learning phase, and the close and far generalization conditions introduced at test. Independent similarity ratings from 54 students confirmed that close learning pairs were more similar one to the others than far learning pairs, p < .01, and that close generalization materials were more similar to the learning materials than the far generalization materials, p < .01.

Procedure

Our procedure was as close as possible to that used in Gentner et al. (2011), except that pictures were displayed via a computer presentation. We illustrate it with the “cutter for” relational category for the close learning and close generalization conditions. A puppet named Sammy was used in order to make the task more attractive for children. The experimenter introduced the game with the following instructions “Hello, we are going to play a game together. In this game we are going to teach Sammy the word buxy. We are going to show
him what buxy means." "Look! This knife (the knife1 was displayed on the computer screen) is the buxy for the watermelon (the watermelon was displayed, left side of the knife1)." "This knife (the knife2 was displayed, below the knife 1) is the buxy for the orange (the orange was displayed, left side of the knife2)." The test started with these instructions: "Now let's look all of them (gesturing across all the training pairs). You see how these are buxies? Now it's your turn. Which one of these (pointing to the test materials --taxonomic: pieces of paper; thematic: pencil; relational: scissors-- is the buxy for the paper in the same way?" Children chose among the three test cards by pointing which is the buxy for the paper.

**Expected Results (data collection is in progress)**

A 2 (Learning Distance: close or far) x 2 (Generalization Distance: close or far) x 3 (Group: ID or TD children) analysis of variance (ANOVA) will be carried out on the proportions of relational choices. Student’s t-tests will be run to compare observed proportions of relational choices with the proportion corresponding to chance level performance (33%), for each condition. Typically developing children should benefit more from the far learning pairs condition than from the close learning pairs condition, while children with intellectual disabilities should benefit more from the close learning pairs condition than from the far learning pairs condition.

**Discussion**

The discussion will focus on pedagogical recommendations to promote lexical and conceptual learning in children with intellectual disabilities.
Does the development of syntax comprehension show a premature asymptote among persons with Down syndrome?

A cross-sectional analysis.

Bruno Facon
Univ. Lille, CNRS, CHU Lille, UMR 9193 – SCALab - Sciences Cognitives et Sciences Affectives, F-59000 Lille, France

David Magis
University of Liège, Belgium

Key words
syntax development, Down syndrome.
Abstract

An uncertainty persists regarding the trajectory of syntactic acquisitions of persons with Down syndrome (DS) beyond childhood. If we know that, ultimately, their syntactic development remains largely incomplete, the question that arises is when it reaches its asymptotic level. For some researchers, the asymptotic level is reach in the early teens, whereas for others, syntactic abilities evolve through early adulthood. It is therefore not yet possible to draw a clear picture of the developmental trajectory of syntactic skills of persons with DS and, in particular, to specify the period when they reach their asymptote. The present work addresses this issue using a cross-sectional approach. Two receptive tests of syntax and vocabulary were administered to a group of children, adolescents and young adults with DS matched both on CA and a measure of nonverbal cognitive development with a group of participants with intellectual disability of undifferentiated aetiology (UND). Regression analyses indicate a significant effect of CA and diagnostic status on syntax and vocabulary scores. However, the interaction between CA and group membership is not significant for either tests. It is concluded persons with DS do not show a premature asymptote with regards their syntactic development.
Purpose of the study

Although the morphosyntactic component of the language development of children with Down Syndrome is, on the whole, of a comparable nature to that observed among typical children (Berglund, Eriksson, & Johanson, 2001; Tager-Flusberg, Calkins, Nolin, & Baumberger, 1990), numerous studies showed that it is particularly slow and stagnates at a very low level in adulthood (e.g., Fowler, Gelman, & Gleitman, 1994). In fact, their grammatical abilities, at virtually every stage of development, fall well below their nonlinguistic abilities (Abbeduto, Warren, & Conners, 2007).

An uncertainty persists regarding the trajectory of their syntactic acquisitions beyond childhood. If we know that, ultimately, the language development of persons with DS remains incomplete, the question that arises is when it reaches its asymptotic level. Do language learning in general and syntax acquisitions in particular continue during or even beyond early adulthood? Does it end early in adolescence? In this second case, no progress would occur beyond 12-14 years. These questions have their roots in the work and positions of Lenneberg (1967), for which the critical period of language acquisition ends at puberty. Although it provides no definitive evidence about children and adolescents with DS, his prediction about them is clear-cut: “In virtually all [...] cases, language development comes to a complete standstill in the early teens. Training and motivation are of little help” (Lenneberg, 1969, p. 640). Some studies tend to prove him right, at least as regards to syntactic acquisitions (Fowler, 1988; Fowler et al., 1994; Rondal & Comblain, 1996). However, the problem seems far from resolved since other works give conflicting results (Chapman, Seung, Schwartz, & Bird, 1998; Chapman, Hesketh, & Kistler, 2002). Thus, although Chapman et al. (2002) corroborated the finding of a stagnation of syntax comprehension between adolescence and adulthood, they observed, at the same time, a steady increase in the average length of verbal productions suggesting a development of syntactic abilities beyond adolescence. Overall, it is therefore not yet possible to draw a clear picture of the developmental trajectory of syntactic skills of persons with DS and, in particular, to specify the period when they reach their asymptote. The present work addresses this issue using a cross-sectional developmental approach.

Method

A test of receptive syntax, the French version of the Test for Reception of Grammar, F-TROG (Lecocq, 1996) was administered to a group of children, adolescents and young adults with DS (N = 62) matched both on CA and a measure of nonverbal cognitive development with a group of participants with intellectual disability of undifferentiated aetiology (UND, N = 62). Syntax test scores were regressed on CA and the slope of regression lines of the two groups were compared. If a premature asymptote occurs for participants with DS, their regression line should exhibit an inflection point earlier than that observed for UND participants. In this case, it should be possible to conclude that DS participants specifically present a premature arrest of their syntactic development. A test of receptive vocabulary, the Echelle de Vocabulaire en Images Peabody (EVIP, Form B, Dunn, Thériault-Whalen, & Dunn, 1993 — the French version of the PPVT), was also administered to each group of participants to check whether the issue of premature asymptote only concerns the syntactic component of language development. According to the conclusions of the literature review of Rondal and Comblain (1996, 2002), no inflection point should be observed for the lexical knowledge of either groups, because the semantic and pragmatic components of language development would be less concerned by the critical period and, therefore, could lead to slow but real progress potentially up to 30-40 years.
Results

Regression analyses indicate that CA is significantly related to both EVIP and F-TROG z-scores. The greater the CA, the greater the vocabulary and syntax comprehension performances. Results also show a significant effect of diagnostic status. As a matter of fact, EVIP and F-TROG scores of UND participants are significantly greater than those of DS participants. However, the interaction between CA and group membership is not significant, for the EVIP as well as the F-TROG.

Conclusion

The present results confirm that language development is a weakness among persons with DS. However, they do not show specific trajectories of development. Stated otherwise, persons with DS do not present a premature asymptote with regards to syntax or vocabulary comprehension. Just as UND participants, they make slow but significant progress for the age span considered. Consequently, very gloomy forecasts made by Lenneberg (1969) are not confirmed, at least for syntax and vocabulary comprehension.

References


Differentiating subgroups of preschool children at risk for Mathematical Learning Disabilities

Hiwet M Costa*
Department of Psychology, Kingston University London

Bethany A Nicholson*
Department of Psychology, Kingston University London

Chris Donlan
Psychology and Language Sciences, University College London

Jo Van Herwegen
Department of Psychology, Kingston University London
Mathematics learning disabilities (MLD) are estimated to affect between 5% and 10% of school-age children (Barbaresi, Katusic, Colligan, Weaver, & Jacobsen, 2005; Shalev, Manor, & Gross-Tsur, 2005). Although the specific cognitive abilities that contribute to MLD are still under investigation, certain areas have emerged as playing key roles in the development of mathematical abilities, including both domain general (e.g., impaired working memory and speed of processing) and domain specific abilities (e.g., impaired numerical skills and Approximate Number System abilities). Although previous studies have examined which cognitive abilities relate to mathematical difficulties in children and adults with MLD, little is known about the rate of MLD among preschoolers or what abilities may explain their mathematical difficulties.

The current study investigated mathematical abilities in 300 preschoolers aged 3 to 5 years old and examined the proportion of children who were considered at risk for MLD, having scored lower than the 35th percentile on the Test of Early Mathematical Abilities. Cluster analysis was used to identify subgroups. The results highlight the differences in executive functions, number knowledge and the Approximate Number System between these subgroups of at-risk children with low mathematical abilities. Current findings suggest that children at risk for MLD constitute a very heterogeneous group. Therefore, different intervention strategies will need to be put into place for these subtypes. However, more research is needed about how these subtypes differ over development.

*these authors contributed equally to this work
The development of primary school children with borderline intellectual functioning and mixed disorder of scholastic skills

Kirsten Schuchardt
University of Hildesheim, Germany
✉ schuchar@uni-hildesheim.de

Merle Skowronek
University of Hildesheim, Germany
✉ skowrone@uni-hildesheim.de

Claudia Mähler
University of Hildesheim, Germany
✉ maehler@uni-hildesheim.de

Gerhard Büttner
Goethe University Frankfurt, Germany
✉ buettner@paed.psych.uni-frankfurt.de

Key words
borderline intellectual functioning, mixed disorder of scholastic skills, primary school children, development
A substantial amount of primary school children show severe learning disorders in reading, spelling and mathematics as well. In our study we differentiated between two groups of children with poor achievement in reading/spelling/mathematics: (a) children with borderline intellectual functioning and (b) children with mixed disorder of scholastic skills. The longitudinal study with three measurement points aimed at investigating the question whether these two groups show similar or different developmental characteristics in their academic achievement and in related cognitive skills. To this end the cognitive and scholastic development from grade 2 to grade 4 was analysed. Participants were $n = 15$ children with borderline intellectual functioning (academic achievements $T < 40$; IQ between 71 and 84), $n = 30$ children with mixed disorder of scholastic skills (academic achievements $T < 40$; IQ $\geq 85$; discrepancy between IQ and scholastic achievement more than 1.2 standard deviations), and $55$ typically developing children without learning disorders (control group). The data were analysed by MANOVAs with group as between and time as within factor.

The poor performance in scholastic skills proved to be stable from grade 2 to grade 4. In addition, similar impairments in (a) phonological awareness, (b) retrieval of knowledge from long-term memory, and (c) functioning of the subsystems of working memory (central executive, phonological loop, and visuo-spatial sketchpad) were found in both groups. Moreover, compared to the control group both children with borderline intellectual functioning and with mixed disorder of scholastic skills had similarly low academic self-concepts in reading, spelling, and mathematics.

The results indicate that children with borderline intellectual functioning and with mixed disorder of scholastic skills are comparable in their scholastic and cognitive development. Despite their different intellectual functioning they seem to build a homogeneous group with regard to their learning difficulties.
Promoting the mathematical skills of young adults with an intellectual disability (ID): pilot study aimed at testing the effectiveness of a MATHS REAL-LIFE programme

Aline Tessari Veyre
University of Fribourg, Department of Special Education, Rue St-Pierre Canisius 21, 1700 Fribourg, Switzerland
✉ aline.tessari@unifr.ch

Geneviève Petitpierre
University of Fribourg, Department of Special Education, Rue St-Pierre Canisius 21, 1700 Fribourg, Switzerland
✉ genevieve.petitpierre@unifr.ch

Key words
Numeracy skills, mathematical intervention, intellectual disabilities
Abstract

Numeracy skills have a considerable impact on the quality of life. They influence participation in a wide range of aspects of everyday life, such as personal independence or employment. They also have a direct impact on the person’s economic and social well-being. A large number of adults with an intellectual disability (ID) under-perform in this respect, they have difficulty in applying basic numeracy skills, even to a very minimal extent, in their everyday lives (Buttler et al., 2001; Tzanakaki et al., 2014). While certain cognitive impairments associated with intellectual disability may partly explain the difficulties encountered with mathematics, environmental factors (restricted access to post-compulsory education, lack of training opportunities, lack of programmes specifically adapted to the needs of this sector of the population, etc.), are also partly to blame. This research project aims to study the effectiveness of a programme for reinforcing basic numeracy skills (MATHS REAL LIFE). This programme consists of two complementary modules. The first aims to strengthen basic numeracy skills using academic exercises. The second aims to support the application of numeracy skills in everyday life. Three conditions will be studied using “partially mixed” methods: A) application of the full programme (N=20 participants); B) partial application of the programme (academic module only, with no application to real life, but with academic exercises to make up for the lack of module 2 (N=20 participants); and C) no intervention (N= 20 participants). The study is directed at young adults with an ID, in other words a sector of the public on whom the lack of training opportunities often weighs heavily.

The scope of the research work is diverse. Firstly, for individuals with an ID, the MATHS REAL LIFE programme respects the principle of distributive justice. In fact, “investment in skills FOR ALL” and “provision of lifelong learning or education FOR ALL” are guiding principles that have governed the policies of the major international organizations for the past fifteen years (OECD, 2001; UNESCO, 2000). But in the field of education of adults with intellectual disabilities, the development of basic skills does however represent a challenge. There is also a particular need for intervention studies in order to support and empower caregivers. In fact, numeracy training material is relatively scarce, if not non-existent, in this field. It also appears important to design effective programmes.
Aims

The aim of this study is to assess the effectiveness of the MATHS REAL LIFE programme. The MATHS REAL LIFE programme is designed to help adults with an ID to enhance their numeracy skills, by updating and supplementing them, and also by encouraging their use in everyday life. The programme sets up two complementary and inter-active modules. Each module includes an assessment phase and an intervention phase. Each participant’s programme is personalised on the basis of his or her results in the initial assessments and his or her interests. The first module aims to consolidate numeracy skills through personalised tuition in areas where strengths and weaknesses have been identified in the initial assessment. The second module aims to reinforce numeracy skills through a more sustained use of skills in real life contexts which people with ID can understand. The programme is based on:

1. current knowledge of cognitive and developmental psychology (Dehaene, 1992)
2. evidence-based practices for teaching mathematics to people with an ID (Hudson & Miller, 2006; Faragher & Clarke, 2014)
3. the theory of situated training (“situated learning” or “real life learning”) according to which the learning situation reflects the contexts of real life (Lave, 1988; Lave & Wenger, 1991; Anderson et al. 1996),
4. the ability to make a concept more accessible by drawing on the use of several types of representation (for example, analogue vs. symbolic) (Fidler & Nadel, 2007; Hayter et al., 2007).

The specific aim of the study is to assess the effectiveness of the MATHS REAL LIFE programme and to compare the effectiveness of the full application of the programme (module 1 + 2) with that of a partial application. We expect the participants who have benefitted from the MATHS REAL LIFE programme to show a statistically significant skills gain. We also expect the participants having followed the full MATHS REAL LIFE programme (module 1 + 2) to attain a significantly higher level of skills. The last question is about social validity (Weigle & Scotti, 2000). We expect the procedure to be highly acceptable to the participants and caregivers (in terms of ethical considerations, financial and time constraints and convenience).

Method

A partially mixed design (Teddlie & Tashakkori, 2009), i.e. a plan linking a randomised controlled trial design (ECR) with a qualitative procedure for one of the hypotheses has been chosen to put our hypotheses to the test. Participants will be randomly assigned to three different groups:

1. experimental group 1 (module 1 + 2)
2. experimental group 2 (module 1)
3. waiting group (control group)

Each group is composed of 20 persons. The participants will be recruited through 4 social care institutions in French-speaking Switzerland. They must be aged between 16 to 35, have been diagnosed with mild or moderate ID (criteria of the American Association on Intellectual and Developmental Disabilities, Schalock et al., 2010), be registered with a centre for continuing or/and vocational training and have French as their mother tongue. The assessment of the pre- and post-tests will be conducted by external assessors (blinded method). Three tools have been selected for quantitative measurements and one for producing qualitative data. The intervention will take place on site in small groups (3-4 persons). As the programme will be applied by different “teachers”, a framework for reporting the procedural fidelity of the intervention will be used in order to verify that the core principles of the intervention the participants are subject to are broadly similar (Billingsley et al., 1980).
Findings of the study

Data are not currently available because the study is still in its very early stages.

Conclusion

Continuing to offer people with ID opportunities for learning must be an imperative in order to satisfy the desire for lifelong learning in people with ID (Petitpierre, Gremaud, Veyre, Bruni, 2014). Intervention programmes that are based on current scientific knowledge and scientifically validated must therefore be developed. This project will endeavour to fill a gap in the current state of knowledge.

1 Diagnostic test of basic maths skills (Tedi-Math, Van Nieuwenhoven et al., 2001), KeyMathTM-3 (Connolly, 2007), questionnaire on the sense of usefulness and the enjoyment of mathematics (Abbas & Kirch, 2010).
2 Semi-directive interview: questions relating to social validity (Weigle & Scotti, 2000).
Compensated and uncompensated needs for cognitive autonomy in learning and academic examination in pupils with mild intellectual disability

Agnès Gouzien-Desbiens
Laboratory PSITEC, EA 4072, University of Lille 3, and ESPE Lille North of France
agnes.desbiens@univ-lille3.fr, agnes.desbiens@espe-lnf.fr

Key words
autonomy, pupils with mild intellectual disability, compensated/ not compensated needs
Nuss (2008) asserts that professional integration is still a problem for persons with intellectual disabilities, and, generally, about 83% of handicapped workers have got only a degree under or equal to a level “five” (CAP), explaining for one part why French handicapped people are less than 3% to find a job. Why do so many persons have problems to get degrees? Knowing the difficulty of pupils with mild intellectual disability to call up effectively their apprenticeship (Büchel, Paour & coll., 1998, Magnin de Cagny, 2010), academic examination should be adapted to allow a most equitable approach, leading to better controlled knowledges of these learners: which needs should be better taken into account, which aftermaths bad considerations may have in academic examination situations? This study relates to investigate how much mild intellectual deficient pupils have their special autonomy needs not compensated or not enough adapted to reach their academic school level, resulting in not obtaining their appropriate degree. 316 pupils with mild intellectual disability learning in special classrooms included in regular schools (206 pupils aged 8 to 12, 110 aged 12 to 20) have been tested through the answers of their teachers to a multiple choice survey about their physical, affective, cognitive autonomy, and their effects on academic achievement in passing exams. The results show the same proportion of subjects having their affective and cognitive autonomy not enough compensated or adapted among the pupils failing to pass their internal and academic exams, representing one pupil on two. Therefore, we propose to build a protocol in order to help pupils with mild intellectual disability in the examination situations to recover most easily their knowledges and validate an adequate degree.
Nuss (2008) asserts that professional integration is still a problem for persons with intellectual disabilities, and, generally, about 83% of handicapped workers have got only a degree under or equal to a level “five” (CAP), explaining for one part why French handicapped people are less than 3% to find a job. Why do so many persons have problems to get degrees? Knowing the difficulty of pupils with mild intellectual disability to call up effectively their apprenticeship (Büchel, Paour & coll., 1998, Magnin de Cagny, 2010), academic examination should be adapted to allow a most equitable approach, leading to better controlled knowledges of these learners: which needs should be better taken into account, which afterwards bad considerations may have in academic examination situations? This study relates to investigate how much mild intellectual deficient pupils have their special autonomy needs not compensated or not enough adapted to reach their academic school level, resulting in not obtaining their appropriate degree. 316 pupils with mild intellectual disability have been tested through the answers of their teachers to a multiple choice survey about their physical, affective, cognitive autonomy, and their effects on academic achievement in passing exams. 206 pupils are 8 to 12 years old, learning in special classrooms included in regular schools. 110 pupils are 12 to 20 years old and belong to special classes of regular middle or high schools or special institutions. Analysing those needs would allow us to build a protocol in order to help pupils with mild intellectual disability in the examination situations to recover most easily their knowledges and validate an adequate degree.

**Method**

The special teachers who work with mild intellectual deficient pupils had to answer to a multiple choice survey, dealing with the abilities of their pupils in affective, physical and cognitive/intellectual autonomy (according to Blache's criterions, 2010) related to their academic achievement or failure in passing exams leading to a degree and not leading to a degree. They had also to specify the needs not possibly compensated or not objects of adaptations in classrooms and exams that would lead to eventual failures. The survey consisted in answering to 3 kinds of questions for each topic of the autonomy (physical, cognitive and affective): specify the actual needs, the needs not compensated in class situation, in school informal and formal assessments, in academic assessments leading to a degree validation.

To specify the needs:

In physical autonomy, the teachers had to write the number of their pupils actually unable to: move in the classroom to get materials/ find one's way inside the school to go alone to the toilets- school cafeteria-other places/ go alone from home to school and school to home, by bus or on foot.

In Intellectual/ cognitive autonomy (named also metacognitive self-regulation by authors such as Brown, 1987, Nader-Grosbois, 2007), the teachers had to write the number of their pupils actually unable to: identify the goal of the task (at short and long term)/remember the instructions for the tasks/ represent the task/ find in memory other useful tasks connected/ plan the task/ check the result of one's reasoning in comparison with the goal announced before/ evaluate themselves/ look for useful organizer referents and use the referents suggested by the teacher.

In Affective/ relational Autonomy, the teachers had to write the number of their pupils actually unable to: begin alone a task/ perseverate on a task/ specify efficiently the achievements and errors/ accept to show one's abilities in inclusion situations/ work with unknown persons/ interact with other pupils.

**Hypothesis:** there is a relation between the adequate helps furnished to pupils with mild intellectual disability (especially about their cognitive autonomy) in exams situations, in learning situations and the obtainment of an appropriate degree. Namely, people with intellectual disabilities are known to have a deficit in self-regulation (Nader-Grosbois, 2007). The proportions of pupils having their needs in autonomy not enough taken into account in exams situation (academic and internal school assessments) are compared by chi-Square to the part of pupils failing to pass their assessments.
Main results

Physical autonomy needs are mostly compensated or objects of efficient adaptations in classrooms and in exams, leading to apparently low aftermath for learning and exams. Despite cognitive autonomy needs are the most numerous, they are objects of efficient adaptations in learning situations in classrooms for 1/2 pupils, the same proportion has no adaptation to support his cognitive autonomy in academic exams situation, leading to fail to pass his degree, especially for the eldest pupils. It seems that about 46% of the cognitive or intellectual needs (and helps associated) in autonomy are finally taken into account in exams' situations to allow the participants to get their degree (CAP). Affective and relational autonomy needs are twice less numerous than cognitive autonomy needs but are also compensated or adapted for one pupil on two. We find the same proportion of subjects failing to pass their exams (internal or academic's) among pupils which needs in affective and cognitive autonomy haven't been objects of adaptation.

Discussion

A protocol, in academic exams situation, could be used to support cognitive autonomy of pupils with mild intellectual disability. Namely, an approach inspired by educational cognitive psychology could be helpful, inducing to: best represent the task, search in memory for closed tasks, plan and check one's proceedings, look for useful organizer referent... Thus, pupils with mild intellectual disability should be more efficient in showing their real abilities. Obtaining degrees is not the only problem to get a job, these pupils should be also accompanied, but it is a first step.
Could social cognition training reduce externalizing behaviors and social maladjustment in preschoolers?

Marine Houssa
Université Catholique de Louvain, Psychological Sciences Research Institute, 10, Place Cardinal Mercier, 1348 Louvain-la-Neuve, Belgium
✉ Marine.houssa@uclouvain.be

Nathalie Nader-Grosbois
Université Catholique de Louvain, Psychological Sciences Research Institute, 10, Place Cardinal Mercier, 1348 Louvain-la-Neuve, Belgium
✉ nathalie.nader@uclouvain.be

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In an experimental study, we tested whether deficits in social cognition could cause deficit in social adjustment and externalizing behavior (EB) in preschoolers. The effects of a middle-term training in social information processing (SIP) and in Theory of Mind (ToM) on social cognition, on emotion regulation, on social adjustment and on EB in preschoolers have been examined.

Participants were 37 EB children who took part in a pre-test and post-test session involving cognitive, socio-cognitive and social adjustment (direct and indirect) measures. They were allocated to experimental group, benefiting from 15 sessions of social cognition training in 5 subgroups including 3 or 4 children, or control group.

The results showed that each group improved in direct measure of SIP in post-test. The experimental group outperformed the control group at the ToM measures in post-test. Regression analyses showed that, after controlling for the pre-test results, ToM indirect measure, SIP, emotion regulation and social adjustment measures in post-test were significantly predicted by group condition. The hypothesis of a causal explanation of difficulties in social adjustment in preschoolers by deficits in social cognition is discussed.
Externalizing behavior (EB) is the most common problem among children of preschool age. A high level of EB has generally been associated with dysfunction in social cognition, with deficits in social problem solving and in emotion regulation (ER). Moreover, children with EB present less social competence and fewer skills in interactions than typically developing (TD) children and are regarded as socially maladjusted. Furthermore, children with higher levels of emotion dysregulation tend to present more EBs and are more likely to be rejected by peers. In developmental psychology, models explain the development of social cognition in connection with the development of social and interactive skills and ER, or explain how deficits in social cognition could have an impact on social maladjustment in children. In this study, we refer to both the Theory of Mind (ToM) and the Social Information Processing (SIP) model, to test the potential role of deficits in social cognition in preschoolers with EB. The literature shows that improving social cognition abilities could be effective. No study has ever investigated the effects of training combining ToM and SIP models, on ToM and SIP abilities, on ER and on social adjustment in preschoolers with EB. To test this hypothesis, we measure the effectiveness of an experimental training program in ToM and SIP on the level of social cognition competences. Furthermore, we examine the potential impact of this training on their ER and on their social (mal)adjustment profiles as perceived by their parents in their everyday relationships. We predicted that children who benefit from training would have significantly better abilities in ToM and SIP in post-test in comparison with their abilities in pre-test. A positive difference between pre- and post-test was also expected for ER and social adjustment. Finally, we predicted significant differences between experimental and control groups in post-test for ToM and SIP measures, and also for ER and social adjustment. The research consisted of three phases: pre-test, training and post-test. For the pre-test session, three different tests were initially administered by an experimenter across two sessions for each participant. The participants were 37 children with EB between 2 years and 11 months and 5 years and 11 months old. 20 children were allocated to the control group, which was a waiting list and 17 other children constituted the experimental group. Children from the experimental group participated in biweekly training sessions of 45 minutes for 8 weeks in small groups. At the end of the intervention, children were assessed in a post-test session. Again, parents completed questionnaires. In the experimental group, children were in subgroups (3 or 4 children) to maximize conversational exchange among children and received training in SIP and ToM competences. The variety of materials (pictures, videos, games, handling of objects, story books, etc.) can help children to generalize and to apply what they have learned in new situations. Various techniques were applied in each session, including feedback, encouragement and explanations from experimenters of the right answer given by the child. Feedback was also provided after each response, as well as an explanation of the correct or expected response. Independent sample t-test comparisons revealed no significant difference between groups. In the pre- post-test comparisons by group, only within the experimental group were there significant differences in the scores of ToM measures, in the scores of angry-tolerant, egotistic-prosocial and social competence scales, in ER, and in all scales of social adjustment. Also, a repeated measure ANOVA was conducted on each measure with pre- and post-test scores in each case as a within-group factor and groups (experimental or control group) as a between-participants factor. This analysis revealed significant time per group interactions with scores in ER, in the angry-tolerant and social competence scales and in social adjustment in favor of the experimental group. Finally, we found a marginal time per group interaction with the score in the indirect ToM measure. To investigate whether the training sessions contribute to children's social cognition, ER, social adjustment and social competences, a hierarchical multiple regression analysis was conducted, after controlling for the pre-test results and individual characteristics. Distinct independent predictors explain scores on ToM measures. In particular, after controlling for pre-test result in the ToM Task Battery (Model 1), and for individual characteristics (Model 2), group condition entered in Model 3 was non-significant. Pre-test results in ER, emotion and group condition were the only variables which made a contribution. For the ToM indirect measure, the SIP direct measure, for social adjustment, for social competences and the "angry/tolerant" scale, pre-test result and group condition were the only variables which made a contribution in Model 3.
Repeated measure analysis showed that training sessions led children to be perceived as having more ER abilities, more mentalization capacities and perspective taking abilities and to a lesser extent, as having better ToM abilities. For direct measures of social cognition, the experimental group had a significant improvement between pre- and post-test for ToM abilities. Concerning SIP abilities, the experimental group improved more than the control group between the two points. After the intervention, parents significantly perceived their children as being less angry and egoistic, having more empathy, being more conscious of their emotions, finding it easier to express appropriate emotions in everyday situations, being socially more adjusted, and having better social relationships.

Multiple regression analyses showed that training sessions are relevant and could be helpful for children with different personality profiles. Finally, group condition is regularly a significant predictor of the post-test results. This result allows us to conclude that the training is effective principally in both emotion and frustration management and social competences, but less in social problem solving.

Even if this study presents some limits, our results show that providing training in social cognition abilities in the preschool period leads to positive changes in social competences, ER and social adjustment. Early interventions that address difficulties in these areas may have lifelong benefits and improve children's later chances of success.
Proceedings:
Christine HUMEZ, IGE
Gauthier BILLIET, PhD student
Yannick Courbois, Professor

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