




Sur le

Number 18   
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# spectre

Magazine of the Centre for Research, Evaluation and Intervention in Autism of Montreal

05



Fluid Reasoning  
in Children  
with Autism

07



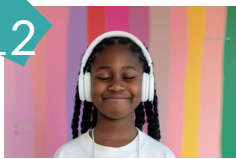
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09



Comic strip

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Music and  
the Spectrum:  
Emotions  
Resonate

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The story of Cram



Centre for Research, Evaluation and Intervention in Autism of Montreal



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## And CREIA was born!



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And CREIA was born!



Centre for Research, Evaluation and Intervention in Autism of **Montreal**



Université   
de Montréal

CHAIRE DE RECHERCHE MARCEL ET ROLANDE GOSSELIN  
EN NEUROSCIENCES COGNITIVES FONDAMENTALES  
ET APPLIQUÉES DU SPECTRE AUTISTIQUE



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Fluid Reasoning in Children with Autism: What if Brain Connectivity Varied According to Task Content and Complexity?



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The story of Cram



Official Magazine of the Montreal Center for Research, Evaluation and Intervention in Autism (CREIA).

CREIA is a center of expertise in autism, located at Rivière-des-Prairies Hospital in Montreal. In addition to providing autism assessment and intervention services, CRÉIA unites 6 university researchers, professors in 4 Quebec universities. The research conducted at CRÉIA ranges from understanding brain function and autistic perception, to mental health and intervention, to the strengths and interests of people with autism.

Graphic design and translation are made possible thanks to the financial support of the Marcel and Rolande Gosselin Research Chair in Fundamental and Applied Cognitive Neuroscience of the Autism Spectrum. The writing and editing of the texts is done on a voluntary basis by CREIA researchers, clinicians and students and their collaborators.

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Sur le spectre:

# An important turning point for Sur le spectre!

This new issue marks an important turning point for Sur le spectre, which officially becomes the Magazine of the Centre for Research, Evaluation and Intervention in Autism of Montreal (CREIA). CREIA, a new entity uniting clinical and research activities in autism, aims to highlight the unique expertise developed in the field of autism at CIUSSS-NIM. We invite you to read the article in this issue on the group's creation and the summary of its first annual day held on October 4<sup>th</sup>, 2024.

We hope that this change of vocation will enable Sur le spectre to offer you even more articles, videos, and podcasts linked directly to clinical practice that are produced by clinicians who are experts in autism. In this way, the magazine reflects CREIA's vision of close collaboration between the autism community, clinicians, managers, researchers, and students. This issue also features a brand-new article format: a testimonial from a young autistic boy, introduced to the Sur le spectre team by his psychiatrist, Dr. Pascale Grégoire.

In this issue, you'll also find an article translating some of the findings of Dr. Alexia Ostrolenk, who recently graduated under the supervision of Dr. Laurent Mottron. The article, written by Mélanie Boisvert, focuses on young autistic children's intense and frequent interest in letters and numbers. Another article summarizes the results of a study conducted at McGill by Dr. Ève-Marie Quintin on the recognition of emotions in music. The final article explains how the autistic brain processes certain types of information more efficiently. This article reviews part of Dr. Janie Degré-Pelletier's doctoral thesis, a recent graduate of Dr. Isabelle Soulières' laboratory at UQAM.

Finally, you'll find a comic strip illustrating the Montreal Stimulation and Play Situation, an experimental situation developed by Dr. Claudine Jacques to better document and understand stereotypic and repetitive behaviors and interests of autistic children.

Many thanks again to all our collaborators, as well as to our faithful financial partner: the Marcel and Rolande Gosselin Research Chair in Fundamental and Applied Cognitive Neuroscience of the Autism Spectrum, Université de Montréal.

Happy Reading! 



Valérie Courchesne  
Ph.D.

Chief editor

The magazine reflects CREIA's vision of close collaboration between the autism community, clinicians, managers, researchers, and students.

# CREiA

Centre for Research, Evaluation and Intervention in Autism of [Montreal](#)



# And CREIA was born!

By ALEXIS LUPIEN-MEILLEUR and MÉGANE PLOURDE

Over the past year, researchers and clinicians deeply committed to autism took the initiative of joining forces to form the **Centre of Research, Evaluation et Intervention in Autism of Montreal**, known by its acronym **CREIA**.

The creation of this clinical-research group is the natural, but essential, culmination of numerous collaborations that have taken place for over the last 30 years now. Under the aegis of CREIA, six researchers affiliated with four Quebec universities have come together: Anne-Marie Nader, Laurent Mottron, and Valérie Courchesne from Université de Montréal, Armando Bertone from McGill University, Claudine Jacques from Université du Québec en Outaouais, and Isabelle Soulières from Université du Québec à Montréal. These researchers are united by their commitment to improving the quality of life of people with autism through their pursuit of unique and varied lines of research in their respective laboratories. But that's not all: CREIA also includes 4 clinics, located at the Hôpital en santé mentale de Rivière-des-Prairies (HSMRDP) which offers specialized autism services. At the heart of the Clinique d'Évaluation des Troubles du Spectre de l'Autisme (CETSA), the Clinique d'Intervention des Troubles du Spectre de l'Autisme (CITSA), the Hôpital de jour Pas à Pas, and the Unité d'hospitalisation pour jeunes autistes, these clinicians, healthcare professionals, and managers put their expertise to work for young autistic people and their families.

By bringing together these 6 laboratories and 4 clinics, CREIA aims to achieve a key objective: to foster close

collaboration and ongoing exchanges between clinical practice and research.

Since the group's inception, several joint events have been organized to bring CREIA members together, including journal clubs, initiated by clinical teams to discuss issues around clinical practice, and bi-monthly scientific presentations where students and researchers translate their research findings and receive feedback from other group members. These initiatives have culminated in the creation of an annual day dedicated to CREIA. The event took place on October 4<sup>th</sup>, 2024, at the Hôpital en santé mentale de Rivière-des-Prairies, and brought together nearly 80 people, including students, researchers, healthcare professionals, clinicians, and research professionals. Nearly a dozen presentations were given providing an overview of the research programs of the various laboratories featuring a glimpse into the diverse current and future projects happening at CREIA. The dynamic exchanges that followed each presentation sparked rich discussions paving the way for potential interdisciplinary collaborations and the establishment of new clinical-research collaborations.

By merging research and clinical practice, CREIA marks a promising turning point in the improvement of interventions and practices for people with autism. The success of CREIA's first annual day is testimony to a promising future where scientific advances and clinical practice complement each other to help improve the lives of people with autism and their families. 🌸

By bringing together these 6 laboratories and 4 clinics, CREIA aims to achieve a key objective: to foster close collaboration and ongoing exchanges between clinical practice and research.

## A look at this year's annual program

- Precursor of cognitive development in autistic children – **Isabelle Soulières**, [Laboratoire IDEA](#)
- Better understanding the behaviors and interests of children with autism using better stimulating contexts – **Claudine Jacques**, **Catherina Lacelle**, **Allyson Bastien**, [Laboratoire LUDICA](#)
- Mental health and autism: at the crossroads of expertise – **Valérie Courchesne**, **Pascale Grégoire**
- Nabilone as adjuvant treatment for severe aggression in young people with intellectual disabilities associated or not with autism spectrum disorder: clinical case series – **Drigissa Illiès**
- Development of laboratory tools for cognitive assessment and intervention for neurodivergent learners – **Armando Bertone**, **PNLab**, <https://www.pnlab.ca/>
- On the Prototype – **Laurent Mottron**
- Screen use in the preschool ASD population with high prototypicality: Function of screen use in the developmental pathway of language acquisition and diversification of interests – **Laura Masi**
- Living environments and learning contexts that respond to the preferences of people with autism – **Anne-Marie Nader**



Children with autism process visuospatial visual matching problems less linguistically and/or semantically than neurotypical children.

## Fluid Reasoning in Children with Autism:

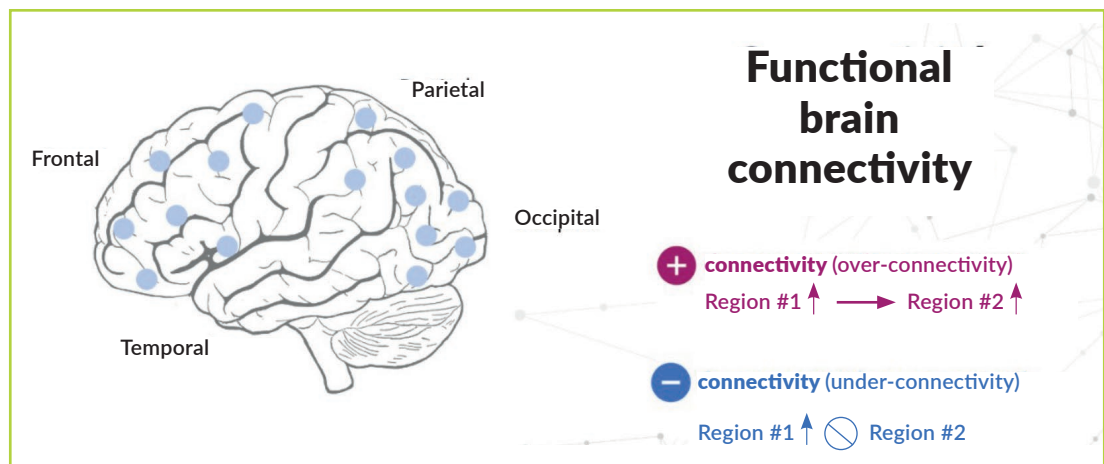
### What if Brain Connectivity Varied According to Task Content and Complexity?

By VICTORIA JEAN and AUDREY-ROSE TURGEON

#### What is Brain Connectivity?

In neuroimaging, brain connectivity refers to the way in which brain regions communicate and interact with each other. Using a variety of tools, such as

functional magnetic resonance imaging, it is possible to determine how different brain regions activate and work together when performing an action or cognitive task.





In autism, a widely recognized model to explain brain function is one of **under-connectivity**<sup>1-2</sup>. This model proposes that, compared with neurotypical individuals, autistic people have less connectivity between brain regions that are far apart (i.e., between the frontal and parietal lobes and the occipital lobe), but more connectivity between regions that are close together, especially in regions at the back of the brain, such as the occipital lobe.

The presence of under-connectivity has often been found in autism studies, while very few results of **over-connectivity** have been reported. This could be explained by the fact that most studies used tasks that represent weaknesses in people with autism. On the other hand, for tasks recognized as strengths in autism, such as visual and spatial tasks, studies concluded that there is over-connectivity between perceptual regions in the back of the brain (e.g., occipital and parietal lobes) and regions in the front of the brain (i.e., frontal lobe) in adults with autism. This result has even been observed in tasks involving more complex abilities,

such as reasoning, a skill that enables us to use logical thinking to solve new problems. To date, very few studies have been able to investigate how the brains of autistic children function during reasoning tasks.

This is what led Janie Degré-Pelletier and her colleagues to study connectivity patterns during reasoning in autistic children. More specifically, in their study published in the journal *Cerebral Cortex*, the researchers addressed the following question: how does the nature of the task and the complexity of the problems influence brain connectivity in children with autism?

### Methodology

To answer their question, 23 children with autism and 23 typical children aged between 6 and 15 years old performed a reasoning task in a functional magnetic resonance imaging (fMRI) machine to collect the functional activity of their brains as they performed the task. The task in question varied in terms of content (visuospatial versus semantic) and complexity (visual matching versus reasoning). Children had to choose which of three images completed the pictorial matrix (Figure 1).

	0 relation	1 relation	2 relations
Semantic			
Visuospatial			

**Fig. 1** Example of presented tasks. Top row: semantic tasks, Bottom row: visuospatial tasks. From left to right, items vary in complexity. For example, for the top-right item (2 semantic relations), we need to infer that a seatbelt offers protection in a car, and therefore, a helmet offers protection on a motorcycle.

For tasks recognized as strengths in autism, such as visual and spatial tasks, studies concluded that there is over-connectivity between perceptual regions in the back of the brain (e.g., occipital and parietal lobes) and regions in the front of the brain (i.e., frontal lobe) in adults with autism.



**original article:**

Degré-Pelletier, J., Danis, É., Thérien, V. D., Bernhardt, B., Barbeau, E. B., & Soulières, I. (2024). Differential neural correlates underlying visuospatial versus semantic reasoning in autistic children. *Cerebral Cortex*, 34(13), 19-29. <https://doi.org/10.1093/cercor/bhae093>

**Other References:**

<sup>1</sup> Belmonte, M. K., Allen, G., Beckel-Mitchener, A., Boulanger, L. M., Carper, R. A. et Webb, S. J. (2004). Autism and Abnormal Development of Brain Connectivity. *The Journal of Neuroscience*, 24(42), 9228. <https://doi.org/10.1523/JNEUROSCI.33340-04.2004>

<sup>2</sup> Just, M. A., Cherkassky, V. L., Keller, T. A. et Minshew, N. J. (2004). Cortical activation and synchronization during sentence comprehension in high-functioning autism: evidence of underconnectivity. *Brain*, 127(8), 1811-1821. <https://doi.org/10.1093/brain/awh199>

<sup>3</sup> Simard, I., Luck, D., Mottron, L., Zeffiro, T. A., & Soulières, I. (2015). Autistic fluid intelligence: Increased reliance on visual functional connectivity with diminished modulation of coupling by task difficulty. *NeuroImage. Clinical*, 9, 467-478. <https://doi.org/10.1016/j.nicl.2015.09.007>

**Results**

**Visuospatial Task**

For the **visuospatial** matching task, children with autism showed underconnectivity, compared to neurotypical children, between the perisylvian language regions and the left temporo-occipital region, which is associated with complex object recognition. This finding suggests **that children with autism process visuospatial visual matching problems less linguistically and/or semantically** than neurotypical children.

However, for the more complex visuospatial items, which require reasoning skills, the opposite pattern of connectivity was observed: autistic children showed over-connectivity between occipital regions and several temporal, occipital, and frontal regions, compared with neurotypical children. By way of background, these brain regions are known to play a role in visual perception, working memory, and selective attention. This is in line with the findings of previous studies, which support the fact that in autistic people, **visual processing via activation of perceptual regions in the occipital lobe is involved in cognitive processes that require more than just visual processing**, as was the case for reasoning.

Interestingly, the over-connectivity identified with increasing level of complexity in visuospatial problems in the present study contrasts with what has been observed previously in adults with autism. In fact, less variability in connectivity has been found in association with increasing task complexity during visuospatial reasoning problems in these adults<sup>3</sup>. Thus, the findings of over-connectivity observed in children seem to reverse with age in the autistic population. The study by Degré-Pelletier and colleagues, therefore, supports the need for longitudinal studies to explain this difference and the potential effect of puberty on connectivity patterns in people with autism.

**Semantic Task**

In contrast to the results obtained with the visuospatial items, the semantic, visual matching and complex reasoning items showed no difference in connectivity between autistic and typical children.

**What can we learn from this study?**

In summary, these results demonstrate that the nature of the task used can greatly vary brain connectivity patterns, thus challenging the under-connectivity model in autism<sup>1-2</sup>. It is becoming increasingly clear that connectivity patterns observed during cognitive tasks vary according to item content and the level of complexity, but also according to the age of the participants. Overall, this study has added to our understanding of autistic children's brain function, which was still largely unstudied, and also highlights the importance of considering the age and developmental period of autistic and neurotypical individuals in neuroimaging research. It is by taking these different elements into consideration that it will eventually be possible to better understand the autistic brain in all its complexity. 🌱



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ÉTUDE: VOTRE INTÉRÊT PRÉFÉRÉ

# Participants autistes recherchés

**PERSONNES AUTISTES ÂGÉES ENTRE  
14 ET 30 ANS**

**POUR PARTICIPER CONTACTEZ-NOUS:**

[moses.lisane@courrier.uqam.ca](mailto:moses.lisane@courrier.uqam.ca)

Une étude en ligne d'environ 30 minutes recherche  
des participants autistes.

Compensation financière

*\*Le parent, partenaire romantique ou ami proche du  
participant sera invité à participer !*



The results show a distinct pattern of interest for autistic children compared with the other two groups.

# Autistic Children Show a Greater Interest in Letters and Numbers than Non-Autistic Children.

Two Studies from Dr. Laurent Mottron's Laboratory

By MÉLANIE BOISVERT and ALEXIA OSTROLENK

Among the children who come to the Clinique d'évaluation pour les troubles du spectre de l'autisme (CÉ TSA) for a diagnostic evaluation, some spend the entire appointment playing with letters on a magnetic board. This keen interest prompted researchers to conduct a study on the subject. Over a four-year period, they assessed and compared the interest in letters and numbers of autistic and non-autistic children. The results show a distinct pattern of interest for autistic children compared with the other two groups, so let's take a closer look.

## Who Were the Project Participants?

### Study 1 - Review of 701 Clinical Records

The clinical records of 701 children under the age of 7 referred to CÉ TSA over a 4-year period were investigated. Of these, 391 children were diagnosed with autism (the autistic group) and 310 children were diagnosed with a diagnosis other than autism or simply received no diagnosis (the clinical group). The majority of autistic children (76%) had very limited or no oral



language while this was the case for 37% of the children in the clinical group. The children's interest was assessed based on medical reports, using a grid to evaluate interest in written material, i.e. letters, numbers, and written words. Based on input from the diagnostic team, two assessors rated the strength of the child's interest in letters and numbers as absent, moderate, intense, or exclusive.

## Study 2 - Telephone Questionnaire

The parents of all the children were contacted to ask them to take part in a telephone questionnaire about their child's interest in written material, and 355 of them agreed (138 from the autistic group and 99 from the clinical group). Again, most of the autistic children (84%) were minimally verbal or non-verbal, whereas a minority of the children in the clinical group (27%) and none of the typically developing children were. The questionnaire lasted around 45 minutes, and asked parents about behaviours demonstrating their child's interest in letters and numbers, and their use of oral language. For example, they were asked: "Does your child name the letters they observe? If so, at what age and in what language?"

## What Were the Results?

### 1. Autistic Children Were More Interested in Letters and Numbers

Although many autistic children had very limited oral language, their interest in letters was more pronounced than in the other groups. Medical records showed intense or exclusive interest in 20% of children with autism, compared with 3% of children in the clinical group. The questionnaire revealed an even more striking figure: 37% of autistic children had an intense or exclusive interest in letters, compared with 23% of the clinical group and 25% of typically developing children. The autistic children's level of oral language had no impact on the level of interest. Results for interest in numbers were similar. In other words, having a diagnosis of autism increased the odds of having a higher level of interest in letters and numbers at the same age by a factor of about 3!

The age at which interest in letters and numbers began was similar between autistic and typically developing children at around 2 and a half years. Where as, it was later in the clinical group, around


3 years of age. Despite their language delay, autistic children develop an interest in written material at a perfectly normal age.

### 2. Different Behaviours

The questionnaire revealed that autistic and non-autistic children showed different levels of interest. More than half the parents of autistic children indicated that letters were special to their child. Children with autism had less social letter interest behaviors, which didn't require interaction with another person. For example, they enjoyed manipulating and aligning letters, or looking at books alone. In comparison, the other two groups presented more social behaviors related to their interest, such as bringing a book to an adult to ask to read it or pretending to read for others.

For example, very few children in the three groups could read complete sentences, but the three autistic children who could do so had started to do so before they were three, two years earlier than those in the other two groups. Other autistic children showed unexpected bilingualism: they had taught themselves to speak in a language that was not present in their environment, for example, with the help of video subtitles.

## What do These Results Mean?

This large-scale study is the first to demonstrate a greater interest in letters and numbers in children with autism. This interest develops at the same age as in typically developing children but manifests itself in different ways. Whereas typically developing children's interest in letters begins when oral language is already well developed, and manifests itself in shared reading, autistic children engage alone in their letter-related activities and make little use of oral language at the same age. The more solitary behaviours of autistic children can sometimes delay the detection of this interest by parents. For some autistic children, this intense interest can lead to the early development of reading skills. The fact that this interest manifests itself independently of the child's level of oral language points to a potential alternative pathway to language acquisition, through the written word. If letters are special for more than half of autistic children, this interest needs to be considered in intervention methods based on the child's strengths. 



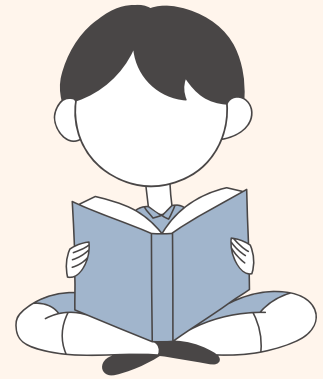
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### Original Article:

Ostrolenk, A., Gagnon, D., Boisvert, M., Lemire, O., Dick, S. C., Côté, M. P., & Mottron, L. (2024). Enhanced interest in letters and numbers in autistic children. *Molecular Autism*, 15(1), 26.

# ÉLÈVES AUTISTES D'ÂGE SCOLAIRE RECHERCHÉS POUR UNE ÉTUDE!

Cette étude vise à documenter  
les profils d'habiletés scolaires  
des élèves autistes.



## Critères d'éligibilité :

- ★ Être âgé entre 6 et 12 ans
- ★ Diagnostic d'autisme

## Participation attendue :

- ★ 2 séances de 1h30

## Compensation :

- ★ 30\$ par séance (total 60\$)

## Lieu :

- ★ Hôpital Rivière-des-Prairies ou Pavillon Adrien-Pinard, UQÀM

Pour participer,  
contactez Ève Picard au :



(514)-323-7260 #4572



projet.intelligence.cnmtl  
@ssss.gouv.qc.ca

## Étude menée par :

Isabelle Soulières, UQÀM  
Claudine Jacques, UQO  
Valérie Courchesne, U de M

# Comic strip

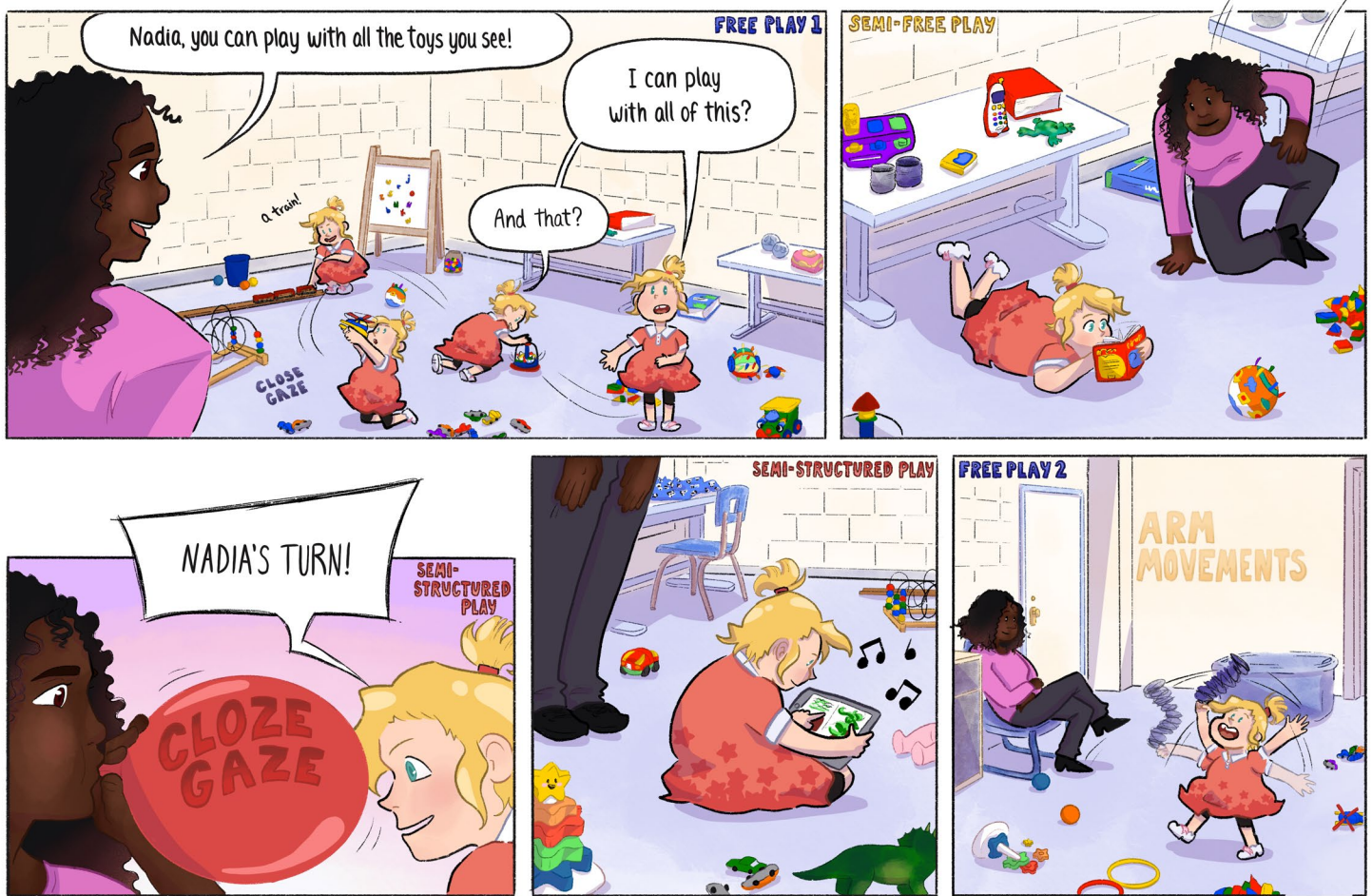


The illustration was designed by STÉPHANIE MILOT, B.A. bd. and the script by CATHERINA LACELLE, a doctoral student in clinical psychology with a specialization in youth and families.

**Context:** As part of the extensive “Another Intelligence” project, preschool children (aged 3 to 6), both autistic and typical, are exposed to the Montreal Stimulating Play Situation (MSPS). The children were filmed to enable analysis of their exploration of objects and their display of repetitive behaviours during four periods of play. In the first period, free play 1, the child can explore the toys of their choice. In the second period, semi-free play, the child can play with

the toys of their choice, while the experimenter activates the toy or copies the child's actions. In the third period, semi-structured play, the experimenter introduces new toys in a predetermined order. Finally, in the last period, free play 2, the child can play with all the toys in the room. In this story, you'll discover Nadia, a young autistic girl, through the 4 periods of the play situation. ❄️

Jacques, C., Courchesne, V., Meilleur, A. A. S., Mineau, S., Ferguson, S., Cousineau, D., Labbe, A., Dawson, M. & Mottron, L. (2018). What interests young autistic children? An exploratory study of object exploration and repetitive behavior. *PLoS one*, 13(12), e0209251.



# Appel à participation

Étude

## ADAPTER LES APPRENTISSAGES AUX PERSONNES AUTISTES

**Objectif de l'étude :** Mieux comprendre les situations favorables aux apprentissages des personnes autistes

### PROFIL DES PERSONNES AUTISTES RECHERCHÉES

- Personnes autistes âgées de 18 ans et plus
- Ayant fait son cheminement scolaire primaire et secondaire au Québec
- Être à l'aise pour participer à un entretien verbal

### DÉROULEMENT

- Entretien individuel d'environ 1h :
  - Pour connaître l'expérience de la personne autiste par rapport à son cheminement scolaire;
  - Cette rencontre peut être faite en visioconférence (Zoom), au domicile ou à l'hôpital Rivière-des-Prairies;
  - Compensation : 40 \$.

***Pour des questions ou participer à l'étude,  
contactez Estellane St-Jean :***



estellane.st-jean.cnmtl@ssss.gouv.qc.ca

(514) 323-7260 poste 2292



Projet mené par Anne-Marie Nader, PhD, professeure, département de psychologie de Université de Montréal  
(approbation du CÉR du CIUSSS-NÎM, no 2025-2844)



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## Music and the Spectrum: Emotions Resonate

By ÈVE-MARIE QUINTIN

Emotion recognition is a skill that seems to vary for people on the spectrum, as indicated in the scientific literature. Studies examining emotional recognition in people on the spectrum have mostly included tasks requiring participants to identify emotions within social contexts where emotion is represented by face or voice. In these studies, we find differences in the emotional recognition skills of people on the spectrum compared to those considered typically developing (TD). Also, these studies often ask participants to respond categorically, i.e., to indicate which emotion is perceived from among choices predetermined by the researchers, which does not allow us to appreciate all the nuances of the emotions perceived by the participant. In other words, a categorical representation of emotions is not sufficient since it only captures a small part of the emotional experience, and reducing emotion recognition to this method can potentially put people on the spectrum at a disadvantage. A more nuanced and wide-ranging method, such as the dimensional method (indicating whether the emotion is positive or negative, and whether the intensity is high or low,

combined with the categorical method), allows a greater understanding of perceived emotions and is more inclusive when considering people with varied language skills. What seems major in this case is that recognizing people's emotions on the spectrum through highly social information such as faces, voice, or body language causes this difference in ability with TD people, but this difference diminishes when using other methods for studying emotion recognition, such as music.

### How is Music Different for People on the Spectrum?

Music is an inherent source of emotion. From an early age, children can identify the emotions of joy and sadness within a soundtrack. Recently, researchers have found that music is a powerhouse for people on the spectrum. Not only has it proven to be a source of entertainment, but people on the spectrum demonstrate better musical memory, better pitch and melody recognition, greater verbal production when music is included in a language development

A categorical representation of emotions is not sufficient since it only captures a small part of the emotional experience, and reducing emotion recognition to this method can potentially put people on the spectrum at a disadvantage.

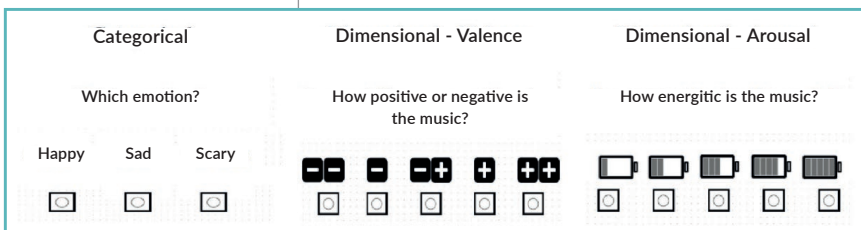
People on the spectrum demonstrate better musical memory, better pitch and melody recognition, greater verbal production when music is included in a language development program and, not least, greater social effort.

program and, not least, greater social effort. Notably, there's more attention to task, a better quality of interaction requiring shared speech, and in general, better conversations reported by parents and/or music teachers. Regarding emotions, people on the spectrum recognize the emotions of joy, fear, and sadness within a soundtrack as well as their TD peers when cognitive skills are considered in scientific analyses. Thus, music seems to offer people on the spectrum a more accessible and easy-to-understand emotional context.

### Basic Emotion Recognition in Autistic Children is Enhanced by Music and is Typical for Faces and Voices: A Study in Brief

Researchers banded together to examine how people on the spectrum and TD people identify emotions in different modalities. 25 children on the spectrum and 23 TD children aged 6 to 13 years old completed three different tasks: recognition of the emotions of joy, sadness, and fear through faces (photos), voice (sounds of crying, laughing, and screaming), and music (violin). The young people were asked to give their answers in three parts: dimensionally, which included evaluating the intensity of the emotion (either very intense or not very intense) and its valence (positive or negative), and categorically (identifying the word corresponding to the emotion represented). The image below shows what the participants saw when they were asked to give their answers.

#### What Results Were Obtained?



#### Original article:

Sivathanan S, Dahary H, Burack JA, Quintin E-M (2023) Basic emotion recognition of children on the autism spectrum is enhanced in music and typical for faces and voices. PLoS ONE 18(1): e0279002. <https://doi.org/10.1371/journal.pone.0279002>

Statistical analyses revealed better recognition of emotions within music in children on the spectrum compared to their TD peers. However, both groups showed similar performance for categorical emotion recognition from faces and voices. Specifically, both groups identified emotions by voice more easily and comparably. In addition, children on the spectrum identified emotions within music and faces in a similar way. As for the TD children, they identified emotions from faces more easily than from music. This indicates


that the TD group showed more variability in their responses than the group on the spectrum.

Regarding emotion ratings (dimensional and categorical), both groups rated emotions similarly in terms of valence (positive-negative) and intensity. On the other hand, children on the spectrum showed more variability in their assessment of the valence of joy.

#### Key Takeaways:

- Children on the spectrum show similar emotion recognition for faces and voices but demonstrate strength in emotion identification within music compared to the TD group.
- Both groups in general identify emotions more readily in the voice modality.
- The TD group identified emotions more easily in faces than in music.
- In general, dimensional responses are similar between groups, which runs opposite to the literature using categorical responses.
- Combining dimensional and categorical methods provides a better understanding of participants' perception of emotions, offering richer, more nuanced responses, but also being more accessible and inclusive for participants who are part of the neurodivergent community (with varying levels of language ability).

#### Why is this Study Important to the Community?

This study underscores the importance of leveraging music, a perceptual force, which seems to offer alternative avenues for emotional and social development programs for children on the spectrum. Music is also readily accessible as it is already part of the academic curriculum. So, since music is proving to be a personal strength of people on the spectrum, socio-emotional programs can be implemented in schools in a way that is effective and accessible to all with the aim of fostering and sustaining this strength in children on the spectrum. 



**The following text was written by a teenager whom I had the opportunity to meet in my clinical work. It clearly illustrates the challenges faced by an autistic person who presents with associated symptoms, but especially someone for whom the overall intellectual potential has been underestimated. I admire this teenager's ability to share his experiences with us today and even more so for doing so with a perspective of hope despite all the adversities he has faced.**

**Pascale Grégoire, MD**  
Child and Adolescent Psychiatrist

## The story of Cram\*

My story could have been a desperate one, but it has a beautiful ending.

I was born incapable of speaking and very clumsy with my fine motor skills. From my very childhood I was unable to dress myself or hold my toys correctly when playing. I remember trying to speak only to make growling sounds.

I was having frequent tantrums from the rage of realizing my body would not obey. I was hitting and mutilating myself to punish myself for being clumsy. I was able to hear and understand everything people were saying but I had no way of answering or even acknowledging that I was understanding. Specialists quickly diagnosed me as autistic with a deep developmental delay.

I went to a specialized school where they assumed I was mentally retarded. I continually felt I was a failure and we were being taught very basic material. I was desperate and depressed so I started to hit teachers which made matters worse.

When I was 8 years old, my dad took me to the United States to see a therapist who immediately spoke to me as a normal child. She told me "my name is Elizabeth come sit and write my name". I stopped crying, took a seat and was able to point at big letter boards to spell her name.

Everything was hard from targeting letters with my eyes, I had to use a pen because my index didn't work to my arm that moved all over the place. But I knew how to read and write and I had just realized I could communicate.

From that moment on I worked on my coordination every day. I was able to control my eyes, my index

started to point and I finally had a communication mechanism with the world. I did this for years traveling 2 days every 2 months for intense sessions.

At one point my dad proposed to my school to show them how to communicate with me using the letter board and to my great surprise the school refused by invoking all kinds of excuses and really refused to believe I could read and write.

I became even more depressed and hopeless. I saw that I would never get an education. I was on a road to nowhere and my behaviour as school got worse.

My situation changed the day a neuropsychologist took the time to evaluate me and let me spell my answers with my letter board. His evaluation gave me hope and allowed me to apply for a normal school.

I am starting my third year in a regular high school this September. I go to school with a lady that was trained to help me with my communication. I can now use an iPad to communicate with my friends and teachers. People appreciate me for who I am even if I don't speak. My teachers are very supportive and I love my school.

Most of all I am finally happy. The period of despair is finished.

I'm writing my story hoping it will help children that have been labeled as disabled and autistic. In my case the disease affects my muscles but not my mental capacity. With my iPad and a little goodwill I will be able to have an education and contribute to society.

My story continues! 

In my case the disease affects my muscles but not my mental capacity. With my iPad and a little goodwill I will be able to have an education and contribute to society.

\* Cram is the pseudonym this teenager has chosen to use.