



Sur le

Number 13
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The Montreal Cognitive Neuroscience Autism Research Group

06



Does the emotional expression of young autistic children differ from neurotypical children?

08



Early Childhood Assessment

10



Restricted and repetitive behaviours in autism

13



Childhood diagnoses of people diagnosed with autism

02

How can autistic individuals learn optimally?





Sur le

spectre



SUMMARY

Number 13 – **SPRING 2022**



page **02**
How can autistic
individuals learn
optimally?


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EN NEUROSCIENCES COGNITIVES FONDAMENTALES
ET APPLIQUÉES DU SPECTRE AUTISTIQUE



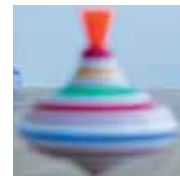
 **06**

Does the emotional
expression of young
autistic children differ
from neurotypical
children? The importance
of context!



 **08**

Early Childhood
Assessment:
The importance of
a multi-method
and multi-perspective
approach



 **11**

Restricted
and repetitive
behaviours
in autism:
How do
they change?



 **13**

Childhood
diagnoses
of people
diagnosed
with autism



Official magazine of the The Montreal Cognitive Neuroscience Autism Research Group

The Montreal Cognitive Neuroscience Autism Research Group focuses on brain function, auditory and visual perception, exceptional skills and interventions in autism.

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Sur le spectre :

A popularity that continues to grow.

It is my pleasure to introduce this 13th issue of *Sur le Spectre* as Editor-in-Chief, replacing Valérie Courchesne for this issue. Once again, this spring edition of the magazine is made possible by the students and researchers who write and edit our articles on a volunteer basis. It is also thanks to the support of our financial partners that this magazine comes to you, and we would like to thank the Marcel and Rolande Gosselin Research Chair in Cognitive Neuroscience and Autism at the Université de Montréal for its support since the very beginning of this project.

We are proud to announce that the second video of *Sur le Spectre* has just been posted on our [YouTube channel](#). The realization of this video was made possible thanks to the financial support of the [Petits Trésors Foundation](#). We would also like to announce that the Fonds de Recherche en Santé du Québec has granted us for a second time a subsidy allowing us to produce several new videos during the summer. These video projects are possible thanks to your support! Seeing more and more of you reading our magazine, issue after issue, motivates us to create even more content to make the world of research more accessible.

In this issue, we are proud to present the results of the most recent articles published by members of our research group. You will find an article on the conditions that support learning in autistic children. You will also learn more about emotional expression in young autistic children, the link between restricted and repetitive behaviours and age, and the multi-method, multi-informant approach to assessing intellectual and adaptive functioning in young autistic children. Finally, you will find out what the Danish health system registry tells us about the presence of comorbidities during childhood in autistic adults.



Janie Degré-Pelletier
Chief editor

Seeing more and more of you reading our magazine, issue after issue, motivates us to create even more content to make the world of research more accessible.



The way of presenting the learning situation could have a significant impact for autistic children.

How can autistic individuals

learn optimally?

By IRENE GARCIA-MOLINA, ANNE-MARIE NADER and ISABELLE SOULIÈRES

Learning relies on the ability to organize information and form concepts, allowing what is learned in one context to be generalized to a new situation. Literature is still unclear on how and how well autistic individuals

can learn. Very often, due in particular to challenges in terms of executive functions (e.g., planning, organization) and sensitivity to sensory overload, we tend to believe that children with autism require significant support

from the outset to learn. However, perhaps we should wonder whether autistic individuals have advantages in some situations depending on how information is presented. There are indications that the learning mechanisms of autistic children differ from those of neurotypical children. Perception, which is more oriented towards local processing and marked by an ability to systematically extract regularities (patterns), could play a greater role in the learning of new information in autistic people. Indeed, the observation of interests of autistic children and their spontaneous and sometimes exceptional learning in certain domains (e.g., hyperlexia, arithmetic), combined with the accounts of autistic people and the results of research which suggest that implicit learning in autism would be entirely possible, suggest that the way of presenting the learning situation could have a significant impact for autistic children. This is what a research team attempted to study, whose work was published in the *Journal of Experimental Psychology* in the fall of 2021.

Our team wanted to clarify the factors influencing learning in autistic children by studying the impact of two of the important components of a learning situation, in this case **(1) the intensity of the feedback** given to the child and **(2) how to present the material** to be learned.

A total of 54 autistic and 52 neurotypical children (6 – 14 years-old) participated in two learning situations. Each learning situation featured an ice cream counter where the children had to learn to distinguish the preference of their customers; some would prefer vanilla ice cream and others chocolate. The "customers" were characters from Mr. Potato Head who varied by the presence or absence of certain characteristics (glasses,

mustache, bowtie, hat). The children could not memorize "by heart" the choice for each character. Indeed, although each character had a preference, no one always chose the same flavour; on occasion, he would select the alternate flavour. The children therefore had to learn the clues suggesting belonging to one or the other of the categories (those who prefer vanilla vs. chocolate).

What is the impact of the intensity of the feedback given to the child?

In typical development, feedback received from an external source (parent, teacher, peers) plays an important role in learning. Depending on the feedback received, sometimes in the form of reinforcement that serves as source of motivation, the child updates his learning. In the first series of situations proposed in the study, the children had to try an answer (vanilla or chocolate) for each of the characters presented. Thanks to the feedback received after each of the trials, the children could gradually learn to distinguish the two groups of customers. The authors wanted to verify whether simple, informative (right/wrong answer) or more intense feedback (adding visual and sound animation as a reinforcement when the child had the correct answer) had the same impact in autistic and non-autistic children (Figure 1).

Results? Autistic children **did not benefit from an increase in feedback**, while it benefited neurotypical children. Indeed, neurotypical children showed better outcome when they learned with higher intensity feedback. On the other hand, for autistic children, the addition of a visual and sound animation did not improve learning, their performance being similar in the two tasks.



In typical development, feedback received from an external source (parent, teacher, peers) plays an important role in learning.



Figure 1 from the original article (Situations with low (b) or higher feedback intensity (c)).

The study findings support a growing literature that suggests autistic children can learn implicitly, and sometimes at a level of complexity comparable to typical children.

What is the impact of the way of presenting the learning material?

Learning can also occur without feedback, observing instead the elements of our environment (people, objects, events). One can learn by gradually identifying the recurrences between the different components. As part of the second series of learning situations, the children observed different characters who already had their cones in their hands. By observing the different characters, the child could identify which characteristics were associated with each group of clients. The question of interest: Do the modalities of material presentation have an impact on the quality of learning? One situation offered an *isolated* presentation in which a single

customer with his cone was presented on the screen, one after the other. The second situation proposed a rather *simultaneous* presentation in which several customers were visible at the same time. The children could manipulate and organize the different examples (each on a small card) on a large board (Figure 2).

Results? Autistic children showed better learning when they had **access to several customers at once** (simultaneous condition) compared to the presentation of customers in isolation (one example at a time). The way of presenting the material did not have an impact for typical children, who learned similarly regardless of the mode of presentation. In a so-called *simultaneous* learning situation, autistic children showed similar results to typical children.

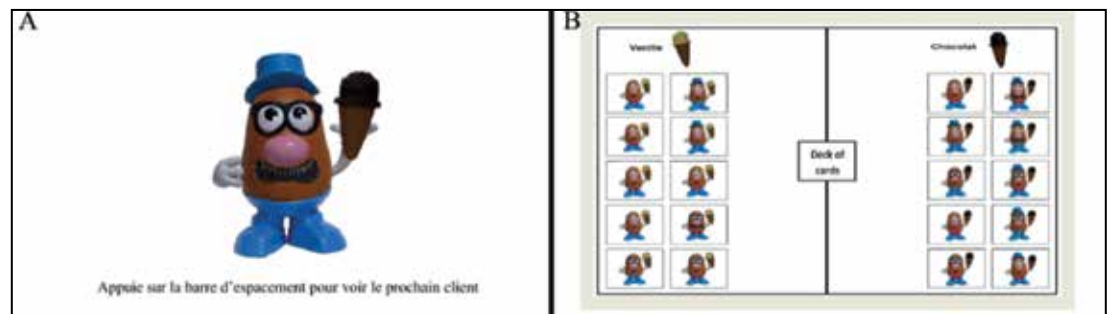


Figure 2 from the original article (Situations with isolated (a) or simultaneous (b) presentation)

What is the take-home message?

The study findings support a growing literature that suggests autistic children can learn implicitly, and sometimes at a level of complexity comparable to typical children. Different proposals can be drawn from the results of this research:

1. Autistic children don't seem to benefit as much from an increase in feedback if it doesn't provide additional information to solve the task. Autistic children even seem rather helped by **feedback that is inherent in the task itself**.
2. In some contexts, autistic children may find it easier to learn if they are presented with **all the relevant information simultaneously** in a learning situation, rather than presented one item at a time as is often the case. Autistic children benefit when they can be presented with **multiple examples of the concept** being taught (e.g., multiple examples of words with the same sound, expressions of joy, multiplications). **Access to a wide range of information** seems to make it easier for the autistic child to detect regularities in the learning

material (i.e., see similarities and differences) and to identify correspondences more easily between different elements that share certain common characteristics (e.g., a letter and its pronunciation).

3. Children's learning was better when they had the opportunity to observe, manipulate, move, classify, and group learning material. The **manipulation of the learning material** would facilitate the observation of the recurrences between the elements and allow feedback inherent to the task (i.e., in the task itself). In addition, when **information is presented in a structured way** (e.g., in a matrix or a table), the necessary information is presented together, simultaneously and remains accessible throughout the learning process. Each component has its place and the links with the other components/examples is more readily observable.

In short, it will be interesting to see how these different proposals can be implemented in the educational strategies developed for autistic children, whether these strategies target functional, socio-emotional, or academic learning.

Original article:

Nader, A. M., Tullo, D., Bouchard, V., Degré-Pelletier, J., Bertone, A., Dawson, M., & Soulières, I. (2021). Category learning in autism: Are some situations better than others?. *Journal of Experimental Psychology: General*.

MAMAN S'ADAPTE : ÉTUDE SUR LE STRESS PARENTAL ET L'ADAPTATION DES MÈRES D'ENFANTS AUTISTES



L'étude documente les particularités d'être mère d'un enfant autiste, et les moyens que les mères développent pour s'adapter comparativement aux mères n'ayant pas d'enfant autiste

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psychologie de l'UQTR*

Pour qui?

- Mères ayant un enfant autiste entre 2 ans et 5 ans 11 mois.

POUR PLUS D'INFORMATION
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En quoi ça consiste?

- Des questionnaires en ligne;
- Un agenda de sommeil;
- Une entrevue téléphonique;
- Une séance Zoom d'observation.

Certificat éthique : CER-18-252-07.27

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When placed in a context adapted to their particularities, autistic children express as many positive emotions as their typical peers.

Does the emotional expression of young autistic children differ from neurotypical children?

The importance of context!

By KATARINA SOTELO

What does the scientific literature tell us?

The scientific literature on emotional expression in individuals with autism tends to point to a deficit or atypicality in this area. For example, in the Diagnostic Manual of Mental Disorders 3rd edition (DSM-3), autistic individuals were described as expressing "odd" or "abnormal" emotions and were described as having a fixed gaze or an inability to smile. The most recent version of this manual (DSM-5) also highlights the lack of

facial expressions in autism. Scientific articles mention an incongruence between the emotion expressed by the autistic child and the context in which he or she finds himself or herself. This incongruence could explain why non-autistic people perceive autistic emotional expressions as bizarre, abnormal, ambiguous, mechanical, disorganized, or irregular.

Second, many studies report more negative emotions and fewer positive emotions in autistic children than in

typical children, beginning in the early stages of development. What these studies have in common is that the context for observing emotional expressions is not adapted to the characteristics of autistic children. For example, these studies document children's emotions in structured situations involving imitation tasks, objects of interest to typical children, or in social situations.

What influence does context have on emotional expression in autistic children?

In a study recently published in the journal *Autism*, Dr. Claudine Jacques and her colleagues have shown that, when placed in a context adapted to their particularities, autistic children express as many positive emotions as their typical peers. Using an innovative method, it has been possible to observe a range of emotions in autistic children.

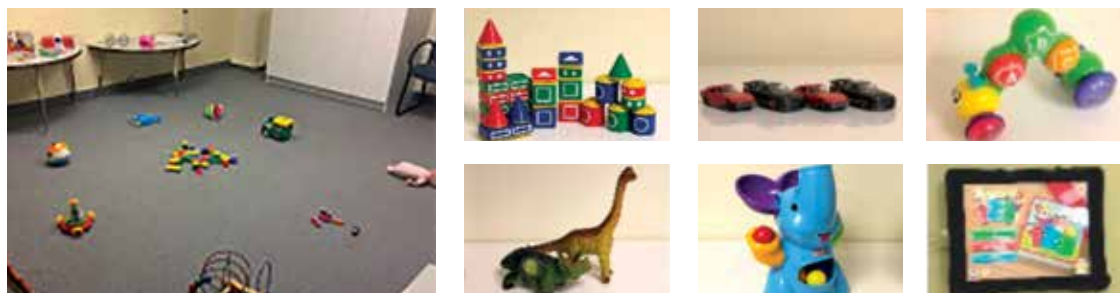
Using an autism-specific method to observe the emotional expressions of young autistic children: The Montreal Stimulation Situation-MSS

Dr. Jacques' team has developed an observation situation involving toys and objects that autistic children are often interested in. For more details on the development of the MSS, we invite you to read the article: *Repetitive behaviors and object exploration in young autistic children*,

published in the 7th issue of *Sur le Spectre*. Using this stimulating play situation tailored to the interests of children with autism, researchers were able to document the emotional expressions of 37 young autistic children and compare them to 39 typical young children between 27 and 56 months of age.

Situation-blind coders, i.e., with no information about the purpose of the study or the status of the group (autistic or typical), coded the valence of the emotional expressions observed during the MSS using a grid that categorized the expressions into 5 categories: positive, negative, neutral, unknown, and undeterminable (e.g., if the child's face was hidden). The "unknown" category corresponded to the expression of atypical and difficult to interpret emotions, often identified in the literature as bizarre or abnormal. In this study, the researchers wanted to use a name that better reflects the current state of knowledge; they are not recognized, so they are unknown!

Three variables were used to document the emotions: their frequency (how often the child expresses this emotion), their duration (how many seconds the emotion lasts) and finally the proportion of children having expressed this emotion.



The results

In the context of the MSS, the positive, negative, and neutral emotional expressions of autistic children and typical children did not differ! Their duration, frequency, and the proportion of children who expressed these emotions in the MSS were similar in both groups.

In contrast, "unknown" facial expressions were more frequent, of longer duration, and found in greater proportion in autistic children. In fact, unknown facial expressions were observed in 43% of the autistic children, whereas they were not observed in any of the typical children.

What we can learn from these results...

This research sheds new light on the emotional expressions of young autistic children. Indeed, the results did not support the fact that negative emotions are more present at the expense of positive emotions in autistic children. On the contrary, both autistic and typical children showed more positive than negative emotions during the MSS, and negative emotions were found with very low frequency in both groups. As for the "unknown" emotions, these were expressed only by autistic children. In this sense, to better understand the nature of these emotions, it is essential to clarify and better define them in future studies. 🌱

As for the "unknown" emotions, these were expressed only by autistic children. In this sense, to better understand the nature of these emotions, it is essential to clarify and better define them in future studies.

Original article:

Jacques, C., Courchesne, V., Mineau, S., Dawson, M., & Mottron, L. (2022). Positive, negative, neutral—or unknown? The perceived valence of emotions expressed by young autistic children in a novel context suited to autism. *Autism*, 13623613211068221.



In autism, estimates of intellectual disability vary between 13% and 84%! We might as well say that there is no consensus! Guidelines to better assess the intelligence of autistic children are therefore needed.

Early Childhood Assessment:

The importance of a multi-method and multi-perspective approach

By ÈVE PICARD

The challenges associated with assessing the intellectual functioning of autistic children

The assessment of autistic intelligence presents many challenges, particularly with preschool autistic children who speak very little or not at all (minimally verbal). Most intelligence measures require verbal responses or an understanding of verbal instructions and are based on a "typical" developmental model not adapted to autistic development. Thus, based solely on their performance on these types of tests, it may be mistakenly assumed that they are less intelligent, when in fact some tests simply do not seem to be appropriate for them.

Assessing intellectual functioning in research

Considering the difficulties in properly assessing autistic children in terms of intelligence, one might ask how this impacts research. To properly document and characterize their groups of autistic children, researchers rely on their level of intelligence as

measured by an assessment. However, because of the difficulties associated with this assessment, research results are often inconsistent and difficult to compare. In addition, these assessment difficulties in autism seem to lead to an underestimation of their intellectual potential, and ultimately to their exclusion from studies. All these issues influence the proportion of autistic children who are considered to have developmental delays or intellectual disabilities. In autism, estimates of intellectual disability vary between 13% and 84%! We might as well say that there is no consensus! Guidelines to better assess the intelligence of autistic children are therefore needed.

Researchers from the Montreal Cognitive Neuroscience Autism Research Group have taken an interest in this issue and have conducted a study to examine the extent to which the use of various tools widely used in clinical and research settings affects the proportion of autistic children identified as having developmental delays.



Methodology

The researchers documented the intellectual and adaptive functioning of a cohort of 64 autistic children and 73 neurotypical children aged 28 to 69 months. Most autistic children were considered minimally verbal. Intellectual functioning was measured using the Mullen Early Learning Scale (MSEL), a battery of tests to be completed with the child, and adaptive functioning was assessed with a telephone interview with the parent using the Vineland Adaptive Behavior Scales-Second Edition (VABS). The VABS assesses different aspects and behaviors related to the child's adaptive functioning, such as daily living (e.g.: personal autonomy, hygiene), communication (e.g.: verbal, written), and socialisation (e.g.: interpersonal relationships, playing).

This multi-method (two tools) and multi-informant (child's performance on a clinician-administered cognitive test **and** the child's adaptive functioning reported by the parent) approach was intended to adequately characterize children's intellectual potential in different contexts (in an assessment room versus in daily life at home).

What were the results?

As expected, the neurotypical children had relatively homogeneous cognitive and adaptive profiles, whereas the autistic children had heterogeneous profiles characterized by **visual strengths** and **verbal weaknesses**.

Although most of the autistic children in the sample were considered minimally verbal, **33% of them scored in the average range** for both intellectual and adaptive functioning. The development of these children is therefore considered typical.


Second, **41% had a score showing deficits in intellectual functioning** as assessed in a standardized context (assessment room), **but an average score in adaptive functioning** as reported by the parent, based on the child's abilities in a familiar context (home). If only one score is considered, the abilities of these autistic children may be underestimated.

Only **23%** of the autistic children in the sample **had a score showing deficits in intellectual functioning and adaptive functioning**. Their performance profiles showed no skill peak, meaning they had homogeneous and low scores on all aspects of both tests. They could be considered as having a developmental delay.

Moreover, beside the children with homogeneous and low profiles (23%), autistic children had heterogeneous profiles; some **peaks in ability** were evident when looking at the more visual subscales and when considering the parent's perspective - suggesting "**hidden**" abilities that could not have been captured with a single tool or by looking at the overall scores on the two tools alone!

These results show that the performance of some autistic children in a standardized setting (low normative conditions; only a few encounters with an unfamiliar assessor) does not necessarily reflect what they can do in a familiar setting, as reported by their parents who are well aware of their skills and functioning. It is possible, therefore, that these autistic children have certain skills that cannot always be captured in the intellectual assessment.

What does this mean?

As the researchers in this study have shown, if we use only the global score of a single cognitive tool, in addition to measuring a single facet of intelligence, we risk underestimating some autistic children and mistakenly considering them as developmentally delayed. In both clinical and research settings, in addition to considering the child's functioning in different contexts (standardized and familiar), it is essential to adopt a **multi-method** and **multi-informant** approach to adequately assess his intellectual potential. 

If we use only the global score of a single cognitive tool, in addition to measuring a single facet of intelligence, we risk underestimating some autistic children and mistakenly considering them as developmentally delayed.

Original article:

Girard, D., Courchesne, V., Degré-Pelletier, J., Letendre, C. et Soulières, I. (2022). Assessing global developmental delay across minimally verbal preschool autistic children: The importance of a multi-method and multi-informant approach. *Autism Research*, 15(1), 103–116. <https://doi.org/10.1002/aur.2630>



PARTICIPANTS RECHERCHÉS

Utiliser l'expertise en autisme pour caractériser les émotions des enfants autistes

Les laboratoires de Claudine Jacques, Ph.D., professeure de psychologie et de psychoéducation à l'UQO, et d'Isabelle Soulières, Ph.D., professeure de neuropsychologie à l'UQAM, sont présentement à la recherche de participants pour une étude en ligne sur les expressions émotionnelles des enfants autistes d'âge préscolaire.

Profils des participants recherchés :

- Professionnels de la santé spécialisés en autisme (au moins la moitié de la clientèle depuis 2 ans minimum)
- Parents d'enfants autistes âgés entre 3 et 12 ans
- Adultes autistes

Nature de la participation : tâche informatisée, courte entrevue et questionnaires

Durée : une rencontre de 90 minutes

Pré-requis : Posséder un ordinateur et une connexion à l'Internet

Compensation : 30\$

Pour plus d'information ou pour participer : contactez Camille Letendre, candidate au doctorat en psychologie à l'UQAM
letendre.camille@courrier.uqam.ca

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Restricted and repetitive behaviours in autism:

How do they change?

By VICTORIA JEAN

One of the central features of autism is the presence of restricted and repetitive behaviours (RRB). This symptom domain encompasses a multitude of very distinct behaviours, including stereotyped movements (e.g., flapping), language stereotypies (e.g., echolalia), a preference for routines and intense interests. Despite the prevalence of these behaviors, their role in the development or evolution over the life span of autistic individuals is still poorly understood.

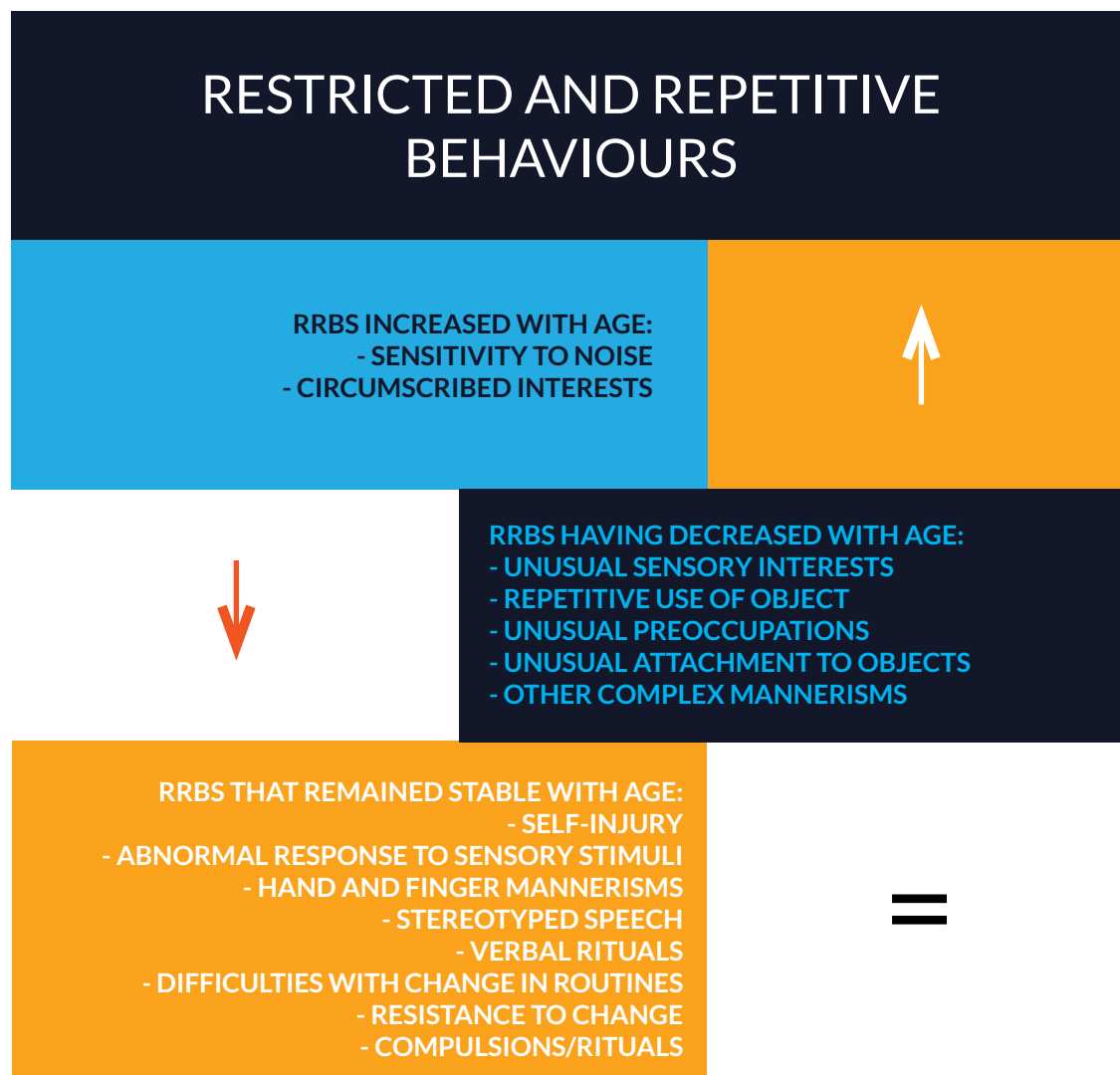
Different approaches have been used to study RRBs. Some studies choose to combine all RRBs together or group them into subcategories, whereas few studies consider each RRB individually. Using the combined approach, researchers have shown an increase in RRBs during the preschool years, followed by a decrease during school age. In addition, these studies have shown a negative relationship between RRBs and adaptive,

intellectual, and language functioning, i.e., the more RRBs, the less advanced the other areas of development. However, when RRBs are divided into categories or studied individually, the picture is much less clear, with some categories or RRBs being positively related to the different developmental spheres while the opposite is true for others, and this is not always consistent from one study to another.

In a study published in *Molecular Autism*, Courchesne and colleagues attempted to shed light on the relationship between individual RRBs, age and non-verbal intelligence quotient (IQ). To do so, they studied changes over time in 15 RRBs included in the *Autism Diagnosis Interview-Revised* (ADI-R) clinical assessment tool. The RRBs were measured in 205 children at the age of diagnosis, then at 6, 8 and 11 years of age, and the researchers explored whether observed changes were related to the child's IQ.

The study first showed a significant relationship between RRBs and children's age. In general, RRBs tend to decrease with age.

In this study, the prevalence of RRBs was measured by the absence or presence of the behaviors, so the decrease in their prevalence with age indicates that many children no longer exhibited certain behaviors as they aged.



Original article:

Courchesne, V., Bedford, R., Pickles, A., Duku, E., Kerns, C., Mirenda, P., Bennett, T., Georgiades, S., Smith, I. M., Ungar, W. J., Vaillancourt, T., Zaidman-Zait, A., Zwaigenbaum, L., Szatmari, P., Elsabbagh, M., & Pathways Team. (2021). Non-verbal IQ and change in restricted and repetitive behavior throughout childhood in autism : A longitudinal study using the Autism Diagnostic Interview-Revised. *Molecular Autism*, 12(1), 57. <https://doi.org/10.1186/s13229-021-00461-7>

The main results

The study first showed a significant relationship between RRBs and **children's age**. In general, RRBs tend to decrease with age. However, when we look at each RRB individually, we see that this relationship depends on the RRB studied. For example, repetitive object use, the presence of complex mannerisms, unusual preoccupations, and unusual sensory interests tended to decrease with age, whereas sensitivity to noise and intense interests tended to increase. The other RRBs were not related to age.

Nonverbal IQ alone was not associated with any of the RRBs. In contrast, an interaction between age, non-verbal IQ and difficulty changing a routine was documented. This means that change over time for this RRB was dependent on IQ. Specifically, difficulty in changing a routine tended to increase with age only when non-verbal IQ was lower.

Conclusion

The results of this study demonstrate the importance of studying restricted and repetitive behaviors individually since their relationship to age or IQ, for example, differs across RRBs. Prioritizing the study of RRBs individually would therefore allow for a better understanding of how they change with age and how they relate to other aspects of autism development. In this study, the prevalence of RRBs was measured by the absence or presence of the behaviors, so the decrease in their prevalence with age indicates that many children no longer exhibited certain behaviors as they aged. Clinically, such a finding suggests that it may be unnecessary to attempt to modify certain RRBs since they will naturally decrease or disappear with age. 🌟



Childhood diagnoses of people diagnosed with autism

By EYA-MIST RØDGAARD and LAURENT MOTTTRON

People with autism are statistically more likely to have other neuropsychiatric diagnoses than the general population. Presence of comorbidities may contribute to the large variation in the presentation of autism, and in how autism is experienced and how individuals may be best supported in their environment.

A collaborative research project between University of Montréal and University of Copenhagen aimed to investigate patterns of autism comorbidity in the Danish population. Denmark has a publicly financed and administered universal healthcare system and maintains centralized registries of in-patient and out-patient hospital visits, including records of which diagnoses were given at each visit. According to national guidelines, assessment following the suspicion of autism should be performed by teams of specialists that are part of the hospital system and thus record autism diagnoses in the registries. The project utilized these registries to identify individuals diagnosed with autism in childhood or adulthood and investigate which other diagnoses they had been given in childhood.

Among **children diagnosed with autism before the age of 16**, the comorbidity rates of psychosis, affective disorders, anxiety disorders, conduct disorder, eating disorders, obsessive-compulsive disorder, attention-deficit hyperactivity disorder, epilepsy, tic disorders, sleep disorders and intellectual disability were calculated. As expected, comorbidity rates were higher than the prevalence of the same conditions in the general population. Furthermore, there were significant sex differences in

comorbidity rates for most of the investigated conditions. Generally, the sex differences were similar to what is observed in the general population. For example, anxiety and depression were more common in autistic girls than in autistic boys, while ADHD was more common in autistic boys than in autistic girls. However, across all conditions there was a tendency that the sex ratio among those with autism was shifted towards females when compared to the sex ratios in the non-autistic population. In other words, autistic girls had a disproportionately higher risk of comorbidity than what would be expected based on the sex ratios of the non-autistic population. Further research is needed to confirm this finding, and the present results cannot point to the reasons of this potential comorbidity disparity. One possible explanation is that girls are less likely to be referred to assessment for autism, but that the emergence of other conditions increases the likelihood of a psychiatric evaluation whereby autism may also be diagnosed. Alternatively, it could reflect that autism diagnoses are sometimes erroneously given to girls who present with symptoms of other psychiatric conditions. A similar trend has previously been observed among individuals with ADHD, so it is possible that it is a general trend in several developmental conditions.

Although autism is expected to manifest in childhood, there are also individuals who are diagnosed for the first time in adulthood, after presumably having been missed throughout childhood. In a parallel study, **individuals first diagnosed with autism in adulthood**

Comorbidity rates were higher than the prevalence of the same conditions in the general population. Furthermore, there were significant sex differences in comorbidity rates for most of the investigated conditions.

Original articles:


Rødgaard, E. M., Jensen, K., Miskowiak, K. W., & Motttron, L. (2021). Autism comorbidities show elevated female-to-male odds ratios and are associated with the age of first autism diagnosis. *Acta Psychiatrica Scandinavica*, 144(5), 475-486.

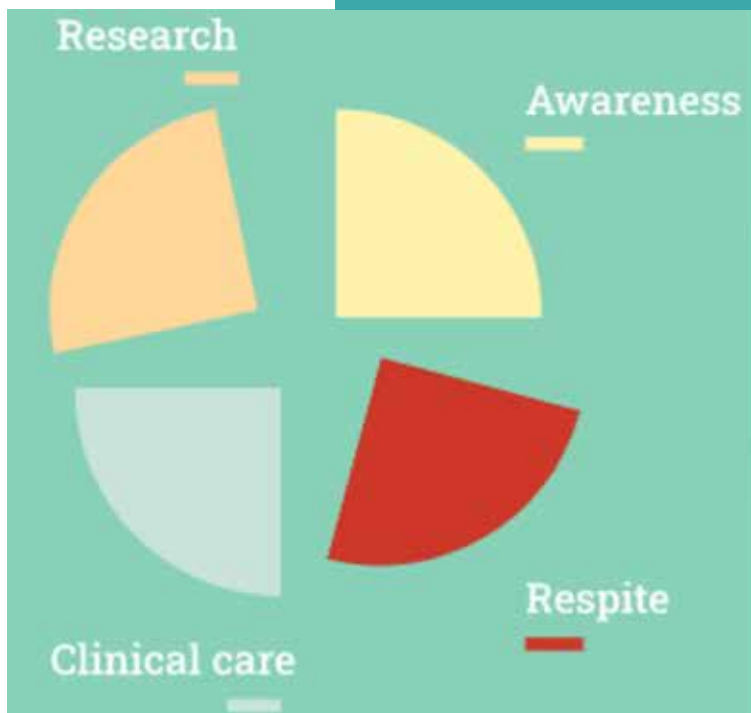
Rødgaard, E. M., Jensen, K., Miskowiak, K. W., & Motttron, L. (2021). Childhood diagnoses in individuals identified as autistics in adulthood. *Molecular Autism*, 12(1), 1-7.

Individuals being diagnosed with autism in adulthood were more often diagnosed with the investigated conditions in childhood, compared to individuals who had no records of any autism diagnoses.

were identified (those who had autism diagnoses registered after the age of 18, but no autism diagnoses registered before the age of 18). The aim was to investigate which problems may have been present in childhood and whether their condition might have been mistaken for another condition with some similar features. It was examined whether they had received any of a set of preselected diagnoses before the age of 18. The diagnoses being investigated were selected because they either often co-occur with autism or share some similar symptoms. Individuals being diagnosed with autism in adulthood were more often diagnosed with the investigated conditions in childhood, compared to individuals who had no records of any autism diagnoses. However, a large fraction of those diagnosed with autism in adulthood (61% of females, 69% of males), were not registered as having received any of the investigated diagnoses in childhood, which is consistent with what has been reported in previous smaller clinic-based studies investigating the medical histories of adults being diagnosed with autism. This could indicate that, for many of those being diagnosed with autism in

adulthood, misdiagnosis in childhood is unlikely to have contributed to delaying the autism diagnosis.

Studies based on population-wide health registries such as those available in Denmark have certain strengths. Data from large numbers of individuals can be analyzed, and no efforts are required for study participants, meaning that biases pertaining to who may or may not choose to participate are eliminated. However, as with all methods there are limitations, and results should be interpreted in the context of other studies using complementary methods. While the Danish health registry contains diagnoses given in the hospital sector, there is no information on diagnoses given by primary physicians or privately practicing psychiatrists. This means that it is not possible to get a full picture of a person's healthcare history, as would be possible with for example an interview or full access to all previous medical records. Comorbidities included in this study are thus likely limited to those with a severity that triggered a referral to a hospital-associated psychiatric department, while milder problems may not have been immediately referred for further psychiatric evaluation. 



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