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Regressive Autism: A Study In Early Developmental Patterns

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by

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B.S., Southern Illinois University, 2012

A Research Paper

Submitted in Partial Fulfillment of the Requirements for the

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Introduction

Under the umbrella of autism spectrum disorders (ASDs), a relatively small but significant population of individuals is retroactively diagnosed with the condition of regressive autism—that is, the loss of language and/or social skills that were previously held by the individual. This regression, often observed and reported to have occurred within the first two years of life, is a subset of ASD and is frequently noted only after it has fully occurred, leaving no opportunity for preventative therapeutic measures to be taken. This small window of opportunity has resulted in a significant lack of technical and clinical information on possible therapy techniques to reverse or decrease the effects of regression on children with autism. With this in mind, if the parents or clinicians of children with autism are trained to recognize possible signs of regression before the child is fully regressed, further studies can be done on possible therapy techniques to limit word, language, or social skill loss. The characteristics, onset age, and formal process of diagnosing autism spectrum disorders are variable, which does not lend to an identifiably concrete process of development. However, resources such as the <u>Diagnostic Statistical Manual of Mental Disorders 5th Edition</u> (DSM-5) present sufficient evidence on the nature of autism for this study to reference children who are diagnosed with autism without regression as children with "typically developing autism." Therefore, the purpose of this literature review is to compare the early development of children with regressive autism to the early development of children with typically developing autism, in order to determine the differences

that may be seen (possibly even before formal autism diagnosis), so that this

knowledge might be applied for practical use in a clinical or diagnostic setting.

The Generalizable Characteristics of Autism

Accuracy of the DSM-5

Due to the varied and extensive studies based on language and

social skills in autism, a standardized pattern emerges that can be generalized

to a majority of the population, and therefore used to form a basis for further

studies of individuals and groups of individuals with autism spectrum

disorder[1]. In 2011, Thomas W. Frazier et al. set out to conduct a study

regarding the symptomatology of autism spectrum disorders (ASDs). The

principal focus of this study was to test the validity of the new criteria for

diagnosing ASDs that was to be included in the forthcoming Diagnostic

Statistical Manual of Mental Disorders 5th Edition (DSM-5). Because Frazier

accrued data from a sample of nearly 15,000 children—aged 2 to 18 years—

with ASDs or non-ASD siblings, his study proves to be a valuable resource of

information that is not easily attained in studies of smaller sample size. The

study presented questionnaires to caregivers that included but were not limited

to inquiries regarding symptoms and ages when developmental milestones were

presented. The DSM-5 requires multiple criterions to be met in order to

diagnose an individual with ASD; criterion involving social communication and

interaction, repetitive or stereotyped behavior, age of symptom presence, and

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[1] As is the case with many disorders, even empirically-based common characteristics
cannot be assumed to generalize to 100% of the disordered population.

impairment of functioning. The results of Frazier's study maintained the claim that the criteria for ASDs in the DSM-5 is valid, and had a sensitivity rating of .93 (Frazier et al., 2011). With the number of ASD diagnoses rising every year, this is a critical time for accuracy. The data presented in this study supports the claim that the symptomatology of autism spectrum disorders is generalizable across a wide range of individuals, therefore alleviating much of the guesswork that previously accompanied clinical diagnosis in the absence of a medical "test" to detect ASDs. However, directly relating to the occurrence of regression in autism, studies are not so cohesive—that is, there is no one comprehensive and empirically-based source for information such as the DSM-5. Instead, it is necessary to examine multiple studies that have been conducted on the many aspects of regressive autism.

Validity of Regressive Autism as a Distinct Condition

Often, it is necessary to simply explain the valid existence of regressive autism in distinction from other disorders that see regression, for example, Rett syndrome. In 2004, Kurita, Koyama, Setoya, Shimizu, and Osada attempted to provide information regarding the variables that are seen between regressive autism (or as the authors refer to it, autistic disorder with speech loss) and childhood disintegrative disorder (CDD), a condition that very closely resembles the loss of language and speech in autism. Using information from clinical records, Kurita et al. demonstrated that children with CDD displayed more fearful behavior due to various applied stimuli, and had a much higher rate of occurrence of epilepsy. It was also stated that children with CDD also

displayed higher abnormalities of stereotypy, i.e. body movements that do not reflect their environment. While these differences between CDD and regressive autism may seem minimal, they are a validation for separate diagnoses of the two conditions (Kurita et al., 2004). Comparatively, great similarity is seen in the patterns of regression between regressive autism and pervasive developmental disorder-not otherwise specified (PDD-NOS). In a study by Meilleur and Fombonne (2009), children previously diagnosed with autism, PDD-NOS and Asperger syndrome were compared in order to assess their developmental patterns. When examining the disorder in general, it would be easy to confuse PDD-NOS with regressive autism, as both disorders see a language regression occurring at equal rates. However, the results of the study show that significantly higher levels of regression in areas other than language were found in the category of children diagnosed with autism, as compared to children in the PDD-NOS and Asperger syndrome categories. It was also shown that the parents of children with regressive autism reported developmental abnormalities at a younger age than parents of children with PDD-NOS (approximately 19 months and 25 months, respectively). Regression was not present in any children in the Asperger syndrome group, but this finding is not significant in light of the accepted "DSM-IV criteria of Asperger syndrome which requires a normal early language development (Meilleur & Fombonne, 2009, p. 120)." While the relatively new DSM-5 (published in May 2013) has placed CDD, PDD-NOS and Asperger syndrome under the broad and widely variable "autism spectrum disorder" title, subtle differences between these

subtypes emerge, lending credence to the idea that regressive autism could be classified as a discrete subtype. However, Meilleur and Fombonne specifically note that despite these subtle differences, there is still little reason to believe that regressive autism could be considered a wholly separate condition (p. 123).

Long-Term Effects of Regressive Autism

Bernabei, Cerquiglini, Cortesi, and D'Ardia (2006) conducted a study regarding the discrete nature of regression in autism on a sample of 40 children with autism, 18 of which had experienced regression, and 22 who had not. The children were observed and then assessed every year from age 2 to 6 in areas such as language (expressive and receptive), play behavior, requesting, communication modality, and cognitive age. Regression was reported to have begun most often between 18 and 24 months (mean: 20.6 months), but the true point of interest was the way in which the two groups differed after the children had experienced regression. Bernabei et al. observed the continued development of children with regressive autism, eventually noting that in the course of several years, their overall ability to regain lost language skills was lacking. Indeed, the children who had experienced regression displayed lower levels of cognition, language, and social skills than their non-regressed counterparts—a discrepancy that only increased with age, rather than showing the ability of the children with regressive autism to essentially "catch up" to the non-regressed children. This is not to say that the children with regressive autism did not improve, however they simply did not develop (or re-develop)

skills with the rapidity that the group of children with typically developing autism displayed, creating an increasingly larger gap between their overall scores. During the fourth year of this study, children with regressive autism demonstrated a plateau in acquiring receptive language skills while the children with non-regressive autism continued to improve. This same pattern of plateau at year four was noted in the area of expressive language (Bernabei et al., 2006). This study serves to indicate that regression in autism is not an experience that occurs in early childhood and is moved past with minimal difficulty. Quite the contrary, as indicated by Bernabei's et al. study; regression in autism seems to have a decided effect on further development, possibly causing much severer delays later in life.

Possible Inconsistency in the Development of Regressive Autism

While the previous examples bring forth evidence that points positively to the condition of regressive autism as identifiable and legitimate, not all studies have concluded with the same results. One such study, conducted by Rogers, Young, Cook, Giolzetti, and Ozonoff (2008) examines the role of imitation in regressive autism. Deferred imitation, i.e. the ability to imitate the acts that others perform after a delay period (as opposed to immediate imitation), has long been considered[2] an "early marker of representational thought with links to language development and symbolic processes (Rogers et al., 2008, p. 449)." However, due to the paucity of studies that looks at the role of deferred

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[2] "Piaget attributed great importance to deferred imitation in the development of representational thought. He stated that internalized, or mental, images were a product of imitation, evidenced by deferred imitation (Rogers et al., 2008, p. 449)."

imitation in children with autism, Rogers et al. set out to conduct a study that investigated deferred and immediate imitation in regressive, non-regressive, and early-onset autism. The results of the study showed that imitation scores, while lower across the board for children with autism regardless of onset type, were not significantly different between regressive and early-onset autism. This would seem to indicate an unsuccessful study, but Rogers states the need for further study; the very young mean age of participants (35.8 months) is a possible limitation, as differences in groups may manifest themselves later in life (Rogers et al., 2008). However, the general purpose of finding consistency in the characteristics of typically developing autism—not to mention regressive autism—is a challenge to researchers and clinicians alike. Even using the term "typically developing autism" is somewhat erroneous, because the developmental nature of the condition is not in any way typical. Autism spectrum disorders, as described in Frazier's aforementioned study, are "highly heterogeneous," and vary widely with respect to symptomatology, cognitive/physical functioning, and acuteness (Frazier, 2011, p. 28). Additionally, the results of one study are not sufficient to disprove the hypothesis that regressive autism should be recognized as a uniquely developing condition. Roger's study looked at one aspect of autism development and concluded that there is no statistically significant difference between the development of deferred imitation in typically developing autism and regressive autism. However, there are many other aspects of language development that were not focused upon in this study, and therefore many other aspects of the

issue to examine.

Thoughts Regarding Internal and External Validity

The researchers that contributed to the success of the several aforementioned studies attempted to complete a very difficult task: producing data that is based on internally valid research, when the very nature of the subject carries numerous confounds. For example, asking parents to report the early language and developmental behavior of their child with autism could lead to widely varying results, depending on the parent's understanding of the disorder, their role in the child's life, or their personal history and experiences. Observation of the development of regressive autism is time-consuming and may produce subject maturation that skews results. However, despite these threats to validity, the studies used were carefully constructed and have managed to achieve a high standard of accuracy, even when working with massive sample sizes or extensive time periods. Methods used by these researchers to construct and carry out a valid research study included but were not limited to: randomized assignment of participants (into groups or pairing with researchers), formal measures of statistical analysis, controlled environments, and the standardization of terms and questionnaires so as to obtain the most accurate information possible from parents and guardians. These careful measures were taken in order to ensure that the information and conclusions that can be taken from this research are able to be regarded as valid and trustworthy contributions to the field.

Future Directions Regarding the Definition of Regressive Autism

The various research goals and claims that have been mentioned thus far are only a minute sample of the vast amounts of work and time that have gone into the study of regressive autism. While studies like the ones conducted by Frazier and Kurita may seem to have produced narrowly applicable information—i.e. determining the validity of autism criteria in the DSM-5 or differentiating between regressive autism and childhood disintegrative disorder—they are small steps in the pursuit of establishing regressive autism as not only an independently existing condition, but one that is familiar to professionals and parents alike. While collecting precise definitions and thorough background for all terms used may be meticulous work, it is by no means trivial in the pursuit of establishing a medical diagnosis.

Closing Thoughts

Keeping in mind that purpose, the claim is posited that further research is necessary to truly cement our definition of regressive autism. As can be seen in Frazier's study, much time and thought was put toward validating the definition of autism spectrum disorders for the DSM-5, providing data that will aid professionals in the field who are most likely to require the information: researchers and clinicians. In future, it would be very advantageous to see such effort put into conducting a study that would so define regressive autism in unmistakable terms. Previously stated, there is no master resource available for the symptomatology and definition of regressive autism, as there is (i.e. the DSM-5) for typically developing autism and myriad other conditions. As Frazier's study exemplifies, a large sample would be required, but data should

be collected from more than one source. Parental report can be problematic, as mentioned previously, but it nevertheless is helpful if provided in conjunction with home videos, data from concurrent studies, and direct observation of participants by clinicians. To include such a description in a future <u>Diagnostic Statistical Manual of Mental Disorders</u> would prove to be a valuable step in increasing consciousness and correct diagnoses of the disorder.

Developmental Characteristics of Regressive Autism

Introduction

Although autism research is ongoing, studies appear to support the ability to detect regressive autism as opposed to typically developing autism in a child before clinical diagnosis, due to differential early language and social development patterns. As seen previously, regressive and non-regressive autism are distinguishable from each other in characteristics and outcome, but a point of interest is the distinguishable nature of the disorders before regression has occurred in full—pointing positively to the ability to recognize the symptoms and in turn to possibly affect the course of the condition. While there is no "cure" for autism, evidence points toward early intervention as playing a key role in helping children with autism attain higher levels of communication and independent functioning.[3] In reference to placing a child into early intervention, it has been often noted that the best source of

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[3] "A major impetus for [early diagnosis] is the general acknowledgement that behavior therapy and applied behavior analysis are effective in treating ASD and the assertion that interventions begun before age 3 years produce a better long-term outcome. (Matson, Wilkins, & Fostad, 2009, p. 38)."

information regarding regression in children is the report of that child's caregiver. Because of the general age of onset for regression, the caregivers are the individuals most likely to have taken notice of the child's skill level and later to see the apparent loss of those skills.

Studying the Onset Patterns of Regressive Autism

In 2003, Wendy Goldberg et al. designed a study of regressive autism around the use of caregiver reports, recognizing these reports as valuable sources of knowledge, rather than insubstantial or invalid qualitative observations. These caregiver reports were used to bring light to issues surrounding the various types of regression (loss of language vs. non-language skills), and the onset age of regression in 44 children who fell within the autism spectrum. The overall purpose of the study was to implement a new supplemental instrument to the typical Autism Diagnosis Interview-Revised (ADI-R): the Regression Supplement Form. Goldberg based her study on the hypothesis that the Regression Supplement Form (RSF) would enhance description of regression in autism for use not only in a clinical setting, but also in research.

> [The RSF] allows a fine-grained description of regression…with the ADI-R being first to identify regression and then the supplemental measure being used to refine knowledge about the timing of loss or losses, domains of regression, and the identification of concurrent events (Goldberg et al., 2003, p. 608).

After the interview was conducted with parents, those who reported loss of language or social skills in a child were given the Regression Supplemental Form, and from that, the results of the study were taken. Goldberg indicates that parents were most likely to report that their child lost both language and non-language skills, rather than just one over the other. In over 35% of cases, social skills (gesturing, direct gaze, etc.) were reported as lost along with language, although non-language skills were reported to have been lost an average of 3 months before language skills began to regress (Goldberg et al., 2003). One of Goldberg's sub-groups consisted of children who were reported to have lost skills in areas that did not involve language. An interesting distinction was made, however, in this group: while the language skills of the children were reported to be unaffected by regression, they were also reported to have still not acquired speech/words by 24 months of age (p. 611). However, this late language acquisition is not abnormal for children with autism as compared typically developing children (who say their first word at approximately one year of age). Additionally, it was stated within the study that after use, the RSF was deemed to be a legitimate and useful tool for researchers and clinicians when used in conjunction with the ADI-R. While this study was based on a comparatively small sample (44 children), Goldberg indicates that the rate of regression (44 children out of 132) is consistent with other studies. The significant findings in this study (for example, that non-language skills often regress months in advance to language skills) provide a starting point in our search to find consistency and notable characteristics in

the onset of regressive autism.

Children Who Regress vs. Those Who Do Not

A two-part study by Matson, Wilkins, and Fostad (2009) looked to provide information regarding children who regress versus those who do not. Part I of the study compared three groups of children (those with regressive autism, those with non-regressive autism, and children with no autism symptoms) on "global measures of ASD symptomatology, comorbid psychopathology, challenging behaviour and social skills" (Matson, et al., 2009, p. 41). Part II of the study used an algorithm of 19 items that attempted to predict regression in children with autism. Items in the algorithm included verbal communication, repetitive speech, social skills, play skills, vocalizations, interests/activities, and various types of disruptive behavior. Matson's et al. study claims that this algorithm, when used as a predictive measure of regression, produced acceptable measures of accuracy: 70.6% sensitivity and 82.2% specificity. However, detailed information on the administration of this algorithm was not provided in the study, nor was a specific description of the administration of the 19 items. Despite this, the results of the study indicated that children with regressive autism present with a specific behavioral profile that involves more impairment "on global measures of ASD symptomatology, comorbid psychopathology, challenging behavior and social skills" (Matson, et al., 2009, p. 44), compared to children with typically developing autism. Although the authors of the study claim that their results support the idea of a distinctive phenotype for children with regressive autism, they do not provide

the necessary information as to how the average individual or clinician might use their algorithm in a practical situation.

Prediction of Regressive Autism

Comparatively, an aforementioned study by Millieur and Fombonne (2009) provides what the authors believe to be clear evidence of predictive symptoms of regressive autism. After examining regression in 135 children, the authors used the Autism Diagnostic Interview Revised (ADI-R; previously mentioned as having been implemented in Goldberg's study on onset patterns of regressive autism) to look at areas such as type and severity of regression in conjunction with rank of birth, gender, and vaccination history. With this information, the authors claim to provide evidence that could be used by clinicians as a basis of predicting the onset of regression. For example, evidence presented by Millieur and Fombonne indicates that children who later experience loss of language skills developed those language skills much earlier than children who do not experience the loss: language at one year as compared with 26 months in the latter group. Of the original 135 subjects, 30 children were identified as having regressed (prevalence rate of 22.2%); 9 of these subjects lost language skills alone, 17 lost non-language skills, and the remaining four lost both language and a non-language skill. Subjects who were identified as having autistic disorder (as opposed to other disorders on the autism spectrum) were "more likely to show [regression] than those diagnosed with Asperger syndrome and…PDD-NOS" (Millieur & Fombonne, 2009, p. 120). Additionally, subjects with autistic disorder had a higher proportion of loss of

skills other than language, and scored significantly higher on the portion of the ADI-R related to repetitive behaviors. In fact, subjects diagnosed with regressive autism scored higher overall on the ADI-R than other subjects (38.5 as compared to 33.5 mean scores)[4]. In reference to language vs. non-language skills, it was found that subjects with autism experienced loss of non-language skills with higher frequency than that of language skills, "confirming that a regressive developmental course may be more frequent than previously thought if careful attention is paid to loss of skills other than languages (Millieur & Fombonne, 2009, p. 122)." Succinctly, the authors of this study present several distinguishing characteristics of regressive autism that can be identified while a child is still very young: that is, abnormally early development of language skills for a child with autism, early loss of non-language skills before language skills regress, increased repetitive behaviors, and high scores on a standardized test such as the ADI-R.

Another significant note made by Millieur and Fombonne was that children who regressed solely in language skills on average said their first word and first phrase much earlier than children who regressed only in non-language skills. A study by Baird et al. (2008) confirms this statement after examining the developmental trajectory of regressive autism. Subjects were divided into 'definite language regression' (the loss of at least five words that were used for three months before regression occurred), 'lower level regression' (plateau or regression before the child reached the five word stage, or

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[4] The scoring system of the ADI-R is such that higher numbers indicate a greater severity of symptoms.

regression of non-language skills), and 'no regression' groups. Evidence collected during this study showed that children with ASD who had not experienced regression spoke their first word at a mean age of 26 months, while children in the 'definite language regression' group spoke their first word at a mean age of 16 months. This study also utilized the Diagnostic Interview for Social and Communication Disorders (DISCO) to supplement the items presented to participants on the ADI (Autism Diagnostic Interview [before revision]). The DISCO consists of 17 questions designed to enquire about a range of normal and abnormal developmental behaviors like babble, early gestures, sucking, play skills and social responsiveness. In reference to development before regression occurred, the 'definite language regression' group had lower DISCO scores overall, which indicates a lower level of developmental abnormality. This lower level of developmental abnormality evidences itself in the child's relatively early production of first words, as well as fewer abnormalities in social communication during the first year. Participants in the 'lower level regression' group had DISCO scores similar to the 'no regression' group, indicating that children with definite or higher level regression are less developmentally impaired prior to regression. Therefore, according to Baird et al. (2009), children who regress in only language may, in fact, present with relatively typical language and social developmental patterns within the first year of life. However, children who regress in early language and/or non-language skills are more likely to present with a profile of abnormal language and social skills even within the first year of life.

Thoughts Regarding Internal and External Validity

Unfortunately, the ability to claim strong internal validity on research studies based largely on parental/caregiver report is difficult. Despite the best efforts of researchers and clinicians to present definitions and consistent measures, there is very little guarantee that all parents or caregivers have the same understanding of developmental patterns or various terminology used in these studies. However, all of the aforementioned studies that employed these research methods attempted to supplement the information whenever possible—with home videos, pediatrician reports, and medical records, thus ensuring a higher level of internal validity. Additionally, the conclusions drawn from these studies are based on the assumption that certain aspects of autism spectrum disorder are generalizable—for example, the fact that children with ASD develop language abnormally late in comparison to typically developing children. Generalizations or assumptions like this may be considered a threat to external validity, but are necessary in order to draw any sort of useful conclusion from the compiled research.

Future Directions for Research Regarding the Prediction of Regressive Autism

Within the studies mentioned above, several possibilities for future research arise. The study by Matson, Wilkins, and Fostad (2009) spoke with authority of the usefulness and validity of the 19-item algorithm that allowed them to predict regressive autism based on the child's behaviors and skills in various areas. However, very little information regarding this algorithm was

provided. Therefore, it would be beneficial in future to have such a measure available to researchers and clinicians, as it may be a very important step in placing a child with autism into early intervention. Additionally, many studies mention the usefulness of parental report in determining the early developmental patterns of children with autism; nevertheless, some doubt is cast onto these reports as there is no way of ensuring that parents all have the same understanding of the nuances of typical or atypical development. Future studies would benefit from a standardized parent/caregiver questionnaire that provides examples of each item so that there is no doubt among parents as to how they should answer specific questions regarding their child. While this measure may not wholly standardize the process of collecting parental report, it adds increased validity to the information received. Finally, the use of one standardized assessment (such as Goldberg's Regression Supplement Form, or Matson's algorithm) would greatly expedite the entire process of studying or predicting regressive autism – however, there is no gold-standard assessment as of yet. Therefore, future research and work on the creation of such an assessment would significantly assist those who attempt to diagnose and treat regressive autism.

Closing Thoughts

In retrospect, there have been several studies mentioned that claim to have evidence pointing to the ability to predict regression in children with autism. Some of these evidences include the fact that children typically regress in non-language skills an average of 3 months before they regress in language

skills (Goldberg et al., 2003), that children who regress are overall more impaired in symptomatology of ASD and behavior/social skills (Matson et al., 2009), and that children who later regress in language typically develop language earlier than children who do not regress in language (Baird et al., 2008). Unfortunately, many of the claims made are based off of the assumption that children will be diagnosed with ASD at a very early age, allowing parents or clinicians to suspect the possibility of regressive autism. But if a child develops speech at one year as opposed to the typical two years seen in autism, parents may have little reason to suspect that their child has autism, in turn delaying the entire process of diagnosis and intervention. This fact only serves to highlight the need for early diagnosis of autism, as well as parental diligence to observe the developmental patterns of their child. This issue does not only affect language, but also presents itself in early behavioral patterns and social skills—an area that parents and clinicians are often not as attuned to in deference to language development.

Discussion

Examining and Interpreting Results

Overall, the research that has been examined seems to lend legitimacy to the hypothesis that regressive autism has a distinct developmental phenotype; possibly even observable before regression itself occurs. While autism spectrum disorders are not wholly homogenous, resources like the DSM-5 are available to give examples of what typically developing autism should look like, even in the very early stages. With these characteristics in mind, it can be seen that

the early development of children with autism who later regress is often distinctively different than children with typically developing autism. Increased abnormality in social skills and behaviors, as well as possibly early language development (as stated in the cases of children with language-only regression) are some of the traits that have been recognized as possibly pointing to later regression. The authors of the aforementioned studies controlled for internal and external validity as meticulously as possible. However, as of yet there seems to be a widespread lack of studies that attempt to predict regressive autism before the regression itself occurs. This means that the studies discussed are retrospective, possibly implicating a bias of hindsight. More specifically, researchers who examine the early development of children who have already regressed might unwittingly scrutinize the early development of these children with more detail than the children who do not regress. This is just one example of the possible confounds to validity that retrospective studies like these encounter. Nevertheless, multiple studies have been mentioned that point to the possibility of predicting regressive autism in the early stages through various developmental abnormalities. This knowledge has the potential to greatly affect how parents and clinicians view the early development of children with autism or suspected autism.

Conclusion

Recognizing the early indicators of regression could a very important step in determining a child's later functioning. As previously stated, children are likely to greatly benefit from intervention at as young of an age as possible,

which depends upon early diagnosis. In future, studies should focus even more on the early characteristics of regressive autism, as well as attempting to diagnose regression before it occurs. To be aware of the risk of regression, however, requires parents to be aware that their child has autism, and to catch regression before occurrence will require autism to be diagnosed at a very young age. Assessments for autism spectrum disorders continue to be developed to detect symptoms in children of increasingly younger ages; so likewise should assessments for regression be developed. The world has seen great advancements in recent years in diagnosing and understanding autism spectrum disorder, and if researchers continue their efforts, regressive autism has the potential to be just as equally well-known.

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