



The Relationship Between Intolerance of Uncertainty and Autism Spectrum Disorder

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Abstract. Nowadays, many people suffer from Autism Spectrum Disorder (ASD). To be specific, ASD has significant negative impact on their social relationships, mental and physical health, and daily functioning. Individuals with ASD often have difficulty in communicating with others. They also are highly intolerant of unpredictable situations, so it is important to learn about their attitudes towards those unexpected situations. The lack of flexibility and tolerance in these situations make them more vulnerable to mental health problems, especially for ASD children. To better understand the relationship between Intolerance Uncertainty (IU) and ASD, some previous studies are taken into the consideration, which are related to IU, ASD, anxiety, and treatments. The important factor is to measure it in terms of subjective perception and objective perception of others in multidimensional dimensions, in order to get more precise data. Based on some questionnaires and interviews, this review focuses on the relationship between IU and ASD, from mainly three perspectives. First, how IU is related to the anxiety symptoms, as well as other symptoms of ASD. Second, the effect of IU on other treatments was analyzed, and this paper focuses on the treatment of modified cognitive-behavioral therapy (MCBT). Third, the effectiveness of training IU as an intervention for individuals with ASD. There are a few intervention studies regarding IU training in ASD. Future research should conduct more longitudinal intervention studies in this area. This review can provide some guidance to the development of effective IU interventions for individuals with ASD.

Keywords: Autistic Spectrum Disorder · Intolerance of Uncertainty · Anxiety · Intervention Study

1 Introduction

Autism Spectrum Disorder (ASD) is a collection of neurodevelopmental abnormalities that affects one out of every 100 people, which is a relatively high proportion of occurrence. The society should pay more attention to this issue, and provide sufficient support to people who suffer from ASD [1]. ASD is characterized as a lack of communication and socialization, along with repetitive and stereotyped behaviors. Plus, children with ASD show impairments in several functioning areas, which are frequently linked to the social and cognitive levels, and adaptive skills [2]. ASD has serious consequences for a child's development as well as the social, and emotional well-being of their family [3].

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The critical value of investigating the relationship between intolerance of uncertainty and ASD is that it can deepen the understanding of autistic symptoms and contribute to the relevant treatments.

Many studies worldwide focus more on the relationship between ASD and the community surrounded, including family, schools, and friends. Specifically, they focused on the main characteristics of ASD, and relevant behavioral and communication interventions. Nowadays, there are several theories of the mainstream ASD research. Researchers have proposed that self-system impairments are frequently linked to ASD's social and cognitive functioning levels [2]. Children with ASD were always isolated in their own world, and barely interact with others [4]. Severe sensory impairments were related to more pronounced social difficulties and lower adaptive functioning in children with ASD [1, 2]. There are two main theories that are the most remarkable of all. Humans often gain self-awareness and social knowledge through interactions with others socially. As a result of their social, linguistic, and cognitive problems, individuals with ASD have a limited knowledge of themselves and others. According to previous research, many high-functioning individuals with ASD, who have higher IQ, may have the awareness of their social deficiencies, but are still unable to solve the social problems perfectly [2]. Furthermore, children with ASD were found to rely on others more than other children at the similar age, to regulate their emotions (ER). Plus, ASD symptom severity was associated with ER abilities, which shows that ASD children have difficulty in controlling their feelings and in regulating their emotions. It is worth noting that most of the research is based on children and teenagers that are too similar in age and the reference value is limited. When the environment is unpredictable, people need to control uncertainty, which requires people's ability to control their emotions. There are numerous studies about emotional regulation difficulties in ASD. However, there is very limited research about intolerance of uncertainty (IU) in ASD. Considering all of these, this paper intends to analyze and discuss the relationship between IU and ASD.

After identifying the gap in this research area, this review aims to conduct deeper analysis to inform it. This paper first stated the definition of IU, and then it discussed the relationship between IU and anxiety in ASD. It included the effects of IU on other relevant ASD symptoms as well. In addition, this review analyzed relevant IU interventions for ASD. IU is a dispositive risk factor involving unadopted responding to conditions of uncertainty. Although IU is not one of the ASD core symptoms, it can significantly impact their daily functioning and adaptive skills. This review can provide some insights for future intervention studies in ASD.

2 The Relationship Between IU and Anxiety in ASD

2.1 The Contribution of IU to Anxiety Symptoms

Their research helps to figure out the association between anxiety and restrictive repetitive behavior (RRB) in ASD children. The experiment is based on questionnaire and interview. Specifically, Spence Children's Anxiety Scale, Scale of Intolerance of Uncertainty, Questionnaire of Repetitive Behavior should all be done by both parents and children. And parents should complete another piece of evidence named Social Responsiveness Scale as well. As for semi-structured interview, in order to gain information

about a specific RRB instance, this interview has questions and assessments using visual analogue for young people [5]. When people face situations in which they can predict what would happen in the future and then have some precautionary measures, they would be calm and able to tackle with difficulty. However, in cases of unpredictable situations, ASD children cannot handle them and are more likely to generate negative emotions such as anxiety. This is because people usually do not have the ability to deal with contingencies. After assessing the design of investigation, questionnaire data, interview data and credibility of those information, a sound conclusion can be gained. It shows a notable positive relationship between IU and anxiety in this group. Repetitive behaviors emphasize that when people are anxious, they tend to repeat a boring action in order to make the surrounding area more predictable and therefore release pressure. For example, an ASD child may repeat closing the door of the closet, opening the window when he/she felt anxious. That's why there is a significant association between RRB and anxiety.

Both anxiety and IU have huge impacts on each other, including TD children and ASD children. Consistent with above study, researchers found that youth with ASD have elevated levels of IU compared to typically developing (TD) youth according to reports done by parent and children. It was examined in 57 children with ASD without concomitant developmental impairment and 32 participants in age of 7–16 [6]. What is more, IU was able to predict the sensory sensitivities that are unrelated to anxiety. They also found that several other ASD features had effects on IU, especially when people are controlling for anxiety, for example, repetitive behaviors and lack of social communication. During the process of assessing the dependent variable -- IU, scientists used the IU Scale with Child and Parent Versions (IUS-C; IUS-P). Children have the propensity to experience negative feelings when facing unpredictable issues. Compared with the TD group, the anxiety level in the ASD group was significantly higher in the parent report, but not significantly higher in the child reports. IU associates with the categorical diagnosis of ASD and individual, specific features such as Emotional dysregulation (ED). To sum up, the article suggests that IU is highly related to ASD characteristics due to common foundations. For example, in fields of genetic, neurology or psychology.

As mentioned above, their passage also aims to research about the contribution of IU to anxiety, which is done by Christina Boulter and other people based on data onto 224 children and adolescents who are diagnosed as ASD patients [7]. With the similar approaches mentioned previously, their study uses additional method: Sensitivity Considerations, which is a behavioral method research. After analyzing the connection between IU and ASD children, as well as anxiety, the results not only validate the correlation between IU and anxiety is present in children with ASD, but furthermore indicated that IU may act as a mediator between ASD and anxiety.

2.2 The Effects of IU and Relevant Factors on ASD Symptoms

Their passage states the role of cognitive inflexibility (CI), alexithymia and IU in externalizing and internalizing behaviors in youth suffer from ASD. Alexithymia means that people fail to express their ideas and emotions. However, humans being sociable animals probably need the ability to express their feelings well. Provided that people have difficulty recognizing or describing their emotions, they cannot face social needs or rules.

Remarkably, alexithymia has been linked to depression. Alexithymia can contribute to anxiety for two major reasons. First of all, Alexithymia may mean that people with autism have a hard time feeling the physical symptoms of anxiety. It can mean that these symptoms are confusing and unpredictable and make anxiety feel much worse. Second of all, Alexithymia can make it harder for individuals with ASD to adjust their emotions. Instead of accepting their sentiments and worries, they may push them away, which may exacerbate the situation [8]. CI is the inability to mold the brain's response according to situational context, including internalizing and/or externalizing difficulties in ASD [9]. For example, normal people are cognitively flexible, while they are dressing up for an occasion, they are following a sequence of activities like changing clothes, doing makeup, donning jewelry, etc. All these activities need to be performed in order to look best ultimately. Flexible thinking and the ability to include activities one after the other [6]. That is why it is important to understand the relationship between IU and ASD symptoms. Parents/caregivers completed questionnaires assessing ASD symptoms, internalizing and externalizing problems, CI and etc. The questionnaires include the Revised Child Anxiety, Depression Scale, Strengths and Difficulties Questionnaire, Children's Alexithymia Measure, Cognitive inflexibility, and the Development and Well-Being Assessment. Using statistical analyses, modelling of structural equations was used to examine trajectories and hypothetical relationships among key variables. In short, IU would lead to internal symptoms, with alexithymia contributing to this pathway, and CI would affect external behaviors and may indirectly contribute to internal pre-monitor due to increasing IU.

Their study helps to understand the relationship between those situations: anxiety and RRB as they frequently occur in ASD children. If ASD children have higher Sensory processing abnormalities and then they are more likely to be intolerant of the surrounding environment. According to the research, IU and anxiety really play important roles in predictable behaviors and repetitive motor. 53 children with ASD aged from 8 to 16 complete some measures like questionnaires about dimension of IU and Repetitive Behavior, as well as the short sensory profile. Researchers take the mean value of each of the measurements. There was greater involvement of IU and anxiety in repetitive motor behaviors than expectation [5]. And IU acts as a mediator in controlling ASD and anxiety. Anxiety is caused by higher levels of IU and can be controlled through RRBs. This is because repeating boring action can help people with ASD to manage the environment and make it more predictable, which lets them to release pressure/anxiety eventually.

3 IU Related Interventions for ASD

3.1 The Impact of IU on the Effectiveness of Intervention

As mentioned above, IU exerts significant impacts on controlling emotions, and ASD symptoms. As a result, it's critical to consider that IU can be utilized as an intervention. Researchers mainly emphasize whether IU would affect MCBT in 43 ASD children (aged from 8–14) without intellectual disability. 38 children and 36 parents needed to complete measurements of the pre-intervention study. Specifically, the Facing Your Fears (FYF) is an intervention that can help to reduce levels of anxiety for parents and youth

[10]. And it suggested that this might reflect the limited emotional comprehension of ASD children. In both groups of people who accept intervention, researchers found that levels of anxiety may fall. Accordingly, better results of MCBT in group of ASD children might be achieved by improving IU. If the IU is relatively high, then it is beneficial for the treatment of MCBT. In conclusion, IU can act as a factor to have positive impacts on other therapies.

3.2 The Impact of IU on the Treatments

If IU is regarded as a target of intervention instead of a factor, it will also have positive effects on treatment. A program named CUES-A© was examined by four autistic adults, which was used to figure out the practicability of CUES-A©. Specifically, all participants follow processes of Intervention, Monitoring, and Follow-Up. This experiment was based on 4 individual ASD adults. Researchers assessed the feasibility of the program in the following main ways: 1. Method called Single Case Experimental Design (SCED), which is used to monitor the change within participants and make a comparison between phases 2. Recorded attendance and completion through questionnaire and interview, which showed that none of the participants gave up and all participants were willing to recommend CUES-A to other autistic adults. The most significant result is that transdiagnostic mechanisms, such as IU, may increase the practical use of treatment [11].

Researchers in their passage also explore the durability and practicability of a parent group-based intervention for youth with ASD that focuses on IU. A program with 8 stages was developed and then completed by 11 parents [12]. After that, parents would value the program and the outcome measures for potential use helped to show that this program has the ability to treat young people with ASD and IU. Considering methods used in their research, parents should complete the CUES© evaluation forms. Since there is increasing evidence that IU plays a remarkable role in anxiety in ASD patients, and the anxiety disorders in ASD. Intervention of IU may have therapeutic utility. In general, cross-diagnostic mechanisms like IU are very useful and practical.

4 Conclusion

To summarize, this paper showed that individuals with ASD have impairment in tolerating uncertain situations. This deficit might be related to their rigid and inflexible behavioral patterns. Once they cannot reach the expectations for a certain situation, they are more likely to have negative feelings, such as anxiety, frustration, or emotional meltdown. IU is related to the severity level of ASD symptoms. IU training is effective for improving the effectiveness of cognitive-behavior therapy for individuals with ASD. IU intervention itself is also beneficial for individuals with ASD.

There are still some limitations in previous studies. First, existing research is based on a cross-sectional approach. Future research should conduct more longitudinal studies, in order to understand the developmental dynamics of IU. Second, existing research focuses more on the relationship between IU and a specific ability. Future work should investigate more regarding the practical use of IU training for daily functioning. The

main contribution of this study is that it provides a theoretical guidance for future IU intervention studies in ASD.

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