

Emotion Regulation and Emotional Distress in Autism Spectrum Disorder: Foundations and Considerations for Future Research

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Abstract Autism spectrum disorder (ASD) is often associated with emotional distress and psychiatric comorbidities. Atypical emotion regulation (ER) may underlie these accompanying features. This special issue of the *Journal of Autism and Developmental Disorders* presents a series of mechanistic and applied papers on ER and emotional experiences in ASD. Important concepts for future research are discussed, including how to conceptualize emotion dysregulation in ASD, the importance of capturing variability in emotion dysregulation in ASD studies, and the promise of intervention approaches that target ER impairments. This special issue highlights the growing emphasis on ER and emotional distress in ASD, and aims to encourage continued research in this area given the potential for this line of inquiry to lead to improved outcomes.

Keywords Autism spectrum disorder · Emotion regulation · Psychiatric comorbidity · Reactivity · Arousal · Behavior

This special issue of the *Journal of Autism and Developmental Disorders* presents a series of papers focused on emotion regulation (ER) and emotional distress in autism spectrum disorder (ASD). ER encompasses the dynamic and complex processes involved in modifying emotional reactions to meet situational demands (Gross and Thompson 2007). Atypical or impaired ER has been implicated in

the development and maintenance of most, if not all, psychiatric disorders (Berking and Wupperman 2012). Yet, ER has been relatively neglected in ASD research until recently, which is surprising given the prominence of aberrant emotional functioning for so many individuals with ASD (e.g., Chandler et al. 2015).

Fortunately, the number of studies focused on ER in ASD is increasing recently, and there is growing interest in related areas of inquiry such as emotional reactivity, stress and coping, and psychiatric comorbidities. For example, depression was recently recognized as a contributor to the high prevalence of suicidal thoughts in adults with high functioning ASD (Cassidy et al. 2014). Other recent work has shown that individuals with ASD rely on more maladaptive ER strategies (e.g., Samson et al. 2014), which is associated with a wide range of negative outcomes, such as poorer social functioning (Nader-Grosbois and Mazzone 2014) and more depression and anxiety symptoms (Mazefsky et al. 2014; Swain et al. 2015). Finally, there is preliminary evidence of possible biological vulnerabilities for impaired ER in ASD, including atypical heart rate variability (Guy et al. 2014) and neural reactivity (Pitskel et al. 2014). There is now ample evidence supporting the importance of further research in this area.

Novel Foundations: This Special Issue

This special issue presents eight papers that touch on different aspects of ER and emotional distress in ASD. The studies cover the lifespan, with participants ranging from 2 years old to adulthood. Studies are included that focus on underlying biological mechanisms as well as applied issues such as assessment and treatment. This special issue also showcases a wide range of methodologies including self-

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and other-informant report questionnaires, eye tracking, pupillometry, functional magnetic resonance imaging (fMRI), and a conceptual review.

The first paper focuses specifically on neural mechanisms related to ER. Using fMRI, Richey and colleagues showed that adults with ASD failed to up-regulate activity in brain regions involved in effortful ER when instructed to engage in cognitive-reappraisal, an adaptive ER strategy that requires changing cognitions about a situation. Samson et al. found that 8–20 year olds with ASD used cognitive reappraisal less frequently in real world contexts based on both parent- and self-report. In a cross-sectional sequential analysis, they further demonstrated that less cognitive appraisal was associated with higher levels of negative emotion, which in turn was related to more maladaptive behavior in ASD. Together, these studies provide additional evidence that ER is atypical at a mechanistic level in ASD, and that ER impairments contribute to poorer behavior.

In addition to the impact of ER on maladaptive behaviors, there are compelling reasons to believe that heightened levels of negative emotions may influence social functioning in ASD. For example, irritability may promote the misinterpretation of social cues or inappropriate behavior in social interactions. It has also been widely argued that individuals with ASD avoid eye contact due to heightened arousal in response to looking at eyes. To address this hypothesis, Nuske and colleagues explored whether preschoolers with ASD have abnormal emotional arousal or gaze patterns when watching videos of familiar or unfamiliar adults. Contrary to expectations, the ASD group responded similarly to controls. Consistent with this finding, Richey et al. also found no differences in eye gaze patterns or pupil dilation (an index of emotional reactivity) to the static face images used in their cognitive reappraisal fMRI task.

The results of White and colleagues suggest that the association between eye gaze and emotion in ASD may be dependent on the presence of specific psychiatric symptoms. In their study, greater self-reported fear of negative evaluation, a hallmark cognitive feature of social anxiety, was associated with more attention to threatening facial expressions in adolescents with ASD. This finding calls attention to the importance of individual differences in cognition on social and emotional functioning in ASD. South and colleagues also highlighted this topic by demonstrating that adults with ASD with more impaired pattern separation memory also reported greater negative emotional experiences.

In addition to cognitive characteristics, there are a number of other factors that contribute to increased emotional distress or challenging behavior in ASD. Once a child with ASD is having an emotional or behavioral

outburst, it can be difficult to identify the precipitants of such behavior. Stark and colleagues present an assessment tool that provides a guideline and visual format for gathering parent-reported information on underlying factors such as sensory and self-regulation concerns, medical and psychiatric comorbidities, or skill deficits that may be contributing to emotion dysregulation. Kerns and colleagues draw attention to the potential role of traumatic events in ASD as an understudied identifiable cause of emotional suffering. They outline a rationale for why individuals with ASD may be at particular risk for negative sequelae following traumatic events, and they provide a model for future research in this area.

Finally, Thomson and colleagues highlight that improving ER skills in ASD through intervention has the potential to enable individuals with ASD to better cope with negative events. They provide initial feasibility, acceptability, and preliminary efficacy data on an ER-focused cognitive-behavioral intervention for children with ASD. Their work is promising not only in demonstrating high satisfaction from consumers, but also suggests that an ER-focused intervention may improve outcomes regardless of the specific type of emotional concern present.

Considerations for Future Research

Each paper in this special issue provides promising avenues for further research on topics related to ER and emotional distress in ASD. What is perhaps most innovative about this body of work is the application of the various methodological tools that are now available to questions about emotion in ASD. ASD research has historically been focused on language, social processing, behavior, and cognition, while largely overlooking the emotional domain. Greater emphasis on ER and related constructs in ASD research is an important advancement for our field with broad potential impact ranging from insight into ASD's etiology to intervention development (Mazefsky et al. 2013).

As efforts to support the emotional well-being and stability of individuals with ASD moves forward, we are faced with fundamental questions about how to conceptualize emotion dysregulation in ASD. Given that emotion dysregulation is not part of the diagnostic criteria for ASD yet often needs to be the focus of treatment, there has been a trend towards the increasingly frequent diagnosis of comorbid psychiatric disorders in individuals with ASD. In *DSM-5*, “with a mental or behavioral disorder” was added as a specifier option for ASD (American Psychiatric Association 2013). This approach acknowledges the common occurrence of emotional and behavioral problems in ASD, but still frames these symptoms as due to an

additional disorder. This draws attention away from the possibility that compromised ER is a core feature of ASD. A specifier for ASD such as “with emotion dysregulation” may be more effective and appropriate, as it would enable the conceptualization of emotion dysregulation as a key dimension upon which individuals with ASD vary (like language and intellectual disability), and it would serve to clearly inform treatment needs while reserving the additional diagnoses for the circumstances when there is true comorbidity.

This notion implies that even if emotion dysregulation is accepted as a core feature of ASD, it is not always present in ASD. Importantly, articles in this special issue clearly demonstrate how individual differences related to emotion processing are associated with variability in cognition, social processing, behavior, and brain function. This argues for assessment of emotional functioning in studies where emotion is not the central focus. Whereas most ASD studies include a measure of ASD symptom severity or match groups on prominent characteristics such as intelligence, emotional presentation and psychiatric symptoms are not commonly considered. It is possible, or even likely, that the emotional presentation of specific samples could explain some of the inconsistent findings across ASD studies.

To account for variability in emotion dysregulation in studies requires measures that are suitable for use across ages and verbal ability levels that adequately capture the range of emotion dysregulation in ASD. This measurement problem may be particularly relevant to the study of emotional constructs given the tendency of existing measures to rely on information conveyed verbally (e.g. “complains about”) to tap internal emotional processes. To address this, we are developing a new measure to characterize emotional distress and problems with ER, with promising indications from a sample of psychiatric inpatients with ASD that it can be applied across the full spectrum of ASD (Mazefsky et al. 2015).

If the underlying processes responsible for emotion dysregulation can be pinpointed, they can be targeted by new treatments. Although psychosocial interventions in ASD have traditionally been disorder-focused (e.g., cognitive-behavioral therapy for social anxiety in ASD), there is growing enthusiasm about the potential of transdiagnostic treatments to yield greater applicability to the heterogeneous manifestations of emotion dysregulation in ASD (Reaven and Wainer 2015; Weiss 2014). The study by Thomson and colleagues (this issue) is illustrative of this promising new direction for psychosocial intervention in ASD. Finally, the work of Stark et al. and Kerns et al. (this issue) highlights the importance of considering contextual and family factors in efforts to support the emotional stability of individuals with ASD.

Overall, the articles in this special issue demonstrate the growth in attention to previously under-studied issues related to ER and emotional distress in ASD. Work in this field is just beginning, and larger and more definitive studies are needed, as well as longitudinal research to understand trajectories of development of ER symptoms in ASD. Studies are also needed to delineate the role of ER in risk for comorbid psychiatric disorders and adult outcomes. A recent study highlighted the importance of such questions by demonstrating that emotional and behavioral problems were associated with decreased independence and more impaired living skills in adults with ASD (Gray et al. 2014). Continued research on the mechanisms underlying ER, and their role in functional outcomes, will support the need for policies and services that promote improved quality of life for people with ASD.

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