Research in Autism Spectrum Disorders 76 (2020) 101600

Contents lists available at ScienceDirect

Research in Autism Spectrum Disorders

journal homepage: www.elsevier.com/locate/rasd

Cognitive emotion regulation strategies, anxiety, and depression in mothers of children with or without neurodevelopmental disorders

Ahmed M. Megreya[a,*], Asma A. Al-Attiyah[a], Ahmed A. Moustafa[b], Elsayed E.A. Hassanein[a]

[a] Department of Psychological Sciences, College of Education, Qatar University, Doha, Qatar
[b] School of Social Sciences & Psychology, Western Sydney University, Sydney, Australia

ARTICLE INFO

Keywords:
Cognitive emotion regulation strategies
Anxiety
Depression
Maternity
Children with autism spectrum disorder
Children with intellectual disability

ABSTRACT

Background: A large number of studies have examined psychological distress and emotion regulation (ER) in parents of children with Autism Spectrum Disorder (ASD). However, no study has previously examined "purely" cognitive ER strategies in parents of children with ASD compared to parents of children with other disabilities.
Method: The *Cognitive Emotion Regulation Questionnaire* (CERQ) along with anxiety and depression sub-scales of the *Personality Inventory for DSM-5* (PID-5) were administered online to three groups of mothers ($N = 90$) of children with either ASD or intellectual disability (ID) as well as mothers of typically developed (TD) children.
Results: Mothers of children with ASD experienced higher levels of anxiety and depression and reported less use of positive reappraisal, positive refocusing, and refocus on planning than mothers of TD children. In addition, mothers of children with ASD had a higher level of anxiety (but not depression) and a lower use of positive reappraisal than mothers of children with ID. Other CERQ strategies (self-blame, rumination, putting into perspective, catastrophizing, and other-blame) were used equally by all mothers. In addition, the patterns of correlations between cognitive ER strategies and anxiety and depression are generally consistent across the three groups of mothers; but anxiety and depression positively correlated with other-blame only in mothers of children with ASD.
Conclusions: Cognitive ER strategies correlated with anxiety and depression in mothers of children with ASD. Accordingly, effective intervention for psychological distress in families of children with ASD should aim to incorporate these strategies.

1. Introduction

Parenthood is generally associated with a high level of stress (for a review see Crnic & Low, 2002), but parents of children with disabilities experience much higher levels of stress than parents of typically developing (TD) children (for a review see Watson, Hayes, & Radford-Paz, 2011). Previous studies reported that parenting a child with Autism Spectrum Disorder (ASD) is more stressful than parenting TD children or children with other disabilities (for reviews see Hayes & Watson, 2013; Porter & Loveland, 2019), and mothers experience higher levels of stress than fathers (Ang & Loh, 2019; Davis & Carter, 2008). The severity of parenting stress was not generally affected by the age of children with ASD; however, the stressors attributable to caring for pre-school-aged children were

* Corresponding author at: Department of Psychological Sciences, College of Education, Qatar University, P.O. 2713, Doha, Qatar.
E-mail address: amegreya@qu.edu.qa (A.M. Megreya).

https://doi.org/10.1016/j.rasd.2020.101600
Received 23 January 2020; Received in revised form 15 May 2020; Accepted 6 June 2020
Available online 17 June 2020
1750-9467/

mainly related to adaptive behaviors, whereas the stressors of caring for school-aged children were related to repetitive behaviors, sensory sensitivities, and problematic behaviors (Zheng, Grove, & Eapen, 2019). Based on Perry's (2004) model of stress in families of children with developmental disabilities, Bluth, Roberson, Billen, and Sams (2013) have proposed a model for parenting stress due to caring for a child with ASD. This model posits that parental styles for reducing, maintaining, or exacerbating stress will moderate parenting stress and the impact of caring for children with ASD. Therefore, understanding how the parents of children with ASD regulate their emotions could have significant implications for improving mental health.

1.1. Emotion regulation

Emotion Regulation (ER) has been conceptualized as the processes or strategies through which individuals can modulate or manage which emotions they have, when they have them, and how these emotions are experienced and expressed (Gross, 1998). These processes can be deliberate or automatic, extrinsic or intrinsic, conscious or unconscious, cognitive or behavioral, and successful or unsuccessful (for an extensive review see Gross, 2014). More adaptive ER strategies are associated with good health, positive affect, and improved social, cognitive, academic, and occupational performances, whereas less adaptive ER strategies are associated with health diseases, negative affect, and a range of impairments in daily life behaviors (Garnefski, Kraaij, & Spinhoven, 2001; Gross & John, 2003). A meta-analysis by Aldao Nolen-Hoeksema, and Schweizer (2010) found that anxiety, depression, eating, and substance-related disorders were negatively associated with two adaptive ER strategies (problem-solving and reappraisal) and positively associated with three less-adaptive ER strategies (rumination, avoidance, and suppression). Interestingly, ER was found to mediate the relation between parents' psychological distress and sensitive parenting behaviors (Carreras, Carter, Heberle, Forbes, & Gray, 2019), confirming an earlier suggestion offered by Dix in 1991 that ER is at the "heart" of parenting (Dix, 1991).

1.2. ER in parents of children with ASD

A large number of studies have examined the use of ER strategies in parents, especially mothers, of children with ASD using different ER scales, which measure a *mixture* of cognitive and behavioral ER strategies. These include the Brief COPE Inventory (e.g., see Benson, 2010, 2014; Hastings et al., 2005; Lai, Goh, Oei, & Sung, 2015; Seymour, Wood, Giallo, & Jellett, 2013), the Coping Inventory for Stressful Situations (e.g., see Dabrowska & Pisula, 2010), the Ways of Coping Questionnaire (e.g., see Sivberg (2002), and the Emotion Regulation Questionnaire (e.g., see Costa, Steffgen, & Ferringm, 2017).

For example, Hastings et al. (2005) reported four ER strategies that were vastly used by parents of children with ASD: active avoidance coping, problem-focused coping, positive coping, and religious/ denial coping. Mothers reported more use of active avoidance and problem-focused coping strategies than fathers, but there were no gender differences in positive coping and religious/ denial coping strategies (Hastings et al., 2005). However, Lai et al. (2015) found that parents of children with ASD reported more use of active avoidance coping than parents of TD children, but both groups were comparable in the use of the other three coping strategies mentioned above. Parents of children with ASD also showed more use of distancing, self-control, social support, escapism, and problem solving than parents of children with TD children, but both groups were comparable in the use of confrontation, accepting responsibility, and reappraisal strategies (Sivberg, 2002). In addition, parents of children with ASD reported using fewer social diversion coping (Dabrowska & Pisula, 2010) and reappraisal strategies (Costa et al., 2017) than parents of TD children.

An ER laboratory task was utilized to examine ER in parents of children with ASD (Hirschler-Guttenberg, Golan, Ostfeld-Etzion, & Feldman, 2015; Ostfeld-Etzion, Golan, Hirschler-Guttenberg, Zagoory-Sharon, & Feldman, 2015). For example, Hirschler-Guttenberg et al. (2015) found that parents of children with ASD, compared to parents of children with typical development, used less complex regulation facilitation strategies, including cognitive reappraisal and emotional reframing, and they employed simple tactics, such as physical comforting to manage fear and social gaze to maintain joy. However, Ostfeld-Etzion et al. (2015) found that parents of children with ASD reported more use of cognitive reframing and emotional reflection than fathers (but not mothers) of TD children. In addition, using the face-to-face-still-face paradigm (a three-episode paradigm where parent-child free play is interrupted by elimination of communication, termed still face, followed by resuming play, termed reunion), Ostfeld-Etzion et al. (2015) found that parents of children with ASD were more sensitive to their child's difficulties and employed greater amounts of simple, physical, and immediate regulation-facilitation behaviors.

Notably, all of these previously-discussed studies have investigated how parents of children with ASD regulate their emotions compared to parents of TD children (Costa et al., 2017; Hirschler-Guttenberg et al., 2015; Lai et al., 2015; Ostfeld-Etzion et al., 2015; Sivberg, 2002). Very few studies have previously examined the relative use of ER strategies among parents of children with ASD compared to parents of children with other disabilities. For example, Dabrowska and Pisula (2010) found that parents of children with ASD had lower scores in social diversion coping than parents of TD children, but they had comparable scores with parents of children with Down syndrome. However, parents in the three groups had similar levels of use task-oriented, emotion-oriented, avoidance-oriented, and distraction strategies.

1.3. ER and mental health problems in parents of children with ASD

ER strategies were found to be associated with stress and mental health problems in parents of children with ASD (e.g., see Benson, 2010, 2014; Hastings et al., 2005; Seymour et al., 2013). Therefore, Seymour et al. (2013) suggested that behavioral difficulties in children with ASD might contribute to parental fatigue, which may in turn influence the use of ineffective coping strategies and increased parental stress. Consistently, Hastings et al. (2005) found that active avoidance coping, but not problem-focused

coping, positively correlated with anxiety, depression, and parenting stress; and positive coping and religious/denial coping strategies negatively correlated with depression, but not with anxiety and parenting stress. These patterns of correlations were consistently observed in both mothers and fathers of children with ASD (Hastings et al., 2005). In addition, the increased use of avoidant coping, interpersonal strain, disengagement, and distraction was associated with increased depression, anger, maladjustment, and reduced well-being, whereas cognitive reframing was associated with improved well-being (2014, Benson, 2010).

More recently, Ang and Loh (2019) found that active avoidance coping was a moderator between stress and depression in both fathers and mothers of children with ASD. In addition, Hu, Han, Bai, and Gao (2019)) reported positive correlations between ER difficulties and parenting stress in both mothers and fathers of children with ASD. Furthermore, parents with ER difficulties were more likely to experience parenting stress, which was, in turn, associated with less adaptive parenting behaviors (e.g., more overprotection and less childcare) and fewer optimal bonding behaviors (Hu et al., 2019).

1.4. The current study

The present study examined, for the first time, how mothers of children with ASD, compared to mothers of children with ID and mothers of TD children, cognitively regulate their emotions using a range of cognitive ER strategies. Therefore, the results of this study will provide clinically useful information that could improve cognitive behavioral therapeutic techniques. Garnefski et al. (2001) defined these cognitive ER strategies as the general cognitive styles or thoughts that individuals use in order to manage and control their emotions during or after the experience of stressful events, including the following:

(1) Self-blame: blaming oneself for what has been experienced.
(2) Acceptance: resigning oneself to what has happened.
(3) Rumination: constant dwelling on the feelings and thoughts associated with a negative event.
(4) Positive refocusing: thinking of other pleasant matters instead of the actual event.
(5) Refocus on planning: considering potential steps to deal with negative events.
(6) Positive reappraisal: attaching a positive meaning to the event in terms of personal growth.
(7) Putting into perspective: playing down the seriousness of a negative event as compared with other events.
(8) Catastrophizing: over-emphasizing the negativity of the events.
(9) Other-blame: placing the blame for what one has experienced on others.

Bruggink, Huisman, Vuijk, Kraaij, and Garnefski (2016) found that adults with ASD use more “other-blame” and less “positive reappraisal” than TD adults, but both groups similarly use the other cognitive ER strategies. However, to the best of our knowledge, there is no previous study that has examined cognitive ER strategies in parents of children with ASD.

The present study also aimed to replicate psychological distress (anxiety and depression) in mothers of children with ASD compared to mothers of children with ID and mothers of TD children. While the vast majority of psychological studies in general were conducted using Western participants (mostly Americans; see Henrich, Heine, & Norenzayan, 2010), the present study was conducted using samples of mothers from an Arab country (Qatar). In addition, anxiety and depression were assessed using subscales of the *Personality Inventory for DSM-5* (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012), which is a significant shift from categorical to dimensional models of psychopathology (Krueger & Markon, 2014). In this assessment, anxiety was defined as “feelings of nervousness, tenseness, or panic in reaction to diverse situations; frequent worry about the negative effects of past unpleasant experiences and future negative possibilities; feeling fearful and apprehensive about uncertainty; and expecting the worst to happen.” Depression was defined as “feelings of being down, miserable, and/or hopeless; difficulty recovering from such moods; pessimism about the future; pervasive shame and/or guilt; feelings of inferior self-worth; and thoughts of suicide and suicidal behavior” (Krueger & Markon, 2014, p. 481).

The third aim of the present study was to investigate the associations between the cognitive ER strategies and psychological distress (anxiety and depression) in mothers of children with ASD compared to mothers of children with ID and TD children. These associations would further enhance our understanding of the impact of cognitive ER strategies on the psychological wellbeing of mothers of children with ASD specifically and children with neurodevelopmental disorders generally.

2. Method

2.1. Participants

A total of ninety Qatari mothers (M_{age} = 38.9 years, SD_{age} = 7.3 years) volunteered to participate in this study: 30 mothers of children with ASD, 30 mothers of children with ID, and 30 mothers of TD children. Children were diagnosed with ASD (17 girls and 13 boys) and ID (16 girls and 14 boys) at the official hospital in Qatar (Hamed Medical Corporation; HMC) using the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM–5). Notably, the DSM-5 diagnoses ASD as a single disorder rather than the older five sub-divisions of Pervasive Developmental Disorders, which include Autistic Disorder, Asperger’s Disorder, Rett’s Disorder, Childhood Disintegrative Disorder, and Pervasive Developmental Disorder Not Otherwise Specified (American Psychiatric Association, 2013). The children were students in two special education institutions, Shafallah Center for Persons with Disability and Qatar Center for Autism and Special Needs, where a full profile of medical and psychological assessments are required for each student. None of children with ASD had ID as informed from their reports. TD Children (18 girls and 12 boys) were students in two

Table 1
Descriptive statistics for some demographic variables for the families of mothers who participated in this study.

	ASD		ID		TD		comparisons
	M	SD	M	SD	M	SD	
Number of children	3.4	1.4	4.1	1.8	4.2	2.4	F (2,87) = 1.55, p = 0.22
Number of disabled children	1.2	.5	1.4	.6	0	0	F (2,87) = 84.55, p < 0.001; 1 & 2 > 3; 1 = 2
Child age (years)	6.8	1.8	7.9	2.6	6.8	2.8	F (2,87) = 2.43, p = 0.09
Child birth order	2.1	.9	2.7	1.9	3.2	2.4	F (2,87) = 1.95, p = 0.06
Mother age (years)	37.5	7.2	39.9	6.3	37.3	7.1	F (2,87) = 1.37, p = 0.26
Father age (years)	42.7	8.7	43.8	7.3	41.8	7.7	F (2,87) = 0.87, p = 0.64
Mother education (years)	14.5	2.8	15	2.2	13.5	2.4	F (2,87) = 2.86, p = 0.06
Father education (years)	14.5	3.2	16	1.4	14.8	2.6	F (2,87) = 2.95, p = 0.06

Note: ASD = Families of children with ASD; ID = Families of children with ID; TD = Families of typically developed children.

governmental primary schools (one for boys and one for girls). The gender of children was matched across the three groups ($\chi^2 < 1$). Table 1 shows descriptive statistics for demographic variables for the families of these three groups of children.

As for inclusion and exclusion criteria, children with ASD or ID were selected according to four criteria: (i) an age range from 5 to 10; (ii) the absence of comorbid disorders as established from the students' profiles; (iii) native Arabic-speaking mothers; and (iv) mothers with a minimum of 12 years of education. The TD children met the same criteria in addition to matching the gender with the groups of children with disabilities.

2.2. Questionnaires

2.2.1. Anxiety and Depression (Personality Inventory for DSM-5 (PID-5); Krueger et al., 2012)

The symptoms of anxiety and depression was measured using the *PID-5* sub-scales of Anxiousness (9 items) and Depressivity (14 items). These self-report measures require participants to describe themselves using a 4-point Likert-type scale ranging from 0 (*very false or often false*) to 3 (*very true or often true*), and the scores of each sub-scale reflect the average of responses. There are no cut-off scores for the Personality Inventory for *DSM-5* (PID-5; Krueger et al., 2012). However, for clinical purposes, T scores might be calculated using the mean ± 2 standard deviations. An Arabic translation for the PID-5 has been validated in Qatar and a few other Arabic countries (see Al-Attiyah, Megreya, Alrashidi, Dominguez-Lara, & alShirawi, 2017). Cronbach's Alpha reliability coefficients of Anxiety and Depression were .89 and .92, respectively (Al-Attiyah et al., 2017). These high reliability rates were also replicated in the present study, in which Cronbach's Alphas were .82 and .85, respectively.

2.2.2. Cognitive Emotion Regulation Questionnaire (CERQ-short; Garnefski & Kraaij, 2006)

The CERQ-short is an 18-item self-report measure of nine cognitive ER strategies (self-blame, acceptance, rumination, positive refocusing, refocus on planning, positive reappraisal, putting into perspective, catastrophizing, and other-blame), each of which involve two items. Participants are asked to rate how they cope with negative events using a 5-point Likert-type scale ranging from 1 (*almost never*) to 5 (*almost always*). Therefore, the scores of each subscale range between 2 and 10, and a high score reflects a primary use of a CERQ strategy. This questionnaire was developed using the same items of the original CERQ (Garnefski et al., 2001), which consisted of 32 items (4 items for each of the nine cognitive ER strategies). An Arabic version of the original CERQ has been validated in a range of Arab-speaking Middle East countries, including Qatar (Megreya, Latzman, Al-Attiyah, & Alrashidi, 2016; Megreya, Latzman, Al-Emadi, & Al-Attiyah, 2018). The nine, two-item CERQ subscales were extracted using principal component analysis; and Cronbach's alpha reliability coefficients of the nine subscales were acceptable to high, ranging from .68 (acceptance) to .81 (positive reappraisal and catastrophizing) (see Garnefski & Kraaij, 2006). In the present study, the Cronbach's Alpha reliability coefficients of the nine, two-item subscales were modest to good, ranging from .61 (positive reappraisal) to .77 (catastrophizing), with a mean alpha of .72.

2.3. Procedure

The questionnaires were administered online using SurveyMonkey. The second author (A. A.) obtained permission from psychologists and social specialists in the centers and schools to contact all mothers to inform them about the nature and goals of the study and to obtain their approval to participate in the study. In addition, all mothers were asked to sign and return the IRB consent forms for their children.

3. Results

3.1. Anxiety and depression

Fig. 1 shows the averages of anxiety and depression in the three groups of mothers. In mothers of children with ASD or ID or TD children, anxiety ranged from 0.3 to 2.8, 0 to 2.5, and 0.2 to 2, respectively, whereas depression ranged from 0.1 to 3, 0 to 3, and 0.1

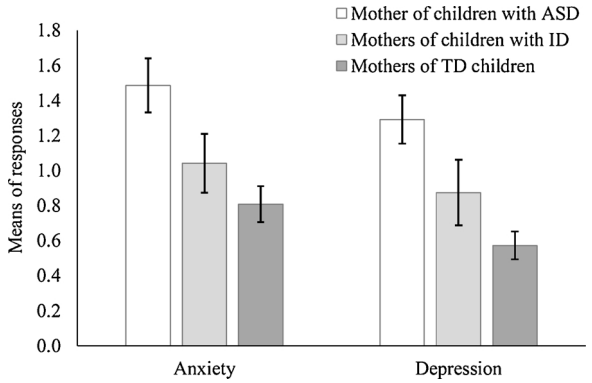

Fig. 1. The averages of anxiety and depression among mothers of children with ASD, mothers of children with ID, and mothers of TD children.

to 1.7, respectively. Two, one-way Analyses of Variances (ANOVAs) revealed main effects for anxiety, F (2,87) = 6.53, p = .002, and η_p^2 = 0.13; and depression, F (2,87) = 6.85, p = .002, and η_p^2 ≤ 0.14 in mothers of children with ASD or ID or TD children, respectively. A Tukey HSD post-hoc test revealed that mothers of children with ASD had higher levels of anxiety and depression than mothers of TD children (qs = 5.03 and 5.21, ps < 0.01, and Cohen's ds = 1.23 and 1.11, respectively). In addition, mothers of children with ASD had higher levels of anxiety than mothers of children with ID (q = 3.32, p = 0.05, and Cohen's d = 0.62); but the depression level was similar in these two groups of mothers (q = 3.02, p = 0.09, and Cohen's d = 0.50). No other differences were found (qs ≥ 1.73). Pearson correlation coefficients revealed strong positive associations between anxiety and depression in the three groups of mothers (rs ≥ .70, p < 0.001).

3.2. The use of cognitive ER strategies

Fig. 2 shows the averages of the maternal use of cognitive ER strategies. A series of one-way ANOVAs revealed significant main effects of Acceptance (Fs (2,87) = 3.69, p = .03, η_p^2 = 0.08), positive refocusing (Fs (2,87) = 5.97, p = .004, η_p^2 = 0.12), refocus on planning (Fs (2,87) = 5.95, p = .004, η_p^2 = 0.12), and positive reappraisal (Fs (2,87) = 6.66, p = .002, η_p^2 = 0.13). No main effects were found for the other strategies (Fs (2,87) ≥ 1.87, ps ≥ .17, η_p^2 ≥ 0.04). Tukey HSD tests revealed that mothers of children with ASD reported lower use of positive reappraisal than mothers of children with ID (q = 4.03, p = .02, Cohen's d = 0.68) and mothers of TD children (q = 4.81, p = .003, Cohen's d = 0.88). In addition, mothers of children with ASD reported lower use of positive refocusing and refocus on planning than mothers of TD children (qs = 4.89 and 4.85, ps = .002 and .003, Cohen's ds = 0.89 and 0.87, respectively). Furthermore, mothers of children with ID reported higher use of Acceptance than mothers of TD children (q = 3.84, p = .02, Cohen's d = 0.65). No other significant comparisons were found (qs ≥ .78).

3.3. The associations between cognitive ER strategies and anxiety and depression

Table 2 shows Pearson correlation coefficients among the cognitive ER strategies and anxiety and depression in the three groups

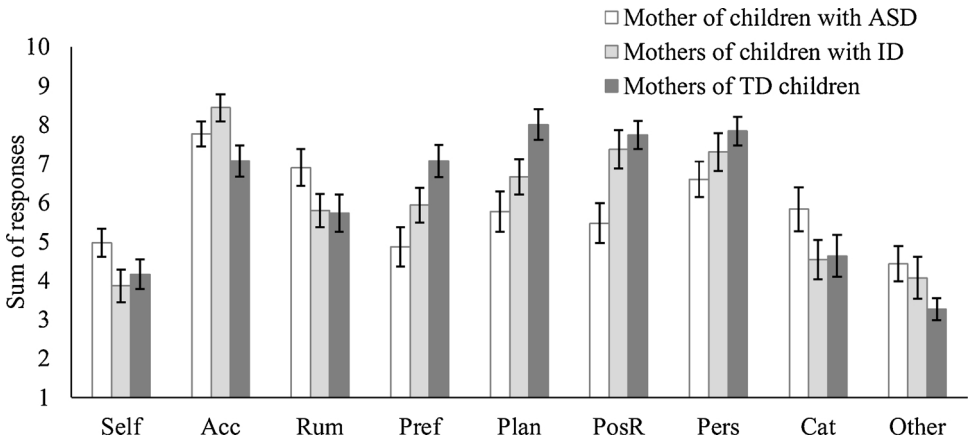

Fig. 2. The averages of frequent use of ER strategies among mothers of children with ASD, mothers of children with ID, and mothers of TD children. *Note*: Self = Self-blame; Acc = Acceptance; Rum = Rumination; PRef = Positive Refocusing; Plan = Refocus on Planning; PosR = Positive Reappraisal; Pers = Putting into Perspective; Cat = Catastrophizing; Other = Other-blame.

Table 2
Pearson correlation coefficients among the nine ER strategies and anxiety and depression in mothers with ASD, mothers of children with ID, and mothers of TD children.

	Mothers of children with ASD		Mothers of children with ID		Mothers of TD children	
	Anxiety	Depression	Anxiety	Depression	Anxiety	Depression
Self.	.12	.09	.32	.28	.49**	.36*
Acc.	.05	−.08	−.06	−.05	−.17	−.05
Rum.	.43*	.44*	.25	.37*	.63**	.46*
PRef.	−.41*	−.43*	−.66**	−.54**	−.46*	−36*
Plan.	−.52**	−.47**	−.30	−.64**	−.46*	−.20
PosR.	−.58**	−.64**	−.64**	−.74**	−.58**	−.67**
Pers.	−.50**	−.43*	−.46*	−.77**	−.50**	−.30
Cat.	.55**	.62**	.55**	.61**	.62**	.40*
Other.	.61**	.57**	.02	.07	−.20	−.29

Note: * = $p < 0.05$; ** = $p < 0.01$; Self = Self-blame; Acc = Acceptance; Rum = Rumination; PRef = Positive Refocusing; Plan = Refocus on Planning; PosR = Positive Reappraisal; Pers = Putting into Perspective; Cat = Catastrophizing; Other= Other-blame.

of mothers. In mothers of children with ASD, anxiety and depression were significantly associated with a high use of rumination, catastrophizing, and other-blame and a minimal use of positive refocusing, refocus on planning, positive reappraisal, and putting into perspective. In mothers of children with ID, anxiety and depression were significantly associated with a high use of catastrophizing and a minimal use of positive refocusing, positive reappraisal, and putting into perspective. In addition, depression, but not anxiety, was associated with a high use of rumination and a low use of refocus on planning. In mothers of TD children, anxiety and depression were significantly associated with a high use of self-blame, rumination, and catastrophizing and a low use of positive refocusing and positive reappraisal. In addition, anxiety, but not depression, was associated with a low use of refocus on planning and putting into perspective. Nevertheless, the use of self-blame did not correlate with anxiety and depression in mothers of children with ASD or ID. In addition, the use of acceptance did not correlate with anxiety and depression in all mother groups.

4. Discussion

In this study, we examined the relationship between the use of cognitive ER strategies and mental health problems (anxiety and depression) among three groups of mothers whose children were TD or diagnosed with two neurodevelopmental disorders (ASD or ID). The results showed that mothers of children with ASD experienced higher levels of anxiety than mothers of TD children and mothers of children with ID. In addition, mothers of children with ASD or ID had higher levels of depression than mothers of TD children; but mothers of children with ASD and mothers of children with ID had a comparable level of depression. Mothers of children with ASD reported a lower use of positive reappraisal than mothers of children with ID and mothers of TD children. In addition, compared to mothers of TD children, mothers of children with ASD reported lower use of positive refocusing and refocus on planning, whereas mothers of children with ID reported higher use of acceptance. Nevertheless, mothers in the three groups reported a comparable use of the other cognitive ER strategies: self-blame, rumination, putting into perspective, catastrophizing and other-blame. In addition, anxiety and depression were negatively correlated with positive refocusing and positive reappraisal, positively correlated with catastrophizing, and not correlated with acceptance. This pattern of correlations was consistent across the three groups of mothers. However, anxiety and depression positively correlated with other-blame only in mothers of children with ASD, whereas anxiety and depression positively correlated with self-blame only in mothers of TD children.

4.1. Anxiety and depression

The results showed that mothers of children with ASD experienced higher levels of anxiety and depression than mothers of TD children (with effect sizes of 1.23 and 1.11; see Fig. 1). In addition, mothers of children with ASD experienced a higher level of anxiety than mothers of children with ID (with an effect size of .62); but both groups had a similar level of depression. Notably, this is the first study to replicate mental health problems in mothers of children with ASD in an Arabic-speaking, Middle Eastern country (Qatar). A meta-analysis of previous studies conducted on Western countries found that parents of children with ASD experienced more psychological distress than parents of TD children (with a mean effect size of 1.58) or parents of children with other disabilities (with a mean effect size of 0.64), especially Down Syndrome (Hayes & Watson, 2013). Consistently, a review of studies conducted in Japan reported that mothers of children with ASD experienced greater psychological distress than mothers of TD children or those with other disabilities (Porter & Loveland, 2019). Together, these results confirm that caring for a child with ASD is associated with a high level of psychological distress (anxiety and depression) across different cultures.

Therefore, interventions for families of children with ASD should target the attenuation of psychological distress that could enhance families' social functioning and mental health, which subsequently might facilitate improvements in ASD symptoms in their children (Enav et al., 2019; Fitzpatrick, McCrudden, & Kirby, 2019). However, parents' psychological distress might not be completely attributed to the ASD in children. Rather, their own characteristics might explain part of their well-being issues (e.g., see Herring et al., 2006). For example, according to a stress model of parents of children with ASD, several individual resources such as

personality traits and cognitive ER strategies moderate the impact of caring for children with ASD on parental psychological distress (Bluth et al., 2013).

4.2. Cognitive ER strategies

This is the first study to examine cognitive ER strategies among mothers of children with ASD compared to mothers of children with ID and mothers of TD children (for reviews see Ang & Loh, 2019; Baker, Fenning, & Moffitt, 2019; Hu et al., 2019). As shown in Fig. 2, mothers of children with ASD reported lower use of positive reappraisal than mothers of TD children (with an effect size of 0.88) and mothers of children with ID (with an effect size of 0.68). In addition, mothers of children with ASD reported lower use of positive refocusing and refocus on planning compared to mothers of TD children (with effect sizes of 0.89 and 0.87, respectively). However, mothers of children with ASD reported use of other cognitive ER strategies (self-blame, acceptance, rumination, putting into perspective, catastrophizing, and other-blame), similar to mothers of TD children and mothers of children with ID (see Fig. 2). Consistently, previous results found that parents of children with ASD reported higher usages of active avoidance (Lai et al., 2015; Sivberg, 2002), problem solving (Sivberg, 2002), cognitive reframing, and emotional reflection (Ostfeld-Etzion et al., 2015) than parents of TD children. Conversely, they reported lower use of cognitive reappraisal (Costa et al., 2017; Hirschler-Guttenberg et al., 2015) and emotional reframing (Hirschler-Guttenberg et al., 2015) than parents of TD children. Together, these results support Bluth et al. (2013) model that cognitive ER strategies as individual resources could moderate the impact of caring for children with ASD on parental psychological distress.

4.3. Anxiety, depression and cognitive ER strategies

The present study showed that anxiety and depression in mothers of children with ASD were associated with high usages of rumination, catastrophizing, and other-blame (maladaptive strategies) and low usages of positive refocusing, refocus on planning, positive reappraisal, and putting into perspective (adaptive strategies). Consistently, previous studies found that psychological distress (anxiety, depression, and parenting stress) in parents of children with ASD was positively correlated with active avoidance coping (Ang & Loh, 2019; Hastings et al., 2005) and negatively correlated with cognitive reframing (Benson, 2010, 2014). As a result, Seymour et al. (2013) suggested that behavioral difficulties in children with ASD might contribute to parental fatigue, which may lead to using less adaptive ER strategies and, consequently, increased parental psychological distress.

4.4. Implications

The results of the present study suggest that targeting the enhancement of adaptive cognitive ER strategies in parents of children with ASD could lead to a reduction of maternal psychological distress. Consistently, Hu et al. (2019) found that ER difficulties in parents of children with ASD were associated with heightened parental psychological distress. Enav et al. (2019) proposed that one important resource in managing high levels of psychological distress in parents of children with ASD is ER, which in turn depends on mentalization or reflective functioning (i.e., the ability to recognize and understand one's own and others' mental states). Enav et al. (2019, p. 1078) argued that "higher levels of mentalization may be associated with the belief that emotions are malleable, which can in turn impact individuals' motivations to regulate their emotions." Accordingly, Enav et al. (2019) examined the effectiveness of a mentalization-based intervention for parents of children with ASD and found that this intervention led to increments of parents' reflective functioning and self-efficacy.

Enav et al. (2019) found that the mentalization-based intervention not only improves parents' functioning but significantly reduces the behavioral and emotional symptoms in their children. Consistently, Hu et al. (2019) found that ER difficulties in parents of children with ASD were associated with heightened parenting stress, which was in turn was associated with less adaptive parenting behaviors. In addition, Carreras et al. (2019) found that difficulties in ER mediate the relationship between psychological distress and parenting behaviors; and that ER was more strongly related to sensitive parenting than was parents' psychological distress. Carreras et al. (2019) suggested that the detrimental effect of parents' psychological distress over their ER capacities might be a mechanistic pathway by which psychological distress impacts parenting behaviors rather than distress itself.

Further evidence indicates that parenting styles modulates ER in children (for reviews see Morris, Silk, Steinberg, Myers, & Robinson, 2007; Rutherford, Wallace, Laurent, & Mayes, 2015). A tripartite model proposed that parent and child characteristics interact with each other, using three main processes (observation, parenting practices, and family emotional climate) to affect ER strategies in children (Morris et al., 2007). Bariola, Hughes, and Gullone (2012) found that maternal use of ER expressive suppression was significantly predictive of a child's use of expressive suppression. Longitudinal studies reported bidirectional parent-child relationships between parenting behaviors and children's emotional and behavioral problems (Lengua & Kovacs, 2005; Shaffer, Lindhiem, Kolko, & Trentacosta, 2013). For example, parents' inconsistent discipline increased negative emotionality in their children, while children's irritability evoked inconsistent discipline in their parents (Lengua & Kovacs, 2005). In addition, parent's timid discipline predicted oppositional defiant disorder in their children, whereas children's oppositional defiant disorder predicted increased timid discipline in their parents (Burke, Pardini, & Loeber, 2008).

Based on these bidirectional parent-child relationships (Lengua & Kovacs, 2005; Shaffer et al., 2013), a lower use of adaptive cognitive ER strategies by mothers of children with ASD suggest that their children could also have problems using those specific adaptive cognitive ER strategies. Individuals with ASD showed more ER difficulties and consistently self-reported or demonstrated a less adaptive pattern of ER strategy use (for reviews see Cai, Richdale, Uljarevic, Dissanayake, & Samson, 2018; Cibralic, Kohlhoff,

Wallace, McMahon, & Eapen, 2020 in press; Mazefsky et al., 2013). Using the CERQ, Bruggink et al. (2016) found that adults with ASD use less "positive reappraisal" than TD adults. Therefore, interventions for parental psychological distress due to caring for children with ASD should not only improve parental use of adaptive cognitive ER strategies, but could lead to improvements in their mental health and in ER capabilities in their children.

4.5. Limitations and future studies

This study has a number of limitations. The use of cognitive ER strategies was examined only in mothers; however, previous studies found that ER difficulties in both mothers and fathers of children with ASD influenced parenting stress and parenting behaviors (e.g., Ang & Loh, 2019; Hu et al., 2019). In addition, the associations among anxiety, depression, and cognitive ER strategies were only correlational and thus could not provide any information on causality. Therefore, future studies need to examine cognitive ER strategies in both mothers and fathers of children with ASD and their associations with parenting stress, using more sophisticated modelling techniques. It is also important to examine the bidirectional relationships between cognitive ER strategies in families of children with ASD.

4.6. Summary and conclusions

Despite these limitations, this is the first study to examine the use of cognitive ER strategies and their associations with anxiety and depression in mothers of children with ASD compared to mothers of TD children or mothers of children with ID. The results showed that mothers of children with ASD experienced a higher level of psychological distress (anxiety and depression) and reported lower use of positive reappraisal, positive refocusing, and refocus on planning than mothers of TD children. In addition, mothers of children with ASD had a higher level of anxiety, but not depression, and a lower use of positive reappraisal than mothers of children with ID. Other cognitive ER strategies (self-blame, rumination, putting into perspective, catastrophizing, and other-blame) were equally used by mothers of children with ASD, mothers of children with ID, and mothers of TD children. Importantly, however, anxiety and depression positively correlated with other-blame *only* in mothers of children with ASD, suggesting that this cognitive strategy might moderate the impact of caring for children with ASD on parental psychological distress. Future studies need to examine this suggestion. In sum, the results of the present study support the suggestions that ER might lie at the "heart" of parenting (Carreras et al., 2019; Dix, 1991), and effective interventions for parenting stress in families of children with ASD should aim to increase the use of adaptive cognitive ER strategies.

CRediT authorship contribution statement

Ahmed M. Megreya: Conceptualization, Methodology, Formal analysis, Writing - original draft, Writing - review & editing. **Asma A. Al-Attiyah:** Data curation. **Ahmed A. Moustafa:** Writing - review & editing. **Elsayed E.A. Hassanein:** Data curation, Writing - review & editing.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.rasd.2020.101600.

References

Al-Attiyah, A. A., Megreya, A. M., Alrashidi, M., Dominguez-Lara, S. A., & alShirawi, A. (2017). The psychometric properties of an Arabic version of the Personality Inventory for DSM-5 (PID-5) across three Arabic-speaking Middle Eastern countries. *International Journal of Culture and Mental Health, 10*, 197–205.

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. Washington, DC: American Psychiatric Publishing.

Ang, K. Q. P., & Loh, P. R. (2019). Mental health and coping in parents of children with Autism Spectrum disorder (ASD) in Singapore: An examination of gender role in caring. *Journal of Autism and Developmental Disorders, 49*, 2129–2145.

Baker, J. K., Fenning, R. M., & Moffitt, J. (2019). Cross-sectional examination of the internalization of emotion co-regulatory support in children with ASD. *Journal of Autism and Developmental Disorders, 49*, 4332–4338.

Bariola, E., Hughes, E. K., & Gullone, E. (2012). Relationships between parent and child emotion regulation strategy use: A brief report. *Journal of Child and Family Studies, 21*, 443–448.

Benson, P. R. (2010). Coping, distress, and well-being in mothers of children with autism. *Research in Autism Spectrum Disorders, 4*, 217–228.

Benson, P. R. (2014). Coping and psychological adjustment among mothers of children with ASD: An accelerated longitudinal study. *Journal of Autism & Developmental Disorder, 44*, 1793–1807.

Bluth, K., Roberson, P. N., Billen, R. M., & Sams, J. M. (2013). A stress model for couples parenting children with autism spectrum disorders and the introduction of a mindfulness intervention. *Journal of Family Theory & Review, 5*, 194–213.

Bruggink, A., Huisman, S., Vuijk, R., Kraaij, V., & Garnefski, N. (2016). Cognitive emotion regulation, anxiety and depression in adults with autism spectrum disorder. *Research in Autism Spectrum Disorders, 22*, 34–44.

Burke, J. D., Pardini, D. A., & Loeber, R. (2008). Reciprocal relationships between parenting behavior and disruptive psychopathology from childhood through adolescence. *Journal of Abnormal Child Psychology, 36*, 679–692.

Cai, R. Y., Richdale, A. L., Uljarevic, M., Dissanayake, C., & Samson, A. C. (2018). Emotion regulation in autism spectrum disorder: Where we are and where we need to go. *Autism Research, 11*, 962–978.

Carreras, J., Carter, A. S., Heberle, A., Forbes, D., & Gray, S. A. O. (2019). Emotion regulation and parent distress: Getting at the heart of sensitive parenting among parents of preschool children experiencing high sociodemographic risk. *Journal of Child and Family Studies, 28*, 2953–2962.

Cibralic, S., Kohlhoff, J., Wallace, N., McMahon, C., & Eapen, V. (2020). A systematic review of emotion regulation in children with Autism Spectrum disorder (in

press) *Research in Autism Spectrum Disorders*.
Costa, A. P., Steffgen, G., & Ferringm, D. (2017). Contributors to well-being and stress in parents of children with autism spectrum disorder. *Research in Autism Spectrum Disorders, 37*, 61–72.
Crnic, K., & Low, C. (2002). *Everyday stresses and parenting. Handbook of parenting. Practical issues in parenting, Vol. 5*, Mahwah, NJ: Lawrence Erlbaum Associates Publishers243–267.
Dabrowska, A., & Pisula, E. (2010). Parenting stress and coping styles in mothers and fathers of pre-school children with autism and Down syndrome. *Journal of Intellectual Disability Research, 54*, 266–280.
Davis, N. O., & Carter, A. S. (2008). Parenting stress in mothers and fathers of toddlers with autism spectrum disorders: Associations with child characteristics. *Journal of Autism and Developmental Disorders, 38*, 1278–1291.
Dix, T. (1991). The affective organization of parenting: Adaptive and maladaptive processes. *Psychological Bulletin, 110*, 3–25.
Enav, Y., Erhard-Weiss, D., Kopelman, M., Samson, A. C., Mehta, S., Gross, J. J., et al. (2019). A non randomized mentalization intervention for parents of children with Autism. *Autism Research, 12*, 1077–1086.
Fitzpatrick, M., McCrudden, E., & Kirby, K. (2019). A pilot investigation of a parenting intervention for parents and children with neurodevelopmental disorders (NDD). *Child Care in Practice, 25*, 129–145.
Garnefski, N., & Kraaij, V. (2006). Relationships between cognitive emotion regulation strategies and depressive symptoms: A comparative study of five specific samples. *Personality and Individual Differences, 40*, 1659–1669.
Garnefski, N., Kraaij, V., & Spinhoven, P. (2001). Negative life events, cognitive emotion regulation and emotional problems. *Personality and Individual Differences, 30*, 1311–1327.
Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2*, 271–299.
Gross, J. J. (Ed.). (2014). *Handbook of emotion regulation*(2nd ed.). New York, NY: Guilford.
Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*, 348–362.
Hastings, R., Kovshoff, H., Brown, T., Ward, N., Espinosa, F., & Remington, B. (2005). Coping strategies in mothers and fathers of preschool and school-age children with autism. *Autism, 9*, 377–391.
Hayes, S. A., & Watson, S. L. (2013). The Impact of parenting stress: A meta-analysis of studies comparing the experience of parenting stress in parents of children with and without Autism Spectrum disorder. *Journal of Autism and Developmental Disorders, 43*, 629–642.
Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature, 466*, 29.
Herring, S., Gray, K., Taffe, J., Tonge, B., Sweeney, D., & Einfeld, S. (2006). Behaviour and emotional problems in toddlers with pervasive developmental disorders and developmental delay: Associations with parental mental health and family functioning. *Journal of Intellectual Disability Research, 50*, 874–882.
Hirschler-Guttenberg, Y., Golan, O., Ostfeld-Etzion, S., & Feldman, R. (2015). Mothering, fathering, and the regulation of negative and positive emotions in high-functioning preschoolers with autism spectrum disorder. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 56*, 530–539.
Hu, X., Han, Z. R., Bai, L., & Gao, M. M. (2019). The mediating role of parenting stress in the relations between parental emotion regulation and parenting behaviors in Chinese families of children with Autism Spectrum disorders: A dyadic analysis. *Journal of Autism and Developmental Disorders, 49*, 3983–3998.
Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2012). Initial construction of a maladaptive personality trait model and inventory for *DSM–5*. *Psychological Medicine, 42*, 1879–1890.
Lai, W. W., Goh, T. J., Oei, T. P. S., & Sung, M. (2015). Coping and well-being in parents of children with autism Spectrum disorders (ASD). *Journal of Autism and Developmental Disorders, 45*, 2582–2593.
Lengua, L. J., & Kovacs, E. A. (2005). Bidirectional associations between temperament and parenting and the prediction of adjustment problems in middle childhood. *Journal of Applied Developmental Psychology, 26*, 21–38.
Mazefsky, C. A., Herrington, J., Siegel, M., Scarpa, A., Maddox, B. B., Scahill, L., et al. (2013). The role of emotion regulation in autism spectrum disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 52*, 679–688.
Megreya, A. M., Latzman, R. D., Al-Attiyah, A. A., & Alrashidi, M. (2016). The robustness of the nine-factor structure of the cognitive emotion regulation questionnaire across four arabic speaking middle eastern countries. *Journal of Cross-cultural Psychology, 47*, 875–890.
Megreya, A. M., Latzman, R. D., Al-Emadi, A. A., & Al-Attiyah, A. A. (2018). An integrative model of emotion regulation and associations with positive and negative affectivity across four Arabic speaking countries and the USA. *Motivation and Emotion, 42*, 566–575.
Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development, 16*, 361–388.
Ostfeld-Etzion, S., Golan, O., Hirschler-Guttenberg, Y., Zagoory-Sharon, O., & Feldman, R. (2015). Neuroendocrine and behavioral response to social rupture and repair in pre-schoolers with autism spectrum disorders interacting with mother and father. *Molecular Autism, 6*, 11.
Perry, A. (2004). A model of stress in families of children with developmental disabilities: Clinical and research applications. *Journal on Developmental Disabilities, 11*, 1–16.
Porter, N., & Loveland, K. A. (2019). An integrative review of parenting stress in mothers of children with autism in Japan. *International Journal of Disability, Development, and Education, 66*, 249–272.
Rutherford, H. J., Wallace, N. S., Laurent, H. K., & Mayes, L. C. (2015). Emotion regulation in parenthood. *Developmental Review, 36*, 1–14.
Seymour, M., Wood, C., Giallo, R., & Jellett, R. (2013). Fatigue, stress and coping in mothers of children with an autism spectrum disorder. *Journal of Autism and Developmental Disorders, 43*, 1547–1554.
Shaffer, A., Lindhiem, O., Kolko, D. J., & Trentacosta, C. J. (2013). Bidirectional effects between parenting practices and child externalizing behavior: A cross-lagged panel analysis in the context of a psychosocial treatment and 3-year follow-up. *Journal of Abnormal Child Psychology, 41*, 199–210.
Sivberg, B. (2002). Family system and coping behaviors: A comparison between parents of children with autistic spectrum disorders and parents with non-autistic children. *Autism, 6*, 397–409.
Watson, S. L., Hayes, S. A., & Radford-Paz, E. (2011). 'Diagnose me please!': A review of research about the journey and initial impact of parents seeking a diagnosis of developmental disability for their child. *International Review of Research in Developmental Disabilities, 41*, 31–72.
Zheng, L., Grove, R., & Eapen, V. (2019). Predictors of maternal stress in pre-school and school-aged children with autism. *Journal of Intellectual & Developmental Disability, 44*, 202–211.