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ORIGINALPAPER

Mental Health and Coping in Parents of Children with Autism Spectrum Disorder (ASD) in Singapore: An Examination of Gender Role in Caring

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Abstract
Research has supported the notion that gender plays a significant role in coping and mental health outcome among parents of children with ASD. The current study aims to examine gender role in the relationship between mental health outcome and coping in parents of children with ASD in Singapore. This study involved 97 fathers and 106 mothers of children with ASD completing self-report questionnaires. MANOVA revealed mothers experienced significantly higher stress levels than fathers. Stress was a significant predictor of depression for fathers but not for mothers. Regression analyses found use of active avoidance coping moderated the relationship between stress and depression in both parents. Implications of these findings on intervention are discussed.

Keywords ASD · Autism · Parents · Coping · Depression · Gender role · Singapore

Challenges faced by individuals with autism spectrum disorder (ASD) are often present in multiple aspects of their lives, such as poor adaptive functioning, anxiety, hyperactivity and obsessive–compulsive behaviours (Bauman 2010; Huang et al. 2014; Peters-Scheffer et al. 2012; Simonoff et al. 2008; Wang et al. 2011). Additionally, individuals with ASD also experience high rates of comorbidities such as attention deficit hyperactivity disorder (ADHD; Bauman 2010; Matson and Cervantes 2014). In Singapore, ASD-related health problems have the most debilitating outcome with high disease burden when compared to other childhood physical and mental health disorders (Ministry of Health, Singapore (MOH) 2010).

Apart from dealing with life challenges and comorbidities, children with ASD often exhibit challenging behaviours such as aggression and tantrums (Adler et al. 2015). Challenging behaviours here refer to behaviours that are not socially acceptable, and/or causing physical harm to self or others and can negatively impact on the affected child in terms of education attainment or living arrangement (Matson et al. 2010). A number of studies have reported that children with ASD are more likely to display challenging behaviours compared to children with learning impairments (Dixon et al. 2008; Dominick et al. 2007; Kurtz et al. 2008); Intellectual Disability (Holden and Gitlesen 2006; Murphy et al. 2005); and those of typically developing children (Nicholas et al. 2008). Additionally, most individuals with ASD have sensory processing issues (Baker et al. 2008; Crane et al. 2009; Kern et al. 2006). Thus, they may have greater challenges in adapting to various stimuli and/or may display unusual interests in particular sensory stimuli in the environment (Samson et al. 2014).

With the atypical interpersonal responsiveness and patterns of communication as seen in children with ASD, understanding what the child wants can be difficult (Busch 2009). In particular, children who have higher level of ASD severity may seem "impossible to reach" (Busch 2009). Often, their parents are unable to form a reciprocal relationship with them. In addition, these parents report that the community was more critical of their child's behaviour in public (Myers et al. 2009). Hence, such deficits in social communication and behavioural control are particularly stressful to the parents of these children (Hayes and Watson 2013).

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Parents have to adapt their parenting behaviours to manage the ASD-related vulnerabilities of their child (van Esch et al. 2018). This can lead to difficulty for parents to meet their own psychological needs of autonomy, competence, and relatedness (Dieleman et al. 2018; Hoffman et al. 2009; Myers et al. 2009; Woodgate et al. 2008). As a result, their ability to effectively support their child with ASD may be negatively impacted and any positive impacts of interventions may be compromised (Karst and Van Hecke 2012).

Nevertheless, despite the challenges in caregiving for a child with ASD, qualitative studies have found that parents can experience benefits. Over time, they can learn to adjust and cope with caring for their child with ASD (Altiere and von Kluge 2009; Koydemir-Özden and Tosun 2010; Luong et al. 2009; Safe et al. 2012; Woodgate et al. 2008), becoming more patient and less judgmental (Altiere and von Kluge 2009), and in the process strengthening the couple's relationship (DePape and Lindsay 2015; Hock et al. 2012).

Parents' Mental Health

In general, parents of children with ASD report having more mental health problems in themselves compared to parents of children with intellectual and other developmental disabilities (Benjak 2009; Bitsika and Sharpley 2004; Kuusikko-Gauffun et al. 2013; Micali et al. 2004; Singer 2006). Commonly, these parents experience higher stress levels (Dabrowska and Pisula 2010; Griffith et al. 2010; Hayes and Watson 2013; Lai et al. 2015; Wang et al. 2011), and report more depression and anxiety symptoms (Baker et al. 2011; Benson and Karloff 2009; Estes et al. 2009; Gallagher et al. 2008; Lai et al. 2015).

Autism symptom severity (Bromley et al. 2004; Hastings 2003; Hastings and Johnson 2001; Herring et al. 2006; Konstantareas and Papageorgiou 2006; Lecavalier et al. 2006) and behaviour problems (Civick 2008; Fiske 2009; Gray 2003; Lecavalier et al. 2006; Lovell et al. 2015) seen in children with ASD were found to be significant predictors of parental mental health outcomes. Receiving social support was another key predictor of parental mental health outcome. Parents of children with ASD who received higher level of support from family and the community reported lower levels of depression, anxiety and anger (Gray and Holden 1992), and parental stress (Lamminen 2008). In addition, a positive correlation between stress and depression in parents of children with ASD was also found (Ingersoll and Hambrick 2011; van Steijn et al. 2014). Benson (2006) reported that stress proliferation was a significant predictor of depression in mothers of children with ASD. However, the study did not consider the role of parental coping and its impact on stress and depression experienced by these parents.

Coping

Coping has been broadly defined as "cognitive and behavioural efforts to manage specific external or internal demands (and conflicts between them) that are appraised as taxing or exceeding the resources of a person" (Lazarus 1991, p. 112). In examining coping strategies to manage stress by parents of pre- and school-age children who are affected by ASD, Hastings et al. (2005a) identified four coping styles based on Brief COPE (Carver et al. 1989; Carver 1997), namely active avoidance, problem-focused, positive, and religious/denial coping. According to Brief COPE (Carver et al. 1989; Carver 1997), active avoidance coping refers to active attempts to avoid the stressor or escape from its effects, such as substance use, behavioural disengagement, self-blame, venting of emotions, and distraction. Problem-focused coping refers to coping strategies that sought to manage the problem itself, including planning, active coping, and seeking instrumental social support, and emotional social support. Positive coping refers to the attempts to adopt positive coping strategies, such as the use of humour and positive reframing, and acceptance and emotional social support. Religious/denial coping refers to coping through religion, such as by praying, and coping through denying the reality of the situation, such as refusing to believe what has happened. Lai et al. (2015) adopted the Brief COPE in their study of Singaporean parents of children with ASD and reported that the use of active avoidance coping was significantly higher in these parents compared to parents of typically developing children.

Support for coping style having a direct impact on mental health is found among many mental health related research (Beasley et al. 2003; Pakenham 2005; Pruchno and Resch 1989; Reuter et al. 2006; Sharpley and Yardley 1999; Terry 1989; Wilkinson et al. 2000). For example, Lin (2015) reported that a greater use of problem-focused rather than emotion-focused coping (i.e. trying to reduce and manage distressing feelings) was generally associated with reduced burden and fewer depressive symptoms in Taiwanese mothers of adolescents with ASD. Studies involving Western samples (Abbeduto et al. 2004; Benson 2014; Glidden et al. 2006; Hastings et al. 2005a; Smith et al. 2008) reported that greater use of emotion-focused coping increased the severity of depressive symptoms in parents. In Carter et al. (2009) study involving 143 mothers, they found that emotion-focused coping was positively associated with depressive symptoms, while problem-focused coping was negatively associated with depressive symptoms. On the other hand, task-oriented coping had been shown to mitigate the adverse effects of stress on mental health (Aldwin and Revenson 1987). Studies also

support coping style as a significant moderator of depression and life satisfaction among caregivers of patient with Alzheimer's disease (Morano 2003), and job stress among Hong Kong workers (Chen et al. 2009).

Research involving parents of children with ASD has typically focused on understanding their coping in the areas of managing child's ASD symptoms, challenging behaviours, and the resulting care-related stress (Plant and Sanders 2007; Shepherd et al. 2018). On the other hand, research into understanding coping as a moderator of stress and depression in these parents has been limited (e.g., Dunn et al. 2001).

Gender Roles

Research has revealed that parenting experiences are different for mothers and fathers. These differences are seen in their interaction with their children, their childcare roles and coping styles. In interacting with their children, mothers tend to communicate more (Fivush et al. 2000; Zaman and Fivush 2013), and express emotions more frequently and extensively compared to fathers (Aznar and Tenenbaum 2013; Fivush et al. 2000). However, it should be noted that child–parents interaction can be influenced by socio-cultural factors and culture (Kornhaber and Marcos 2000).

Traditionally, child-caring responsibility lies largely with the mothers (Gray 2003; McKeever 1981; Wang et al. 2011), and fathers are seen as the provider for the family (Gray 2003; May 1991). However, in recent years, fathers are increasingly being involved in the daily care of their children, shifting from breadwinner to co-parenting roles (Lamb 2000; Pleck and Masciadrelli 2004; Williams 2008). This shift in gender role is encouraged in Singapore, a city-state in Southeast Asia, comprising of a multi-ethnic population with a majority of Chinese ethnicity. State policies such as Working Mother Child Relief scheme, public childcare services and the foreign domestic workers scheme were formed to increase women's participation in the workforce. Such policies enable families with children to seek alternative childcare arrangements, and enable mothers to be "de-housewifed" so as to remain in employment (Ochiai et al. 2008). However, cultural expectation of gender role in relation to childcare has not caught up with the policy changes. Though Singaporeans generally agree that both parents should share the responsibilities of childcare (Ministry of Community Development, Youth and Sports 2009), such responsibility still primarily lies with the mothers (Quek 2014). When caring for a child with disability or chronic condition, parental roles are more precisely defined, often with mothers taking on disproportionately more responsibility for domestic labour and caring for child compared to fathers (Gray 2003). Such well-defined gender roles and expectations may contribute to the differences in mental health outcomes for mothers and fathers.

Currently, only a small body of existing literature has examined gender as predictor of mental health in parents of children with ASD. Research studies investigating gender differences in mental health of parents of children with ASD have found that the mothers reported more stress (Beckman 1991; Hastings 2003; Trute 1995), and have more mental health problems compared to the fathers (Davis and Carter 2008; Hastings et al. 2005b; Olsson and Hwang 2001). Davis and Carter (2008) reported that paternal stress was significantly affected by the child with ASD (specifically by externalizing behaviours exhibited by that child), whereas maternal stress was associated with practical and time management issues. In contrast, Fiske (2009) reported that the child's externalizing behaviours contributed equally to the perceived stress reported by both parents. On the other hand, Altiere and von Kluge (2009) found that fathers reported a greater level of social isolation (less support from family and friends) than mothers. Within matched pairs of fathers and mothers, the fathers demonstrated fewer adaptive coping skills than mothers (Lee 2009).

Existing research indicates men and women use different coping resources and strategies. Western studies examining parents of children with ASD have found that in the same family, mothers reported utilising more of social support, problem-focused coping, and spiritual coping strategies compared to the fathers. In contrast, the fathers reported utilising more of emotional coping (e.g. suppressing frustrations, avoiding family problems by going to work) (Dabrowska and Pisula 2010; Gray 2003; Hastings et al. 2005a; Essex et al. 1999). In addition, fathers are more likely to focus on work (Nealy et al. 2012) and less likely to attend support groups. Mothers, on the other hand, are more likely to be involved in local parent support groups (Mandell and Salzer 2007; Twoy et al. 2007).

Furthermore, research has shown that illness and disability in the family may have different meanings for men and women. Particularly, women are more likely than men to blame themselves for their child's problems and have their identities threatened by the illness and disability of their children (Anderson and Elfert 1989). When men and women experienced the same conflicts regarding work and family roles, their interpretations of these conflicts can be different, and women often perceived these conflicts as detrimental (Simon 1995).

The Current Study

With the particular challenges faced by parents in caring for children with ASD, existing literature suggests that these parents experience higher levels of mental health problems,

as compared to parents of typically developing children and parents of children with other developmental disabilities. A literature search revealed that there had been several research studies on gender difference in parents of children with ASD prior to year 2010. However, such investigation has tailed off since. In considering that research studies investigating the stress–depression relationship in parents of children with ASD have largely involved Western samples and focused on mainly mothers; research in gender differences have reported that psychologically, women are more negatively affected than men when faced with stressful life events such as illness and disability; cultural differences exist between Asian and Western societies; and with the changing time and shift in gender role, older findings in such research area may no longer be applicable. Furthermore, in a systematic review of the ASD research, Ilias et al. (2018) have advocated the need to explore parenting stress, coping, and resilience in this research area within the South East Asian region. Hence, the current study would like to understand the role of coping in parents of children with ASD and how their coping style influence their experience with stress and depression. This study hypothesised that: (1) mothers would report significantly higher levels of stress, anxiety and depression, compared to fathers; (2) coping style is a moderator of the relationship between stress and depression experienced by the fathers and mothers.

Method

Participants

A total of 203 parents consisting of 106 mothers and 97 fathers participated in the study. The sample comprised of Chinese (82.8%), Malay (3.4%), Indian (2.5%), Eurasian (2.5%), and Others (8.9%; consisted of parents of other nationalities from the Philippines, Indonesia and Myanmar). Among them, 97% of the parents were married, while the remaining of the parent participants were divorced/separated, but with joint custody of child (3%). A summary of the ages of parents and child with ASD, child's gender, parent's education level, parent's employment status, presence of other children with ASD/other disabilities, and whether parent has help with caregiving, is presented in Table 1.

Table 1 Demographic data of parents

	Mothers[a] (n = 106)	Fathers[b] (n = 97)	Total (N = 203)
Age [M (SD)]			
Parent's age (years)	40.44 (4.57)[c] (Range = 28–55)	43.94 (5.25) (Range = 34–61)	42.11 (5.20)
Child's age (years)	8.73 (1.58) (Range = 6–13)	8.82 (1.61) (Range = 6–13)	8.78 (1.59)
Child's gender			
Male	91 (85.8%)	85 (87.6%)	176 (86.7%)
Female	15 (14.2%)	12 (12.4%)	27 (13.3%)
Parent's educational level			
University/postgrad	56 (53.3%)[c]	53 (54.6%)	109 (54%)
Polytechnic/pre-university	22 (21%)[c]	22 (22.7%)	44 (21.7%)
Secondary/vocational	24 (22.9%)[c]	19 (19.6%)	43 (21.3%)
Primary or below	1 (1%)[c]	1 (1%)	2 (1%)
Others	2 (1.9%)[c]	2 (2.1%)	4 (2%)
In employment			
Yes	66 (63.9%)[c]	94 (96.9%)	160 (79.2%)
No	39 (37.1%)[c]	3 (3.1%)	42 (20.8%)
Have other children with ASD or other disabilities			
Yes	17 (16%)[c]	15 (15.5%)	32 (15.8%)
No	88 (83%)[c]	82 (84.5%)	170 (84.2%)
Have help with caregiving			
Yes	62 (58.5%)	57 (58.8%)	119 (58.6%)
No	44 (41.5%)	40 (41.2%)	84 (41.4%)

[a]Standard deviation and percentages are based on the sample of mothers

[b]Standard deviation and percentages are based on the sample of fathers

[c]Based on 105 responses, due to one missing response

The diagnoses of the children reported by the parents were Autism Spectrum Disorder (80.8%), Autistic Disorder (6.9%), Asperger's Syndrome (3.9%), and Pervasive Developmental Disorder (4.4%). Eight participants did not report the diagnosis of their child but their responses to the questionnaires were included in the analysis of this study.

It is to note that the Diagnostic Statistical Manual of Mental Disorders—Fourth Edition (DSM-IV; American Psychiatric Association 1994) had Asperger's Syndrome, Pervasive Developmental Disorder, Childhood Integration Disorder and Autistic Disorder, considered to be under the umbrella of Autism Spectrum Disorders (ASD), while the current most updated Diagnostic Statistical Manual of Mental Disorders—Fifth Edition (DSM-5; American Psychiatric Association 2013) uses a single term of diagnosis, Autism Spectrum Disorder (ASD). All children included in this study met the criteria in either DSM-IV or DSM-5.

The inclusion criteria for this study are as follow: (1) Parents have at least one child with ASD in the primary school age of 7–14 years old (includes maximum of 2 years beyond the typical age for primary school, as some students may have enrolled at an older age or required longer time to complete their primary school studies); (2) Parents need to have a basic command of English language to be able to complete the questionnaires; and (3) Parents who are currently married, or those who are divorced/separated but have joint custody of the child with ASD. Single parents who were the sole provider of care for the child with ASD were excluded from this study.

Measures

Demographic Questionnaire

A demographic questionnaire was developed to elicit information regarding participant's age, gender, ethnicity, socioeconomic status (i.e., job, education level, income), child's characteristics (i.e., age, gender, diagnosis, challenges), household information (i.e., other children, other family members in household, help with caregiving), and participant's involvement in caregiving of child with ASD.

Depression, Anxiety, Stress Scales

Depression, Anxiety, Stress Scales (DASS; Lovibond and Lovibond 1995) is a self-report questionnaire that measures frequency of behaviours or intensity of feelings based on three subscales of anxiety, depression and stress. Each of the subscales consists of 14 items. The Depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. The Anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The Stress scale is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatience. Using a four-point severity/frequency scale, participants rate the extent to which they have experienced each state over the past week. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items. The DASS has shown to have sound psychometric properties, and can be applied in both healthy and psychiatric populations. Internal consistency of the three subscales ranged from .81 to .97 (Brown et al. 1997; Clara et al. 2001; Lovibond and Lovibond 1995). The scales have been found to be stable over time, with test–retest reliability at .71 for depression, .79 for anxiety and .81 for stress (Brown et al. 1997), are widely used in clinical and non-clinical samples, and have also been validated for use in Asia (Oei et al. 2013). There were strong internal consistencies of the DASS total scale, Depression, Anxiety, and Stress subscales, when used on a Singapore sample (Lai et al. 2015).

Brief COPE

Brief COPE (Carver et al. 1989; Carver 1997) is a self-reporting, 28-item version of the COPE instrument that measures the usage frequencies of broad-based maladaptive and adaptive coping strategies. Items are rated on a four-point rating scale (i.e., from 1 = "I haven't been doing this at all" to 4 = "I've been doing this a lot"). It comprises of 14 two-item subscales, representing coping strategies of active coping, planning, positive reframing, acceptance, humour, religion, use of emotional support, use of instrumental support, self-distraction, denial, venting, substance use, behavioural disengagement, and self-blame. The Cronbach's alpha for these original subscales ranged from .50 to .90 (Carver 1997).

Hastings et al. (2005a) reported four coping domains in this scale that are relevant to raising a child with autism—active avoidance coping, problem-focused coping, positive coping and religious/denial coping. The scores on each domain were obtained by summation of the responses on the relevant items. The higher the score in the domain means a higher frequency of using that coping style. Lai et al. (2015) also reported internal consistency of the use of the four domains in their study with Singaporean sample, with Cronbach's coefficient alphas of .92 (Brief COPE total), .76 (active avoidance coping), .89 (problem-focused coping), .83 (positive coping), and .69 (religious/denial coping).

Autism Treatment Evaluation Checklist

The Autism Treatment Evaluation Checklist (ATEC; Rimland and Edelson 1999) is a self-reporting instrument which was designed to provide a quantitative assessment of autism severity. It is composed of four subscales: (1) speech/language/communication, (2) sociability, (3) sensory/cognitive awareness, and (4) health/physical behaviour. Each subscale consists of items, ranging from 14 to 25. Participants circle the suitable response for each item, according to the corresponding code for each subscale. For example, on the speech/language/communication subscale, the code used is N (not true), S (somewhat true), and V (very true). Participants will circle the letter N, S or V accordingly. The responses on the items are scored and summed up to obtain a subscale score. The sum of the scores for each subscale gives the total ATEC score. The higher the score, the more severe is the autism symptom. The internal reliability of the ATEC is very high (0.94 for the Total score), based on a split-half reliability test on over 1300 completed ATECs (Rimland and Edelson 2005).

Strengths and Difficulties Questionnaire

The Strengths and Difficulties Questionnaire (SDQ; Goodman 1997) is a brief behavioural screening questionnaire for those aged 3–16 years old, which was administered to participants to get an understanding of the child's behaviour. The 25 items in the questionnaire are divided between five scales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and pro-social behaviour. Participants rate the child's behaviour based on the last 6 months or this school year. Three ratings are provided: Not True, Somewhat True, Certainly True. The ratings are scored and summed up to obtain a score for each subscale. A total difficulties score, calculated by summation of the subscale score for emotional symptoms, conduct problems, hyperactivity/inattention, and peer relationship problems, was used to assess the extent of child behaviour problems in the child with ASD. Studies from Taiwan, Hong Kong and Japan (Lai et al. 2010; Liu et al. 2013; Moriwaki and Kamio 2014) have supported the validity of SDQ for its use on the Asian population with the translated Chinese and Japanese versions. The Chinese version parent-report SDQ reported moderate to strong intraclass correlation coefficient of the subscales for internalizing (.85), prosocial (.90), hyperactive (.77) and Conduct (.71) (Liu et al. 2013).

Procedure

Ethics approval for this study was obtained from the James Cook University Human Research Ethics Committee (HREC). To recruit participants, 15 government special needs schools and 16 private special needs schools and special needs intervention centres in Singapore were invited to participate. In total, only two special needs school and one special needs intervention centre agreed to participate.

Packs containing questionnaires and information sheet were passed to the two special need schools which the schools then distributed to all parents of students with ASD. Parents who were interested to participate in the study were given the option of responding by returning the completed questionnaires in the envelope enclosed to a collection box placed in the general office in the school, or to access an online version of the questionnaires. Participation in the study was voluntary. To ensure anonymity, no names or written consent were required. Participants were informed via the information sheet that they agreed to give consent to participate if they returned the sealed envelopes with the completed hard copy questionnaires. With online participation, participants were informed to indicate consent before they could proceed to complete the questionnaire.

For the special needs intervention centre, a soft copy of the information sheet was provided to the centre, which was sent out to parents of children with ASD. Interested parents were given the option of completing a hard copy questionnaire which could be obtained at the centre, or access the online version. Informed consent was obtained by procedure as mentioned above.

In addition, interested parents who heard about the study via participants were recruited into the study. Information sheet was provided to these parents after they contacted the researchers. These participants also had the option of completing a hard copy questionnaire or to access the online questionnaire. Informed consent was obtained by procedure as mentioned above.

A total of 206 participants responded to the study, of which 194 responded via hard copy questionnaires and 12 were online questionnaires. Responses from three participants were not included as one questionnaire was incomplete and two participants did not meet the research criteria.

Design and Data Analysis

The current study adopted a survey questionnaire design and data collected were subjected to a Multivariate Analysis of Variance (MANOVA) with gender (mothers, fathers) as independent variable and stress, anxiety, and depression as dependent variables. Scores from DASS stress, anxiety and depression subscales were used to indicate the level of stress, anxiety and depression in the parents.

Two hierarchical regressions were also conducted separately for the mothers and fathers groups. Level of depressive symptoms is indicated by the score of the Depression subscale in the DASS. Subscale total scores from the ATEC

were computed for autism symptom severity, while sum of difficulty score on the SDQ was used to indicate child behaviour problems.

Scores for stress were obtained from the Stress subscale on the DASS. Scores for the different coping styles, active avoidance, problem-focused, positive and religious/denial coping, were obtained from the summation of relevant item scores for each coping style on the Brief COPE, as per the factor dimensions that were identified in Hastings et al. (2005a). To test for the moderation effect, interaction terms were computed. A set of interaction variable *Stress* × *Active Avoidance* was obtained by multiplying the scores from Stress subscale with the scores from the moderator variable Active Avoidance Coping subscale. Likewise, the interaction variable *Stress* × *Positive Coping* was computed by multiplying the scores from Stress subscale with the scores from the moderator variable Positive Coping subscale.

Results

A one-way between-group multivariate analysis of variance (MANOVA) was performed to investigate parental differences in stress, depression and anxiety. No violation of assumption testing was noted. The results revealed a statistically significant difference between mothers and fathers on the combined dependent variables, stress, depression, and anxiety, Pillai's Trace = .05, $F(3, 195) = 3.11$, $p = .028$.

Univariate results for the dependent variables were performed with a Bonferroni adjusted alpha level of .017. There was statistically significant difference between mothers and fathers on stress, $F(1, 197) = 9.04$, $p = .003$, $\eta p^2 = .04$. Mothers reported significantly higher levels of stress ($M = 12.50$, SD = 8.60) than fathers ($M = 8.90$, $SD = 8.29$). However, there was no statistically significant difference between mothers and fathers on depression, $F(1, 197) = 4.32$, $p = .039$, $\eta p^2 = .02$. There was also no statistically significant difference between mothers and fathers on anxiety, $F(1, 197) = 5.63$, $p = .019$, $\eta p^2 = .03$.

A hierarchical multiple regression was conducted separately for mothers and fathers groups with depression as the criterion variable, and stress and four coping styles (active avoidance, problem-focused, positive, religious/denial) as predictors, while controlling for parents' education level, help with caregiving, child behaviour problem and autism symptom severity. Tolerance and VIF were within accepted limits, thus the assumption of multi-collinearity was deemed to have been met (Coakes 2005). Assumptions of normality, linearity, and homoscedasticity were also satisfied (Pallant 2010).

Significant moderating effects found were plotted using ModGraph-I (Jose 2013), which follows Aiken and West's (1991) suggestion of trichotomizing both main variable (stress) and moderator (coping style) to obtain values that are used in plotting the graph. The three levels of high, medium, and low (for both the main variable and moderating variable) were computed using the mean as the medium value, one standard deviation above the mean as the high value, and one standard deviation below the mean as the low value (Aiken and West 1991).

Fathers Group

Results from the hierarchical multiple regression (Table 2) for the fathers group revealed that after entering parents' education level, help with caregiving, child behaviour problem and autism symptom severity into model 1, these accounted for 17% of the variance in depression, $F(4, 85) = 4.27$, $p < .01$. In entering the four coping styles and stress into Model 2, the total variance explained by the model as a whole was 71%, $F(9, 80) = 21.50$, $p < .001$. Both coping styles and stress explained an additional 54% of the variance in depression, R^2 change = .54, F change $(5, 80) = 29.54$, $p < .001$. Stress ($\beta = .74$, $p < .001$) and active avoidance coping ($\beta = .25$, $p < .01$) were found to be significant predictors. The interaction term *Stress* × *Active Avoidance* was then entered into model 3. The total variance explained by this model as a whole was 73%, $F(13, 76) = 21.00$, $p < .001$, with $\Delta R^2 = .02$, $\Delta F(1, 79) = 5.56$, $p < .05$. In model 3, stress was a significant predictor of depression ($\beta = .46$, $p < .01$), and the interaction effect of *Stress and Active Avoidance* on depression was found to be statistically significant ($\beta = .48$, $p < .05$). The interaction effect of *Stress and Active Avoidance* is illustrated in Fig. 1.

Figure 1 presents the relationship between stress and depression at high, medium and low levels of active avoidance coping. According to Fig. 1, the steepest slope is observed for high levels of active avoidance coping, while the gentlest slope is observed for fathers with low levels of active avoidance coping. Thus, stress has the strongest positive association with depression for fathers who reported high levels of active avoidance coping, while the weakest association is seen in fathers who reported low active avoidance coping.

Mothers Group

Results from the hierarchical multiple regression (Table 3) for the mothers group revealed that after entering Parents' education level, help with caregiving, child behaviour problem and autism symptom severity into Model 1, these explained 28% of the variance in depression, $F(4, 88) = 8.39$, $p < .001$. After entry of the four coping styles and stress into Model 2, the total variance explained by the model as a whole was 78%, $F(9, 83) = 32.83$, $p < .001$. The coping styles and stress

Table 2 Summary of hierarchical regression for variables predicting depression—fathers (n = 90)

Variable	Model 1			Model 2			Model 3		
	B	SE B	β	B	SE B	β	B	SE B	β
Control variables									
Parent's education level	−.37	.84	−.04	−.34	.52	−.04	−.45	.51	−.05
Help with caregiving	2.02	1.58	.13	.68	.99	.04	.57	.97	.04
Behaviour problem	.15	.17	.10	−.10	.11	−.07	−.08	.10	−.06
Autism symptom severity	.11	.04	.33**	−.01	.03	−.02	−.02	.03	−.04
Independent variables									
Active avoidance				.44	.15	.25**	.04	.22	.03
Problem-focused				−.21	.16	−.13	−.20	.16	−.13
Positive				−.01	.18	−.01	.04	.18	.02
Religious/denial				−.29	.22	−.10	−.31	.22	−.10
Stress				.69	.08	.74***	.43	.14	.46**
Interaction									
Stress × active avoidance							.02	.01	.48*
R^2		.17			.71			.73	
R^2 change		.17			.54			.02	
F		4.27**			21.50***			21***	

Seven fathers were not included in the analyses due to missing responses in one or more questionnaires

*$p < .05$; **$p < .01$; ***$p < .001$

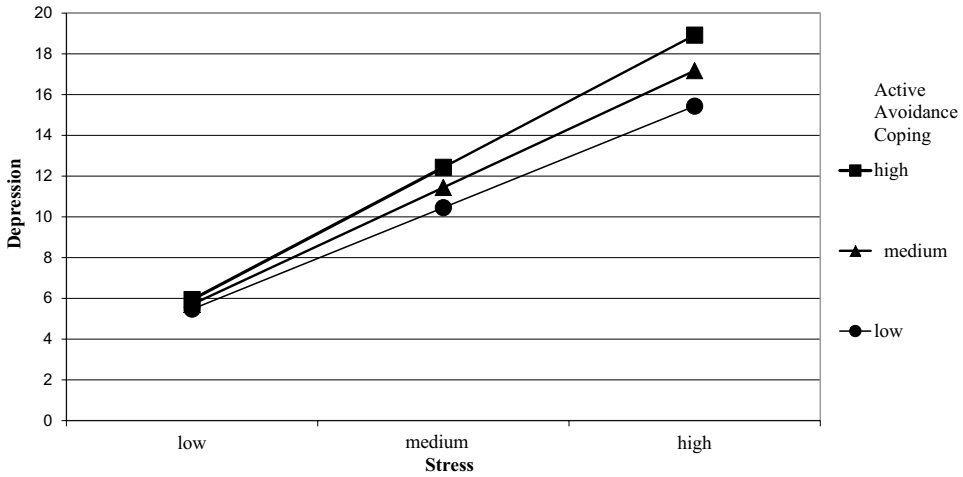

Fig. 1 Interaction between active avoidance coping and stress in fathers

explained an additional 51% of the variance in depression, R^2 change = .51, *F*change (5, 83) = 38.19, $p < .001$. Positive coping ($\beta = -.24$, $p < .01$) and active avoidance coping ($\beta = .26$, $p < .01$) were found to be significant predictors. Both interaction terms *Stress* × *Active Avoidance and Stress* × *Positive Coping* were entered into model 3, but only the interaction effect of *Stress* × *Active Avoidance* on depression was found to be statistically significant, $\beta = .93$, $p < .01$. Stress was not a significant predictor for depression ($\beta = .38$, $p = .092$). The total variance explained by the model 3 as a whole was 80%, $F(11, 81) = 30.28$, $p < .001$, with $\Delta R^2 = .02$, $\Delta F(2, 81) = 4.91$, $p < .05$. The interaction effect for *Stress* × *Active Avoidance* is illustrated in Fig. 2.

Figure 2 presents the relationship between stress and depression at high, medium and low levels of active avoidance coping. According to Fig. 2, the steepest slope is observed for high levels of active avoidance coping, while the gentlest slope is observed for mothers with low levels of active avoidance coping. Thus, stress has the strongest positive association with depression for mothers who reported high levels of active avoidance coping, while the weakest association is seen in mothers who reported low active avoidance coping.

Table 3 Summary of hierarchical regression for variables predicting depression—mothers (n = 93)

Variable	Model 1			Model 2			Model 3		
	B	SE B	β	B	SE B	β	B	SE B	β
Control variables									
Parent's education level	.94	.76	.12	− .22	.46	− .03	− .39	.45	− .05
Help with caregiving	1.91	1.53	.12	.90	.88	.06	1.15	.85	.07
Behaviour problem	.44	.17	.30*	.25	.10	.17	.18	.10	.13
Autism symptom severity	.07	.04	.19	.00	.03	.01	.01	.03	.03
Independent variables									
Active avoidance				.52	.14	.26**	− .19	.26	− .09
Problem-focused				.06	.14	.04	.14	.13	.09
Positive				− .53	.18	− .24**	− .25	.24	− .11
Religious/denial				− .01	.20	− .00	− .12	.19	− .04
Stress				.57	.06	.63***	.35	.20	.38
Interaction									
Stress × active avoidance							.04	.01	.93**
Stress × positive							− .03	.02	− .44
R^2		.28			.78			.80	
R^2 change		.28			.51			.02	
F		8.39***			32.83***			30.28***	

Thirteen mothers were not included in the analyses due to missing responses in one or more questionnaires

*$p < .05$; **$p < .01$; ***$p < .001$

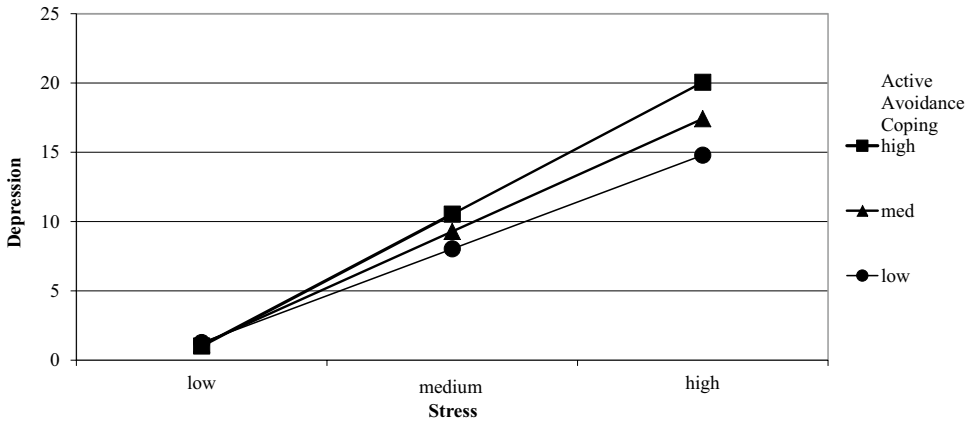

Fig. 2 Interaction between active avoidance coping and stress in mothers

Discussion

The current study examined gender differences in mental health outcome in parents of children with ASD. This study hypothesised that (1) mothers would report significantly higher levels of stress, anxiety and depression, compared to fathers; (2) coping style is a moderator of this relationship between stress and depression experienced by the fathers and mothers. Analyses using the MANOVA revealed statistically significant difference in stress levels between mothers and fathers, with higher stress levels reported in mothers as compared to fathers. However, levels of depression and anxiety did not emerge as significantly different between mothers and fathers. Findings from hierarchical regression analyses revealed that active avoidance coping was a moderator between stress and depression for both parents. In fathers, stress emerged as a significant predictor for depression, after the controlling for parents' education level, autism symptom severity, and child behaviour problems. However, stress did not emerge as a significant predictor for depression in mothers.

Gender Difference in Stress

Though it is noted that the effect of gender on stress was small, the findings from this study confirm previous studies

involving parents of children with ASD in which mothers tend to experience higher levels of stress (Hastings 2003; Hastings et al. 2005a; Trute 1995). However, levels of anxiety and depression were not significantly different for both parents in this study. This could be explained by Lazarus and Folkman's (1984) transactional model of stress and coping which suggests that the process of coping with stressful situations is dynamic, involving an individual's appraisal of the situation and subsequent decision on coping strategies, which impact eventual outcome. Hence, it is possible that the ways mothers and fathers coped may have impacted their eventual psychological well-being. This is consistent with findings in other studies where individuals who experienced a high level of life stress did not show any negative outcome in psychological health (Beasley et al. 2003), and the stressful situation was not always followed by anxiety (Duica et al. 2012).

There are several possible factors that can contribute to the gender difference in stress levels seen in this sample of parents in Singapore. One contributing factor may be how mothers and fathers experience the stressful situation of caregiving for the child. This may be the result of possibly different caregiving activities and the extent of the mothers and fathers involvement. Looking at the descriptive statistics (from survey questions asked about different activities parents are involved in), mothers tended to be involved more in teaching the child (93.3% of mothers, 63.2% of fathers), managing child's behaviour (88.5% of mothers, 76.8% of fathers), and helping child with daily living activities (68.3% of mothers, 49.5% of fathers). Varying involvement in activities with the child may possibly have surfaced different challenges for mothers and fathers, contributing to their differing experience of caregiving for the child with ASD, and different types of stress experienced. Allen et al. (2013) study found that the sociability of the child with ASD predicted stress in mothers, while deficits in the child's sensory and cognitive awareness predicted fathers' stress, suggesting that different aspects of a child's deficits contribute to parents' stress.

Another possible contributing factor may be gender roles and expectations. Given that societal expectations in Singapore generally still tend to view women as taking the caregiver role (Quek 2014), mothers tend to be the ones who are more involved in caregiving and completing household chores compared to fathers (Ministry of Social and Family Development 2015). In the current study sample, 39 mothers (37.1% of mothers) indicated they were homemakers, whereas three fathers (3.1% of fathers) indicated they had stayed home because they had retired or were currently unemployed. Gender expectations that women are responsible for childcare were also reported in studies involving Singaporean couples (Quek 2014; Quek and Knudson-Martin 2008). These studies found that the decision for the women to scale back or stop work was often described by their husbands to be the "wives' choice" and those mothers who stopped work would cite maternal obligation as the reason for doing so. Quek (2014) noted that despite the overall movement toward equal status in the marital relationship and shared parenting, women in Singapore tended to be the ones to withdraw from the workforce when work and parenting responsibilities could not be satisfactorily resolved.

Nonetheless, Morris (2012) noted that work can have a positive impact on parents' mental health. In his study that examined the relationship between work and mental health among mothers of children who were in poor to fair health, had disabilities, or exhibited behaviour problems, to mothers of typically developing children, analyses indicated that mothers of older children with special needs benefit more than other mothers from working outside the home. The study concluded that this might likely be due to the positive spill-over effects from work to family, or the time away from home responsibilities is in itself stress-reducing, providing respite to the mothers. In Tiedje et al.'s (1990) study, a mother described that "the distance and time away from the children give me a better perspective about them and their behaviour" (p. 70). In other qualitative studies (e.g. Einam and Cuskelly 2002; George et al. 2008), parents of children with disabilities have often viewed the work domain as a place where they can recuperate or as a place to replenish resources. Hence, with more mothers taking the caregiving role and stopping work, there may be less respite for them as compared to fathers, contributing to the significantly higher levels of stress observed in mothers in this sample.

On the other hand, work may not necessarily be a space of respite for some mothers who remain in the workforce. Though a majority of people in Singapore agree that mothers and fathers should share the child caregiving responsibilities, but the key definition of responsibilities of a father was that of a "breadwinner" (Ministry of Community Development, Youth and Sports 2009). In such a social context, where working mothers are expected to fulfil their role in caregiving and building their career, mothers may possibly experience more stress as compared to fathers (Moen and Roehling 2005). Consistent with that, Parish's (2006) study involving mothers of older children with disabilities reported feeling isolated and depressed, and overwhelmed by the stress of balancing work and caregiving.

Overall, as indicated in the demographic questionnaire completed by parents in this study, mothers tended to spend more time with the child with ASD (mean of 41.7 h per week), as compared to fathers (mean of 25.45 h per week). This further highlights the issue of lack of respite for the mothers. Current study also revealed that 6.6% of mothers highlighted the lack of time for self, while no fathers reported such a challenge. In addition, 8.5% of mothers reported the challenge of having to juggle needs of other

family members and commitments, while only 1% of fathers reported so. Essentially, as Lazarus and Folkman's transactional model (1984) suggests, the interplay of different situational and individual factors determines eventual outcome. Even as parents of children with disabilities may benefit from going to work, work-family conflict is noted to have an independent impact on parents' mental health too (Grzywacz and Bass 2003). In addition, factors such as personality traits and resilience have been found to influence the relationship between stress and mental health outcomes (Campbell-Sillsa et al. 2006; Leandro and Castillo 2010).

Stress as a Predictor of Depression

For fathers, stress was a significant predictor for depression. However, this was not the case for mothers. Such a result may be due to fathers engaging in ineffective coping strategies to mitigate the relationship between stress and depression. This concurs with Strachan's (2005) study that found a greater pile-up of life stressors associated with lower utilization and reduced effectiveness of coping strategies by the fathers. It should be recognised that there are other sources of stress identified in fathers. Key findings from a fatherhood public perception survey (Ministry of Community Development, Youth and Sports 2009) conducted in Singapore reflected work responsibilities to be the most common parenting challenge faced by fathers, followed by financial difficulties/pressures. Fathers are also less likely to access suitable supports for themselves as shown in having relatively low rates of seeking (Sullivan 2002) and receiving (Altiere and von Kluge 2009) emotional and instrumental support when parenting children with disabilities. In the current study, fathers spent less time with the child with ASD as compared to mothers. A likely outcome of this reduced time spent with the child might have resulted in limited understanding of the child's behaviour and needs, which led to more frustration in the fathers when challenging behaviours in the child with ASD appeared. On the contrary, having spent more time with the child, the mothers might have a better understanding of the needs and cues of the child leading to better management of the challenging behaviour, thus reducing stress in mothers. As it is not within the scope of the current study, it is inappropriate to speculate on the likely explanation of the ineffective coping strategies use by fathers. Nevertheless, this finding supports the notion that stress has a unique contribution to depression for fathers of children with ASD.

Moderating Role of Coping Style

Results from this study revealed that active avoidance coping plays a moderating role in experiencing stress and depression for both parents of children with ASD. Contrary to previous studies, problem-focused coping did not significantly predict better psychological well-being, nor did it moderate the relationship between stress and depression. This is not surprising as it has been suggested that coping needs to be appropriate to the situation. When there is low controllability of stressor, participants fared better if they engaged in positive emotion-focused coping strategies such as distancing rather than if they persisted in trying to problem solve an uncontrollable situation (Park et al. 2001). Hence, in managing the challenging behaviour of a child with ASD, engaging in emotion-focused coping styles may be more suitable if the situation is perceived as beyond the parent's control.

Active Avoidance Coping

A significant interaction was observed between stress and active avoidance coping for both fathers and mothers. Active avoidance items in the Brief COPE involved strategies such as giving up on coping, blaming and criticizing oneself, and expression of negative feelings. Such ways of coping dwell on negative emotions and thoughts, often seeing oneself in a negative light. This is consistent with cognitive theory that views depression as resulting from thought patterns, such as negative thinking and self-deprecation (Beck 1967, 1970, 1976). Self-criticism has also been found to be associated with depression in several studies (e.g., Dinger et al. 2015; Sturman and Mongrain 2005). Similarly, in Hastings et al. (2005a) study, active avoidance coping was found to be significantly positively correlated with anxiety, depression and stress in both mothers and fathers, suggesting that coping by such ways involving negative emotions and thoughts contribute to negative mental health outcomes. As a result, active avoidance coping in parents of children with ASD actually serves to strengthen the relationship between stress and depression. Though there has been increasing amount of research into the area of positive emotions and coping, which have suggested that positive experiences may buffer against negative well-being (Kayfitz et al. 2010), it is interesting to note that positive coping did not emerge as a significant moderator in the relationship between stress and depression in this study.

Limitations

In the current study, there are a number of limitations that need to be addressed. One issue is the exclusion of parents who did not understand the English language as the survey questionnaires were in English. It is also noted that many participants in this study left out information about their income, and this resulted in the current study not able to control for the income variable, which may have

provided a more accurate reflection of socioeconomic status. In addition, caution in interpreting results in relation to self-report of stress need to be exercised. Fisher and Dube (2005) explained that differences in the emotional expressivity of males and females could be due to a greater desire by males to adjust their emotional displays toward what they believe is socially desirable. As such, the difference between mothers and fathers' responses in the self-report questionnaires regarding emotions may have been contributed by father's desire to appear less emotional, aligning more with the masculine stereotype, where there is avoidance of characteristics that reflect vulnerability, such as grief (Eagly et al. 2000).

Another limitation of the study is the use of DASS, which is a general scale. The choice of specific and non-specific stress scales can have a large impact on findings of the study (Shepherd et al. 2018). Lacking in examining ASD-specific context, any unique stressors that parents of children with ASD faced may not have been captured and examined by this study. Also, MANCOVA was not conducted in this study, thus impact of variables such as child's age or socioeconomic status, may not have been accounted for. This study involved some parents who have more than one child with ASD/other disabilities, and the stress experienced may have been contributed by the other children and not the child with ASD. However, we are unable to determine if the stress had been caused by raising several children, or specifically the child with ASD.

Recruitment done mainly through special need schools and intervention centres may have biased the sample in this study, as parents involved may have had more resources to seek help. The majority of parents involved in the study were from one school, where children were considered to be of higher functioning autism, thus it may not be reflective of the challenges that are faced by parents of children with moderate to severe autism in Singapore. In addition, information about parental mental health prior to the diagnosis of the child with ASD and possible training for coping was not collected in this study, thus limiting ability to statistically control for any possible confounding variables.

In the current study, parents' cognitions, such as their views of their extent of control in the situation (locus of control) and self-efficacy, were also not considered. However, Falk et al. (2014) found that parent's perceived ability of self to set limits and monitor the child's behaviour was a significant predictor of anxiety and stress in parents. Coping styles may possibly be influenced by parents' perceptions of their own abilities, impacting the coping strategies that they employed. It is argued that providing parenting skills training without challenging the underlying belief systems related to the ability to implement those skills may be less effective in the long run. Future studies could seek to understand the relations between parental cognition and coping, and how these impact parental mental health among parents of children with ASD.

Implications and Future Directions

The results of this study have implications on assessment and intervention for both parents of children with ASD. As stress did not emerge as a significant predictor for depression in mothers, it is reasonable to assume that certain factors may have helped buffer the mothers from depression. Therefore, it is vital to identify and include these factors in the prevention and intervention for depression in parents who are caring for a child with ASD. In addition, since active avoidance coping enhances the relationship of stress and depression in both mothers and fathers, it is therefore essential that screening of the parents' coping styles be conducted and any maladaptive coping styles be identified so that intervention can be provided for these parents.

To further understand the factors contributing to the gender differences, future studies should focus on examining family-work conflict and support system for both parents of children with ASD. This effort will help us better understand the challenges of juggling between family life, work and caregiving for a child with ASD faced by these parents in Singapore with the aim of promoting parental mental wellbeing.

Future studies should also include longitudinal studies in order to shed light on how coping styles and their effectiveness for these parents may change over time. Carter and McGoldrick (1988) suggest that parents of children with ASD may experience different phases, from the pre-diagnosis, diagnosis, family life adjustment, navigating the system, parental empowerment, and finally moving forward where parents come to accept the 'new normal' and identify the benefits of caring for a child with ASD. In each phase, different coping strategies may be appropriate. Hence, identification of phases with appropriate coping strategies is necessary to assist these parents to cope effectively while maintaining a positive mental health outcome.

Conclusion

Mothers of children with ASD report higher levels of stress than fathers of children with ASD, whereas no significant differences in anxiety and depression were found between parents. This study adds to the current scarce literature of the relationship of stress and depression in parents of children with ASD, and is the first study in Singapore to utilise Hastings et al.'s (2005a) coping dimensions in investigating the moderating role of coping on the stress–depression relationship. Active avoidance coping in both mothers and fathers were found to strengthen the relationship between

stress and depression in these parents. This indicates the need for interventions to target such maladaptive ways of coping among parents of children with ASD. Stress emerged as a predictor of depression in fathers only, pointing to the need for interventions with fathers of children with ASD to not only address active avoidance ways of coping, but to also target management of stress.

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