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ORIGINAL PAPER

The Associations between Child Irritability, Parental Distress, Parental Irritability and Family Functioning in Children Accessing Mental Health Services

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Abstract

Irritability, characterised by anger, frustration, and emotional dysregulation, is a common transdiagnostic symptom associated with child and adolescent referrals to mental health services and is associated with significant negative outcomes. Despite this, little is known about the link between irritability and the broader family environment. The present study described parental and family dysfunction in families of 51 children and adolescents (aged 6 to 15 years) with severe irritability referred to Victorian public mental health services. Further, we aimed to explore the associations between children's irritability, parent functioning (parental distress and parental irritability), and family dysfunction. Child irritability was measured on the Affective Reactivity Index (ARI) and was obtained from participating children and their primary parent/caregiver (90% mothers). Participants psychiatric diagnoses were obtained using the Development and Well-Being Assessment through an interview with parents who also provided ratings of their own distress (Kessler 6), irritability (ARI), and family dysfunction (McMaster Family Assessment Device). We found high rates of family dysfunction (80%) and 39% of parents reported moderate to high psychological distress. Higher self-reported irritability was moderately associated with lower family dysfunction. All other relationships examined were non-significant. Findings suggest a complex relationship between severe childhood irritability and parental and family functioning with implications for treatment discussed.

Keywords Irritability · Children · Parental distress · Family functioning · Parental irritability

Highlights

- Cross-sectional study examining the association between youth irritability and family functioning.
- Family dysfunction was common in families of children with severe irritability.
- Thirty nine percent of parents reported moderate to high psychological distress.
- Parent-reported child irritability was not significantly associated with family or parent functioning.
- Unexpectedly, self-reported child irritability was associated with decreased family dysfunction.
- The family context is important to consider when treatment planning.

Irritability, characterised by anger, frustration, and emotional dysregulation (Stringaris et al., 2018), is a common transdiagnostic symptom associated with referrals to child and adolescent mental health services and is associated with

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significant negative outcomes (Carlson et al., 2009). Problematic irritability is thought to arise when individuals have a lowered threshold for experiencing frustration compared to peers (Leibenluft, 2017). Children with severe irritability are defined as those with chronic irritability who have regular temper outbursts which interfere with daily functioning. Irritability is seen in a range of psychiatric disorders across childhood and adolescence, including disruptive behaviour disorders, attention-deficit/hyperactivity disorder (ADHD), depression, and anxiety (Copeland et al., 2013). Chronic severe irritability in childhood is also proposed to be a key feature of more severe childhood psychopathology, including early onset bipolar disorder, severe mood dysregulation disorder (SMD) and disruptive mood dysregulation disorder (DMDD) which is a newer disorder characterised by chronic irritability and developmentally inappropriate temper outbursts (Stringaris et al., 2018; Copeland et al., 2013).

Irritability in childhood is a risk factor for poor long-term outcomes including multiple later onset psychiatric diagnoses, reduced educational attainment, higher unemployment, increased substance use (Krieger et al., 2013; Leibenluft, 2017), higher rates of offending (Copeland et al., 2013), and suicidality (Benarous et al., 2019). In addition, these children and youth use more health care services (15 times) in comparison to children without severe irritability (Copeland et al., 2013), and experience higher levels of school difficulties such as increased suspension (Copeland et al., 2013), and poorer school attendance (Mulraney et al., 2017). Within the family system, caring for a child with mental health difficulties may impact negatively on the parent-child relationship and increase family stressors, potentially impacting both the child and caregiver psychological health. Irritability is unique as a psychiatric symptom in that it has both internalising and externalising aspects. Whilst the behavioural manifestations of irritability are easily observable, the internal feelings of irritability such as feeling tense or on edge are not always obvious to an external observer. Thus, it is important when investigating a construct such as irritability, to include information from multiple reporters.

Several mechanisms have been proposed as underlying irritability including genetic predispositions, aberrant neurological pathways including a heightened sensitivity to threat and alterations in reward processing, and negative cycles of parent-child interactions (Stringaris et al., 2018). The family environment is critical in the context of healthy childhood development (Deault, 2010). Broadly, children's mental health difficulties have previously been associated with specific aspects of family functioning including increased parental depression, stress, and hostility, and poorer intrafamilial relationships (Caci et al., 2014; Cussen et al., 2012). An important component of understanding irritability in children involves examining the environmental factors that may contribute to, or perhaps modulate the severity of, irritability symptoms. This could enable understanding of how treatment approaches might integrate a family focus with a more child- centred approach. Bronfenbrenner's ecological systems theory (Bronfenbrenner & Morris, 2007) highlights the importance of parent's roles in their children's development and how the child's immediate family experiences can influence and shape their development. Further, family systems paradigm proposes that the family system is itself a complex social system, in which family members interact and influence each other. Therefore, behavioural change interventions may also need to consider the family, interactions between family members and address dysfunctional patterns in families (Priest, 2021).

To date, little is known about parental and family functioning within the families of children with irritability, despite the potential importance of this association to the development of interventions and family supports. What is known is often extrapolated from research in specific childhood disorders where irritability is common (e.g., ADHD and Oppositional Defiant Disorder/Conduct Disorder (ODD; CD)). For example, ADHD has been associated with poorer family functioning across several family domains, including increased parental psychopathology including depression and stress (Mulraney et al., 2017; Theule et al., 2010), increased parent-child hostility (Lifford et al., 2009), as well as poorer parent and sibling relationships (Caci et al., 2014; Cussen et al., 2012). Research suggests that the relationship between children's externalising behaviours and the child's environment, including aspects of parental stress and family functioning may be transactional (Morgan et al., 2002). For example, negative affect and aggression in children may cause disruptions to family interactions and cohesion and increase parental stress, in turn, leading to more problematic child behaviours. One study showed that highest levels of parental distress occurred within the context of children with conduct problems and callous-unemotional traits (Fanti & Centifanti, 2014). It remains unclear whether family functioning and parental psychopathology are associated with children's irritability symptoms. Further research is required to broaden our understanding and inform treatment.

Parent Psychological Distress

Irritability has been associated with maternal depression and anxiety in pre-schoolers, however, by age six only depression was associated with a child's irritability symptoms (Dougherty et al., 2013). Further, the irritability dimension of ODD has been associated with a family history of

maternal depression and suicidality (Krieger et al., 2013), and irritability in adolescents has been associated with maternal depression (Mulraney et al., 2017). We are only aware of one study that has directly examined the association between child irritability and parent psychopathology. Wiggins et al. (2014), examined the longitudinal relationships between childhood irritability and maternal depression in a birth cohort of children ($N = 4{,}712$) from toddlerhood through to middle childhood. Findings showed children with high and escalating irritability from age three to nine were nearly five times more likely to be parented by a mother with recurrent depression in comparison to children with consistently low symptoms of irritability. Additionally, results showed evidence of a bidirectional relationship between maternal depression and child irritability (Wiggins et al., 2014), which is also evident in typically developing children (Neece et al., 2012).

Parental Irritability

Less is known about the relationship between child irritability and parental irritability. Stressful life situations, as well as temperament and genetic predisposition, may elevate feelings of frustration, anger, and annoyance in parents of irritable children. For example, a review by Thartori et al. (2019) found that mothers' dispositional tendency to be irritable and to react aggressively when provoked or stressed may lead to more punitive and maladaptive parenting styles, increasing the risk for problematic child behaviour. It is also possible that parents who exhibit irritable behaviours such as shouting, and temper outbursts model this behaviour to the child, resulting in a spiral of negative irritable parent-child interactions.

Understanding parental irritability in families of children with severe irritability may be helpful when designing treatment and intervention for irritable children. For example, group-based parenting programs, such as the Positive Parenting Programme (Triple P; Pickering and Sanders (2015)) are effective in reducing both child problem behaviours, as well as improving parental mental health and parental self-efficacy (Furlong et al., 2013). Triple P aims to teach parents skills to manage their child's behaviour more effectively, moderate their reactiveness and to reduce parent-child conflict. Despite this, no studies have yet examined the association between parent and child irritability.

Family Functioning

Family functioning represents the dynamics that exist within the family system, including interpersonal relationships, togetherness, independence, family roles, communication, and patterns of behaviours used by family members to address life stressors (Miller et al., 2000). These are important factors that strongly influence and determine the behaviour of family members (Miller et al., 2000; Walsh, 2012). Family dysfunction (i.e., lack of cohesion and structure) has been associated with increased behavioural problems, delinquency, and poorer functioning across childhood (Hoeve et al., 2009; Kroneman et al., 2009; Racz & McMahon, 2011; van As & Janssens, 2002). In addition, a recent study found evidence of reciprocal relationships between childhood ADHD symptoms and family functioning (Breaux & Harvey, 2018). More generally, children's mental health problems can impact on the whole family and can increase parent stress and decrease family quality of life (Deault, 2010; Leeman et al., 2016). Targeted interventions designed to strengthen families and support parental mental health may improve outcomes for these children. However, to date, family, and parent functioning in children with irritability remains largely unexplored.

The Present Study

The aims of the present study were to (1) describe family functioning, parental distress, and parental irritability in children with severe irritability accessing public mental health services, (2) assess the level of agreement between children self-report and parent report of their child's irritability, and (3) examine child irritability by both self-report and parent report in relation to general family functioning, parental distress, and parental irritability. It was hypothesised that higher child irritability symptoms would be associated with greater family dysfunction, increased parental irritability, and higher levels of parental distress.

Method

Design

This was a cross-sectional study which used baseline data from a clinical cohort of children with severe irritability who were accepted for treatment by a publicly funded child and adolescent mental health service (CAMHS) in Victoria, Australia. The study was approved by The Royal Children's Hospital (Melbourne) Human Research Ethics Committee (HREC; 37091A). Written parental consent was obtained for all parents, as well as children 12 years and above who were deemed mature and competent under sections 4.2 and 4.5.5 of the National statement. Ethical permission was granted to use the data.

Participants

Participants were 51 children and adolescents (27 males, 24 females) with severe irritability (>3) on the Affective Reactivity Index (ARI; Stringaris et al., 2012), between the ages of 6 to 15 years, referred to one of three community mental health teams when recruited. Three quarters of participating children were aged below 13 years. Parental participants were predominately (90%) mothers, with 76% having completed their high school education or above, and 37% report living in single-parent households. Children were recruited to the study in 2017–2019 and family assessments occurred on site at the Children's hospital between December 2017 and March 2019.

Table 1 presents the participant demographic characteristics. As shown, the average age of participants was 11.2 years ($SD = 2.51$), and 53% were male. As expected, mean irritability symptoms by both parent ($M = 7.4$) and self-report ($M = 6.0$) were high, however, there was considerable spread across individuals as evident in ARI score range (parent 1 to 12, child 0 to 12). Nearly all participating children (93%) met DSM-5 criteria for at least one psychiatric disorder with an average of 2.89 disorders amongst participants based on the Development and Well-Being Assessment (DAWBA) interview. Neurodevelopmental disorders were the most prevalent disorders, with nearly half of children (49%) meeting ADHD criteria and 17% percent of children were reported by a parent to have a diagnosis of ASD. Three-quarters of the sample met criteria for either an internalising or externalising disorder, or both, of which the most common disorders were generalised anxiety disorder (GAD; 22%) and ODD (17%). Medication use for the treatment of mental health conditions was 41%, with an average 1.6 medications per child. Common medications used by participating children were selective serotonin reuptake inhibitors (SSRIs), atypical antipsychotics, psychostimulants, clonidine, and melatonin (Supplementary Table 1). The SES range indicated participating families varied in their level of economic disadvantage (SES score range 928 to 1119), with the mean SES score (1011) relatively similar to the population average of 1000 (Australian Bureau of Statistics ABS (2011)).

Table 1 Sample characteristics ($N = 51$)

	M (*SD*, range)/*n* (%)
Child	
Age	11.17 (2.5, 6–15.1)
Younger children (<13 years)	38 (75)
Older Children (13+ years)	13 (25)
Male	27 (53)
Medication use	21 (41)
Irritability – pr[a]	7.4 (2.7, 1–12)
Irritability – sr[b]	6.0 (3.2, 0–12)
Neurodevelopmental Disorders	
Autism spectrum disorder (ASD)[d]	18 (17)
Attention deficit hyperactivity disorder (ADHD)	29 (49)
Internalising/Externalising diagnoses[c]	
Internalising disorder	13 (26)
Externalising disorder	35 (70)
Both	11 (22)
None	13 (25)
Parent/guardian	
Mother	46 (90)
Parental distress[e]	6.8 (4.6, 0–17)
Parental irritability[f]	2.4 (1.8, 0–7)
Family functioning[g]	2.2 (0.26, 1.6–2.9)
Completed high school or above (*n*,%)	36 (72)
SES (SEIFA)[h]	1010.7 (48.5, 928–1119)
Single parent	19 (37)

[a]Parent-report of Irritability measured on the Affective Reactivity Index (ARI)

[b]Child self-reported ARI

[c]Assessed via clinical interview using the Development and Well-Being Assessment (DAWBA)

[d]Parent-report of their child's clinical diagnoses

[e]Kessler Psychological Distress Scale (K6)

[f]Mother's report of their own irritability on the ARI

[g]General functioning on the Family Assessment Device (FAD), a score above 2 represents family dysfunction

[h]Socio-Economic Indexes for Areas ($M = 1000$; $SD = 100$), higher scores reflect greater education advantage

Procedures

Families were invited to learn more about the study through an invitation letter sent to parents by the mental health service, supplied by the research team. Contact details of families that did not opt-out of the study after two weeks were provided to the research team. Families were then contacted by the research team to discuss participation further. Those wishing to take part were screened for eligibility. Children and adolescents experiencing clinically relevant levels of irritability at the time of recruitment were included in the study. This was defined as a score of >3 (Mulraney et al., 2014) on the parent-rated ARI (Stringaris et al., 2012) and rated as being impaired according to the ARI impairment item (i.e., overall, irritability causes him/her problems). These criteria were set by the consulting Psychiatrist. Children were excluded if they had a major illness or disability (e.g., intellectual disability or physical disability) that would prevent completion of the measures or were non-English speaking. Fig. 1 outlines the recruitment flow. The participating children and responding parents

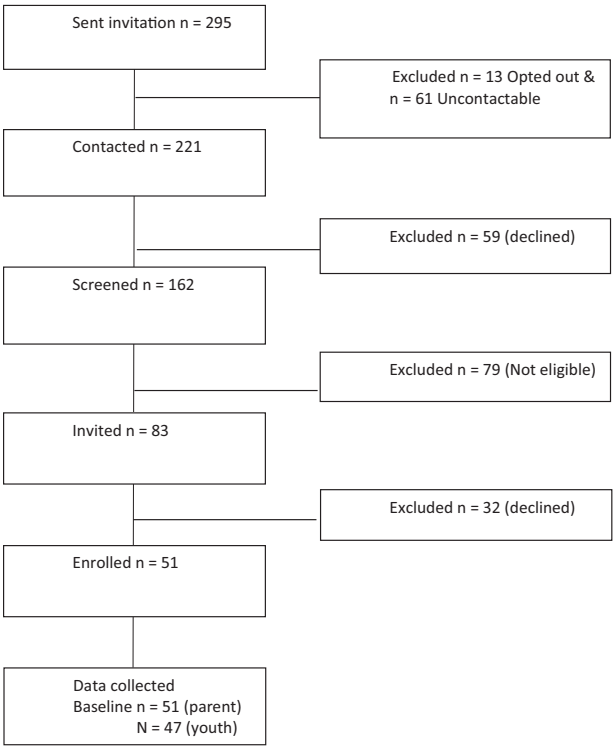

Fig. 1 Summary of participant flow

were formally assessed once enrolled in the study, which took place 3 to 6 months after initial screening, with scores occasionally varying from initial screening as the ARI is a state-based measure. Data were collected during a two-hour face-to-face research visit, which was conducted by trained clinical research officers with bachelor level psychology degrees or higher. Assessments were conducted at The Royal Children's Hospital or a hospital community Mental Health service closer to the child's home.

During the visit, the parent completed a comprehensive clinical interview to assess the participating child's psychological wellbeing and completed a questionnaire about the child's behaviour, and irritability symptoms, as well as their own distress levels, irritability, family functioning, and an investigator-derived questionnaire asking about socio-demographic information such as parent education, age, and family resident postcode. Participating children completed a questionnaire about their irritability and behaviour during the assessment visit. All participating children were supported by the clinical interviewer to complete their questionnaire during the assessment visit. Cognitive assessments were also completed by children which are not included in this study.

Measures

Irritability symptoms were measured using the Affective Reactivity Index – a 6-item validated scale measuring irritability symptoms (Stringaris et al., 2012). The ARI has been validated for use in children and adults (Mulraney et al., 2014; Stringaris et al., 2012) and has good psychometric properties (Stringaris et al., 2012). Three versions were included: self and parent report of the child's irritability and a parent self-report version. The six items of the ARI measure irritable behaviour, including frequency, duration, and threshold (e.g., 'loses his/her temper easily'). Respondents rate each item using a 3-point Likert scale (0 = 'not true' to 2 = 'certainly true'). Items were summed to give a total score (0–12), with higher scores indicative of more severe irritability. Adequate internal consistency was observed in this study on all informant reports. Cronbach's alpha (α) = 0.83 for child self-report, α = 0.82 for parent report and α = 0.72 parental self-report of irritability. Cut-off points of >3 (parent-report) and of >4 (self-report) have previously been used to denote psychopathology in children (Mulraney et al., 2014). The mean score reported from an Australian cohort of adults self-reporting on the ARI (Mulraney et al., 2014) served as the comparative mean for adults as published norms are not available.

Parental distress was measured on the Kessler 6 (K6) – a 6-item validated measure of adult psychological distress (Furukawa et al., 2003). The scale is a quantifier of non-specific psychological distress. It has demonstrated excellent internal consistency and reliability (Cronbach's α = 0.89). It also has consistent psychometric properties across major socio-demographic sub samples and strongly discriminates between community cases and non-cases of DSM-IV/ SCID (Kessler et al., 2010). The 6-items were rated using a 5-point Likert-type scale which ranges from 'none of the time' (value = 0) to 'all of the time' (value = 4). Scores range from 0 to 24, with higher scores indicating greater distress. Internal consistency in this study was α = 0.83. For comparison purposes, scores were classified as low psychological distress (0–7), moderate psychological distress (8–12) and high psychological distress (13–24), as per interpretation guidelines (Kessler et al., 2003).

Family functioning was measured on the General Functioning scale (GF) of the Family Assessment Device (FAD) – a 12-item scale that measures overall effective functioning of a family (Miller et al., 1985). The GF scale comprised six "effective" (e.g., *In times of crisis we can turn to each other for support*) and six "dysfunctional" items (e.g., *We don't get along well together*). Parents rated each item (1-4; Strongly agree, agree, disagree, strongly disagree) depending on how well each statement described their own family, high scores indicate greater family dysfunction. Internal consistency in this study was α = 0.75. The FAD GF can also be examined as dichotomous according to the published healthy/unhealthy cut-off point of 2.0, using the calculated mean item score which is the total score divided by 12 and it ranges from 1 to 4 (Miller et al., 1985).

Accordingly, family functioning can be considered as "functional" versus "dysfunctional" (Staccini et al., 2014).

Children's psychiatric disorders were assessed through a comprehensive diagnostic interview with the child's parent, using the Development and Well-Being Assessment (DAWBA; Aebi et al., 2012). The DAWBA diagnoses were made according to DSM-5 criteria and classified into four categories: (1) internalising disorders only (separation anxiety, specific phobias, social anxiety, generalised anxiety disorder (GAD) and major depressive disorder (MDD)), (2) externalising disorders only (ODD and CD), (3) meeting criteria for both internalising and externalising disorders, or (4) no diagnosis. We also examined ADHD (meets diagnostic criteria: yes or no) assessed on the DAWBA and parent report of an autism spectrum disorder (ASD) diagnosis. Psychiatric disorders were examined as potential confounding variables.

Demographic information including child age, sex, parent education level and family postcode were obtained from participating parents. Family socioeconomic status (SES) was measured using the Socio-Economic Indexes for Areas (SEIFA) Disadvantage Index (Australian Bureau of Statistics ABS (2011)), which is a measure of neighbourhood disadvantage indexed on family postcode, with higher scores reflecting less disadvantage. The SEIFA mean population score is 1000 ($SD = 100$).

Statistical Analysis

All analyses were conducted in Stata version 16 statistical software (StataCorp, 2017). Descriptive statistics (frequencies and means with standard deviations) were used to examine sample characteristics and to describe parent and family functioning of the participating families compared to published normative data from the general community (Aim 1). Intraclass correlation coefficients (ICCs) were calculated to establish the degree of agreement between parent- and child ratings of the same ARI rating scale through two-way mixed effect model (Aim 2). An ICC < 0.40 can be interpreted as low agreement. Multiple linear regression was used (Aim 3) to model the cross-sectional associations between continuous scores on the ARI (child and parent-reported) and family functioning. Before the analyses, univariate normality was assessed, skewness and kurtosis coefficients for variables were within acceptable ranges. An examination of studentized residuals with leverage greater than $(2k + 2)/n$ identified one participant as having undue influence on results, this participant was excluded from the analysis. Pairwise correlation analyses were conducted to examine the strength of associations between study variables, the Pearson's r can be interpreted as weak, 0.10 – <0.30. moderate, 0.30 – <0.50 and large, ≥0.50 (Cohen, 1988). Child sex, externalising comorbidity, and SES (SEIFA) were significantly ($p = 0.05$) associated with one or more dependent variables (i.e., family functioning, parental irritability, and parental distress) and were retained as covariates in the regression models.

Results

Family and Parent Functioning and Parental Irritability in Severely Irritable Children

Family functioning measured on the FAD-GF by parent self-report showed that a high proportion of families (80%) were experiencing perceived family dysfunction, indicated by a mean score ≥2 on the FAD-GF ($M = 2.25$, $SD = 0.26$). Families with high family dysfunction (≥2) may be at increased risk and require intervention (Staccini et al., 2014) compared with families below the cut point considered functional.

In relation to parent functioning, parental psychological distress interpreted through established K6 clinical cut points showed 61% of parents reported low distress, 26% moderate distress and 13% high distress. Identical proportions of psychological distress have previously been reported in an Australian adult population study in the same collection year; however, these data were collected using the comparable but extended 10 item measure (K-10) measure (ABS, 2017).

The sample mean score for parent report of their own irritability ($M = 2.41$, $SD = 1.84$) was comparable previously published irritability ($M = 2.41$, $SD = 2.18$) in a normative cohort of Australian adults (Mulraney et al., 2014), with no statistical difference in means using a mean comparison one sample t-test.

Correlation Analyses

Parent- and self-reported child irritability were not significantly correlated with each other and there was no effect of child sex (see Figure 2 for scatterplot of variables). There was no agreement between parent-report and self-report of children's irritability. The average measure ICC was −0.12 (95% CI −0.91 to 0.32).

Table 2 presents correlations between study variables. There was a moderate negative correlation between children's self-reported irritability and family dysfunction ($r = -0.31$, $p < 0.05$). A similar pattern of associations was observed between children's irritability by parent report and family dysfunction ($r = -0.23$), although findings were non-significant. In relation to other study variables, children's self-reported irritability was moderately associated with parent education ($r = -0.40$) and with child externalising disorder ($r = 0.43$), indicating children with an

Table 2 Bivariate Correlations for Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Child irritability -sr[a]	–														
2. Child irritability – pr[b]	−0.09	–													
3. Family functioning[c]	−0.31*	−0.23	–												
4. Parental irritability[d]	0.13	−0.10	0.08	–											
5. Parental distress[e]	0.06	0.16	0.28*	0.23	–										
6. Sex (male)	0.05	−0.20	0.41*	−0.07	0.11	–									
7. Age	−0.06	0.09	−0.06	0.07	−0.06	−0.23	–								
8. Medication use	0.05	−0.15	0.10	0.28	−0.08	0.22	0.25	–							
9. Internalising disorder[f]	0.00	0.27	−0.13	−0.04	0.01	0.18	0.11	0.14	–						
10. Externalising disorder[f]	0.03	0.43*	0.05	−0.19	0.31*	0.10	−0.08	−0.06	0.19	–					
11. ADHD[f]	0.10	0.21	−0.20	−0.11	0.01	0.08	−0.08	0.16	−0.02	0.10	–				
12. Both intern/extern[f]	0.11	0.23	−0.08	−0.08	−0.01	0.30*	0.02	0.14	0.90*	0.35	0.07	–			
13. ASD	0.05	0.00	−0.08	0.00	0.06	0.27*	0.16	0.37*	0.32*	0.13	0.36*	0.31*	–		
14. Single parent- no	−0.17	−0.09	0.07	0.13	0.02	0.06	−0.01	0.17	−0.28	−0.12	0.32*	−0.22	−0.07	–	
15. Completed HS -parent	−0.40*	−0.06	−0.06	−0.19	−0.23	−0.03	−0.12	0.00	−0.03	−0.13	−0.01	−0.09	−0.08	0.23	–
16. SES[g]	−0.09	−0.01	−0.28*	−0.19	−0.18	0.04	0.11	−0.14	0.12	−0.22	−0.02	0.00	0.06	−0.03	0.25
n	*46*	*51*	*51*	*51*	*51*	*51*	*51*	*51*	*51*	*51*	*51*	*51*	*51*	*51*	*51*

[a]Self-report of child irritability measured on the Affective Reactivity Index (ARI)

[b]Parent report of child irritability on the ARI, higher scores reflect greater irritability

[c]General functioning on the Family Assessment Device (FAD), higher scores indicate poorer functioning

[d]Parent report of their own irritability on the ARI

[e]Kessler Psychological Distress Scale six (K6), higher scores reflect higher stress

[f]Assessed via clinical interview using the Development and Well-Being Assessment (DAWBA), 0 = negative, 1 = positive

[g]Socio-Economic Indexes for Areas ($M = 1000$; $SD = 100$), higher scores reflect greater education advantage. For ASD, 0 = negative, 1 = positive. For sex, 0 = female, 1 = male. For single parent. 0 = partner, 1 = single. For parent education, 0 = not complete, 1 = complete

*$p < 0.05$

Table 3 Adjusted Regression Analyses Examining Associations between Self-Reported Child Irritability, Family Functioning, Parental Distress and Parental Irritability

	Family functioning[a]				Parental distress[b]				Parental irritability[c]			
	b	*95% CI*	*β*	*p* value	b	*95% CI*	*β*	*p* value	b	*95% CI*	*β*	*p* value
Youth Irritability[d]	**−0.36**	**−0.59, −0.12**	**−0.37**	**0.004**	0.07	−0.10, 0.24	0.12	0.420	0.057	−0.37, 0.49	0.04	*0.791*
Sex - male	**2.33**	**0.84, 3.83**	**0.38**	**0.003**	−0.25	−1.33, 0.84	−0.07	0.647	0.813	−1.95, 3.58	0.09	*0.556*
Externalising Disorder	−0.45	−2.11, 1.21	−0.07	0.585	−0.88	−2.08, 0.32	−0.22	0.148	2.48	−0.58, 5.55	0.25	*0.110*
SES	**−0.03**	**−0.04, −0.01**	**−0.41**	**0.002**	−0.01	−0.021, 0.00	−0.23	0.133	−0.011	−0.04, 0.02	−0.12	*0.439*
Model Fit	$R^2 = 0.41$, $p < 0.001$				$R^2 = 0.11$, $p = 0.32$				$R^2 = 0.11$, $p = 0.31$			

Note. Outcome variables include: [a]General functioning on the Family Assessment Device, bolding denotes significance

[b]Kessler Psychological Distress Scale Six-items (K6)

[c]Self-reported Affective Reactivity Index (ARI), higher scores reflect worse functioning

[d]Self-report of child irritability measured on ARI. Models adjusted for child sex, externalising disorder, and Socio-Economic Indexes for Areas (SES). $N = 46$. R^2 = percentage of the variance in the explanatory variable in each model

externalising disorder had more severe irritability symptoms. Parent reported child irritability was not significantly associated with parental irritability, or parental distress.

An examination of other study variables associated with the outcomes of interest, showed parental distress was weakly associated with family dysfunction ($r = 0.28$). While child sex, externalising comorbidity and SES were significantly associated with one or more of the outcomes of interest and were retained as covariates in subsequent regression models. Child age, medication status, internalising disorder and both internalising and externalising disorder, single parent and parent completed high school were not significantly associated with parental irritability, parental distress, or family dysfunction ($p > 0.05$) and were not retained as covariates in subsequent regression analyses.

Multivariate Regression Analyses

Linear regression analyses were conducted to examine the associations between child irritability and parental distress, parental irritability, or family functioning. All models control for child sex, externalising disorder, and SES. Three models pertaining to child self-reported irritability are shown in Table 3. Child self-reported irritability was moderately associated with family functioning, including when covariates were held constant ($\beta = 0.37$, $p = 0.004$). Children's sex and family SES were also associated with family functioning. Being male was associated with higher family dysfunction (2.46-point higher GF FAD score), while higher SES was associated with more effective family functioning and was the strongest explanatory variable in the model of family functioning ($\beta = 0.41$). Around 41% of the variance in family functioning scores ($R^2 = 0.41$) was explained by child self-reported irritability, sex, externalising disorder, and SES. Child self-reported irritability was not significantly associated with parental irritability or parental distress.

Analyses were repeated using parent-reported child irritability and results are shown in Table 4. Parent-reported child irritability was not uniquely associated with family functioning after adjusting for covariates. Child sex and SES were associated with family functioning. Around 28% of the variance of family functioning scores ($R^2 = 0.28$) was explained by parent-reported irritability, sex, externalising disorder, and SES. Parent-reported child irritability was not significantly associated with parental irritability or parental distress.

To check that the pattern of relationships was not affected by child age, post-hoc sensitivity analyses were conducted using independent t-test to compare the means between younger children (<13 years) and older children (13^+) on family functioning, parent self-reported irritability and parental psychological distress. Results of the t-tests yielded no significant mean difference between younger and older children on any outcome at the 0.05 level.

Discussion

The current study adds to the growing body of literature on irritability among children and adolescents seeking mental health services by describing the associations between child irritability (both self and parent reported) and parental irritability and psychological distress and the family environment. The current study sought to describe parent mental health and family functioning within these families, as parents and families provide the daily support and caregiving to these young people. When compared to parents and families in the general population, these families experience higher levels of family dysfunction (i.e., higher

Table 4 Adjusted Regression Analyses Examining Parent-Reported Youth Irritability, Family Functioning, Parental Distress and Parental Irritability

	Family functioning[a]				Parental distress[b]				Parental irritability[c]			
	b	*95% CI*	*β*	*p* value	b	*95% CI*	*β*	*p* value	b	*95% CI*	*β*	*p* value
Youth Irritability[d]	−0.19	−0.54, 0.15	−0.16	0.267	0.12	−0.43, 0.68	0.07	0.654	−0.00	−0.22, 0.21	−0.00	0.985
Sex - male	**2.46**	**0.79, 4.15**	**0.39**	**0.005**	0.94	−1.76, 3.63	0.10	0.486	−0.13	−1.19, 0.94	−0.04	0.810
Externalising Disorder	0.09	−1.95, 2.13	0.01	0.927	2.40	−0.87, 0.5.68	−0.24	0.147	−0.93	−2.22, 0.36	−0.24	0.154
SES	**−0.02**	**−0.04**, **−0.00**	**−0.29**	**0.028**	−0.01	−0.04, 0.02	−0.13	0.375	−0.01	−0.02, 0.00	−0.24	0.103
Model Fit	$R^2 = 0.28$, $p = 0.003$				$R^2 = 0.12$, $p = 0.21$				$R^2 = 0.10$, $p = 0.32$			

[a]General functioning on the Family Assessment Device, bolding denotes significance

[b]Kessler Psychological Distress Scale Six-items (K6)

[c]Self-reported Affective Reactivity Index (ARI), higher scores reflect worse functioning

[d]Parent report of child irritability measured on ARI. Models adjusted for child sex, externalising disorder, and Socio-Economic Indexes for Areas (SES). $N = 50$. R^2 = percentage of the variance in the dependednt variable that the of the variance in the explanatory variable in each model

conflict and poorer communication), with only 20% of families classified as functioning effectively. Additionally, almost 40 percent of parents reported moderate to high psychological distress, of which 13% were experiencing clinically significant distress. These rates are very similar to those reported for adults in a contemporaneous Australian population study (ABS, 2017). It is important to recognise that the parents of children with severe irritability seeking mental health treatment may be experiencing their own mental health and family difficulties that may not be a consequence of their child's difficulties. These difficulties could themselves impact on the child's wellbeing and interfere with the parents ability to engage and support their child during treatment, potentially impacting their child's treatment success (Staudt, 2007).

An examination of the agreement between parent and self-rated child showed that overall, both parents and children reported significantly elevated child irritability. Parents' rated their child's irritability symptoms higher than the child's own rating, which is consistent with prior research (Stringaris et al., 2012). However, we found no agreement between child and parent rated irritability which is inconsistent with prior research (Mulraney et al., 2014, Stringaris et al., 2012). It is possible that children are rating themselves differently because children rate themselves on their internal state, while parents' rate on what they observe. Further parents and children may share different views on the child's anger reaction threshold, frequency and duration of angry feelings/behaviours which are examined explicitly in the ARI scale. For example, a child may rate that they get over an angry outburst immediately, but the parent concludes that the child is staying in their room because they are still feeling angry. Possibly, the rating scales are not specific enough to pick up these differences in children who experience frequent and concerning irritable mood. This finding highlights the importance of obtaining the child's perspective of their own irritability in addition to parental ratings.

We then examined associations between children's irritability and family functioning, which have not previously been examined in children with irritability. Contrary to findings in broader mental health research which has linked mental health and behavioural difficulties to higher family dysfunction (Leeman et al., 2016; van As & Janssens, 2002), we found increased child self-reported irritability was associated with lower levels of family dysfunction. While this pattern of findings was seen for both parent and self-reported child irritability, only the association between self-reported irritability and family functioning was statistically significant. Given the associations between irritability and deficits in emotional regulation, threat detection and reward processing (Brotman et al., 2017), it may be that children who live in family environments that set more limits and have higher behavioural expectations may experience increased frustration to having their goals blocked or not receiving desired rewards. It is also possible that children living in a more cohesive and responsive family environment show better insight into their behaviour and are more able to recognise and rate the impact of their irritability. Replication across different samples and further study into these complex relationships are required.

Finally, we examined the relationship between child irritability and parental functioning. We did not find evidence that these factors were significantly associated. This is in contrast to Wiggins et al. (2014) who found evidence of a bi-directional relationship between irritability and maternal depression in children and a study of irritability in adolescents with ADHD that found parent and self-reported irritability symptoms were associated with poorer parent mental health, including higher parental stress (Mulraney et al., 2017). Methodological differences may account for disparities in study findings, for example, differing measures of parental mental health and study populations. To

our knowledge, this is the first study to examine this relationship in children with complex and severe clinical presentations of irritability. Broader research exploring the relationship between child mental health diagnoses and parental mental health in clinical samples referred for mental health treatment have also yielded mixed results, with no consistent pattern of findings (van Steijn et al., 2014; Vidair et al., 2011; Wesseldijk et al., 2018).

A novel aspect of this study was to examine whether child irritability was associated with levels of parental irritability. We hypothesised that participating parents may experience elevated irritability given the shared heritability of mental health disorders, of which irritability is a key feature (Serretti & Fabbri, 2013). However, the mean irritability score for parents was like that seen in a community population of Australian adults and levels of child irritability by either parent or child self-report were not associated with levels of parent irritability. Further, parental irritability was not significantly associated with other variables in our model. It is not clear what factors may explain the varying levels of parental irritability amongst participating parents.

Strengths and Limitations

This study has several strengths, including the use of both parent and child ratings of child irritability on the well-validated ARI scale to gauge current irritability symptoms. Also, a clinical interview with the child's parent using the DAWBA to screen for child mental health disorders provides a comprehensive standardised assessment of presenting symptoms and disorders which enabled us to control for the impact of internalising and externalising disorders on parental mental health and family functioning. However, the study is not without limitations. This is a cross-sectional study and therefore inferences about causality cannot be made. Further, findings are limited to young people accessing CAMHS. The primary limitation is the small sample size, which limited our power to detect weaker associations between variables in our analyses and to partition data by age. Our findings need to be replicated in a larger sample. We also lacked a control group. Our sample had a complex clinical presentation and severe levels of irritability, it may be that a different pattern of associations between irritability and family and parent functioning would be observed in other populations. Finally, this study examined only three aspects of the family environment. Future research should consider other factors including parental monitoring, parenting styles and sibling relationships (Racz & McMahon, 2011; Roberts et al., 2018), as well as getting perspectives from other family members. Further, research in children with conduct disorders suggests that specific child traits (i.e., callous-unemotional) may be detrimental to effective family functioning, as children with these traits are less responsive to the influence of parents and families (Fanti & Centifanti, 2014). This study also relied on self-report of family functioning and not objective assessments of a family's actual functioning. Caregivers may have overestimated their functioning to present themselves more favourably.

Implications and Future Directions

These findings have several implications for clinical practice and future research. Professionals should take into consideration the family contexts of the children they are treating. In this sample of severely irritable children, there was a very high level of family dysfunction. Although we were unable to examine the direction of this relationship it is likely bidirectional, and thus clinicians assessing and treating children and adolescents who present with severe irritability should take care to consider the family environment. A lack of family cohesiveness, increased family conflict and difficulties implementing daily routines may influence the child's level of engagement and compliance with treatment and should be considered by clinicians when developing treatment plans. Additionally, some parents might also be experiencing mental health difficulties of their own and may need to be connected to additional services and supports. However, most parents did not report concerning levels of psychological distress or irritability despite the perceived difficulties associated with parenting children with severe levels of irritability requiring referral to a mental health service. This may be of clinical importance when considering parental engagement in the child's ongoing treatment and in developing a a family-centred approach to treatment. Parenting programs may seek to help parents to better understand the underlying mechanisms of irritability and possible function of these behaviours from the perspective of their child, as well as helping parents to manage and identify their own stressors.

The current evidence base for irritability treatment is small, and most studies have focused on pharmacological (e.g., antipsychotics) (Arnold et al., 2010) or child-focused (e.g., cognitive behavioral therapy) interventions (Kircanski et al., 2018). Given the high rates of family dysfunction we have observed in the current study, family-centered interventions are an important area to explore in relation to treating irritability in youth. Child-centered approaches that target maladaptive behaviours and help children develop improved inhibitory control and emotional regulation are also needed. A combined child and family approach to treatment could yield the best outcomes (Brotman et al., 2017). Clinicians also should ensure that they are conducting a thorough diagnostic assessment of children who present with severe irritability. There is considerable literature demonstrating that children with severe irritability often experience multiple mental health disorders concurrently (Copeland et al., 2013; Stringaris et al., 2018), consistent with our finding that the children in this study typically met criteria for 2–3 psychiatric disorders. It is

particularly important to ensure the assessment encompasses neurodevelopmental disorders as well as internalising and externalising disorders, as these are all common in children with severe irritability.

Conclusions

Results showed that a high proportion of families of children and adolescents with severe irritability in this study were experiencing family dysfunction and that a significant minority (39%) of parents reported moderate to high psychological distress. However, there was only partial evidence that child irritability was associated with family functioning, and this was not in the direction expected. Findings point to an intricate interplay between children presenting with multiple complex presentations and their family environment, which will require further research to elucidate.

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