

Fear, Worry, and Ritualistic Behaviour in Childhood: Developmental Trends and Interrelations

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Previous studies of childhood fear, worry, and ritualistic behaviour have been limited by restricted age ranges, narrow ranges of anxiety phenomena, non-comparable methodologies, and assessment of typical behaviour within a pathological context. Content and intensity of fear, worry, and ritualistic behaviour, and associations among these variables, were assessed through a semi-structured interview individually administered to 142 children aged 7–16 years. Common themes in the content of fear, worry, and ritualistic behaviour varied predictably with age. Intensity ratings for all three phenomena decreased with age, although this decline was only significant between 7 and 10 years. Levels were higher in girls than boys. Fear and worry were positively related, and the regular performance of rituals was related to anxiety across the age range. Worry was more strongly related than fear to engagement in ritualistic behaviour. We consider implications for the understanding of anxiety and ritualistic behaviour in typical and atypical development. Copyright © 2009 John Wiley & Sons, Ltd.

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An increasing empirical focus on anxiety disorders in childhood (e.g. Cartwright-Hatton, 2006; Comer, Kendall, Franklin, Hudson, & Pimentel, 2004) has led researchers to consider how psychopathological conditions can be illuminated through the study of anxiety in typically developing children. For example,

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comparisons have recently been made between childhood-onset obsessive-compulsive disorder (OCD) and aspects of typical development, in that normative rituals have a strong phenomenological resemblance to the pathological rituals of OCD, and also appear to relate to emotional distress and anxiety (Evans, Gray, & Leckman, 1999; Leonard, Goldberger, Rapoport, Cheslow, & Swedo, 1990; Zohar & Bruno, 1997).

Studies of fear, worry, and ritualistic behaviour in typical children therefore offer the potential to provide normative data against which apparently pathological extremes of cognition and behaviour can be evaluated. Further information regarding the presentation of these phenomena throughout typical development offers important potential not only to improve understanding of OCD, but also to guide earlier identification and assessment of, and intervention in, this debilitating anxiety disorder in childhood. From a theoretical point of view, normative information about how fear, worry, and rituals interrelate in typical children will additionally allow the testing of claims about the developmental relations among anxiety experiences and behaviour.

Fear can be defined as a concern regarding danger or threat to survival (Gullone, King, & Ollendick, 2000). Empirical studies of childhood fear have demonstrated both that it is common (Gullone & King, 1997) and that it follows a specific ontogenetic course. While fears with imaginary themes such as ghosts and monsters prevail in early childhood (Bauer, 1976), realistic fears involving bodily injury/physical danger increase with age (Ollendick, Yule, & Ollier, 1991), culminating in fears of social and medical situations (Gullone & King, 1997). General fearfulness peaks around age 7 (Muris, Merckelbach, Gadet, & Moolaert, 2000) and decreases thereafter, with girls reporting more fear than boys at all ages (Ollendick *et al.*, 1991). Childhood fear research has predominantly made use of lengthy self-report questionnaires, such as the revised Fear Survey Schedule for Children (FSSC-R; Ollendick, 1983), which requires participants to report levels of fear towards a range of stimuli and situations. Rather than assessing actual fears, the FSSC-R has been argued to reflect a negative affective response to the thought of specific events occurring (McCathie & Spence, 1991). Further concerns are whether the closed-response form of the instrument might cue respondents to report fears they may not have generated alone, and whether self-report questionnaires are appropriate for young school-age participants.

In contrast to fear, worry can be defined as a concern regarding possible future social or cognitive discomfort (Barlow, 1988). Although worry is common in childhood (Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998), researchers have typically asked participants to self-report non-specific worry and anxiety-related physiological symptoms. Where information about worry content has been gathered, interviews and thought list procedures are typical (e.g. Silverman, La Greca, & Wasserstein, 1995; Vasey, Crnic, & Carter, 1994). In parallel with changes in fear manifestation, concrete worries (e.g. about physical well-being) are increasingly overshadowed by competency and social evaluative concerns as children mature (Vasey *et al.*, 1994), although the most common worries (harm befalling a loved one, health, social relations, and school performance) are apparent throughout childhood and adolescence (Muris *et al.*, 1998). Mirroring the peak in fearfulness during middle childhood, the prevalence of children reporting worry almost doubles to 80% after 7 years of age (Muris *et al.*, 2000), with girls consistently reporting more worry than boys (Ollendick, 2001).

Defined as repetitive behaviours that are carried out in a rigid and compulsive-like manner (Evans *et al.*, 1997), rituals have long been viewed as typical of

childhood. Young preschoolers frequently demand uniformity, constancy, and attention to minute details (Evans *et al.*, 1997). Later in childhood, rituals can take the form of complex, rule-based games, or behaviours intended to ward off (King & Noshpitz, 1991) or 'undo' negative consequences (Leonard *et al.*, 1990). Ritualistic behaviours decrease significantly around age 6 (Evans *et al.*, 1997), and continue to decline throughout childhood and adolescence (Zohar & Bruno, 1997). Younger children's rituals have mostly been investigated through parental report on the Childhood Routines Inventory (Evans *et al.*, 1997), while older children have typically self-reported ritualistic behaviour on clinical measures of obsessive-compulsive symptomatology (Leonard *et al.*, 1990). Thus, while early ritualistic behaviours have been normalized in research, the rituals of older childhood have been considered within a pathological context, potentially prompting under-responding in older children and adolescents. Comparability of ritualistic behaviour across normative childhood research is also restricted by the use of different informants at different ages. While parental report is appropriate for younger children, self-report measures are necessary as rituals become progressively more secretive, internalized, or restricted to contexts where parents are absent.

Potential implications for psychopathology mean that there is a pressing need to determine how fear, worry, and ritualistic behaviour interrelate across typical childhood. Crucially, such research would allow us to discriminate between different explanations of the developmental relations among anxiety phenomena. One possibility is that any such interrelations represent a general underlying anxiety process, which will relate to intensity of these experiences across the board. Another is that worry in particular reflects the presence of intrusive thoughts, which are in turn alleviated by the production of ritualistic behaviour. In investigating this question, Evans *et al.* (1999) administered the Childhood Routines Inventory and a fear inventory to 61 parents with children between 1 and 7 years. Although ritualistic behaviour was most prevalent in children aged 2–4 years, and positively correlated with fear levels at all ages, the relation between fear and rituals strengthened after 4 years of age. Evans *et al.* (1999) suggest that rituals have an adaptive function at this time, providing increased feelings of self-efficacy in an environment perceived as out of control. In view of this, the performance of ritualistic behaviours may become an increasingly maladaptive reaction to anxiety as childhood progresses. In support of this view, Zohar and Bruno (1997) found that, in a large community sample of 8–14 year olds, obsessive-compulsive symptomatology commonly reported by the youngest children was present in only a minority of the eldest, but was associated with higher levels of trait anxiety in this group. Furthermore, a higher proportion of older children in the sample reported extreme obsessions and compulsions.

While innovative, the studies of Evans *et al.* (1999) and Zohar and Bruno (1997) do not provide us with a complete picture of the developmental interrelations among fear, worry, and rituals in typical childhood. Firstly, they use only limited age ranges of participants and restricted ranges of anxiety phenomena. Secondly, they rely on a mix of non-comparable reporting methodologies (self-report and parental report). Finally, Zohar and Bruno's study employed a clinical questionnaire for assessing obsessive-compulsive symptomatology in a non-clinical sample, which might lack sensitivity in this group.

We set out to attempt to remedy these weaknesses of earlier studies with a cross-sectional design that would assess fears, worries, and ritualistic behaviours between the ages of 7 and 16. The use of an improved methodology specifically

designed for assessing these experiences in typical childhood allowed us to obtain a clearer developmental picture (through the use of measures that were consistent across ages), and consequently to examine the developmental relations among fear, worry, and rituals in more detail, and over a wider age range, than has been possible in previous studies.

Our choice of methodology was motivated by a desire to combine the systematicity of closed-response techniques with the greater flexibility of open-response methods. We first gave children an opportunity to self-report anxieties, followed by closed-response lists of fears, worries, and ritualistic behaviours. It was decided that this format would be most inclusive of all children, decreasing participation demands sufficiently to allow even the youngest children in the study (aged 7–8 years) to reliably report on their fears, worries, and ritualistic behaviours, while also ensuring the sensitivity of the procedure. This method was also expected to produce a truer picture of the most common anxiety phenomena in childhood and adolescence, avoiding the aforementioned problems of exclusively using a closed-response format. In addition to allowing us to investigate these experiences across a wide age range of typically developing children, our methodology made it possible to examine developmental relations between these variables.

Previous research has suggested that common developmental themes colour typical childhood fears, worries, and rituals, and on this basis, it was expected that the content of each of these constructs would alter in predictable fashions according to age (Hypothesis 1). It was also hypothesized that fear, worry, and ritualistic behaviour would be most prevalent in middle childhood, decreasing with increasing age (Hypothesis 2), and that girls would evince higher levels of fear, worry, and rituals than boys (Hypothesis 3). In line with previous arguments that fear and anxiety are related constructs (e.g. Gullone *et al.*, 2000) we expected fear and worry to be positively related across childhood and adolescence (Hypothesis 4). It was also anticipated that ritualistic behaviour would be positively related to fear across childhood, extending the findings of Evans *et al.* (1997) (Hypothesis 5). The relation between rituals and worry has not specifically been explored in the previous empirical childhood literature. However, as high worry is known to be especially associated with maladaptive problem solving (Dugas *et al.*, 1995), worry was expected to play a significant role in the performance of ritualistic behaviours across childhood and adolescence (Hypothesis 6).

METHOD

Participants

Participants were recruited following written informed parental consent from schools in North-East England. The sample included 142 children divided into four age groups: 7–8 years ($M = 7.5$ years, $S.D. = 0.47$, $N = 31$, 18 girls), 10–11 years ($M = 10.3$ years, $S.D. = 0.44$, $N = 31$, 18 girls), 13–14 years ($M = 13.7$ years, $S.D. = 0.49$, $N = 40$, 20 girls), and 15–16 years ($M = 15.2$ years, $S.D. = 0.32$, $N = 40$, 20 girls). The proportion of pupils eligible for free school meals ranged from broadly in line with the national average, to above average. 3% of children were from minority ethnic groups, and all spoke English as a first language. The study was approved by a university ethics committee.

The Fears, Worries, and Ritualistic Behaviours Interview

A combined open- and closed-response methodology involved children firstly self-generating fears and worries, then reporting on how much they feared/how often they worried about a list of closed-response items. Self-generating ritualistic behaviours proved too difficult for most 7–11 year old children in piloting ($N = 60$, Laing, 2002), so ritual items were closed-response only.

The majority of closed-response items were initially developed as part of a previous interview study examining the fears, worries, and ritualistic behaviours of typically developing children aged 7–11 years (Laing, 2002). As the present study included a wider age range of participants, it was important to determine the applicability of this interview to older children. Items were therefore verified or further generated via a comprehensive literature review of articles examining fear, worry, and ritualistic behaviour in children between 7–16 years. Only items reported among the 15 most common fears and worries in two or more studies were considered. Ritual items were selected from the most common compulsions reported in paediatric studies, and then rephrased to fit a normative framework, in order to minimize false denial responses. Each list was edited following consultation with experts in childhood obsessive-compulsive and other anxiety disorders, with potentially sensitive or distressing items, including anxiety about self or family dying, and worry about parents divorcing, being removed. Following this process, all of the original items from Laing's (2002) interview were retained. In addition, five items were added to the fear scale (Items 5, 6, 7, 9, and 14; see Table 1), four were added to the worry scale (Items 11, 13, 14, and 15; see Table 2), and one was added to the ritual scale (Item 15; see Table 3). The final interview included 15 fear, 15 worry, and 15 ritual items, and was further piloted with nine schoolchildren aged 7–15 years to confirm applicability of closed-response items. In each case, items were commonly endorsed as part of each child's typical experience, with high levels of familiarity and relevance.

Comparable 4-point Likert rating scales were used for each anxiety phenomenon. For fear, ratings for each item were 0 = not scared, 1 = a little scared, 2 = quite scared, and 3 = very scared. For worry and ritualistic behaviour, children were asked to rate how often they worried about/performed each item, with 0 = never, 1 = sometimes, 2 = often, and 3 = always. Total scores for each variable were derived by summing scores for the 15 items. Large card scales (1 m × 30 cm) depicting the Likert ratings were used to facilitate understanding and help anchor ratings. After endorsing an item, children were asked to point or refer verbally to the place on the meter that best described how they felt about each fear, worry, or ritual. The fear and worry meters also included pictures of faces displaying the emotions of the extreme points on each scale.

Participants were interviewed individually by a female researcher in a quiet room in school. Standardized instructions explained the aim and content of the procedure, that there were no right or wrong answers, and that it was acceptable to withdraw at any time. Initially, children were asked to self-generate personal fears (e.g. *Can you tell me about anything that you find scary?*). If, after the first prompt, children said that they could not think of or did not have any fears (this happened with 20% of the participants), the closed-response questions were presented; otherwise, participants were given up to two more prompts. Children then gave fear ratings for each self-generated and closed-response item with the aid of the 'scare meter'. Participants in the younger two age groups received a further initial practice item. Open- and closed-response ratings of worry were obtained in an identical fashion (27% of participants did not self-generate any

Table 1. Mean fear ratings (maximum = 3), percentage of 'very scary' (3) ratings, and rank order for each item (lowest = 15) by age group

Fear item	7-8 yrs	10-11 yrs	13-14 yrs	15-16 yrs
	Mean %3	Mean %3	Mean %3	Mean %3
	Rank	Rank	Rank	Rank
Animal	1.6	1.0	0.6	0.8
	35.5	9.7	10.0	15.0
	6	8	7	7
Insect	0.9	0.9	0.8	1.2
	9.7	9.7	15.0	22.5
	13	8	3	4
Strangers	2.5	2.1	1.3	1.6
	67.7	48.4	22.5	30.0
	3	2	1	2
Getting lost	2.3	1.7	1.1	1.4
	58.1	12.9	10.0	20.0
	5	7	7	5
Heights	2.3	0.5	0.7	0.7
	64.5	6.5	10.0	12.5
	4	11	7	8
Being in a fire	2.6	2.4	1.1	1.6
	74.2	64.5	12.5	25.0
	2	1	5	3
Injections/blood	1.4	0.9	0.7	0.8
	16.1	9.7	7.5	17.5
	11	8	10	6
Car accident	2.6	2.0	1.1	1.9
	77.4	35.5	20.0	40.0
	1	3	2	1
Going to the dentist	0.2	0.1	0.5	0.7
	0.0	3.2	5.0	12.5
	15	12	11	8
Being in the dark	0.5	0.3	0.4	0.2
	6.5	3.2	2.5	2.5
	14	12	12	14
Ghosts/supernatural phenomena	1.2	0.5	0.5	0.4
	32.3	0.0	2.5	7.5
	7	15	12	12
Lonely places	1.6	0.8	1.0	0.9
	22.6	16.1	12.5	2.5
	7	5	5	14
Alone at home	1.2	0.7	0.4	0.4
	32.3	3.2	2.5	5.0
	10	12	12	13
Lifts/small spaces	0.9	0.8	1.0	0.6
	12.9	16.1	15.0	10.0
	12	5	3	10
Nightmares	1.8	1.3	0.8	0.7
	32.3	19.4	2.5	10.0
	6	4	12	10

worries), followed by the closed-response ritualistic behaviour items. This combined open- and closed-response methodology for fear and worry allowed children spontaneously to report their most salient fears and worries without

Table 2. Mean worry ratings (maximum = 3), percentage of 'always' (3) ratings, and rank order for each item (maximum = 15) by age group

Worry item	7-8 yrs	10-11 yrs	13-14 yrs	15-16
	Mean %3	Mean %3	Mean %3	Mean %3
	Rank	Rank	Rank	Rank
Being told off	1.2	0.7	0.8	0.5
	22.6	0.0	2.5	0.0
	10	14	9	15
Bad marks at school	1.0	0.8	1.1	1.4
	16.1	3.2	10.0	12.5
	12	12	4	6
Harm to loved one	2.5	1.9	1.8	2.0
	58.1	29.0	17.5	30.0
	1	1	1	1
Being bullied	1.8	1.2	0.5	0.4
	45.2	19.4	2.5	2.5
	3	4	9	13
Being criticized/others complaining about me	1.8	1.1	0.8	0.5
	35.5	6.5	7.5	2.5
	6	9	6	13
Losing friends	2.0	1.5	1.1	1.3
	48.4	19.4	12.5	15.0
	2	4	2	5
Appearance	0.6	0.8	0.9	1.0
	6.5	9.7	5.0	17.5
	15	7	7	3
Whether other children like me	1.5	0.8	0.9	0.9
	29.0	0.0	2.5	5.0
	9	14	9	11
Germs/dirty things	1.8	1.1	0.8	0.9
	38.7	22.6	2.5	10.0
	5	3	9	7
Iraq War	1.3	1.1	0.8	0.9
	32.3	29.0	2.5	10.0
	7	1	9	7
Whether I've done things properly	1.4	1.3	1.2	1.3
	16.1	12.9	10.0	10.0
	12	6	4	7
Going to school	0.8	0.4	0.3	0.4
	9.7	6.5	0.0	5.0
	14	9	15	11
Being clean enough	1.3	1.0	0.8	1.4
	32.3	6.5	15.0	17.5
	7	9	2	3
Meeting someone for the first time	1.2	0.9	0.9	1.4
	22.6	3.2	5.0	27.5
	10	12	7	2
Friends talking about me behind my back	2.0	1.2	1.4	0.9
	45.2	9.7	15.0	7.5
	3	7	2	10

being influenced by the subsequent items, providing an indication of the validity of the closed-response anxieties. The entire procedure lasted around 20 min and was followed by a debriefing.

Table 3. Mean ritualistic behaviour ratings (maximum = 3), percentage of 'always' (3) ratings, and rank order for each item (maximum = 15) by age group

Ritualistic behaviour item	7–8 yrs	10–11 yrs	13–14 yrs	15–16 yrs
	Mean %3	Mean %3	Mean %3	Mean %3
	Rank	Rank	Rank	Rank
Routine I must do before getting into bed	1.3 25.8 6	1.1 29.0 1	0.8 20.0 3	1.2 32.5 1
Check doors or windows are shut/locked or taps are turned off more than once	1.0 19.4 10	0.8 6.5 8	1.3 17.5 5	1.1 17.5 5
Arrange objects to be in straight lines	1.2 19.4 10	0.8 3.2 10	0.5 7.5 11	0.5 5.0 14
Prefer objects to be symmetrical/arranged in patterns	1.6 35.5 3	0.8 3.2 10	0.9 10.0 9	0.7 7.5 11
Need to keep certain toys/belongings in special places	1.9 54.8 1	1.1 16.1 5	1.1 25.0 1	1.3 22.5 3
Wash hands/body repeatedly	1.1 12.9 13	1.0 0.0 15	0.8 7.5 11	1.4 17.5 5
Keep bedroom very tidy—a fixed place for everything	1.2 25.8 6	0.7 12.9 6	1.2 20.0 3	1.2 25.0 2
Need to do things again and again before they feel 'right'	1.3 12.9 13	1.1 6.5 8	0.6 5.0 14	1.0 10.0 8
Count over and over/repeat numbers in mind	1.1 22.6 8	1.0 3.2 10	0.4 7.5 11	0.7 7.5 11
Keep things I don't really need	1.8 29.0 5	1.8 25.8 2	1.4 17.5 5	1.7 15.0 7
Superstitious games (e.g. don't walk under ladder/step on crack)	0.9 19.4 10	0.3 3.2 10	0.9 22.5 2	1.0 22.5 3
Lucky number/word to keep away bad luck	1.3 22.6 8	1.1 22.6 3	0.1 0.0 15	0.6 10.0 8
Thoughts that go over and over in your mind even though you don't want them to	1.8 38.7 2	1.5 19.4 4	1.0 12.5 7	1.3 10.0 8
Count up to a special number/need to do something a specific number of times	0.7 6.5 15	0.5 3.2 10	0.7 10.0 9	0.5 5.0 14
A special way of doing something you cannot change, even if you wanted to	1.4 32.3 4	1.0 12.9 6	0.6 12.5 7	1.0 7.5 11

RESULTS

Reliability of Scales

Cronbach's α 's ranged from 0.78 for ritualistic behaviour to 0.84 for both fear and worry scales. To establish test-retest reliability, 28 of the 31 children tested in each of the two younger age groups, and 37 of the 40 children tested in each of the two older age groups, were re-interviewed 9 months later. Across age groups, test-retest correlations ranged from 0.69 to 0.75 for fear, 0.62 to 0.80 for worry, and 0.59 to 0.80 for ritualistic behaviour. Convergent validity data from a separate sample of 40 11–16 year old children (Laing, 2008) showed total intensity scores for each scale to correlate moderately to highly with corresponding established instruments for fear (specific phobia sub-scale of the Screen for Child Anxiety Related Emotional Disorders—Revised [SCARED-R; Muris *et al.*, 1998], $r = 0.43$, $p < 0.01$), worry (Generalized Anxiety Disorder (GAD) sub-scale of the SCARED-R, $r = 0.47$, $p < 0.01$; Penn State Worry Questionnaire for Children [PSWQ-C; Chorpita, Tracey, Brown, Colluca & Barlow, 1997], $r = 0.29$, $p < 0.05$), and ritualistic behaviour (OCD sub-scale of the SCARED-R, $r = 0.69$, $p < 0.01$; Short Leyton Obsessional Inventory for Children [Bamber, Tamplin, Park, Kyte, & Goodyer, 2002], $r = 0.79$, $p < 0.01$). These analyses also provided further support for the notion of a delineation between fear and worry in typical childhood, as the fear scale neither correlated with the GAD sub-scale of the SCARED-R nor the PSWQ-C, and the worry scale did not correlate with the specific phobia sub-scale of the SCARED-R.

Nature of Childhood Fear

Mean values and the percentage of extreme (i.e. 3) ratings for each closed-response fear item were calculated (Table 1). Items were ranked within each age group according to percentage of children giving the maximum intensity rating of 3. Fear intensity generally decreased with age, with the proportion of children appearing 'very scared' of an item often lessening with increasing age. Fear of animals, heights, ghosts/the supernatural, and being alone at home diminished between 7–8 and 10–11 years, with intense fear of strangers, lonely places, being in a car accident, and nightmares continuing to decline up to 13–14 years. In contrast, dentist fears increased across the whole age range, and insect fears increased to a maximum at 15–16 years. While fear intensity generally declined with age, fear of strangers and being in a fire/car accident ranked highly across ages.

Comparison of self-generated versus closed-response items supported the content validity of the scale. The percentage of self-generated fears not included on the closed-response scale and rated as 'very scary' (i.e. 3) was low (7–8 yrs = 15%, 10–11 yrs = 0%, 13–14 yrs = 1.9%, and 15–16 yrs = 8%), suggesting that the majority of intense self-generated fears were already included in the closed-response scale. Examples of reported fears not on the scale included 'clowns', 'when I watch something scary on television', and 'flying'.

Nature of Childhood Worry

Worry intensity declined with increasing age, particularly between 7 and 11 years (Table 2). Extreme worry relating to being told off, harm to a loved one, being criticized, losing friends, and being liked was less frequent after 7–8 years. Intense worry about germs and being bullied decreased until 13–14 years. Social

evaluative worries concerning appearance, being clean enough, and meeting someone for the first time all received higher rankings with age. Concern about harm befalling a loved one was the highest-ranked worry at all ages. Unexpectedly, the war in Iraq, widely reported in the media at the time of data collection (December 2004), received an equally high ranking among 10–11 year olds.

The percentage of intense self-generated worries not included on the closed-response scale was low for each age group (7–8 yrs = 5%, 10–11 yrs = 0%, 13–14 yrs = 8.2%, and 15–16 yrs = 7.9%), supporting the content validity of the scale. Examples of reported worries not on the scale include 'my pet being harmed', 'that I've left the door unlocked', and 'the future'.

Nature of Childhood Ritualistic Behaviour

Self-report of ritualistic behaviours generally declined with age (Table 3). Preference for arranging objects symmetrically/in straight lines, repetitive counting, intrusive thoughts, and rigid behaviours decreased sharply between 7 and 11 years of age. Although decreasing with age, the need to keep belongings in special places ranked highly across age groups, as did bedtime routines. Checking and washing behaviours, superstitious games, and the need to repeat an action until it felt 'right' decreased in intensity between 7 and 11 and subsequently increased again around 13 years.

Intensity of Childhood Fear, Worry, and Ritualistic Behaviour

Summed fear, worry, and ritual intensity scores each had a possible range of 0–45. Descriptive statistics are shown in Table 4. A 4 (Age) \times 2 (Gender) \times 3 (Scale) mixed analysis of variance (ANOVA) was conducted with two between-subjects factors (Age and Gender) and one within-subject (Scale). Large main effects were found for Age, $F(3, 134) = 14.12$, $p < 0.001$, $\eta^2 = 0.240$, observed power = 1.000, and Gender, $F(1, 134) = 25.39$, $p < 0.001$, $\eta^2 = 0.159$, observed power = 0.999. Simple effects analyses attributed the effect of Age to higher intensity scores in the 7–8 year group compared with other age groups, $p < 0.001$. The main Gender effect reflected higher scores for girls at all ages. No other main effects or interactions were significant ($F_s < 1$), except the Age \times Scale interaction, $F(5.69, 254.16) = 2.29$, $p = 0.039$, $\eta^2 = 0.049$, observed power = 0.776 (Greenhouse–Geisser adjustment for violation of sphericity), depicted in Figure 1. A series of repeated measures ANOVAs showed an effect of Scale, $F(2, 58) = 4.77$, $p < 0.05$, among 7–8 year olds only, due to higher intensity scores for fear compared with ritualistic behaviour, $t(30) = 2.75$, $p = 0.01$, and for worry compared with ritualistic behaviour, $t(30) = 2.36$, $p = 0.025$ (Bonferroni adjustment to $\alpha = 0.025$). No effects of Scale were found in the other age groups, F_s between 0.44–2.52, n.s.

Relations Among Fear, Worry, and Ritualistic Behaviour

Fear, worry, and ritual scores were highly intercorrelated, with little change in correlation strength with age (for ages 7–8, 10–11, 13–14, and 15–16, respectively, between fear and worry: $r = 0.62, 0.58, 0.58, 0.69$; between fear and ritualistic behaviour: $r = 0.50, 0.47, 0.54, 0.54$; between worry and ritualistic behaviour: $r = 0.72, 0.62, 0.64, 0.73$, all significant at $p < 0.001$). Regression analyses were constructed with ritual scores as the dependent variable. Age-group divisions

Table 4. Mean fear, worry, and ritualistic behaviour scores by age and gender

Scale	7–8 yrs	10–11 yrs	13–14 yrs	15–16 yrs
	Mean	Mean	Mean	Mean
	S.D.	S.D.	S.D.	S.D.
<i>Fear</i>				
Girl	24.78 8.32	19.22 6.70	13.90 8.60	17.40 5.70
Boy	22.31 9.47	11.46 6.62	9.15 5.46	10.55 6.70
Total	23.74 8.76	15.97 7.63	11.53 7.50	13.98 7.06
<i>Worry</i>				
Girl	24.78 7.57	17.61 7.20	16.35 6.33	18.20 7.65
Boy	18.92 9.28	12.85 6.74	11.35 6.82	11.60 6.11
Total	22.32 8.69	15.61 7.30	13.85 6.97	14.90 7.61
<i>Ritualistic behaviour</i>				
Girl	21.28 6.72	15.33 5.46	14.60 8.20	18.50 9.06
Boy	17.54 7.95	13.38 4.90	9.40 6.94	11.45 6.50
Total	19.71 7.38	14.52 5.24	12.00 7.95	14.98 8.56

were collapsed and age was included, along with gender, in the first block of the analyses, with fear entered on the second block. The results of this analysis are shown in Table 5. Age and gender did not remain significant predictors of ritual intensity after the entry of fear. Worry was entered in the third block and was a significant predictor. To test specificity, the analysis was repeated, entering worry instead to the second block, and fear to the third (see Table 6). Worry made a greater unique contribution when entered either alone (37%) or after fear (17%) into the analyses compared with when fear was entered alone (22%) or after worry (2%) (Table 6). Addition of age and gender interaction terms in further regressions generated non-significant effects for these terms.

Subsequent partial correlation analyses within age groups revealed further evidence of specificity. Once the influence of worry was accounted for, fear no longer related to the performance of ritualistic behaviour (7–8 yrs: $r = 0.10$, n.s.; 10–11 yrs: $r = 0.18$ n.s.; 13–14 yrs, $r = 0.27$, n.s.; 15–16 yrs, $r = 0.08$, n.s.). In contrast, when fear was controlled for, worry remained highly significantly correlated with ritualistic behaviour (7–8 yrs: $r = 0.60$, $p < 0.001$; 10–11 yrs: $r = 0.48$, $p < 0.01$, 13–14 yrs, $r = 0.48$, $p < 0.01$; 15–16 yrs: $r = 0.58$, $p < 0.001$).

DISCUSSION

We investigated fear, worry, and ritualistic behaviour in children aged 7–16 years through a normatively framed, semi-structured interview. Our first hypothesis, that contents of fear, worry, and ritualistic behaviour would reflect

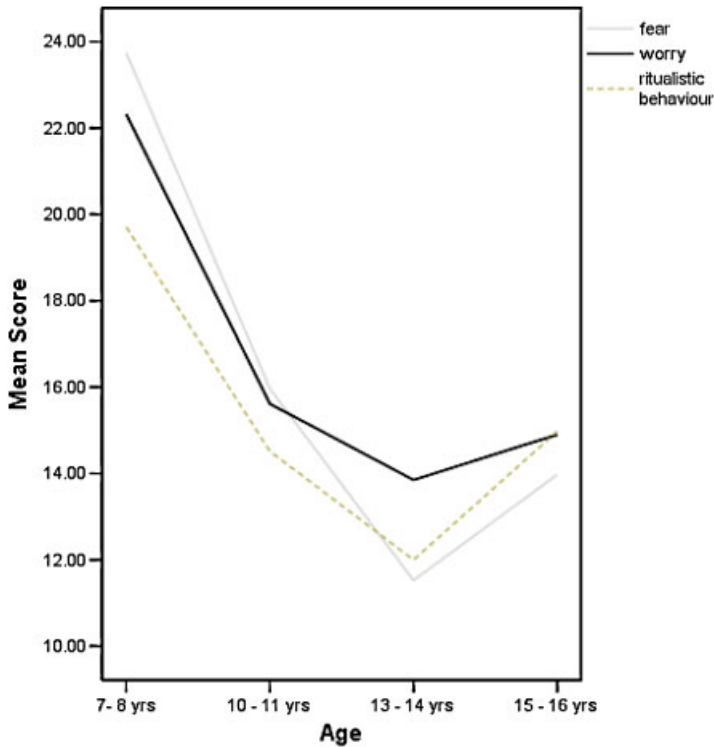


Figure 1. Developmental trends in fear, worry, and ritualistic behaviour between 7–16 years of age.

Table 5. Summary of hierarchical regression analyses for variables predicting ritualistic behaviour—first analysis

	Variable	<i>B</i>	SE <i>B</i>	β
Step 1	Age	−1.4	0.56	−0.20*
	Gender	−4.7	1.24	−0.30***
Step 2	Age	0.07	0.53	0.01
	Gender	−2.1	1.56	−0.13
	Fear	0.49	0.07	0.54***
Step 3	Age	0.29	0.46	0.04
	Gender	−0.70	1.01	−0.04
	Fear	0.17	0.08	0.19*
	Worry	0.56	0.08	0.58***

Note: $R^2 = 0.14$ for Step 1 ($p < 0.001$); $\Delta R^2 = 0.22$ for Step 2 ($p < 0.001$); $\Delta R^2 = 0.17$ for Step 3 ($p < 0.001$). * $p < 0.05$, *** $p < 0.001$.

developmentally typical themes, was supported. Partial support was found for Hypothesis 2, in that the youngest children (aged 7–8 years) reported greatest intensity of fear, worry, and ritualistic behaviour. The decline in intensity of these

Table 6. Summary of hierarchical regression analyses for variables predicting ritualistic behaviour—second analysis

	Variable	B	SE B	β
Step 1	Age	-1.4	0.56	-0.20*
	Gender	-4.7	1.24	-0.30***
Step 2	Age	-0.00	0.45	-0.00
	Gender	-1.04	1.01	-0.07
	Worry	0.66	0.07	0.69***
Step 3	Age	0.29	0.46	0.04
	Gender	-0.70	1.01	-0.04
	Worry	0.56	0.08	0.58***
	Fear	0.17	0.08	0.19*

Note: $R^2 = 0.14$ for Step 1 ($p < 0.001$); $\Delta R^2 = 0.37$ for Step 2 ($p < 0.001$); $\Delta R^2 = 0.02$ for Step 3 ($p < 0.05$).
* $p < 0.005$, *** $p < 0.001$.

phenomena was only significant between 7–8 and 10–11 years of age. In line with Hypothesis 3, intensity of fear, worry, and ritualistic behaviour was higher in girls than boys, regardless of age. Supporting Hypothesis 4, fear and worry were positively related, and ritualistic behaviour was related to fear and worry across age groups (Hypotheses 5 and 6). The association between worry and rituals appeared stronger than that between fear and rituals.

The present study replicates and extends several previous findings. The nature and intensity of all three phenomena was consistent with previous reports across childhood and adolescence. For example, early fears concerning imaginary phenomena, nightmares, and animals decreased as development progressed (Bauer, 1976). In contrast, fear of insects, specifically spiders, increased over development, in line with previous studies using open- rather than closed-response tasks (Gullone, 1999). One explanation is that participants typically rate the long lists of closed-response items in fear schedules comparatively. Several of these items pertain to extreme danger and presumably evoke a strong emotional response. Older children, with their increased reasoning and cognitive abilities, may therefore rate items such as insect fears with less intensity in the context of other, more dangerous items. The present findings suggest that a combination of open and closed methods may produce the truest picture of anxiety throughout childhood and adolescence.

We also replicated established patterns in relation to worry, such as the prominence of concern over peer relations and behavioural competence in middle childhood (Vasey *et al.*, 1994). Possibly related to the increase in social evaluative concerns during adolescence, which may have included greater concerns about hygiene and cleanliness, washing rituals also intensified with age (see also Zohar and Bruno, 1997). Checking behaviours were similarly more prominent during this developmental epoch, perhaps reflecting the increased independence and responsibility expected of older children. Arranging and symmetry rituals substantially diminished during middle childhood. As a result of their greater understanding of the contingencies of daily life, older children may feel less compelled to simplify and impose a personalized structure on the surrounding environment (Evans *et al.*, 1997). In parallel with previous research (Zohar & Bruno, 1997), children in the present study also reported a decreasing susceptibility to intrusive, uncontrollable thoughts at this time.

Developmental variation in fear, worry, and rituals is presumably common because the significance of specific stimuli and situations alters across childhood and adolescence. While the intensity of specific fears or worries generally reduced with age, the most commonly expressed anxieties related to danger and physical injury. This predominance of anxiety surrounding harm and danger-related events has been linked to our biological propensity to experience fear in response to stimuli that threaten survival (Gullone, 1999). Although the cueing effect of closed-response items may have distorted previous findings (McCathie & Spence, 1991), we found widespread anxiety concerning harm/danger to self or loved ones regardless of reporting format, confirming previous findings that anxiety over low-frequency events is ubiquitous among both non-clinical and clinical samples of children and adolescents (Gullone, 1999). It appears that children understand that dangerous events are unlikely to occur, and yet this understanding does little to attenuate any associated anxiety (Silverman *et al.*, 1995). A possible mechanism to explain this phenomenon, known as 'ex-consequencia reasoning' (the tendency to reason that the subjective experience of anxiety is clear evidence for the danger of a specific situation) has been reported among clinically anxious samples (Beck & Emery, 1985), and our findings may indicate that this tendency extends to non-clinical childhood anxiety.

As in previous longitudinal and cross-sectional studies (Gullone & King, 1997; Muris *et al.*, 2000; Zohar & Bruno, 1997), fear, worry, and ritualistic behaviours were particularly intense during middle childhood, decreasing most rapidly between 7 and 10 years of age. We found consistency over 9 months in fear, worry, and ritual intensity scores, supporting suggestions that individual differences in anxiety are relatively stable (Gullone & King, 1997). Young children reporting high levels of anxiety and ritualistic behaviour may therefore be more likely to remain susceptible to these experiences throughout ontogeny.

In addition to providing descriptive data on fear, worry, and ritualistic behaviour in typical childhood, our findings allowed us to speculate on possible causal associations among these variables. Throughout the age range studied, worry intensity was a stronger predictor than fear of the propensity to perform ritualistic behaviour. This previously undocumented association may originate from an underlying similarity between the processes of worry and obsessions. While fear relates to apprehension arising in response to present, realistic danger (Marks, 1987), both worry and obsessions similarly involve negative and relatively uncontrollable anticipatory thought processes. Associations have been reported between measures of worry and obsessional symptoms (e.g. Freeston *et al.*, 1994), suggesting that normative ritualistic behaviour may similarly represent efforts to relieve tension and anxiety (Marks, 1987). While perhaps an adequate response to anxiety in early life, more flexible, sophisticated strategies are required successfully to deal with the complex environmental demands of later childhood, resulting in a decrease in ritualistic behaviour with age. The continuing links between ritualistic behaviour and intense anxiety will mean that extreme worry may increasingly become a pre-requisite to the previously successful, though increasingly maladaptive, response of ritualistic behaviour. In examining this possibility, future replications with larger samples may be able to determine whether the observed predictive relation between worry and ritualistic behaviour strengthens with age, by conducting the regression analyses reported here on separate, larger age groups.

While the combined open- and closed-response semi-structured interview methodology is a strength of this study, findings are limited due to the reliance on a single informant. Although children's internalizing symptoms are acknowledged to

be reliably reported by children themselves (Silverman & Eisen, 1992), and the present study reported good estimates of test–retest reliability and convergent validity, additional data from parents may have yielded further relevant information, particularly on younger children’s rituals. In addition, our cross-sectional findings would be strengthened by longitudinal studies to examine sub-clinical levels of anxiety and ritualistic behaviour throughout development.

Our study was motivated by a need to obtain normative data on anxiety phenomena in typical childhood as a context within which to evaluate pathological behaviour. In the absence of direct empirical confirmation, the predictive value of childhood anxiety and ritualistic behaviour for the eventual onset of psychopathology is unclear. Leonard *et al.* (1990) dismissed this possibility after examining retrospective parental reports of the childhood rituals of OCD patients compared with controls. The connection between normative childhood ritual and eventual disorder was attributed to retrospective report bias, and dismissed on the grounds that the content of premorbid behaviour was unrelated to the symptoms of the disorder. However, our findings show that normative anxieties and rituals change in content over time as a function of altering developmental salience, in a similar fashion to pathological examples of the phenomena. Children and adolescents with OCD often display multiple obsessions and compulsions, the specific types of which change in both content and severity over the course of the disorder (Rettew, Swedo, Leonard, Lenane, & Rapaport, 1992). While prior research has claimed that these changes occur in no clear sequence (Leonard *et al.*, 1990), the developmental pattern observed in previous clinical research clearly accords with the present findings. This suggests that there may be ages of vulnerability for certain manifestations of obsessive–compulsive symptomatology, and that age-specific variability in OCD presentation may be coloured by common and fluctuating typical developmental themes in anxiety and ritualistic behaviour. This does not necessarily mean that normative anxieties and rituals will develop into clinical obsessions and compulsions, but highlights the importance of considering typical developmental variability to increase the sensitivity of research and clinical work.

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