The Nature of Feared Outcome Representations in Children

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The present study investigated the way in which feared outcomes are organized in long-term memory in children and adolescents. A list of items relating to threatening outcomes, originally generated by children, was given to an additional 560 children (aged 6 to 16) and rated for the degree to which they worried about each. Factor analysis revealed two interpretable factors of feared outcomes. The first factor centered on concerns about physical harm while the second factor centered on social consequences that children and adolescents worry about. The two factors were consistent across gender, age, and clinical status. A scale involving the maximally discriminating items showed good internal consistency and test–retest reliability.

Information processing models of anxiety (e.g., Beck & Clark, 1988; Lang, 1979) stress the importance not only of representations of feared stimuli but, perhaps more importantly, of representations of expected outcomes associated with those stimuli. In fact it is precisely the expected outcomes and more particularly their pattern of associations with stimuli which theoretically distinguish individuals with normal and pathological levels of anxiety (Beck & Clark, 1988). For example, a mental representation of a palpitation is, no doubt, common to everyone. But a strong tendency to associate such an event with a coronary is specific to individuals with panic disorder (McNally, 1990). Thus, it is the feared outcomes which in most cases can provide the most unique understanding of excessive anxiety and

which are the focus of recent conceptualizations of the anxiety disorders (e.g., Beck & Clark, 1988; McNally, 1990; Rapee, 1991).

In developing information processing models of anxiety, one of the most basic questions is how such feared outcomes are organized or grouped in long-term memory. For example, it may be that all feared outcomes are represented as a single entity ("something bad"). Alternatively, it may be that networks of feared outcomes are more logically organized into two, three, four, or more clusters of thematically similar outcomes such as psychic stress, physical fears, or economic fears. A knowledge of the organization of feared outcomes in long-term memory would help to improve our understanding of the anxiety disorders because it may help to provide more precise predictions about differences within the anxiety disorders. For example, in the adult literature it has been found that attentional bias is demonstrated to different types of information in a "social" disorder (social phobia) as opposed to a "physical" disorder (panic disorder) (Hope, Rapee, Heimberg, & Dombeck, 1990). Along similar lines, knowledge of the organization of feared outcomes may help to provide a more empirical framework for a system of classification rather than the current, largely consensual systems.

Unfortunately, to date, there has been little research into the nature and organization of feared outcomes in either children or adults. Some attempt has been made to examine the organization of fears by looking at the factor structure of feared stimulus measures such as the Fear Survey Schedule (Geer, 1965; Ollendick, 1983). Few of these studies have used children as subjects, but two which have done so have indicated different numbers of factors of feared stimuli (Miller, Barrett, Hampe, & Noble, 1972; Ollendick, 1983). In a similar fashion, using adult subjects, such studies have produced inconsistent results, providing anywhere between three and 17 factors (Bates, 1971; Endler, Hunt, & Rosenstein, 1962). Such inconsistent results may be partly due to the nature of stimulus measures, thus lending further support to the value of outcome conceptualizations of anxiety. For example, fear of riding on buses may be due to a fear of negative evaluation, in which case it would cluster with fears of social situations, or it could be due to a fear of being trapped, in which case it would cluster with fears of enclosed spaces.

To date, there have been few studies of the factor structure of feared outcomes. A recent study using adults asked subjects to indicate the degree to which they "typically worried" about a number of events (Lovibond & Rapee, 1993). The events were selected from pilot data to be terminal or outcome events rather than initiating stimuli (e.g., "being burned" rather than "fire"). The resulting Negative Outcome Questionnaire (NOQ) was administered to 623 subjects, consisting of both a student sample and a

community sample. The results indicated a fairly clear two-factor solution with the factors seemingly representing fears of negative evaluation and fears of physical trauma. Importantly, these two outcome factors appeared to have somewhat different properties, showing different patterns of relationships with age, and with measures of depression, worry, and tension. Similar results have been reported in a study using adolescents (aged 12 to 18 years) in which three clusters emerged: physical threat, interpersonal threat, and personal consequences (Stattin, Magnusson, Olah, Kassin, & Reddy, 1991). This study provided evidence for the value of identifying feared outcome factors by demonstrating that scores on specific factors accounted for more variance in situational anxiety than did scores on a measure of trait anxiety.

The purpose of the present investigation was to extend these data to examine the structure of feared outcomes in children. Investigation of children's anxiety has often been conducted under the assumption that the phenomenon in children is identical to that in adults. While this may be the case, it is not necessarily true and thus research into the nature of anxiety needs to be conducted independently at all developmental levels, using items obtained from within the appropriate age group. It may well be found that children's representations of feared outcomes are grouped similarly to those of adults. On the other hand, it may be that the tendency to cluster related outcomes in long-term memory may not be developed at younger ages (Stattin et al., 1991) and that feared outcomes are represented as a single factor. The study also included a number of standard children's anxiety measures in order to examine the relationships between these measures and any identified factors. In the present study we initially generated items from children for use in the later investigation. In addition, by examining a large number of subjects, it was possible to test for any developmental changes in a cross-sectional fashion.

METHOD

Subjects

The subjects were 560 school children, aged from 6 to 16 years. Mean age was 11.0 years (SD = 2.9). Two hundred and eighty-three (50.5%) were female and 277 (49.5%) were male. Two groups were drawn from schools in a large city in Australia, a primary school (n = 85) and a high school (n = 96). In both schools all children were asked to participate (approximately 300 at each school) but only those with written parental permission on the day of testing were included. A third group was drawn randomly

from the community ($n = 266$) and a fourth from a child anxiety project ($n = 113$) conducted by a major university in the same city. All children were enrolled in regular classrooms in Queensland.

Materials

The Child and Adolescent Worry Scale (CAWS) was constructed by first conducting a pilot study in a school not subsequently used in the research. All children in years 1 through 7 (approximately 400) were asked to write down "all the terrible, unpleasant and nasty things that can happen to children." Help with spelling or writing was given to those children who requested it. From this list all redundancies were eliminated. Items on rape, physical abuse, and kidnapping were deleted because of parental objection to these items being presented on a measure to children. Any items that had a specification of situational context, i.e., antecedent stimuli, were also deleted (cf. Lovibond & Rapee, 1993). A final list of 31 items was retained. The instructions asked children to indicate how much they worried about each item on a 3-point Likert scale ($0 = none$ to $2 = a lot$). The scale was aided by a graphic at the top of each page which depicted a smiling face, a slightly worried face, and a very worried face representing each score.

Procedure

In the school situations the investigator was introduced to each class by the regular classroom teacher. Directions were given after the questionnaires were handed out. The items were read to all the primary classrooms but not to the secondary classrooms. Children were instructed to read each item, then place a tick in the column which indicated their level of worry. Any questions were answered by the researcher. For children not assessed in the classroom, questionnaires were sent through the mail and parents were asked to ensure that they were completed by the children independently. There were no significant differences on mean scores on the questionnaire between the children who had the items read to them ($M = 27.68$, $SD = 13.24$), children who read the items themselves ($M = 26.43$, $SD = 11.78$), and those who had them mailed ($M = 25.60$, $SD = 13.05$), $F(2, 444) = 0.87$, n.s. The questionnaire was readministered to 38 children from the community group after 1 week and to a different group of 59 children also from the community group after 3 months. One hundred seventy-six of the children from the community group and the university group also completed the Fear Survey Schedule for Children—Revised (FSSC-R; Ollendick, 1983), the Trait scale of the State-Trait Anxiety Inventory for

Children (STAIC; Spielberger, 1970), the Children's Depression Inventory (CDI; Kovacs & Beck, 1977), and the Revised Children's Manifest Anxiety Scale (CMAS; Reynolds & Richmond, 1978).

RESULTS

Factor Analysis

A matrix of the intercorrelations among the 31 items was obtained and subjected to factor-analytic procedures. Responses to items were analyzed through the method of principal factors with R^2 in the diagonal of the item-correlations matrix as the initial communality (h^2) estimates. Factors extracted through this method were then rotated orthogonally through the varimax procedure and obliquely through the oblimin procedure. Only those factors with eigenvalues greater than 1 were retained for rotation.

Items were considered to load on a rotated factor if their loading on that factor was 0.4 or greater and if the item had no comparable loading on another factor (Tabachnik & Fidell, 1983). As the ratio of observations to variables is generally recommended to be 10:1, well over that proportion was obtained for the 31 items ($n = 560$).

The principal-components factor analysis conducted on the correlation matrix retained six factors for rotation. The six factors with eigenvalues greater than 1 accounted for a total of 57.9% of the variance.

Orthogonal and oblique rotation of the six factors produced a solution that lacked conceptual clarity. The smaller factors were difficult to interpret meaningfully. Examination of the scree plot (Cattell, 1966) revealed that two factors could reliably be extracted. These two factors obtained eigenvalues of 9.3 and 3.5 and provided the most interpretable solution semantically. The oblique rotation yielded a correlation of 0.4 between the two factors. Thus a two-factor solution was retained, the two factors accounting for 32.2% and 10.6% of the variance, respectively.

Table I presents all items of the scale grouped by factor. As the oblimin and varimax rotations were almost identical, varimax rotation was used. Items comprising each factor are listed in descending order of importance to loading. Using the criterion of 0.4, it can be seen that one item loaded on both factors and one item did not load on either factor. The two-factor solution accounted for 42.8% of the total variance.

As can be seen in Table I, factor 1 was defined by items characterized by worries related to death, pain, and physical injury. Thus this factor will be referred to as physical threat. It contained 14 items. Factor 2 also con-

Table I. Factor Loadings, Communalities, and Percent of Variance for the Two Factors of the Child and Adolescent Worry Scale

	Factor 1	Factor 2	Communalities
21. not being able to breathe[a]	0.82	0.11	0.69
24. being drowned[a]	0.79	0.15	0.65
5. being blind[a]	0.79	0.01	0.62
8. being killed in war[a]	0.78	0.04	0.62
6. being confined in a wheelchair[a]	0.77	0.03	0.60
2. being injured in a car accident[a]	0.73	0.14	0.56
18. being burnt[a]	0.72	0.16	0.54
14. dying[a]	0.71	0.15	0.52
15. breaking arm or leg[a]	0.65	0.20	0.47
10. being bashed up	0.60	0.38	0.49
11. being lost	0.57	0.39	0.47
25. vomiting	0.53	0.28	0.36
28. being stung	0.42	0.36	0.31
20. being sick	0.40	0.36	0.29
19. being teased[b]	0.15	0.70	0.51
17. people being nasty to you[b]	0.27	0.66	0.51
16. not having anyone to play with[b]	0.21	0.65	0.46
27. being criticized[b]	0.24	0.62	0.44
29. looking silly[b]	0.06	0.62	0.39
4. being left out[b]	0.14	0.60	0.38
1. being laughed at[b]	0.03	0.60	0.36
11. making a mistake[b]	0.07	0.58	0.34
31. not having any friends[b]	0.30	0.57	0.42
9. being lonely[b]	0.18	0.56	0.34
22. not looking good[b]	0.01	0.54	0.30
12. being hurt	0.38	0.44	0.34
30. being blamed unfairly	0.31	0.46	0.31
7. coming last in a race	−0.05	0.45	0.20
3. teacher being mad at you	0.26	0.43	0.25
13. being smacked or hit	0.44	0.44	0.38
23. being late for school	0.14	0.38	0.16

[a]Item included in physical scale.
[b]Item included in social scale.

tained 14 items and was characterized by worries related to social embarrassment, loneliness, and perfectionism. Thus this factor will be referred to as social threat.

Factorial Invariance

Factorial invariance has been recommended for all personality (Katzenmeyer & Stenner, 1977) and cognitive instruments (Reynolds, 1978,

cited in Reynolds & Richmond, 1978). Factorial invariance refers to the similarity or constancy of a dimension as one moves across important subject parameters (Arrindel, Emmelkamp, & van der Ende, 1984). It defines the limits of the scale and establishes the valid limits of the scale's use. As Derogatis (1977) argued, factorial invariance also provides information on the practical limits of generalizability and thereby the reliability of the measure. It also highlights important differences among groups in psychopathology and permits direct comparisons of groups.

In the present study factorial invariance was explored across gender, across age, and across clinical status. In each case, a scree plot test indicated that a two-factor solution provided the best description of the data. Table II shows the eigenvalues and percentage variance for the two factors by gender, age, and clinical status. Twenty-seven of the items loaded on the same factors for both males and females. Being bashed, smacked, or sick or the teacher being mad at you loaded differently for boys and girls. Twenty-eight of the items loaded on the same factors for both younger and older students. Being stung, being smacked, and being sick loaded differently. Twenty-nine of the items loaded on the same factors for clinically disordered children and nondiagnosed children. Being smacked and hurt loaded differently.

Maximally Discriminating Variables

For research and clinical purposes, it would seem especially valuable to identify those items which maximally differentiate social from physical concerns. Two criteria were used to retain items. First, items had to have a substantial difference in loading on the two factors. The absolute value of the difference between the loading on factor 1 and the loading on factor 2 was calculated for each item. The differences ranged from 0.71 on the item "not being able to breathe" to a difference of loading of only 0.02

Table II. Factorial Invariance for Males and Females, Age and Clinical Status

	Factor 1		Factor 2		
	Eigenvalue	Percent	Eigenvalue	Percent	Total
Males	9.7	31.2	3.2	10.4	41.6
Females	10.2	33.9	3.4	11.0	43.9
< 11 Years	10.7	34.5	3.0	9.7	44.2
> 11 Years	9.0	29.1	3.9	12.7	41.7
Anxiety disorder	11.1	35.6	3.9	12.5	48.1
Nonclinical	9.8	31.5	3.2	10.2	41.7

for the item "being hurt." Visual examination of the loading difference scores for items in each factor in descending order indicated a natural break in each factor. This break occurred on the physical factor below item 15 (loading difference = .45) and on the social factor below item 22 (loading difference = .38). Thus, in selecting items to maximally distinguish social from physical concerns, the first criterion was to exclude items which fell below these apparent natural breaks in loading difference scores. A second criterion was to exclude any items which loaded greater than .3 on the alternate factor. Those items which did not meet these two criteria were discarded. This left nine items to comprise a physical concerns scale and 11 items to comprise a social concerns scale (see Table I).

Reliability and Validity of the Physical and Social Concerns Scales

Reliability of the physical and social scales was assessed by internal consistency, and test–retest reliability over 1-week and 3-month intervals.

Internal consistency (coefficient alpha) was found to be .92 for the physical scale and .84 for the social scale.

Thirty-eight children were readministered the CAWS on two separate occasions 1 week apart. One-week test–retest reliability for the physical scale was .91. Mean scores were 7.5 (SD = 6.2) and 7.3 (SD = 6.1) for the first and second administrations, respectively. This difference was not significant, $t(37)$ = 0.44, n.s. One-week test–retest reliability for the social scale was .84. The mean scores were 8.1 (SD = 4.2) and 8.1 (SD = 5.2), respectively, also showing a nonsignificant difference, $t(37)$ = −0.11, n.s. Thus the scores on the two scales remained stable over 7 days, indicating high test–retest reliability.

Fifty-nine children were also readministered the physical and social scale on two separate occasions 3 months apart. Mean scores for the first and second administration of the physical scale were 7.7 (SD = 6.2) and 6.8 (SD = 5.6), with a correlation of .82. The difference between tests was not significant, $t(58)$ = 1.88, n.s. The mean scores for the social scale were 8.7 (SD = 5.0) and 7.1 (SD = 4.6), a difference which was significant, $t(58)$ = 3.31, p < .05. The correlation was .71, indicating that although the scores fell over time the relative values of anxiety remained consistent.

Results therefore indicate that the two scales possess high internal consistency. They are highly reliable over a 1-week interval and are moderately to strongly reliable over a three-month interval, although the social scale may lack some stability over periods as long as 3 months.

Validity of the Physical and Social Scales

Validity of the two scales was ascertained by correlations with the CDI, the FSSC-R, the CMAS, and the STAIC. Both the physical scale and the social scale correlated positively and significantly with all the other measures (all $p < .01$) (see Table III). Two-tailed Fischer's exact tests were conducted to examine differences between the correlations of the physical scale and the social scale with each of the measures. The two scales did not differ significantly in their correlation with the FSSC-R (total), Fisher's exact = 0.86, n.s., the CMAS (total), Fisher's exact = 1.44, n.s., or the STAIC, Fisher's exact = 1.15, n.s. However, the social scale correlated significantly more than the physical scale with factor 1 of the FSSC-R, Fisher's exact = 3.19, $p < .05$, and factor 1 of the CMAS, Fisher's exact = 2.51, $p < .05$, and showed a trend toward significance on the CDI, Fisher's exact = 1.73, $p < .1$. The physical scale correlated significantly more with the sum of factors 2, 3, and 4 of the FSSC-R than the social scale, Fisher's exact = 1.96, $p < .05$.

Age and Sex Differences

As the physical and social scales had different numbers of items, the mean item scores were used in comparisons across age and sex. To explore systematic differences between the physical and social scales a 2 (sex: Male, Female) × 3 (age: 6 to 9, 10 to 13, 14 to 16 Years) × 2 (threat: Physical, Social) repeated-measures analysis of variance (ANOVA) was computed. The results revealed a significant main effect for threat, $F(1, 554) = 48.93$,

Table III. Correlation of Physical and Social Scales with Other Measures[a]

	Physical scale	Social scale
FSSC-R (total)	.59	.52
Factor 1 FSSC-R	.38	.62
Factors 2, 3, and 4 FSSC-R	.57	.42
CMAS (total)	.37	.49
Factor 1 CMAS	.32	.53
STAIC	.38	.48
CDI	.21	.37

[a]FSSC-R = Fear Survey Schedule for Children—Revised; CMAS = Children's Manifest Anxiety Scale; STAIC = State-Trait Anxiety Inventory for Children; CDI = Children's Depression Inventory. Factor 1 FFSC = fear of failure and criticism; factors 2, 3, and 4 FSSC-R = fear of the unknown, fear of injury and small animals, and fear of danger and death, respectively; factor 1 CMAS = worry/sensitivity.

$p < .001$, and significant Age × Threat, $F(2, 554) = 7.03$, $p < .01$, Sex ×
Threat $F(1, 554) = 13.51$, $p < .001$, and Age × Sex × Threat, $F(2, 554) =$
6.81, $p < .01$, interactions.

To simplify interpretation, this significant repeated-measures ANOVA
was followed by two 2 (Sex) × 3 (Age) univariate ANOVAs examining re-
lationships within each scale separately. For the physical scale, a significant
main effect was found for age, $F(2, 557) = 4.56$, $p < .05$, but not for sex,
$F(1, 558) = 0.09$, n.s. (see Table IV). For the social scale there is a significant
main effect for sex, $F(1, 558) = 25.56$, $p < .001$, but not for age, $F(2, 557)$
$= 1.18$, n.s. (see Table V). There were no significant two-way interactions.

DISCUSSION

The results of the factor analysis indicate that it is possible to identify
two interpretable factors of feared outcomes. Factor 1 appears to be a
physical threat factor, with items centering on the consequences of physical
harm, such as not being able to breathe, being blind, and being drowned.
Factor 2 contains items which center on the social consequences that chil-
dren and adolescents worry about, such as being left out, looking silly, and
being teased. Of the 31 items only one failed to load saliently on either

Table IV. Mean Item Scores on Physical Scale by Age and Sex (Standard Deviations in Parentheses)

Age	Male		Female		Total	
6 to 9 Years	1.02	(0.65)	1.15	(0.70)	1.09	(0.68)
10 to 13 Years	0.89	(0.66)	0.93	(0.67)	0.91	(0.67)
14 to 16 Years	1.01	(0.58)	0.84	(0.54)	0.92	(0.57)
Total	0.97	(0.64)	0.99	(0.67)	0.98	(0.65)

Table V. Mean Item Scores on Social Scale by Age and Sex (Standard Deviations in Parentheses)

Age	Male		Female		Total	
6 to 9 Years	0.71	(0.44)	0.83	(0.42)	0.77	(0.44)
10 to 13 Years	0.74	(0.40)	0.90	(0.45)	0.82	(0.44)
14 to 16 Years	0.60	(0.41)	0.92	(0.40)	0.76	(0.43)
Total	0.70	(0.42)	0.88	(0.43)	0.79	(0.43)

factor with one loading on both. The multifactor nature of the scale was thus confirmed, with the two factors consistent across gender, age, and clinical status. The consistent factor structure across age is especially important as it provides evidence against any suggestions of a developmental change in internal feared outcome representations, at least from an age of around 6 years.

These results suggest that the organization of feared outcomes in children can be parsimoniously explained by concerns about social and physical threat. It is interesting to note the marked similarity between these results and those in adults (Lovibond & Rapee, 1993). These factors offer some support for a suggestion that threat representations in long-term memory are similar in children and adults and are organized around two broad clusters. The validity of this distinction was demonstrated by the fact that the two factors showed some distinguishing properties such as different relationships with age, sex, and other measures.

The results showed a pattern of declining total worries with increasing age. This is similar to several other findings of decreases in total fear scores using stimulus items (King et al., 1989; Harter & Whitesell, 1989; Simon & Ward, 1974). The scores for worries on the physical scale also followed this trend of decrease with age. However the worries on the social scale remained relatively constant. This finding is contrary to some previous research based on measures of feared stimuli which seemed to suggest that social concerns increase with age (Harter & Whitesell, 1989; King et al., 1989). Whether this discrepancy is due to differences between measures of feared stimuli and feared outcomes or to methodological differences remains to be determined.

The present study also supported previous findings that, compared with social threat, physical threat is of most concern to children (King et al., 1989). It is interesting to note that the major worries in young adults appear to be social concerns (Lovibond & Rapee, 1993), with physical concerns becoming more prominent for older adults. Thus a developmental pattern may be emerging showing a decrease in physical concerns with age up to young adulthood but a reversal of this trend beyond this stage.

In line with other findings with children, females reported more worries than males overall (Bamber, 1974; King et al., 1989; Ollendick, Matson, & Helsel, 1985; Simon & Ward, 1982). However, although the social scale produced a similar result, with females expressing more social concerns than males, for the physical scale there were no gender differences. This parallels similar results with adults where no sex differences have been found on worries about physical outcomes, whereas females have been found to report more worries than males about social outcomes (Lovibond & Rapee, 1993).

Finally, the social and physical factors showed a somewhat different pattern of correlations with other measures. As expected, the physical factor correlated more strongly with the more physical scales of the FSSC-R while the social factor correlated more with the equivalent scale of the FSSC-R. In addition, the social factor also tended to correlate more with the worry scale of the CMAS and the CDI, a pattern which is similar to that shown in adults (Lovibond & Rapee, 1993). These data are consistent with reports that with adult subjects the Manifest Anxiety Scale and State Trait Anxiety Inventory tend to be more closely related to social concerns (Endler & Okada, 1975; Stattin et al., 1991).

The reasons for the suggested differences between the social and physical factors are difficult to discern. On the one hand, it may be that perceived physical threat and perceived social threat truly have distinct properties. An alternative possibility is that children do not differentiate between the perceived cost of negative outcomes (aversiveness) and the perceived probability of negative outcomes happening to them (frequency rates). As McCathie and Spence (1991) have found, children might not differentiate between worry and aversiveness and thus the two scales could reflect this lack of distinction. Further investigation of this concept needs to be carried out.

In summary it was found that two factors of physical and social threat accounted for 42.8% of the variance in the Child and Adolescent Worry Scale. The two factors were differentially associated with age and sex. Physical concerns declined with age but social concerns remained constant. Physical concerns showed no gender differences whereas females showed greater social concerns than males. The two factors were also differentially related to measures of anxiety and depression. These results provide evidence to suggest that threat representations in long-term memory are organized around two broad clusters, in both children and adults.

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