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# Three dimensions of oppositionality in youth

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**Background:** Oppositional defiant disorder (ODD) in youth is a strong predictor of mental illness yet the wide range of associations with psychiatric disorders remains largely unexplained. The aim of this study was to investigate whether the identification of irritable, headstrong and hurtful dimensions within youth oppositionality would clarify the pattern of associations between oppositionality and a wide range of psychopathology in early and adult life. **Methods:** Cross-sectional data from national mental health surveys including 18,415 subjects aged 5–16 in the United Kingdom. The main outcome measures were the associations between *a priori* hypothesised dimensions of oppositionality with psychiatric disorders and symptoms; parent and teacher-derived information were used in multivariate regression analysis. **Results:** Our three *a priori* dimensions had very different associations with disorders and symptom scales. Irritability was the only predictor of emotional disorders (parent report: OR = 3.26 [CI 95% 2.79, 3.80]; teacher report: OR = 2.78 [2.39, 3.22]); the hurtful dimension was particularly strongly associated with seeming cold-blooded or callous (parent report:  $\beta = .32$  [.27, .37]; teacher report: .33 [.30, .36]); and the headstrong dimension was most strongly associated with attention deficit hyperactivity disorder (ADHD; parent report: OR = 3.21 [2.43, 4.23]; teacher report : OR = 7.18 [5.25, 9.82]). All three dimensions were associated with conduct disorder, with the headstrong dimension being the main predictor of non-aggressive symptoms (parent report:  $\beta = .31$  [.27, .34]; teacher report: .43 [.40, .45]), and with the hurtful dimension being the main predictor of aggressive symptoms (parent report:  $\beta = .35$  [.32, .39]; teacher report: .40 [.39, .42]). **Conclusions:** The three dimensions of oppositionality have distinctive external correlates, suggesting they may also be differential predictors of aetiology, prognosis and treatment responsiveness. **Keywords:** Oppositional defiant disorder, attention deficit hyperactivity disorder, conduct disorder, emotional disorders, irritability, comorbidity, depression.

The significance of oppositional defiant disorder (ODD) in youth is apparent in its high prevalence and its particularly strong association with a wide range of adult psychiatric illness (Kim-Cohen et al., 2003; Nock, Kazdin, Hiripi, & Kessler, 2007), conduct disorder (CD) and antisociality (Burke, Loeber, Lahey, & Rathouz, 2005; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Ford, Goodman, & Meltzer, 2003). The items that define ODD show a high degree of inter-correlation and factorial unity (Frick et al., 1993; Loeber, Burke, Lahey, Winters, & Zera, 2000). Beyond its associations with CD, ODD has strong associations not only with attention-deficit/hyperactivity disorder (ADHD) (Angold et al., 1999) but also with emotional disorders such as major depression and anxiety disorders (Burke et al., 2005; Maughan, Rowe, Messer, Goodman, & Meltzer, 2004). This breadth of cross-sectional and longitudinal associations raises the possibility that ODD may be a more complex, multidimensional category capturing a wider range of psychopathology beyond early or mild manifestations of disruptive behaviour.

A better understanding of oppositionality in childhood is important for a number of reasons. Firstly, if ODD consists of more than one dimension, this is very likely to have its basis in aetiological or pathophysiological variability, a fact of particular

importance for genetic and imaging studies. Secondly, the existence of more than one dimension within ODD may indicate that differential interventions should be offered to children and adolescents who have ODD, with corresponding implications for service planning. Different dimensions of oppositionality may predict distinctive developmental trajectories, thereby influencing the psychiatric outcome in adult life – potentially important for the classification of disorders in childhood and the practice of adult psychiatry.

Our aim here is to test the *a priori* hypothesis that ODD comprises items which, whilst strongly inter-correlated, form distinct dimensions and serve to explain why ODD is associated with such a variety of disorders. In particular, we propose that three distinct dimensions may contribute to ODD. The first of these is an 'Irritable' dimension reflected in the DSM-IV items, *often loses temper, is often angry and resentful, and is often touchy or easily annoyed by others*. A similar, but not identical, dimension has been previously suggested (Burke et al., 2005) and we expect this to account for the associations of ODD with emotional disorders.

Of the non-irritable ODD items, spitefulness and vindictiveness have previously been shown to load as well on conduct disorder factors in exploratory multivariate analyses (Lahey et al., 2004a). Following these findings, we hypothesise a second 'Hurtful'

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dimension of oppositionality that is most strongly associated with the callous, premeditated and aggressive components of conduct disorder.

Finally, having separated off the irritable and hurtful items, there are four remaining items contributing to the DSM-IV criteria, namely *often argues with adults, often actively defies or refuses to comply with adults' requests or rules, often deliberately annoys other people, often blames others for his or her mistakes or misbehaviour*. Prior theory does not provide any strong basis for predicting the likely associations of this third possible dimension, which we designated 'Headstrong'.

## Methods

### Population

The British Child and Adolescent Mental Health Surveys (B-CAMHS) were carried out by the Office for National Statistics for the British Department of Health in 1999 (B-CAMHS99,  $N = 10348$ ) and 2004 (B-CAMHS04,  $N = 7977$ ) on representative groups of 5–16-year-olds. These two separate cross-sectional surveys used the same sampling and assessment approaches, obtaining a combined sample of 18,415. The design of B-CAMHS99 is described in Ford et al. (2003), Meltzer, Gatward, Goodman, and Ford (2000), Messer, Goodman, Rowe, Meltzer, and Maughan (2006) and that of the B-CAMHS04 survey in Green, McGinnity, Meltzer, Ford, and Goodman (2005). Briefly, in Great Britain 'child benefit' is a universal state-benefit payable for each child in the family, and it has an extremely high uptake. The child benefit register was used to develop a sampling frame of postal sectors from England, Wales, and Scotland that, after excluding families with no recorded postal code or subject to current revision of their record, was estimated to represent 90% of all British children. Between the two surveys, 901 postal sectors (out of the 9,000 covering Great Britain) were sampled with a probability related to the size of the sector, and stratified by regional health authority and socioeconomic group. A total of 26,544 5–16-year-olds were sampled, of whom 23,025 (87%) were approached by the Office for National Statistics (ONS): 7% had opted out before the details were passed to ONS, and a further 6% had moved without trace or the child was ineligible for some other reason (died, in foster care, outside age criteria). Of those eligible individuals known to ONS, 18,415 participated (80% of those approached, 69% of those originally selected); ONS interviewers were unable to contact 3% of eligible families, and 17% refused to participate. For the combined total of 18,415 families, information was collected from 18,324 parents (99.5%). Parents gave their permission for the teacher to be contacted in 95% of cases, which led to information being obtained from 14,366 teachers (78.0%) and from 7,549 youth (88.0% of the 11–16-year-olds).

### Measures

The Strengths and Difficulties Questionnaire (SDQ) is a 25-item questionnaire with robust psychometric

properties (Bourdon, Goodman, Rae, Simpson, & Koretz, 2005; Goodman, 1997, 2001). Although administered to parents, teachers, and youth in this study, the scores derived from youth report were not used in the analyses reported here. This was partly because youth information was less complete (since it was only collected on the older half of the sample) and partly because previous analyses have shown youth to be less discriminating informants (Goodman, Ford, Simmons, Gatward, & Meltzer, 2000b).

The Development and Well-Being Assessment (DAWBA) was used in both surveys and has been extensively described previously (Ford et al., 2003; Goodman, Ford, Richards, Gatward, & Meltzer, 2000a; Messer et al., 2006). It is a structured interview administered by lay interviewers who also recorded verbatim accounts of any reported problems. The questions are closely related to DSM-IV and ICD-10 (American Psychiatric Association, 2000; World Health, 1994) diagnostic criteria and focus on current rather than lifetime problems. The  $\kappa$  statistic for chance-corrected agreement between two raters was .86 for any disorder (SE .04), .57 for internalising disorders (SE .11), and .98 for externalising disorders (SE .02) (Ford et al., 2003). Children were assigned a diagnosis only if their symptoms were causing significant distress or social impairment. The DAWBA interview was administered to all parents and to all children aged 11 or over; a shortened version of the DAWBA was mailed to the child's teacher. Further information on the DAWBA is available from <http://www.dawba.com>, including online and downloadable versions of the measures and demonstrations of the clinical rating process.

To keep the interview as brief as possible, the DAWBA makes use of 'skip rules' that allow interviewers to omit many of the detailed questions in a section when answers to preliminary questions indicate a very low probability of disorder in that domain. In the case of the section for the parental report on oppositional defiant disorder, the parents are not asked any of the items on ODD unless: (a) the parent-based SDQ conduct score is in the top 20% for a community sample, or (b) in answer to a screening question, the parent reports that the child's behaviour is more troublesome than that of other children of the same age. The initial validation of the DAWBA demonstrated that this procedure allows 76% of community cases to skip the questions on ODD at relatively low cost – of the ODD cases diagnosed in the absence of skip rules, 94% were still diagnosed when the skip rules are in place (Goodman et al., 2000a). In the present study, 23% of the parents of 5–16-year-olds ( $N = 4278$ ) got past the skip rules to answer the questions on ODD. In contrast, the teacher-report version for ODD does not make use of these skip rules and full information was available on 14,020 of the 14,366 teacher responses (98%).

The prevalence of at least one DSM-IV disorder in our sample is 9.5%, with ODD being the single commonest disorder (2.3%) (Ford et al., 2003). The DAWBA asks about 9 separate symptoms of ODD: one question on each of the first seven DSM-IV items and two separate questions on the eighth DSM-IV item, asking about spiteful and vindictive behaviour separately. The ODD items were split as follows into the three *a priori* specified categories listed below. Each question was

introduced with the stem: 'Over the **last 6 months**, and as compared with other children of the same age, has s/he often...' and followed by the specific clause.

Irritable:

- had temper outbursts?
- been touchy or easily annoyed?
- been angry and resentful?

Headstrong:

- argued with grown-ups?
- taken no notice of rules, or refused to do as s/he is told?
- seemed to do things to annoy other people on purpose
- blamed others for his/her own mistakes or bad behaviour?

Hurtful:

- been spiteful?

*tried to get his/her own back on people?* (this is a colloquial British expression for vindictive behaviour).

The response categories for each item were 'no more than others' (scored 0), 'a little more than others' (scored 1) and 'a lot more than others' (scored 2). Older children (11–16 years of age) scored significantly higher in all three dimensions compared to children in the younger age group (5–10 years). Similarly, boys compared to girls scored significantly higher in the Irritable and Headstrong dimensions of oppositionality; the scores for Hurtful were similar for both genders.

In accordance with (Lahey et al., 2000; Maughan et al., 2004) we generated three CD subscales for the purposes of some analyses, namely: (a) aggressive CD symptoms (*bullying, fighting, weapon use, cruelty to people, cruelty to animals, stealing with confrontation, forced sex*); (b) status violations (*staying out late, running away, truancy*); and (c) total non-aggressive CD symptoms (*fire setting, vandalism, breaking in, lying, stealing without confrontation*). The scores were generated by dividing the sum of items for each dimension by their total number. The teacher version of the CD scales contained only those questions which teachers were likely to be in position to have knowledge about; hence, teachers were not asked the items on burglary, stealing with confrontation, running away from home, and staying out late.

In the 2004 but not the 1999 B-CAMHS survey, parents and teachers were asked whether the subject 'can seem cold-blooded or callous' in the B-CAMHS. The response categories were 'not true' (scored 0), 'partly true' (scored 1) and 'certainly true' (scored 2).

### Analysis

Stata Version 10 (StataCorp, 2007) was used. Backward logistic and linear regression were used for categorical and continuous dependent variables respectively. The value for removal from the model was set at  $p < .05$ . To compare the size of coefficients of the dependent variables that entered the final model, we used a z-test (implemented in Stata's linear

combination, *lincom*, post-estimation function). This tests the null hypothesis that the size of two coefficients with a given standard error does not differ from zero.

To ensure that the regression models used were not degraded by multi-collinearity we calculated the Variance Inflation Factor, VIF (Velleman, 1981). The maximum value in our models was 3.02; models are deemed uninterpretable when VIF values reach 10 (Belsey, Kuh, & Welsch, 1980).

Previous studies based on this dataset have shown that although weighting, stratification and clustering need to be taken into account when calculating exact prevalences (Ford et al., 2003), these design effects were sufficiently small that no adjustment was necessary when patterns of association are being established (Fombonne, Simmons, Ford, Meltzer, & Goodman, 2001). Analyses for this study were done without adjustment for weighting, stratification and clustering.

### Ethical approval

The Institute of Psychiatry granted ethical approval for the clinical rating and secondary analysis of data from the British Child and Adolescent Mental Health Survey (reference 255/99).

### Results

As described above, 'skip rules' operated at the beginning of the section completed by parents on behavioural disorders and this resulted in the full set of questions on oppositional and conduct problems being administered to only a quarter of the total sample. In contrast, the teacher report was not subject to skip rules and was available for 76% of the total population. The characteristics of the two samples are shown in Table 1. Children included in the analysis were younger than those not included. The children of parents who got past the skip rule and provided full information on behavioural problems were more likely to come from a disadvantaged background. The reverse was true for the teacher sample, probably because teachers in more deprived neighbourhoods were less likely to return a questionnaire. Not surprisingly, when parents reported sufficient behavioural problems in the screening questions to get past the skip rule, the rate of diagnosed disorder was substantially higher, particularly for externalising disorders, but also for emotional disorders.

In our sample ODD had a high internal reliability of  $\alpha = .92$ . The correlations between the three dimensions were: Irritable with Headstrong (parent  $r = .78$ ; teacher  $r = .78$ ), Irritable with Hurtful (parent  $r = .62$ ; teacher  $r = .70$ ), Headstrong with Hurtful (parent  $r = .65$ ; teacher  $r = .72$ ) and they were all highly significant ( $p < .001$ ).

Table 2 displays the results of backward linear regression adjusted for age and gender, with the

**Table 1** Sample characteristics

	Age (SD)	Male	Mother with degree	Home ownership	Traditional family	ODD	CD	ADHD	Emotional disorders
<i>Parent report</i>									
Included ( N = 4278)	10.4 (3.3)	56.9	16.0	54.9	30.6	4.2	6.7	7.5	8.5
Excluded ( N = 14,137)	10.9 (3.2)	48.7	26.9	73.6	46.5	.6	.3	.6	2.7
	<sup>a</sup> p < .001	p < .001	p < .001	p < .001	p < .001	p < .001	p < .001	p < .001	p < .001
<i>Teacher report</i>									
Response ( N = 14,020)	10.6 (3.2)	50.3	25.1	70.1	67.2	3.3	1.6	2.3	3.8
No response ( N = 4395)	11.4 (3.3)	51.6	21.5	64.4	60.7	2.5	2.4	1.8	4.6
	<sup>a</sup> p < .001	ns	p < .001	p < .001	p < .001	p < .05	p < .01	p < .05	p < .05

The top part of the table represents sample characteristics for those with and without a parental account and the bottom row those with and without a teacher report.

Note: All numbers correspond to percentages, with the exception of Age given in number of years. ODD: oppositional defiant disorder; CD: conduct disorder; ADHD: attention deficit hyperactivity disorder; SD: standard deviation; ns: not significant. <sup>a</sup>t-test.

**Table 2** Dimensions of oppositionality and their independent associations with SDQ scales

	Emotional problems	Hyperactivity	Conduct problems	Peer problems	Prosociality
<i>Irritable</i>					
Parent	.34***[.31, .36]	.07**[.02, .11]	.07***[.03, .11]	.21***[.16, .25]	-.06**[-.11, -.02]
Teacher	.39***[.36, .41]	.08***[.06, .10]	.26***[.24, .27]	.27***[.24, .29]	-.05***[-.07, -.03]
<i>Headstrong</i>					
Parent	-	.30***[.25, .34]	.29***[.25, .33]	.06*[.01, .11]	-.13***[-.17, -.08]
Teacher	-.04**[-.07, -.02]	.57***[.55, .59]	.50***[.48, .51]	.08***[.05, .10]	-.39***[-.42, -.37]
<i>Hurtful</i>					
Parent	-	.04*[.00, .08]	.22***[.19, .26]	.10***[.06, .14]	-.19***[-.23, -.15]
Teacher	-.08***[-.10, -.06]	-.06***[-.08, -.04]	.15***[.13, .16]	.08***[.05, .10]	-.11***[-.13, -.09]
Contrasts					
Parent	<u>Irrit</u>	<u>Head Irrit</u>	<u>Head Irrit</u>	<u>Irrit Head</u>	<u>Hurt Head Irrit</u>
Teacher	<u>Irrit Head</u>	<u>Head Irrit</u>	<u>Head Irrit</u>	<u>Irrit Head</u>	<u>Head Irrit</u>

The independent associations between the three dimensions of ODD and SDQ-scales adjusted for age and gender are reported. Standardised regression coefficients (β) and their respective 95% confidence intervals in brackets are presented. Dashes denote those independent variables that were removed from the model. For each of the Irritable, Headstrong, and Hurtful dimensions the top rows represent parent ratings of symptoms and the bottom rows those of teachers. (\*p < .05, \*\*p < .01, \*\*\*p < .001). Contrasts are between individual coefficients, testing the null hypothesis that they do not differ. The groups are arranged in order of size; those with common underlining are not significantly different at a p < .05 level. (Irrit = Irritable; Head = Headstrong; Hurt = Hurtful).

three parent- and teacher-rated dimensions of oppositionality as the independent variables, and with SDQ symptom scores, from the corresponding informant, as the dependent variables. The Irritable dimension of oppositionality stands out as the significantly strongest predictor of increased emotional and peer problems by both parent and teacher account. The Headstrong dimension of oppositionality was the significantly strongest predictor of hyperactivity by both parent and teacher report; the headstrong dimension also showed the largest coefficients for parent- and teacher-rated conduct problems, but the differences were not significant. The strongest negative predictor of Prosociality was Hurtful by parental account and Headstrong for the teachers. These analyses were also performed stratifying for age and gender and age within gender – there were minor differences but no major departures from the pattern of the findings reported above.

A comparable pattern emerges from backward logistic regression analyses using diagnostic groupings as dependent variables, adjusted for age and gender (Table 3). The Irritable dimension of ODD was

the only predictor of emotional disorders for both parent and teacher report (Table 3). The Irritable dimension showed the strongest associations to ICD-10 depression by parent report (Irritable: OR = 3.39, CI: 2.46 to 4.66, p < .001; Headstrong and Hurtful were not significant); whereas, the associations with ICD-10 depression for teacher report were similar between the Irritable and Headstrong dimension (Irritable: OR = 1.93, CI: 1.02 to 3.66, p < .05; Headstrong: OR = 2.08, CI: 1.08 to 4.02, p < .05; Hurtful not significant). The Headstrong dimension of ODD was the significantly strongest predictor of ADHD. However, whilst Headstrong showed the largest regression coefficients with Conduct Disorder their size did not differ significantly from those of Irritable or Headstrong (Table 3).

Table 4 shows the results from backward linear regression analyses using each of the different symptom domains for conduct disorder (aggressive, status violations, non-aggressive) and the item ‘Can seem cold-blooded or callous’. The Hurtful dimension had the significantly strongest association with the aggressive domain of conduct disorder domains

**Table 3** Dimensions of oppositionality and their independent association with psychiatric diagnoses

	Emotional disorders	Conduct disorder	ADHD
<i>Irritable</i>			
Parent	3.26***[2.79, 3.80]	1.93***[1.40, 2.65]	1.68***[1.29, 2.19]
Teacher	2.78***[2.39, 3.22]	2.30***[1.58, 3.36]	2.03***[1.51, 2.74]
<i>Headstrong</i>			
Parent	–	3.27***[2.31, 4.61]	3.21***[2.43, 4.23]
Teacher		4.30***[2.89, 6.41]	7.18***[5.25, 9.82]
<i>Hurtful</i>			
Parent	–	2.04***[1.59, 2.62]	–
Teacher		2.11***[1.51, 2.95]	–
Comparisons			
Parent	Irrit	<u>Head Hurt Irrit</u>	Head Irrit
Teacher	Irrit	<u>Head Irrit Hurt</u>	Head Irrit

Here we report the independent associations between the three dimensions of ODD and psychiatric diagnoses adjusted for age and gender. Odds ratios and their respective 95% confidence intervals in brackets are presented. Dashes denote those independent variables that were removed from the model at  $p < .05$ . For each of the Irritable, Headstrong, and Hurtful dimensions the top rows represent parent ratings of symptoms and the bottom rows those of teachers. (\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ ). Contrasts are between individual coefficients, testing the null hypothesis that they do not differ. The groups are arranged in order of size; those with common underlining are not significantly different at a  $p < .05$  level. (Irrit = Irritable; Head = Headstrong; Hurt = Hurtful).

**Table 4** Dimensions of oppositionality and their independent association with conduct disorder symptom groups and callousness

	CD: Aggressive	CD: Status violations	CD: Non-aggressive	Cold-blooded/callous
<i>Irritable</i>				
Parent	.13***[.09, .17]	.10***[.06, .15]	–	.13***[.08, .19]
Teacher	.15***[.13, .16]	.09***[.06, .12]	–.03**[–.06, –.01]	.09***[.06, .13]
<i>Headstrong</i>				
Parent	.13***[.09, .18]	.18***[.13, .22]	.31***[.27, .34]	–
Teacher	.28***[.26, .30]	.25***[.23, .28]	.43***[.40, .45]	.18***[.14, .2]
<i>Hurtful</i>				
Parent	.35***[.32, .39]	–	.22***[.18, .26]	.32***[.27, .37]
Teacher	.40***[.39, .42]	–.04***[–.07, –.02]	.30***[.28, .32]	.33***[.30, .36]
Comparisons				
Parent	Hurt <u>Head Irrit</u>	<u>Head Irrit</u>	Head Hurt	Hurt Irrit
Teacher	Hurt <u>Head Irrit</u>	Head Irrit Hurt	Head Hurt Irrit	Hurt Head Irrit

Here we report the independent associations between the three dimensions of ODD and symptom groups of CD ( $N = 4278$  for parents and  $N = 14,020$  for teachers) and the item cold-blooded or callous ( $N = 1723$  for parents and  $N = 5867$  for teachers). The top rows represent parent-rated and the bottom rows teacher-rated symptoms for each dimension. We present standardised coefficients ( $\beta$ ) with 95% confidence intervals in brackets. (\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ ). Contrasts are between individual coefficients, testing the null hypothesis that they do not differ. The groups are arranged in order of size; those with common underlining are not significantly different at a  $p < .05$  level. (Irrit = Irritable; Head = Headstrong; Hurt = Hurtful).

and showed the significantly strongest associations with cold-bloodedness and callousness in both parent and teacher ratings. The Headstrong dimension of oppositionality had the strongest association with non-aggressive offending for both parent and teacher ratings. Headstrong was also significantly strongest in predicting status violations in the teacher reports.

## Discussion

The three dimensions of oppositionality that we proposed *a priori*, namely Irritable, Headstrong and Hurtful, differed substantially in their associations with categorical and continuous measures of psychopathology in a large sample of 5–16-year-olds from epidemiological surveys. This was true both judging from teacher ratings on the ‘low risk’ sample as a whole, and also judging from parent ratings of the ‘medium risk’ sample of children and adoles-

cents with higher rates of psychopathology and socioeconomic deprivation – an internal replication that supports the generalisability of the findings.

Emotional symptoms and disorders were particularly associated with the Irritable dimension of oppositionality. The influential ‘failure’ model (Patterson & Stoolmiller, 1991) of comorbidity suggests that emotional difficulties stem from problems with peers and family members that, in turn, result from a child’s aversive behaviours. However, if this were true, one would expect the Headstrong and Hurtful dimensions to be at least as strongly associated with emotional disorders, which is not the case here – pointing to a more specific link between emotional disorders and irritability. There has recently been a debate about the status of irritability (Leibenluft, Cohen, Gorrindo, Brook, & Pine, 2006; NIMH roundtable on prepubertal bipolar disorder, 2001). It is of note that irritability, conceptualised as

part of a wider syndrome of negative affect, has been shown to be a strong predictor of later depression rather than antisociality (Brotman et al., 2006). Our findings would be compatible with a tendency for negative affect to manifest both as emotional disorders and also as irritability that leads on to behavioural problems. It is important to note that the pattern of associations between the Irritable dimension and Emotional disorders is unlikely to have its origins in mere symptom overlap: the association also holds between ICD-10 defined depression (which does not contain Irritability as a symptom) and the Irritable dimension of oppositionality.

Categorical and dimensional measures of ADHD were particularly associated with the Headstrong dimension of oppositionality. This is in keeping with previous findings showing that ODD items load on a single factor with hyperactive and impulsive items in factor analysis (Lahey et al., 2004b). One speculative explanation is that ADHD and Headstrong items share a joint origin in delay aversion (Castellanos, Sonuga-Barke, Milham, & Tannock, 2006), with the Headstrong items reflecting an attitude of 'I want it, I want it now, I won't wait'; however, this would apply only to some of the Headstrong items.

The three dimensions of oppositionality were associated with somewhat different manifestations of conduct disorder. The Headstrong dimension was particularly associated with status violations – not surprising given that taking no notice of rules is one of the headstrong items. To a lesser extent, the Headstrong dimension was also associated with non-aggressive offences. The Hurtful dimension was strongly associated with teacher and parent ratings of the child as callous or cold-blooded – suggesting that the link between the Hurtful dimension and both non-aggressive and aggressive offences may reflect callous and premeditated behaviour. By contrast, the link between the Irritable dimension and both aggressive symptoms and status violations may reflect reactive behaviours triggered by anger.

As in previous studies, the pattern of correlations between the various oppositional symptoms reported here suggests a relatively coherent factor. It seems unlikely, therefore, that there are three distinct subgroups within oppositionality. Instead, the differential pattern of external associations points to the existence of three dimensions, rather than subtypes, of oppositionality. Conversely, the pattern of associations of the three dimensions suggests that there may be different trajectories leading to oppositionality and, conceivably, differential patterns of persistence.

The phenomenon of different pathways leading to similar outcomes is well recognised in developmental psychiatry (Cicchetti & Rogosch, 1996). The distinction between early-onset and adolescence-limited conduct disorder (Moffitt, 1993) provides a good example since both can result in apparently similar problems in adolescence, but with different

childhood precursors and adult consequences. We posit an analogous model and propose a set of related refutable hypotheses. Firstly, we hypothesise that the three dimensions of oppositionality have different antecedents, whether temperamental, environmental or genetic. Secondly, we propose that the difference between the three dimensions is partly obscured in childhood and adolescence because any aversive trait (whether Irritable, Headstrong or Hurtful) is liable to evoke retaliation and thereby initiate self-reinforcing cycles of mutually aversive interactions between a child and others (Patterson, Marsh, Hammerlynck, & Handy, 1976). For example, the temper outbursts of an irritable child may elicit punitive parental responses that promote spiteful and vindictive behaviours in addition to the original irritable ones. Thirdly, we suggest that the underlying dimensions predict the emergence of comorbidity across the lifespan. For instance, we propose that oppositional children will be particularly likely to become depressed adults if they score high on the Irritable dimension even if they do not have an emotional disorder in childhood. Fourthly, we hypothesise that the dimensions of oppositionality will influence response to therapy. For example, one of the dimensions we identify (Hurtful) may be related to a dimension of psychopathy that has previously been shown to affect response to parenting treatment (Dadds & Salmon, 2003).

Our study has some important limitations. Firstly, our sample was only asked about nine oppositional symptoms, and some of these may have reflected a mixture of different dimensions. For example, although we classified deliberately 'annoying other people' as a Headstrong symptom, it might be a mixture of Headstrong and Hurtful. To the extent that we assigned mixed symptoms just to a single dimension *a priori*, this should have obscured differences between dimensions and would not plausibly account for our findings. Future research using longer scales with a greater diversity of oppositional items might facilitate the separation of dimensions or the identification of additional dimensions. In this context it is also important to note that caution is due when interpreting differences between inter-correlated parameters, as in this study; however, it is important to point out that there was no multi-collinearity in any of our models. Secondly, the cross-sectional design of this study cannot offer information about the antecedents and outcomes of the three dimensions of oppositionality described here – something that will require longitudinal analyses. Thirdly, although the overlap between parent- and teacher-rated results is reassuring, it will be important to replicate these findings in a low-risk parent-rated sample. Finally, it will be important to replicate our findings in a 'universal' sample, that is, where no skip rules were in operation for ascertaining symptoms of oppositionality.

The existence of different dimensions of oppositionality may be important for a variety of reasons. Clinicians treating oppositionality and those involved in the planning of service provision may need to assess the three dimensions described here in order to predict the most appropriate treatment for any given child. For researchers who are trying to identify the genes, environments, brain activation patterns or longitudinal courses associated with oppositional defiant disorder, it may also be productive to focus on the three dimensions of oppositionality as well as on the syndrome as a whole. Finally, given the very strong associations of oppositionality in youth with psychopathology in adult life (Kim-Cohen et al., 2003; Nock et al., 2007), the results presented here may have implications for a better developmental understanding of adult psychiatric illness, an explicit aim of DSM-V (Pine et al., 2002).

## Conclusions

The three dimensions of oppositionality have distinctive external correlates, suggesting they may also differ significantly in aetiology, prognosis and treatment responsiveness.

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