

The neuroscience of callous-unemotional subtype of conduct problems: Implications for intervention and education

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Objective

This paper presents a novel school-based intervention programme for children with chronic and severe emotional and behavioural difficulties. The main aim of the programme is to reduce conduct problems and to increase prosocial behaviours. A secondary aim is to reduce CU traits. The ultimate aim of such a programme is to help pupils with severe and chronic conduct problems back on track to mainstream education. The programme was developed based on basic science findings, including recent neuroscience work on children with elevated levels of callous-unemotional (CU) traits. This programme also aims to feedback into the research base by examining how CU contributes toward conduct problems in the classroom and how far it is possible to reduce CU traits as well as conduct problems.

Perspectives on conduct problems

Early-onset conduct problems carry a strong risk for persistent offending and psychiatric and physical health problems in later life (Moffitt, 2003; Odgers et al., 2007). Given this knowledge of poor outcome for individuals with conduct problems, early intervention is of vital importance.

Recent research indicates that one delineator of heterogeneity within children with early-onset conduct problems is a CU disposition. The presence of CU designates a subgroup of children with a more severe, aggressive, and stable pattern of conduct problems and a specific neurocognitive profile indicative of hyporeactivity to others' distress and punishment to self (Blair et al., 2006). Recent evidence, including behavioural genetic, neuropsychological and neuroimaging sources, indicates that CU is a useful method of subtyping conduct problems (Blair et al., 2006; Jones et al., 2009a; Viding et al., 2005).

Data from twin studies suggest that conduct problems are strongly heritable in children with elevated levels of CU (CP/CU+), but more likely to be due to environmental influences in children with conduct problems, but not CU (CP/CU-) (Viding et al., 2008). There are also differences in the cognitive-affective profile associated with these two groups. Children with CP/CU+ have specific deficits in recognizing distress emotions (fear and sadness) and show little or no affective empathy responses to another's emotional state (Blair & Viding, 2008; Jones et al., 2009b). However, children with CP/CU+ have no deficits in mentalising (Jones et al., 2009b). Children with CP/CU- do not have difficulties in recognizing others' distress and also have intact mentalising skills (Jones et al., 2009b). Neuroscience research has recently shown that children with CP/CU+ have differences at the level of the brain. fMRI data has demonstrated amygdala hyporeactivity in children with CP/CU+ compared with matched controls in response to fearful faces (Jones et al., 2009a; Marsh et al., 2008). Structural brain differences have also been reported in children with CP/CU+ compared with typically

developing children in brain areas that have been associated with affective empathy, self-referential thinking and moral reasoning (DeBrito et al., 2009).

Modes of Inquiry

Early indications from more traditional intervention approaches suggest that conduct problems and CU traits can be reduced (e.g. Hawes & Dadds, 2007). Our on-going school intervention programme represents a joint project between basic science research and Educational Psychology and has been developed to specifically address the needs of children with severe and chronic conduct problems (CU+ and CU-).

Current neurocognitive research suggests that children with CP/CU+ should benefit from modified treatment approaches. These treatments should avoid ineffective approaches (e.g. punishment) and either identify treatment strategies that are congruent with presenting strengths and weaknesses, (e.g. response to reward, which appears intact) or boost the weak affective response system.

There are four aims of the current programme:

- i) Increase pupils' level of socially acceptable reward-seeking behaviour;
- ii) Reduce antisocial reward seeking-behaviour;
- iii) Increase awareness of others' needs and perspectives;
- iv) Increase ability to interpret and use feedback to shape their behaviour.

The programme enables staff to identify and respond to the varying, and often complex, range of factors underpinning pupils' social, emotional and behavioural difficulties; thus maximising the likelihood of achieving and maintaining gains in their learning and behaviour. Depending on the nature and severity of the needs of a particular pupil, or class, teachers and support staff can draw from a range of strategies and techniques aimed at increasing their social, emotional and cognitive functioning, as well as their language and communication. In recognition of the fact that some difficulties (e.g. with regulating emotions) are shared by all pupils, a number of 'cornerstone' teaching and intervention strategies are common to all classes, as well as being used more widely across the school. For those pupils with the most significant behaviour difficulties (including elevated levels of CU), additional adaptations to the curriculum and timetable are made, in order to target the development of particular skills. For example, video-coaching is used with some pupils and appears to be one of the most useful methods of helping pupils with extremely challenging behaviour to understand and think about their own episodes of antisocial behaviour.

Evidence

The programme continues its relationship with research by involving research psychologists in its evaluation. A single-case design study is currently in place to investigate change in behaviour and psychological adjustment over the first two years of the intervention. A cost-effectiveness analysis is also being carried out to determine the efficacy of the intervention. The evaluation takes four-strand approach; obtaining information from the teachers, parents, and children in the form of standardized neuropsychological tests and self-reports on behaviour and functioning. Reports are generated for all pupils based on the neuropsychological assessments and parent and teacher reports. Teachers and support staff will receive detailed feedback about how best to use this information to tailor individual learning and behavioural programmes for each pupil.

Results so far

Data collected so far from the school suggests that pupils with elevated CU also have increased behavioural difficulties, hyperactivity and peer problems, as well as reduced prosocial behaviour. Data collection on behavioural change is on-going, however preliminary reports suggest that positive behavioural change is apparent in most pupils. Factors that seem to limit behavioural change include chaotic home environment and unsatisfactorily managed ADHD.

Significance

Pupils with chronic and severe conduct problems characteristically experience academic and social difficulties during their school careers and are at risk of extremely poor outcome. This programme represents a reciprocal relationship between neuroscience, research and practice that is having a positive effect on pupils with severe and chronic conduct problems. We argue that all intervention programmes should have a firm research basis and should be rigorously evaluated over a prolonged period of time.

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