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Signalling changes to individuals who show resistance to change can reduce challenging behaviour



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ABSTRACT

Background & objectives: Several neurodevelopmental disorders are associated with resistance to change and challenging behaviours – including temper outbursts – that ensue following changes to routines, plans or expectations (here, collectively: expectations). Here, a change signalling intervention was tested for proof of concept and potential practical effectiveness.

Methods: Twelve individuals with Prader-Willi syndrome participated in researcher- and caregiver-led pairing of a distinctive visual-verbal signal with subsequent changes to expectations. Specific expectations for a planned subset of five participants were systematically observed in minimally manipulated natural environments. Nine caregivers completed a temper outburst diary during a four week baseline period and a two week signalling evaluation period.

Results: Participants demonstrated consistently less temper outburst behaviour in the systematic observations when changes imposed to expectations were signalled, compared to when changes were not signalled. Four of the nine participants whose caregivers completed the behaviour diary demonstrated reliable reductions in temper outbursts between baseline and signalling evaluation.

Limitations: An active control group for the present initial evaluation of the signalling strategy using evidence from caregiver behaviour diaries was outside the scope of the present pilot study. Thus, findings cannot support the clinical efficacy of the present signalling approach.

Conclusions: Proof of concept evidence that reliable pairing of a distinctive cue with a subsequent change to expectation can reduce associated challenging behaviour is provided. Data provide additional support for the importance of specific practical steps in further evaluations of the change signalling approach.

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1. Introduction

Several neurodevelopmental disorders are associated with a strong preference for predictability, with increased risk of challenging behaviour following changes to routines, expectations or plans (will be referred to collectively here as expectations). For example, resistance to change is more common in individuals with Prader-Willi, fragile X, Smith Magenis, and Lowe syndromes compared to multiple neurodevelopmental disorder comparison groups (Moss, Oliver, Arron, Burbidge, & Berg, 2009). The increased risk of challenging behaviour following changes to expectations has been demonstrated in research with individuals with Prader-Willi and fragile X syndromes (Tunnicliffe, Woodcock, Oliver, Bull &

Penhallow, 2014; Woodcock, Oliver & Humphreys 2009a) and is reported anecdotally by families with these other genetic syndromes. Further, changes to expectations have been demonstrated as a common trigger of challenging behaviour in individuals with an intellectual disabilities of mixed aetiologies (Furniss & Biswas, 2012), and in individuals with autism spectrum disorder (Gomot & Wicker, 2012).

Prader-Willi syndrome,¹ one such disorder, has been estimated to have a population prevalence of at least 1:52,000 in the UK, although the actual rate is likely to be somewhat higher (Whittington et al., 2001). The disorder is associated with mild to moderate intellectual disability, with an average IQ of around 60 (Whittington et al., 2004). PWS is caused by a mutation affecting the paternally derived q11-q13 region of chromosome 15. Most prevalence estimates for clinically elevated preference for

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¹ Prader-Willi syndrome is abbreviated as PWS.

predictability are upwards of 60% of individuals with the syndrome (Holland, Whittington, Webb, Boer, & Clarke, 2003; Moss et al., 2009). The profile of challenging behaviour precipitated by changes in people with PWS most commonly takes the form of temper outbursts, which are shown by at least 80% of individuals and are an important priority for intervention (Holland et al., 2003; Tunncliffe, Woodcock, Bull, Oliver, & Penhallow, 2014; Woodcock et al., 2009a).

The objective of the present study was to develop and pilot a caregiver led behavioural intervention to decrease the frequency and severity of temper outbursts triggered by changes to routines, expectations and plans (referred to collectively as changes to expectations) shown by individuals with PWS. Given the expression of similar resistance to change behaviour in individuals with other neurodevelopmental disorders, this work will provide an important foundation for the application and evaluation of such an intervention approach on a larger scale.

When individuals with PWS are exposed to changes to expectations across different settings but with the consistent presence of a particular stimulus (e.g. a specific person), there can be a reduction in the frequency of low level challenging behaviours precipitated by such changes over successive experimental observations (Woodcock, Oliver & Humphreys, 2011). A possible explanation for this effect is that via repeated pairing with changes to expectations, the stimulus comes to reliably predict the occurrence of changes through associative learning, and that this increased predictability makes the change less aversive.

This explanation draws support from the specific cognitive difficulty in task switching, which appears to be linked to the preference for predictability observed in individuals with PWS via the demand that changes to expectations place on such switching abilities (and may be relevant for the corresponding preference observed in certain other neurodevelopmental disorders, such as fragile X syndrome and autism spectrum disorder; D'Cruz et al., 2013; Lopez, Lincoln, Ozonoff, & Lai, 2005; Woodcock, Oliver & Humphreys, 2009b). Neurocognitive paradigms have demonstrated that task switching can be facilitated by presentation of external stimuli that indicate a particular task, and also by increasing the time available to prepare for a switch once knowledge of its pending occurrence has been ascertained (e.g. Monsell, 2003). Thus, the presence of a stimulus that reliably predicts the occurrence of a change to expectation may reduce the demand on the deficient cognitive process linked to resistance to change.

The reliable pairing of a distinctive cue with an event or stimulus that demonstrates a known relationship with an individual's behaviour has been exploited in stimulus control procedures, which form an important part of several behaviour intervention approaches that have demonstrated utility with individuals with neurodevelopmental disorders (Shahan & Chase, 2002). Distinctive cues have been paired with the non-availability of reinforcing contingencies for challenging behaviour so that challenging behaviour is reduced in the presence of the cue (e.g. Cammilleri, Tiger, & Hanley, 2008; Heald, Allen, Villa, & Oliver, 2013; Kuhn, Chirighin, & Zelenka, 2010). In addition, distinctive cues have been paired with current or upcoming aversive stimuli (a verbal reprimand, the removal of a preferred item/activity) so that eventually challenging behaviour is reduced in the presence of the cue alone (Maglieri, DeLeon, Rodriguez-Catter, & Sevin, 2000).

The reductions in change-triggered challenging behaviours observed in individuals with PWS over successive changes when a particular person is present (Woodcock et al., 2011) suggest that pairing a cue with the reliable occurrence of changes may constitute an effective intervention strategy. To the best of our knowledge, stimulus control procedures have not been previously applied in this context in any population (i.e. using a cue to signal

impending changes – regardless of their nature – when change per se has been identified as a key antecedent for challenging behaviour). However, video modelling has been applied, particularly with individuals with autism spectrum disorder, aiming to increase the ease of individuals' transitions between tasks (e.g. Schreibman, Whalen, & Stahmer, 2000), and it has been suggested that such modelling results in the ascertainment of stimulus control by the video over transitioning behaviour (Nikopoulos, Canavan, & Nikopoulou-Smyrni, 2009). Thus, such video modelling approaches appear to increase the predictability of impending events in an activity specific way. Similarly, visual activity schedules have been widely employed in transition settings with individuals with autism spectrum disorders and intellectual disabilities. Frequently such approaches have aimed to increase transitioning behaviour (i.e. have a primary goal and measured outcome of increasing adaptive functioning, not of reducing challenging behaviour) and current cumulative evidence supports the efficacy of visual scheduling in achieving this objective (Knight, Sartini, & Spriggs, 2015). However, there is also evidence demonstrating that use of visual schedules can decrease challenging behaviour linked to transitions (e.g. Mesibov and Shea, 2010; Tullis, Cannella-Malone, & Payne, 2015). Whilst visual activity scheduling may potentially reduce the number of changes to expectations that individuals are exposed to (because the sequence of events described in the schedule is adhered to), the content of the schedule may also increase the predictability of impending events in a task specific way, similarly to the video modelling approach.

In the present study, a caregiver led intervention strategy for reducing temper outbursts triggered by changes to expectations in individuals with PWS was developed, implemented and evaluated in a proof of concept study (such studies have been highlighted as an essential step in intervention development; Craig et al., 2008). A stimulus control approach was used to establish a distinctive signal, which would reliably predict the occurrence of a change to expectation. The novelty of the present approach results from its independence from the nature of the impending changes in an individual's environment. Presently employed and previously evaluated intervention approaches that attempt to increase the predictability of individuals' environments do so in an event dependent manner (i.e. by increasing information available on impending activities as in the video modelling and activity scheduling procedures described above). The present approach however, requires no specific information on forthcoming activities and thus has the potential to be more resource efficient and easier to implement than existing approaches.

We hypothesized that stimulus control over temper outburst behaviours would be demonstrated such that these behaviours would be lower in frequency following a change to expectation that was signalled, compared to a corresponding change that had not been signalled. In addition, relative to a baseline period preceding application of the signalling procedure by caregivers, the overall number of temper outbursts following changes to expectations would decrease.

2. Material and methods

2.1. Participants

Twelve individuals with PWS were recruited via the Prader-Willi Syndrome Association in the UK – a support group for families – and from a group of specialist UK residential homes. In line with the demographic makeup of the support association, all participants were white British and of middle to high socioeconomic status. Caregivers were interviewed via telephone on the context of the temper outbursts that they observe (see Appendix A for the

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