



## Teachers' perceptions of Restricted and Repetitive Behaviours (RRBs) in children with ASD: Attributions, confidence and emotional response

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### ARTICLE INFO

No. of reviews completed 2

#### Keywords:

Autism Spectrum Disorder  
Restricted and Repetitive Behaviours  
Attribution  
Self-efficacy  
Education

### ABSTRACT

**Background:** Restricted and Repetitive Behaviours (RRBs) are some of the most difficult behaviours to manage in children with Autism Spectrum Disorders (ASD). Although RRBs frequently occur in educational settings, we know little about the way in which teachers understand these behaviours.

**Aims:** The study aimed to explore the attributions, emotional response and feelings of confidence held by teachers working in different educational settings when faced with RRBs.

**Methods and procedures:** A single group survey design using behavioural vignettes was adopted in order to elicit teacher beliefs and ratings.

**Outcomes and results:** Analysis indicated that there were differences in the attributions and confidence ratings held for different types of RRBs. Significant differences were also observed between teachers working in mainstream and specialist educational settings. Emotional response and confidence scores were often predictive of one another alongside factors related to teaching experience.

**Conclusion and implications:** The findings indicate that teachers from mainstream schools potentially hold less helpful beliefs in response to RRBs and therefore are a professional group who may benefit the most from additional support and training. Further research could consider conducting a qualitative exploration of why teachers hold certain beliefs about RRBs and/or sampling those who are less experienced in working with children with ASD.

### What this paper adds?

Restricted and Repetitive behaviours (RRBs) are a core symptom of Autism Spectrum Disorders (ASD) and are reported by parents and teachers as some of the most difficult behaviours to manage. In spite of this, it is unclear how teachers perceive RRBs within the classroom environment and the factors that influence any beliefs held. This study is the first of its kind to investigate teachers' understanding, emotional reaction and management of RRBs using both behavioural vignettes and attribution theory. Within the study we identified differences in the attributions and confidence reported by teachers for different types of RRBs. Significant differences were also observed between teachers working in mainstream and specialist educational settings. The study therefore provides an understanding of the factors that influence how teachers perceive RRBs. The findings indicate that the development of training packages for the management of RRBs in teachers working specifically in mainstream schools may be beneficial. Evidence for

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<https://doi.org/10.1016/j.ridd.2019.01.009>

Received 10 August 2018; Received in revised form 18 January 2019; Accepted 18 January 2019

Available online 16 March 2019

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the development and utilisation of behavioural vignettes in order to elicit attributions is also demonstrated.

## 1. Introduction

Restricted and Repetitive Behaviours (RRBs), which are characterised by repetition and a desire for sameness, are key diagnostic characteristics for Autism Spectrum Disorders (ASD; [APA, 2013](#)). Although DSM-IV criteria subdivide RRBs into four subtypes, factor analysis of RRBs and associated measures has found that these behaviours can be consistently grouped into two categories ([Cuccaro et al., 2003](#); [Honey, Leekam, Turner, & McConachie, 2007](#)). Lower order behaviours or Repetitive Sensory Motor behaviours, are characterised by motor mannerisms (e.g. hand flapping), sensory seeking behaviours and repetitive use of objects (e.g. excessive smelling or touching of hair). Such behaviours are found to be more frequent in younger and developmentally delayed children. In contrast, higher order behaviours or Insistence on Sameness behaviours (including rituals, difficulties with changes in routine and circumscribed interests such playing or arranging toys in a certain order or an intense fascination with specific TV shows) are often found in older individuals with higher language and cognitive capacities ([Leekam, Prior, & Uljarevic, 2011](#)).

RRBs can be both time consuming and constitute a major barrier to social adaption and learning, as these behaviours are frequently performed to the detriment of other activities ([Cunningham & Schreibman, 2008](#)). Frequent engagement with RRBs may reflect a variety of functions including self-stimulation or emotional regulation ([Leekam et al., 2011](#)). These behaviours can have a significant impact, not only on the person themselves but also on significant others, with parents and carers frequently citing these behaviours as some of the most difficult to manage ([Grahame et al., 2015](#); [Horner, Carr, Strain, Todd, & Reed, 2002](#); [Lecavalier, Leone, & Wiltz, 2006](#)). Indeed frequent and intense RRBs associated are associated with elevated levels of parental stress and reduced family functioning ([Boyd, McDonough, & Bodfish, 2012](#)). Consequently, there has been a movement towards interventions aimed at increasing self-efficacy and the emotional resilience of carers when faced with managing RRBs ([Boyd, McDonough, Rupp, Khan, & Bodfish, 2011](#); [Grahame et al., 2015](#)).

This shift in working with significant others (as opposed to directly with the child) is similar to approaches employed in the field of learning disability and challenging behaviour ([Grey, Hastings, & McClean, 2007](#)). Working at a systemic level with parents and care staff for example, is important as the emotional and behavioural response exhibited by significant others can reinforce challenging behaviours ([Hastings & Remington, 1994](#); [Williams, Dagnan, Rodgers, & McDowell, 2012](#)). Weiner's theory of attribution and helping behaviour ([Weiner, 2010](#)) proposes that the way in which a behaviour is attributed or located on dimensions such as controllability (locus of control), stability and internal/external factors (locus of causality) will evoke either anger or sympathy from a carer/significant other. Sympathy for example is more likely to be invoked if controllability of behaviour is perceived as low and this, in turn, leads to a higher level of helping behaviours ([Menec & Perry, 1998](#)). Based upon this theory, evidence indicates that it is possible to develop training and support packages which significantly alter negative attributions ([Williams et al., 2012](#)) and subsequently result in reductions in carer stress and challenging behaviours ([Grey & McClean, 2007](#); [Ingham, 2011](#)).

Research indicates that the school environment can be a very stressful and uncertain environment for children with ASD, resulting in heightened levels of RRBs ([Hodgson, Freeston, Honey, & Rodgers, 2017](#); [Johnson, 2017](#); [Lidstone et al., 2014](#)). Teachers are a significant factor in relation to a child's academic achievement ([Rockoff, 2004](#)) and are often perceived by parents of children with ASD as holding a critical role in successfully implementing behavioural management strategies across education and home settings ([Grahame et al., 2015](#)). Teachers themselves often cite RRBs as a significant difficulty when working with children with ASD, adding weight to the notion that these behaviours are both present at school and have a detrimental impact upon academic and social learning ([Azad & Mandell, 2016](#); [Johnson, 2017](#)). Although there is emerging evidence for the development and utility of parent mediated management programmes focussing upon RRBs ([Boyd et al., 2011](#); [Grahame et al., 2015](#)), little attention has been given to understanding how teachers perceive and manage RRBs in a classroom setting.

In the U.K. almost half of all students with ASD are taught in mainstream educational provisions ([Wilkinson & Twist, 2010](#)) despite there being no national requirement for teachers in these schools to hold autism related qualifications and/or have any experience of teaching children with ASD ([APPGA, 2017](#)). Recent surveys highlight that at least 60–70% of U.K teachers do not feel they have adequate training to work with children with ASD ([Ambitious About Autism, 2013](#)). Unsurprisingly, teachers working with young people with ASD have been identified as experiencing heightened levels of anxiety and stress ([Hastings & Brown, 2002](#); [Lecavalier et al., 2006](#)). Indeed poor psychological wellbeing and burnout in teachers is strongly associated with reductions in the quality of teaching ([Hastings & Bham, 2003](#); [Jenkins, Rose, & Lovell, 1997](#)) therefore it is important to identify and support specific groups of teachers who may experience reduced confidence and hold negative attributions towards RRBs.

Research directly investigating teachers' understanding and management of RRBs is largely absent, although attempts have been made to elicit teachers' descriptions of RRB and how these behaviours may be related to the ability to tolerate uncertainty ([Johnson, 2017](#)). Relevant research applying attribution theory indicates that there is a general tendency for teachers to locate what they perceive as disruptive and aggressive behaviours as within a student's control, rather than in the context of the classroom environment ([Maguire, Ball, & Braun, 2010](#); [Sullivan, Johnson, Owens, & Conway, 2014](#)). Teachers have also been reported to attribute challenging behaviours, including stereotypy, to internal and stable causes ([Alevriadou & Pavlidou, 2016](#)). [Burns \(2000\)](#) hypothesises that children with diagnostic labels such as ASD, compared to those with no diagnosis, are likely to have behaviours attributed to internal characteristics, although this statement is yet to be explored empirically. According to [Weiner's model \(2010\)](#) if a teacher locates the child's behaviour internally and within their control this can result in reduced levels of support and helping behaviours. Previous research indicates that teachers who hold such attributions experience greater anger and frustration towards student behaviour and are more likely to criticise and adopt punitive or remedial interventions ([Georgiou, Christou, Stavrinides, & Panaoura, 2002](#); [Matteucci, 2007](#)).

Certain factors however have been found that may moderate attributional tendencies. Teachers who have more training and experience of working with children who have learning disabilities and challenging behaviour, have been reported to display more external attributions of behaviour (Brady & Woolfson, 2008; Male, 2003). This finding has not been replicated when investigating teachers working specifically with children who have ASD (Ling, Mak, & Cheng, 2010). Given that surveys suggest that teachers from mainstream educational settings have limited theoretical knowledge of ASD and associated behaviours (Helps, Newsom-Davis, & Callias, 1999; Lian et al., 2008) it seems plausible that experience and the educational setting in which a teacher works would indeed influence attributions held. An examination of teachers' general attitudes to children with ASD in the U.S.A however found no difference between teachers working across mainstream and specialist educational provisions (Park & Chitiyo, 2011). As such, it is worth exploring whether teachers working into specialist schools report more favourable attributions in comparison to their colleagues working in mainstream settings, given that they are more likely to have received ASD specific training, work daily with children who have ASD/RRBs and often teach within the context of reduced class sizes (Simpson, de Boer-Ott, & Smith-Myles, 2003).

Teachers with a higher sense of self efficacy are also more likely to attribute challenging behaviour and learning difficulties externally (Brady & Woolfson, 2008). Teacher attributional approaches and feelings of confidence have been reported to directly influence a teacher's willingness to modify teaching methods (Stein & Wang, 1988), be associated with their general psychological wellbeing (Wang, Hall, & Rahimi, 2015; Zee, 2016) and influence their emotional response to challenging behaviours (Bibou-Nakou & Kiosseoglou, 2000). Exploring reported levels of self-efficacy for managing RRBs and any interaction with attributions held, is worth considering in order to ensure both the psychological wellbeing and optimal performance of teachers.

The type of behaviour exhibited by an individual has also been demonstrated to significantly influence staff attributions and emotional response. For example, Zijlmans, Embregts, Bosman, and Willems, (2012) found that aggressive and challenging behaviours directed at others were perceived as more controllable and resulted in a more fearful and anxious emotional response from care staff compared to self-injury. Although tentative, it is therefore possible that teachers may attribute higher order behaviours such as rituals and circumscribed interests as controllable since they may interrupt or demand significant attention from others within the classroom. Research in other settings indicates that caregivers are less likely to attend or respond to lower order motor behaviours (Harrop, Gulsrud, Shih, Hovsepian, & Kasari, 2016), a process which may mirror what happens in the school environment. As repetitive motor and sensory behaviours may be perceived as physiological in origin (Leekam et al., 2011) it would seem plausible that teachers would rate these behaviours as more stable but ultimately not within the child's control. Understanding whether different RRBs elicit different attributions and emotions, will help us identify which behaviours teachers perceive to be the most challenging and thus inform the needs of any future training packages.

### 1.1. Aims

The following study aimed to examine the influence of RRB type (lower versus higher) and the setting in which a teacher works (mainstream versus specialist school) upon attributions, emotional response and feelings of self-efficacy/confidence. This study is the first of its kind to apply Weiner's theory of attribution in order to investigate attributions held by teachers towards RRBs. Any significant findings (such as identifying that teachers working in specialist schools hold significantly different beliefs to their mainstream counterparts) will be useful in directing and designing training and support packages targeting specific RRBs and/or teaching groups.

Based upon previous (related) research, the following exploratory hypotheses were examined:

**Hypothesis 1.** Teachers will rate higher order behaviours (rituals and circumscribed interests) as more controllable than lower order (motor and sensory) behaviours.

**Hypothesis 2.** Following on from Hypothesis 1; Teachers will report increased frustration and lower levels of sympathy in response to higher order behaviours.

**Hypothesis 3.** Teachers in mainstream schools will rate RRBs as being controllable, internal and stable in comparison to teachers from specialist educational provisions.

**Hypothesis 4.** Teachers in mainstream schools will report increased frustration and lower levels of sympathy in response to higher and lower order behaviours.

**Hypothesis 5.** Teachers in mainstream schools will report reduced levels of confidence in relation to the management of higher and lower order behaviours.

Secondary analysis within this study focused upon exploring the factors that predict the emotional response and feelings of confidence reported by teachers.

## 2. Method

### 2.1. Design

The study utilised a single group online survey based approach. This allowed for the use of a quasi-experimental design to investigate the impact of RRB type and educational setting (independent variables) on the attributions, emotional response and feelings of self-efficacy/confidence reported by teachers (dependent variables).

## 2.2. Participants

Teachers or learning support assistants from the U.K. who were currently or had ever worked with one or more children in a classroom setting with an Autism Spectrum Disorder were eligible for study inclusion. Children were defined for the purposes of this study as those of school reception age (e.g. 4–5 years old) up to 18 years.

## 2.3. Measures

Previous research focussing upon the measurement of attributions has utilised descriptive vignettes in order to obtain responses from participants (e.g. Williams, 2008; Kesterson, 2012; Shelton, 2013). Although there is some debate regarding the ecological validity of descriptive vignettes over video presentations or “real” observations of behaviour (Hastings, Tombs, Monzani, & Boulton, 2003), the benefits of survey based research are extensive (Jeffries & Maeder, 2011). For example they allow for standardisation across participants (Veal, 2002) but can also be manipulated to isolate or represent an individual concept or behaviour (Hughes & Huby, 2002). A descriptive vignette method was therefore chosen as it allowed for the examination of a teachers’ response in relation to a range of lower and higher order RRBs.

## 2.4. Vignette development

Prior to piloting, vignettes were developed from previous qualitative research (Johnson, 2017) which had captured first hand descriptions of RRBs from teachers. Initially sixteen vignettes were developed covering a range of motor based RRBs (e.g. hand flapping), sensory behaviours (e.g. licking objects), routines (e.g. always having to be first in a line) and circumscribed interests (e.g. intense focus and knowledge of Minecraft). In order to reduce the variability between vignettes and possible factors which could influence participant response, all fictitious children described in the vignettes were male, were described as having a diagnosis of ASD, were aged between 8–12 years (in order to cover primary and secondary school ages) and were not labelled as intellectually impaired.

Each vignette involved a classroom situation within which a child engaged in a RRB whereby the teacher might have to intervene (e.g. the described behaviour impacts upon another child, the teacher themselves or involves the destruction of property). Questions regarding locus of *control*, *causality* and *stability* of behaviour were used to measure the attributional response of participants. Based on Weiner’s theory of attribution and helping behaviour (Weiner, 2010), *emotional response* to the described behaviour was assessed using two questions measuring sympathy felt towards the child and feelings of frustration. Self-efficacy or *confidence* was assessed using one question adapted from the Teachers Sense of Efficacy Scale (Hoy & Woolfolk, 1993). All questions utilised a 7 point Likert style response scale (see Supplementary Material 2).

Sixteen vignettes were piloted to assess whether the vignette descriptions clearly represented Insistence on Sameness (higher order) behaviours or Repetitive Sensory Motor (lower order) behaviours. Piloting was undertaken via a questionnaire (see Supplementary Material 1) during a meeting of the North East Autism Research network. Nineteen members participated in the pilot study with four higher and four lower vignettes chosen based upon the ratings of participants as being clear examples of a specified behaviour (agreement of at least 85% that the behaviour described within the vignette clearly represented either a higher or lower order RRB).

## 2.5. Vignette distribution

Eight vignettes (four representing higher and four representing lower order RRBs) were distributed to participants using the computer package Qualtrics with data collection taking place between July 2017 and January 2018. A poster containing a web link to the survey was emailed directly to head teachers of primary and secondary, mainstream and specialist schools within the North East of England (see Appendix B). The study was also promoted through local CAMHS services, educational psychologists, twitter posts and the Research Autism website. Consent was obtained from all participants online and prior to collecting any demographic/research data.

## 2.6. Ethical approval

The study was peer reviewed by the Newcastle University Doctorate in Clinical Psychology project panel and was granted ethical approval by the Newcastle University Faculty of Medical Sciences ethics committee.

## 2.7. Data analysis & missing data

In order to prepare data for analysis, mean scores were calculated for lower and higher order RRBs across subscales (*control*, *causality*, *stability*, *emotional response*, and *confidence*). Lower RRB scores were obtained from vignettes 2, 3, 5, 8 whilst higher order scores were obtained from vignettes 1, 4, 6, 7.

For the purposes of this study, participants were defined as those providing consent and completing at least six behavioural vignettes. Those responding to the survey but providing data below this threshold were excluded. Missing data was therefore minimal (< 30% for any participant) allowing for the use of a mean replacement method of imputation to be used. For example a mean score

**Table 1**  
Participant Demographic details.

	Total Sample (n)
Profession (Teacher : LSA)	59 : 24
Educational Setting (Mainstream : Specialist)	56 : 27
Mean years worked with ASD (SD.)	10.0 (7.3)
Gender (Female : Male : Transsexual)	72 : 6 : 1
Age	
18–25 years	5
26–35 years	25
36–45 years	22
46–59 years	23
60 years or above	4
Currently teach child with ASD (Yes : No)	65 : 14
Received training (Yes : No)	34 : 45

was calculated using the participant's scores on corresponding scales/vignettes (e.g. missing Stability score [Vignette 7] = mean score [Vignettes 1 + 4 + 6]).

All data was screened for Skew and Kurtosis with acceptable limits set at  $\pm 2$  (Field, 2009). Outliers, where present, were winsorized. Where data did not meet test assumptions (e.g. significant heterogeneity of variance) a square root calculation/transformation was used in order to stabilize the variance between groups. Sensitivity analysis was performed using both winsorized and transformed data.

### 3. Results

#### 3.1. Participant demographics

In total 111 people responded to the survey although only 83 provided sufficient data to be classified as participants (e.g. provided data for at least six behavioural vignettes). Table 1 indicates that the majority of participants within this study were teachers (71.1%) working within mainstream schools (67.5%). Participants were distributed across all age groups and predominately female (91.1%). Many reported several years' experience of working with children with ASD (Mean = 10.0; SD = 7.3 years) and a significant proportion indicated having received some form of RRB training (43%) during their career.

As our hypotheses examined differences between those working in mainstream and specialist schools, the distribution of teachers and LSAs, the proportion of those having received training and the mean number of years worked with children with ASD were compared between groups. Statistical analysis using independent t-tests and Chi-square tests indicated that there was no significant difference between those working in different educational settings (Profession:  $\chi(1) = 2.105$ ,  $p = 0.147$ ; Received training:  $\chi(1) = 0.603$ ,  $p = .438$ ; Years worked:  $t(81) = -0.168$ ,  $p = .867$ ).

#### 3.2. Vignette integrity/item reliability

As vignettes were purposefully developed for this study, reliability analysis was conducted using participant data. Acceptable levels of Cronbach's alpha were set at  $\geq 0.7$ . The survey indicated acceptable internal consistency for the measurement of attributions, *emotional response* and *confidence* across vignettes (Table 2). There was also acceptable levels of internal consistency for vignettes representing either higher (Vignettes 1, 4, 6 & 7) or lower RRBs (Vignettes 2, 3, 5 & 8) except for the attribution of *control* in relation to higher RRBs. Item level analysis within this scale indicated that the deletion of items within vignettes would not significantly improve reliability. Thus the scoring of scales was not adjusted for the purposes of data analysis.

#### 3.3. Attributions

Mixed ANOVAs were used to assess for differences in attributions between educational settings (mainstream versus specialist; between-subjects) and RRBs (lower versus higher; within-subjects) alongside the identification of any interaction effects. Analysis

**Table 2**  
Internal consistency and Cronbach's  $\alpha$  for subscales and RRB type.

	Lower RRB (Vignettes 2, 3, 5, 8)	Higher RRB (Vignettes 1, 4, 6, 7)	Combined (All Vignettes)
<i>Control</i>	0.730	0.644	0.833
<i>Causality</i>	0.938	0.909	0.959
<i>Stability</i>	0.830	0.850	0.907
<i>Emotional Response</i>	0.825	0.823	0.912
<i>Confidence</i>	0.854	0.884	0.928

**Table 3**  
Mean attribution, emotional response and confidence scores by RRB type and Educational Setting.

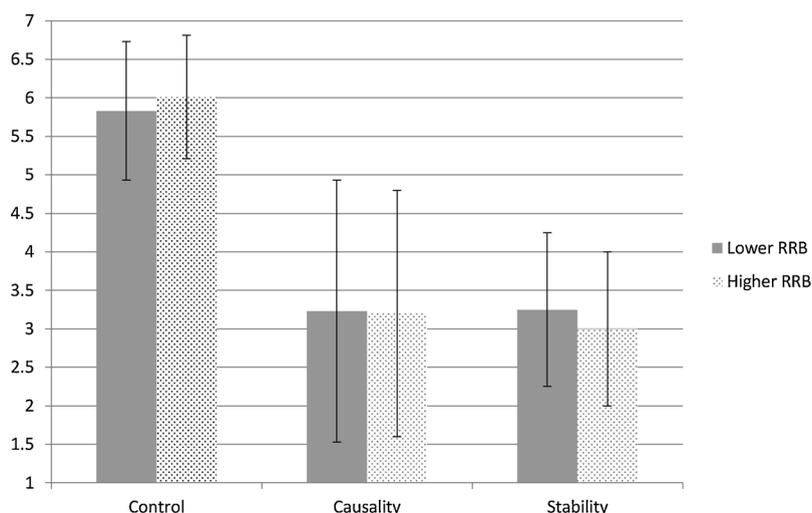
	RRB		Setting			RRB x Setting
	Total mean (SD)	Effect	Mainstream mean (SD)	Specialist mean (SD)	Effect	Effect
<b>Control<sup>a</sup></b>						
Lower	5.83 (0.9)	$F = 5.26, p = .024$	5.73 (0.9)	6.05 (0.8)	$F = 1.85, p = .178$	$F = 0.98, p = .325$
Higher	6.01 (0.8)		5.95 (0.8)	6.13 (0.7)		
<b>Causality</b>						
Lower	3.23 (1.7)	$F = 0.45, p = .833$	3.15 (1.6)	3.41 (1.9)	$F = 0.60, p = .440$	$F = 0.19, p = .664$
Higher	3.20 (1.6)		3.09 (1.6)	3.43 (1.8)		
<b>Stability</b>						
Lower	3.25 (1.0)	$F = 5.86, p = .018$	3.40 (1.0)	2.94 (1.1)	$F = 1.7, p = .200$	$F = 4.76, p = .032$
Higher	3.00 (1.0)		3.04 (1.0)	2.92 (1.1)		
<b>Emotional</b>						
Lower	5.05 (1.9)	$F = 2.09, p = .152$	5.56 (1.9)	4.00 (1.5)	$F = 12.59, p = .001$	$F = 1.31, p = .256$
Higher	5.16 (1.9)		5.59 (1.9)	4.27 (1.7)		
<b>Confidence<sup>a</sup></b>						
Lower	5.70 (1.2)	$F = 4.05, p = .048$	5.43 (1.3)	6.19 (0.9)	$F = 9.13, p = .003$	$F = 0.49, p = .485$
Higher	5.52 (1.2)		5.25 (1.3)	6.08 (0.9)		

\* Note. Sensitivity analysis/data transformation performed.

indicated that there was a significant difference between the attributions of *control* ( $F(1, 81) = 5.26, p = .024, \eta^2 = .061, \text{power} = 0.621$ ) and *stability* ( $F(1, 81) = 5.86, p = .018, \eta^2 = 0.067, \text{power} = 0.667$ ) when participants were presented with either higher or lower RRB vignettes (Table 3). Higher order behaviours were rated as being more difficult to control (Higher RRB mean [sd] = 6.01 [0.8]; Lower RRB mean [sd] = 5.83 [0.9]) and a more stable characteristic, (Higher RRB mean [sd] = 3.00 [1.0]; Lower RRB mean [sd] = 3.25 [1.0]) with lower order behaviours perceived as being easier for the child to control but less likely to occur over time (Fig. 1). Sensitivity analysis on *control* scores using transformed data indicated that the finding was robust ( $F(1, 81) = 5.38, p = .023, \eta^2 = .062$ ). A significant interaction was also observed between RRB type and educational setting for the attribution of *stability* with those from mainstream schools rating higher order RRBs as more stable than lower order behaviours ( $F(2, 80) = 4.76, p = .032, \eta^2 = .056, \text{power} = 0.578$ ). There was no significant interaction between all three attributions, RRB type and Education setting ( $F(2, 80) = 2.17, p = .121, \eta^2 = .051$ ).

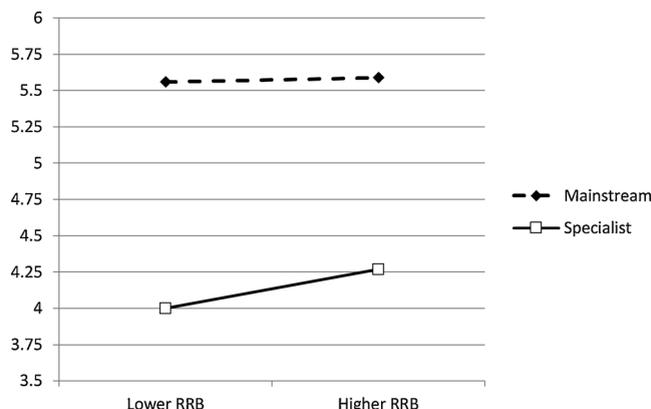
### 3.4. Emotional response and confidence

Similarly Mixed ANOVAs were utilised to assess for differences in *emotional response* or *confidence* scores. Although there was no significant difference in the *emotional response* scores for higher and lower RRBs ( $F(1, 81) = 2.09, p = .152, \eta^2 = .025, \text{power} =$



**Fig. 1.** Mean attribution and standard deviation scores by RRB type.

Note. Higher control scores equate to the attribution that the behaviour is more difficult for the child to control. Lower scores for causality indicate that the child’s behaviour is perceived as a personal characteristic whilst lower stability scores indicate that the child’s behaviour will consistently occur over time.



**Fig. 2.** Interaction between RRB type and Educational setting (Emotional Response).  
 Note. Higher scores indicate a more negative emotional response (e.g. lower levels of sympathy and greater feelings of frustration).

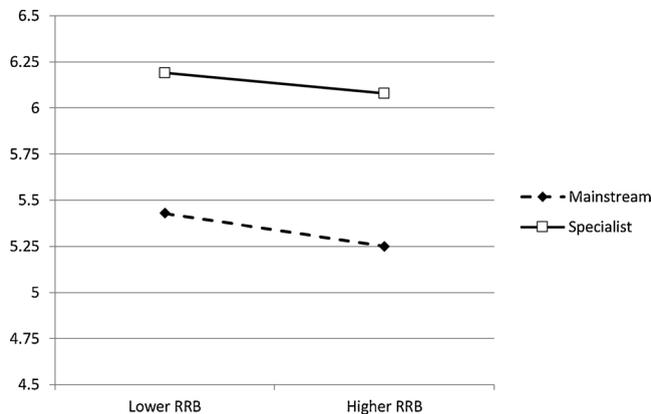
0.298), there was a significant difference between those working in different educational settings ( $F(1, 81) = 12.59, p = .001, \eta^2 = .135, \text{power} = 0.939$ ). Teachers working in mainstream schools reported less sympathy and greater frustration compared to their counterparts working in specialist schools (Fig. 2). In terms of *confidence* in managing behaviours, again there was a significant effect between educational settings with those in specialist schools reporting much greater confidence ( $F(1, 81) = 9.13, p = .003, \eta^2 = .101, \text{power} = 0.848$ ; Fig. 3). *Confidence* ratings were also found to be significantly higher for managing lower order RRBs ( $F(1, 81) = 4.05, p = .048, \eta^2 = .048, \text{power} = 0.511$ ). Sensitivity analysis using transformed *confidence* scores confirmed that these effects were significant (RRB type:  $F(1, 81) = 4.24, p = .043, \eta^2 = .050$ ; Educational Setting:  $F(1, 81) = 9.44, p = .003, \eta^2 = .104$ ).

### 3.5. Predictors of emotional response

A two-step hierarchical regression was undertaken to examine predictors of *emotional response* (Table 4). Model one was built around variables related to experience (e.g. years worked, educational setting and whether training had been received). Model two included attributions and emotional response or confidence scores. Multicollinearity within the model was assessed via the calculation of a tolerance statistic with a score of  $> 0.1$  deemed acceptable. Independence of errors were assessed via the calculation of the Durbin-Watson statistics with scores between 1–3 indicating acceptable levels of autocorrelation (Field, 2009).

At step 1, Educational setting, years worked and training accounted for 26.8% of the variance for lower order *emotional response* scores, ( $R^2 = 0.268, F(3, 75) = 9.14, p = .001, f^2 = .366$ ) although only Educational setting ( $\beta = -0.397, p = .001$ ) and years worked ( $\beta = -0.292, p = .004$ ) made a significant individual contribution. At step 2, attribution and confidence scores were entered and made a significant contribution accounting for an additional 16.9% of the variance. Thus the overall model accounted for 43.7% of the variance ( $R^2 = 0.437, F(7, 71) = 7.87, p = .001, f^2 = .776, \text{power} = 0.999$ ) with *control* ( $\beta = -0.281, p = 0.009$ ) *confidence* ( $\beta = -0.238, p = .026$ ), Educational setting ( $\beta = -0.250, p = .014$ ) and years worked ( $\beta = -0.198, p = .035$ ) identified as significant predictors of *emotional response*.

For Higher order *emotional response* scores, step 1 accounted for 26.8% of the variance ( $R^2 = 0.268, F(3, 75) = 9.14, p = .001, f^2 = .366$ ) with all individual predictors making a significant contribution (Educational setting:  $\beta = -0.347, p = .001$ ; years worked:  $\beta$



**Fig. 3.** Interaction between RRB type and Educational setting (Confidence subscale).  
 Note. Higher scores indicate greater feelings of confidence in managing behaviours within the classroom.

**Table 4**  
Predictors of Emotional Response.

Predictor	Emotional Response (Lower)					Emotional Response (Higher)				
	$\beta$	<i>p</i> value	$R^2$	$\Delta R^2$	$\Delta F$	$\beta$	<i>p</i> value	$R^2$	$\Delta R^2$	$\Delta F$
<b>Model 1</b>			.268	.268	<b>9.137***</b>			.268	.268	<b>9.139***</b>
Years worked	-.292	<b>.004</b>				-.303	<b>.003</b>			
Educational setting (Mainstream = 1, Specialist = 2)	-.397	<b>.001</b>				-.347	<b>.001</b>			
Training (Yes = 1, No = 2)	.170	.092				.242	.017			
<b>Model 2</b>			.437	.169	<b>5.331***</b>			.500	.233	<b>8.262***</b>
Years worked	-.198	<b>.035</b>				-.186	<b>.037</b>			
Educational setting (Mainstream = 1, Specialist = 2)	-.250	<b>.014</b>				-.229	<b>.015</b>			
Training (Yes = 1, No = 2)	.106	.256				.186	.044			
Control	-.281	<b>.009</b>				-.376	<b>.001</b>			
Causality	-.013	.893				.031	.740			
Stability	.084	.401				.006	.950			
Confidence	-.238	<b>.026</b>				-.233	<b>.026</b>			

\* Note.  $p < 0.05$  \*\* $p < 0.01$  \*\*\* $p < 0.01$ .

= -0.303,  $p = .003$ ; training:  $\beta = 0.242, p = .017$ ). At step 2, attribution and confidence scores were once again entered and made a significant contribution accounting for an additional 23.3% of the variance. The overall model accounted for 50% of the variance ( $R^2 = 0.500, F(7, 71) = 10.16, p = .001, f^2 = 1.00, power = 0.999$ ). Similar to lower order RRBs, it was found that *control* ( $\beta = -0.376, p = .001$ ) and *confidence* scores ( $\beta = -0.233, p = .026$ ) significantly predicted *emotional response* as well as Educational setting ( $\beta = -0.229, p = .015$ ), years worked ( $\beta = -0.186, p = .037$ ) and training ( $\beta = 0.186, p = .044$ ). The strongest predictor in this model was once again *Control*.

### 3.6. Predictors of confidence

In order to examine predictors of *confidence*, a two-step hierarchical regression was once again undertaken (Table 5). For Lower order *confidence* scores, step 1 accounted for 15.1% of the variance ( $R^2 = 0.151, F(3, 75) = 4.43, p = .006, f^2 = .178$ ) with only Educational setting making a significant individual contribution ( $\beta = -0.326, p = .003$ ). At step 2, attribution and emotional response scores were entered and made a significant contribution accounting for a further 16.8% of the variance. The overall model accounted for 31.9% of the variance ( $R^2 = 0.319, F(7, 71) = 4.75, p = .001, f^2 = .468, power = 0.999$ ) with *emotional response* ( $\beta = -0.287, p = .026$ ) and *control* ( $\beta = 0.249, p = .036$ ) found to be the only significant predictors of lower order *confidence* scores.

In terms of Higher order *confidence* scores, step 1 accounted for 23.7% of the variance ( $R^2 = 0.237, F(3, 75) = 7.76, p = .001, f^2 = .311$ ) with all individual predictors making a significant contribution (Educational setting:  $\beta = 0.340, p = .001$ ; years worked:  $\beta = 0.243, p = .019$ ; training:  $\beta = -0.260, p = .012$ ). At step 2, attribution and emotional response scores made a significant contribution accounting for a further 13.6% of the variance. Thus the overall model accounted for 37.3% of the variance ( $R^2 = 0.373, F(7, 71) = 6.02, p = .001, f^2 = .595, power = 0.999$ ) with *emotional response* ( $\beta = -0.292, p = .026$ ) and Educational setting ( $\beta = 0.223, p = .035$ ) identified as significant predictors of higher order *confidence* scores.

**Table 5**  
Predictors of Confidence.

Predictor	Confidence (Lower)					Confidence (Higher)				
	$\beta$	<i>p</i> value	$R^2$	$\Delta R^2$	$\Delta F$	$\beta$	<i>p</i> value	$R^2$	$\Delta R^2$	$\Delta F$
<b>Model 1</b>			.151	.151	<b>4.433**</b>			.237	.237	<b>7.758***</b>
Years worked	.145	.179				.243	<b>.019</b>			
Educational setting (Mainstream = 1, Specialist = 2)	.326	<b>.003</b>				.340	<b>.001</b>			
Training (Yes = 1, No = 2)	-.171	.114				-.260	<b>.012</b>			
<b>Model 2</b>			.319	.168	<b>4.380**</b>			.373	.136	<b>3.842**</b>
Years worked	.027	.794				.127	.209			
Educational setting (Mainstream = 1, Specialist = 2)	.206	.067				.223	<b>.035</b>			
Training (Yes = 1, No = 2)	-.075	.469				-.165	.111			
Control	.249	<b>.036</b>				.170	.143			
Causality	-.001	.989				-.004	.967			
Stability	.200	.065				.110	.280			
Emotional Response	-.287	<b>.026</b>				-.292	<b>.026</b>			

\* Note.  $p < 0.05$  \*\* $p < 0.01$  \*\*\* $p < 0.01$ .

## 4. Discussion

The aim of this study was to investigate the attributions, emotional response and levels of confidence held by teachers working with children with RRBs. Our findings indicate that teachers have different attributions of higher and lower order RRB in terms of both the level of *control* the child has over the behaviours and the stability of the behaviours. Interestingly however, in spite of these differences, teachers reported no difference in their emotional response towards these two different types of RRBs. We did find, however that teachers reported being less confident in their ability to manage higher order behaviours. No differences in attributions in relation to RRBs were found between teachers working within mainstream and specialist settings. However, the sample of teachers working in mainstream schools in this study, reported significantly reduced confidence and less sympathy towards children with RRBs, compared to their peers in specialist educational settings.

Based upon research by Zijlmans et al. (2012) investigating challenging behaviours, we had predicted that higher order behaviours, which potentially demand increased levels of attention within the classroom environment, would be rated as highly controllable. Contrary to our hypothesis however we found that higher order behaviours were rated by teachers as more difficult to control and more stable than lower order behaviours. It will be important to determine whether this finding can be replicated in a novel sample or whether it is an artefact of instability in the behavioural vignettes used in the current study. This is particularly important given that internal consistency scores for the measurement of *control* were somewhat lower than other scales.

In line with our prediction that higher order RRBs would be viewed as more controllable and stable and in line with Weiner's theory of attribution (Weiner, 2010), we also predicted that higher order behaviours would evoke a more negative emotional response from teachers compared to lower order RRBs. In contrast, we observed no differences in the *emotional response* reported by teachers towards higher or lower RRBs. The reduced confidence reported by teachers in managing higher order behaviours is also at odds with this finding and again highlights that rituals, difficulties with changes in routine and circumscribed interests are viewed somewhat differently to lower order behaviours. The mechanisms behind these differences require further exploration but remain unanswered within the context of this study.

Previous research indicates that attributions may be moderated by experience and training (Brady & Woolfson, 2008; Male, 2003). Our opportunity sample of teachers in mainstream and specialist settings was well matched in these areas and this may explain why no differences were found in the attributions of teachers across settings. However, significant differences were observed in the *emotional response* and levels of *confidence* reported by teachers across settings. Due to the large effect sizes observed and high levels of post hoc power this finding appears robust. Although tentative, these differences may reflect factors associated with working in specialist settings such as increased access to learning support assistants and other professions (e.g. educational psychologists), reduced class sizes and enhanced training specifically focussing upon behaviour management.

Our findings also indicate a strong inter-relationship between *emotional response* and *confidence* scores, with factors relating to teaching experience also proving to be significant predictors. Previous research applying Bandura's model of self-efficacy (Bandura, 1997) to teachers, suggests that prior experience and frequency of mastery experiences are important factors in moderating attributional beliefs (Tschannen-Moran & Hoy, 2007). Therefore it is not surprising that *emotional response* scores and feelings of *confidence* were significant predictors of one another. In terms of attributions, *control* (i.e. the perception that a child is able to inhibit or adjust his or her behaviour) was predictive of *emotional response* and ratings of *confidence*, thus providing partial support of Weiner's model. Previous research attempting to investigate Weiner's model in the field of learning disability and challenging behaviours has found mixed evidence for the association between causal attributions and an individual's emotional response (Jones & Hastings, 2003; Ling & Mak, 2012; Rose & Rose, 2005). Although exploratory, the results of our study have important implications for future interventions regarding the management of RRBs and the mechanisms such interventions might target.

### 4.1. Strengths, limitations and future research

This is the first study of its kind to investigate the attributions and responses of teachers towards RRBs. In depth qualitative interviews with those participating in this study would have been useful to confirm or refute our findings and explore the putative reasons for the differences in attributional, emotional and confidence ratings obtained. Due to the sampling approach utilised for this study it is highly likely that our participants represent a motivated and experienced group of teachers working with children with ASD. The findings therefore require replication with education staff with less experience and knowledge of ASD. Ultimately, differences observed between specialist and mainstream teachers in this study maybe much greater in the wider U.K. educational system.

It is also worth reflecting on our experience of using vignettes in order to elicit research data. Despite criticism that written vignettes may lack ecological validity (Lucas, Collins, & Langdon, 2009), developing vignettes from teachers' experiences and piloting them with experts and professionals enabled us to have confidence that the behaviours described represent appropriate examples of lower and higher order RRBs. Apart from the attribution of *control*, reliability analysis indicated that our survey tool demonstrated high levels of internal consistency for the measurement of attributions, *emotional response* and *confidence* across RRBs. Our vignettes have the potential to be used by others, in order to evaluate small scale or much larger national projects aimed at improving the knowledge and confidence of teachers working with ASD and RRBs.

Of course, there is scope to develop and evaluate our methodological approach further, if desired, for example through the creation of video vignettes of different RRBs and comparing a teacher's response across both written and more visual methods. Previous research has demonstrated stronger emotional reactions solicited using 'real' incidents of challenging behaviour (Wanless & Jahoda, 2002) whilst others have hypothesised that written vignettes enable participants to respond more "intellectually" rather than

arousing a true emotional response (Williams, 2008). Despite the additional resources and possible ethical implications required to obtain video examples within a classroom setting, a handful of studies investigating challenging behaviour (Hastings et al., 2003; Mossman, Hastings, & Brown, 2002b) and stereotypy (Sperry & Symons, 2003) have managed to obtain sufficient video material. Embedding such videos within an online survey may prove challenging but ultimately worthwhile in order to maximise both participation and ecological validity in future replications of this study.

This study assessed teachers emotional responses and confidence in managing RRBs. Of course, the influence of other important constructs such as stress and professional burnout was not captured. Indeed the results of our hierarchical regression indicate that there is additional variance yet to be explained by other predictors. The concept of burnout within the teaching profession has been investigated, with high levels associated with the holding of negative attitudes towards helping students and low levels of self-efficacy (Jennett, Harris, & Mesibov, 2003). The inclusion of a teacher based measure of burnout would be useful to determine whether those recruited to this study are typical and representative of their fellow professionals.

#### 4.2. Implications for practice

Given that RRBs frequently occur within the school environment (Azad & Mandell, 2016; Johnson, 2017) and our finding that teachers based in mainstream schools tend to report increased levels of frustration and reduced confidence when faced with these behaviours (compared to their counterparts working in specialist schools), it is worth considering the development of interventions for this group of teachers. More specifically, any intervention with teachers based in mainstream settings could focus on developing confidence around managing higher order behaviours, as these were consistently rated (by both groups) as the most troublesome behaviours within our vignettes. Previous research, with parents, indicates that interventions supporting teachers would be appreciated given the significant role teachers play in a child's day to day development and implementing behavioural management strategies consistently across settings (Grahame et al., 2015). The increasing number of children with ASD now being taught within mainstream schools in the U.K (Wilkinson & Twist, 2010) is another strong justification for initially up-skilling this specific group of teachers.

Given the impact a teacher's *emotional response* appears to have upon their subsequent feelings of *confidence* and vice versa, it seems plausible to focus any intervention on targeting these factors rather than exclusively on attributions associated with lower or higher order RRBs. Indeed, given the results of the regression analysis, only the attribution of *Control* was significant in understanding how a teacher may react in the classroom environment. However it is currently unclear which type and mode of training would be most beneficial given that parental approaches have utilised a range of psychoeducational approaches or multi-session group based workshops varying greatly in effectiveness (Nevill, Lecavalier, & Stratis, 2018). It is also unclear whether it would be most effective to offer any training to teachers before or several years post qualification. Therefore a training needs assessment should be undertaken before development and piloting of any future intervention specifically focussing upon understanding and managing RRBs.

#### 4.3. Conclusions

This study is the first of its kind to apply Weiner's theory of attribution in order to investigate attributions held by teachers towards RRBs. The findings indicate there are significant differences between how teachers in mainstream and specialist educational settings respond to RRBs in terms of their emotional reaction and reported levels of confidence in managing such behaviours. The observed differences in attributions and confidence ratings which appear to vary depending upon the type of RRB demonstrated by a child, requires further investigation given the exploratory nature of this study and associated statistical power. The findings have clinical implications, indicating that training and support should be offered to teachers, especially in mainstream settings, in order to help them understand and manage RRBs. The focus of any training should aim to enhance the confidence and self-efficacy of teachers, more so than behavioural attributions made about the child's behaviour. Further research could consider using video vignettes to elicit the response of teachers and/or sampling hard to reach teaching groups, as this study is likely to have obtained a highly motivated sample of teachers, which is unlikely to the wider U.K. educational system.

#### Funding sources

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors and was undertaken as a student project for the Newcastle University Doctorate in Clinical Psychology course.

#### Competing interests

The authors declare that they have no competing interests.

#### Data statement

Anonymised data from this study is available from the corresponding author on request.

## Acknowledgements

The authors would like to thank Professor Mark Freeston for his statistical advice and Nicola Johnson and the North East Autism Research (NEAR) group for all their support around vignette development.

## Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.ridd.2019.01.009>.

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