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Article

Comprehensive Assessment of Triggers for Behaviours of Concern Scale (CATS): Initial Development

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Abstract: Challenging behaviour displayed by people with intellectual disabilities (ID) can be difficult to manage if caregivers do not understand the reasons for the behaviour. Identifying the contextual variables/triggers for the behaviour is likely to help undertake a functional analysis leading to a person-centred positive behaviour support plan. Currently, a limited number of checklists are available for trigger assessment and none were developed using an interview with the family caregivers. This article describes the development and contents of the comprehensive assessment of triggers for behaviours of concern scale (CATS). CATS was developed in two stages. Stage 1 used a ‘bottom-up’ approach, in which caregivers of adults with ID who show aggressive behaviour were interviewed to identify the triggers for aggression. In stage two, using a ‘top-down’ approach, a comprehensive literature review was conducted to gather items from existing trigger checklists. Trigger items from both stages were combined and the duplicates were removed. The final list in CATS consists of 333 contextual triggers categorised under five main domains and 12 subdomains. CATS can be used by caregivers to identify triggers or antecedents of challenging behaviour. Further work is needed to test its psychometric properties, utility, and acceptability.

Keywords: challenging behaviours; behaviours that challenge; triggers of challenging behaviour; triggers for challenging behaviour scale; contextual assessment of challenging behaviour; intellectual disabilities



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1. Introduction

Challenging behaviour, also known as behaviour that challenges or behaviour of concern, is defined as behaviour that is of such an intensity, frequency, or duration as to threaten the quality of life and/or the physical safety of the individual or others; it is likely to lead to responses that are restrictive, aversive, or result in exclusion [1]. Challenging behaviour is common in people with intellectual disabilities (ID) with up to 60.4% adults with ID showing at least one form of challenging behaviour [2]. The prevalence of severe challenging behaviour among people with ID is between 10% and 18% [2,3]. This increases with the severity of ID, with up to 82% of people with multiple and profound disabilities displaying challenging behaviour [4]. Challenging behaviour has been reported in the form of aggressive, self-injurious (SIB), and destructive behaviour, and other forms of behaviours such as temper tantrum, overactivity, inappropriate sexual behaviour, night-time disturbance, etc. [2,3]. Challenging behaviour has detrimental effects on the person’s quality of life and their physical, social, and emotional wellbeing [5]. Challenging behaviour also incurs a significant cost [6] and has been associated with caregiver’s stress, exclusion from community facilities, and inappropriate and increased use of restrictive practices, including use of psychotropic medication and, in some cases, loss of community placement, leading to hospital admission [7,8]. Therefore, to reduce costs and improve the quality of life of the person with ID and their caregivers, challenging behaviour needs to be assessed effectively to guide appropriate interventions. The challenging behaviour is the outcome of a complex

interplay among biological (physical illness, genetic syndromes, underlying brain damage, etc.), psychological (emotional trauma, abuse, stress, psychiatric disorders, etc.), and social/environmental (crowded environment, lack of personal space, etc.) conditions (see Appendix A). Therefore, a biopsychosocial approach is needed to formulate and implement an effective person-centred intervention by a multidisciplinary team.

It is proposed that challenging behaviour serves a function, and it is important to know that function to help ameliorate the behaviour [1,9]. Functional assessment is a well-known procedure to detect the function of the behaviour by identifying antecedents and consequences that maintain challenging behaviour [10]. This helps to develop a person-centred positive behaviour support plan for individuals with ID. Matson and colleagues [11] developed the questions about behavioural function (QABF) scale to aid functional analysis. The QABF categorises functions under six headings, namely attention (receive attention), escape (avoid something), nonsocial (factors internal to the person), physical (physical problems such as relief from pain), and tangible (achieve something). Function of challenging behaviour is strongly influenced by context, specifically contexts that involve physical, activity/routine, social, and biological variables [12–14]. Contextual variables can be considered as triggers to challenging behaviour or antecedents and have a functional relationship to challenging behaviour. For instance, if the function of challenging behaviour is to achieve attention from a particular support staff, then the absence of that support staff can increase instances of challenging behaviour. Presence or absence of support staff therefore acts as a specific contextual trigger to challenging behaviour. Biological/physical/genetic, psychological/psychiatric, and social/environmental contextual variables or triggers for challenging behaviours can be easily detected by untrained caregivers through the use of indirect assessments [10]. Triggers could be predisposing (e.g., genetic disorder) or precipitating (e.g., pain in the body) or perpetuating (e.g., crowded environment).

Five scales are available for the assessment of contextual variables, namely (a) contextual assessment inventory for problem behaviour (CAIPB) [13,14], (b) setting event inventory (SEI) [15], (c) setting event checklist (SEC) [16], (d) setting events list (SEL) [17], and (e) challenging behaviour attributions scale (CHABA) [18]. In addition, there are also six scales available for the assessment of function/motivation of challenging behaviour (see Table 1). Further details of the five contextual scales are presented in Table 2. However, none of these scales were developed using a ‘bottom up’ approach in which both family and paid caregivers were interviewed to detect triggers for challenging behaviour among people they care for. Therefore, we have developed the comprehensive assessment of triggers for behaviours of concern scale (CATS) for caregivers to use to detect triggers for challenging behaviour using a combined ‘bottom up’ (interview with caregivers) and ‘top-down’ (reviews of items in the existing scales) approach. This was done in the context of a larger project that developed a short-term psycho-education for carers to reduce over-medication of people with intellectual disabilities (SPECTROM) <https://spectrom.wixsite.com/project> (accessed on 12 September 2021) [19]. In this paper, we present the method used to develop CATS and its content, and compared its characteristics with other existing tools.

Table 1. Scales and studies identified in the literature search.

	Scale Name	Studies Identified by Literature Search in Relation to Scale
Scales related to contextual variables	Contextual Assessment Inventory for Problem Behaviour (CAIPB)	McAtee (2002) [14] McAtee et al. (2004) [13] Carr et al. (2008) [20] Embregts et al. (2009) [21]
	Setting Events List (SEL)	McGill et al. (2005) [17]
	Setting Events Checklist (SEC)	Gardner et al. (1986) [16]
	Setting Events Inventory (SEI)	Tustin et al. (1997) [15]
	Challenging Behaviour Attributions Scale (CHABA)	Hastings (1997) [18]

Table 1. Cont.

	Scale Name	Studies Identified by Literature Search in Relation to Scale
Scales related to functional assessment	Questions about Behavioural Function (QABF)	Medeiros et al. (2013) [22] Watkins and Rapp (2013) [23] Paclawskyj et al. (2000) [24] Matson et al. (2012) [25] Singh et al. (2009) [26]
	The Functional Analysis Checklist	Sturmey (2001) [27]
	Functional Analysis Screening tool (FAS)	Iwata et al. (2013) [28]
	Functional Assessment for Multiple Causality (FACT)	Matson et al. (2003) [29]
	Functional analysis	Delgado-Casas et al. (2014) [30]
	Motivation Assessment Scale (MAS)	Durand and Crimmins (1988) [31] Singh et al. (1993) [32] Bihm et al. (1991) [33]

Table 2. Information on contextual/trigger scales.

Name of Scale	Items	Categories	Subcategories	Items per Sub/Category	Completion Method	Scale Development
Contextual Assessment Inventory of Problem Behaviour (CAIPB) [13]	80 items with 13 open ended questions	(a) Social/cultural, (b) Task/activity, (c) Physical and biological	<ol style="list-style-type: none"> Social/cultural category items were grouped into two subcategories: negative interactions and disappointment. Tasks/activities category items were grouped into two subcategories: factors related to tasks and factors related to daily routines. Physical category items were grouped into two subcategories: uncomfortable environment and changes in environment. Biological category items were grouped into three subcategories: medication, illness, and physiological states. 	<p>Social/Cultural— Negative interactions: 22 items and 1 open-ended question; Disappointments: 10 items and 2 open-ended questions.</p> <p>Tasks/Activities— Factors related to tasks: 13 items and 1 open-ended question; Factors related to daily routines: 8 items and 2 open-ended questions.</p> <p>Physical— Uncomfortable environment: 6 items and 1 open-ended question; Changes in environment: 5 items and 2 open-ended questions.</p> <p>Biological Category Medication: 2 items and 1 open-ended question; Illness: 4 items and 1 open-ended question. Physiological states: 10 and 2 open-ended questions.</p>	Likelihood of association between challenging behaviour (CB) and items are rated on a 5-point scale, from 1 (never) to 5 (always).	Scale development included 6 steps: review of the existing literature, generation of item pool, group items into the four generic categories, identify subcategories, determine format for measurement, administer inventory to staff, and evaluating the inventory.

Table 2. Cont.

Name of Scale	Items	Categories	Subcategories	Items per Sub/Category	Completion Method	Scale Development
Setting Event Checklist (SEC) [16]	17 items	No categories	No subcategories	Not applicable	Occurrence/ nonoccurrence of each item in the morning (a.m.) or evening (p.m.) recorded prior to attending programmes.	Developed by discussing with residential staff regarding situations or events that would provoke CB for a group of individuals with moderate and severe intellectual disabilities who lived in the residential facility and presented chronic CB while attending a community work training program.
Setting Event List (SEL) [17]	76 items	<ul style="list-style-type: none"> (a) Physical setting, (b) Time of day, (c) Day of week, (d) Time of year, (e) Weather conditions, (f) Activities, (g) Social contexts, (h) Personal contexts, (i) Presence of particular clients, (j) Presence of particular staff members 	No subcategories	<ul style="list-style-type: none"> (a) Physical setting: 12 (b) Time of day: 9 (c) Day of week: 7 (d) Time of year: 6 (e) Weather conditions: 6 (f) Activities: 13 (g) Social context: 9 (h) Personal context: 14 (i) Presence of particular clients and presence of particular staff members; Number of items equivalent to other clients and staff. 	Report whether target CB was more or less likely (or 'makes no difference' or 'not applicable') across the items.	Developed in reference to 22 individuals with intellectual disabilities in 18 different residential service settings.

Table 2. Cont.

Name of Scale	Items	Categories	Subcategories	Items per Sub/Category	Completion Method	Scale Development
Setting Events Inventory (SEI) [15]	155 items	(a) Carer Attention,	No subcategories	(a) Carer attention: 12	Rate the likelihood of challenging behaviour occurring within 5 min of the client encountering each situation using a four-point scale: 0 (unlikely or occurs on less than 10% of occasions), 1 (sometimes or between 11% and 50% of occasions), 2 (often or from 51% to 80% of occasions), and 3 (almost always or over 81% of occasions).	Developed based on available literature and on information about individual clients that had been gathered using antecedent-behaviour-consequence (ABC) charts by the researcher.
		(b) Carer Instruction,		(b) Carer instruction: 11		
		(c) Carer Touch,		(c) Carer touch: 8		
		(d) Criticism,		(d) Criticism: 10		
		(e) Correcting Consequence,		(e) Correcting consequence: 9		
		(f) Peer Agitation,		(f) Peer agitation: 13		
		(g) Peer Encroachment,		(g) Peer encroachment: 11		
		(h) Possessions,		(h) Possessions: 5		
		(i) Task Difficulty,		(i) Task difficulty: 4		
		(j) Environmental Noise,		(j) Environmental noise: 3		
		(k) Organised Activity, Changes,		(k) Organised activity: 15		
		(l) Disappointment,		(l) Changes: 15		
		(m) Fine Motor Activity,		(m) Disappointment: 7		
		(n) Physical Activity,		(n) Fine motor activity: 4		
		(o) Low Participation,		(o) Physical activity: 5		
(p) Refusal,	(p) Low participation: 6					
(q) Seeking Support and	(q) Refusal: 8					
(r) Disruptive Communication	(r) Seeking support: 6					
	(s) Disruptive communication: 3					
Challenging Behaviour Attributions Scale (CHABA) [18]	33 items	(a) Learned positive behaviour (LP),	No subcategories	(a) LP: 3	Five-point scale ranging from 'very unlikely' to 'very likely.'	Further developed from a 25-item scale previously developed by Hastings et al. (1997) [34] in which the items were collated from literature review and followed by ratings on the items by support staff based on case vignettes.
		(b) Learned negative behaviour (LN),		(b) LN: 3		
		(c) Biomedical (BM),		(c) BM: 6		
		(d) Emotional (EM),		(d) EM: 7		
		(e) Physical environment (PE),		(e) PE: 8		
		(f) Stimulation (ST)		(f) ST: 6		

2. Materials and Methods

CATS was developed in two main stages. In stage 1, using a 'bottom-up' approach, one author (G.U.) interviewed 100 caregivers (both family and paid caregivers) of adults with ID who showed aggressive behaviour. During the interview, the caregivers were asked to describe what they thought were the triggers for aggressive behaviour in adults with ID they cared for. The interview scripts were analysed using a qualitative method, thematic analysis [35], which generated a list of themes for triggers. These themes were categorised under five headings. Several subthemes were created under each theme. In stage two,

another author (B.L.) carried out a comprehensive literature review of publications on contextual trigger scales for challenging behaviour in ID and motivational analysis, which generated a pool of contextual trigger items. The themes from stage 1 and trigger items from stage 2 were combined and duplicates were removed. The final checklist of triggers was categorised using the same five themes that were used in stage 1. Both the themes in stage 1 and item checklists in stage 2 were ratified and confirmed by the third author (S.D.).

2.1. Stage 1

The work in stage 1 was done as part of a larger project called, 'A Longitudinal Observational Study of Aggressive Behaviour in Adults with Intellectual Disabilities (ID)'. This project studied aggressive behaviour and its interventions prospectively during a period of 12 months among 100 adults with ID who were treated in psychiatric outpatient clinics in the West Midlands area of the UK [36]. The level of ID ranged from mild to profound, of which 23% participants had mild ID, 32% had moderate, 41% had severe, and 4% had profound ID; 41% of participants had a diagnosis of autism spectrum disorder and 4% was diagnosed with Asperger's syndrome. Most participants had a comorbid medical/health condition and mental health diagnosis.

During the interview each caregiver (56% paid worker, 44% family carer) was asked 'Do you know of any triggers for the aggression or what motivates the aggression?' in the person that you care for. Caregivers' responses were written down as close to verbatim as possible and to maintain anonymity, 'P' was used instead of names of individuals with ID (see Appendix B). The qualitative analysis of interview data looked for semantic patterns. Initial reading and re-reading of interview data helped to develop initial codes. Emergent themes were then analysed against the full data set to create thematic maps with candidate themes and subthemes. For inter-rater reliability, a trainee psychiatrist had independently analysed data and both S.T. and G.U. then discussed the final themes. In stage 2, these themes and subthemes were converted into a trigger items checklist.

2.2. Stage 2

In stage 2, a comprehensive literature review generated a pool of contextual trigger items that were then compared with the stage 1 themes/items and the duplicates were removed. Finally, the combined list of trigger items was categorised in contextual groups. A second author (S.D.) who is a senior professor of psychiatry in the field of ID ratified the final list for any duplication and missing items. Any disagreements on item categorisation were discussed and a final consensus was reached. The final draft of comprehensive checklist was then sent for feedback to 53 stakeholders involved in the SPECTROM project [19]. The stakeholders consisted of adults with ID and their families, researchers, direct support staff, and community learning disability team members including psychiatrists, speech and language therapists, a learning disability nurse, general practitioners and pharmacists, and representatives of service provider organisations.

The literature review was conducted using the following databases: OVID Journals (included Medline), PsycARTICLES, Embase, and PsycINFO. The search terms included: contextual scale OR rating scale OR functional assessment AND challenging behaviour OR problem behaviour AND intellectual disability.

The search terms were broad rather than specific to be inclusive and yield maximum results. Although we wanted to search for contextual triggers assessment scales, both contextual and functional assessment scales for challenging behaviour were included.

Articles published between 1985 and June 2019 in English language were searched. References cited in some relevant selected articles were screened to gather additional articles through cross-referencing. Articles relevant to the topic of interest were selected for the review, whereas articles that did not relate to the challenging behaviour scale were excluded. Conference abstracts, poster presentations, and scales unrelated to challenging behaviour were excluded. Scales related to quality of life, emotions, and mental health in people with ID were excluded.

Five trainees were interviewed to explore their experience of using CATS. Interviews were analysed using a thematic analysis method [35].

3. Results

In stage 1, 168 contextual variables were identified which were categorised under five main themes (internal environment (within the person), external environment (outside of the person), expression of volition, characteristics of ID, and specific activities/events) and 12 subthemes (Table 3). The highest number of items mentioned by the caregivers fell in the categories of external environment ($n = 92$), and internal environment ($n = 76$). Most commonly described subthemes by the caregivers were social environment, such as conflict with peers or witnessing conflicts and an issue around confrontation ($n = 75$), followed by limits to volition, such as not having demands met ($n = 63$); emotional state, such as too much excitement, stress, agitation, not feeling secured ($n = 58$); physical environment, such as noisy, busy, crowded environment overwhelming the person's visual, auditory, and spatial stimuli, and making the atmosphere unpleasant or painful to bear ($n = 54$); and uncertainty ($n = 54$). There was overlap among the subthemes and contextual variables (Figure 1).

In stage 2, a total of 258 articles were gathered using the search, from which 20 articles were identified by cross-referencing and hand searching. Twenty articles were duplicates and removed. A total of 238 titles were screened from which 32 articles were selected for abstract screening. Reasons for exclusion can be found in Figure 2. Eight more articles were removed at the abstract screening stage as they did not contain information on scales/triggers of challenging behaviours. Twenty-four articles were selected for full text screening that focused on scales for challenging behaviours or provided information on scales. Four articles were further removed at full text screening as they were behaviour rating scales and not assessments for challenging behaviour. Finally, 20 articles were selected (see Figure 2) for inclusion in the review.

Scales related to functional analysis and assessment of contextual variables were given the same weight because useful triggers or motivations of challenging behaviours can be extracted from the functional analysis scales. For example, from the functional analysis checklist, for the question 'Does the behaviour occur more in a crowded room?', the context at which challenging behaviour will occur was extracted. In this case, the context 'crowded room' was extracted and placed in the item pool. Similarly, the context 'making requests' was extracted from the question 'Does the behaviour occur when any request is made of this person?' in the motivation assessment scale (MAS).

The SEC [16] items are not categorised, and the SEL [17], CHABA [18], and SEI [15] do not have subcategories. The lowest number of contextual variables ($n = 17$) was in the SEC (see Table 2). There are no scoring methods applied for these scales as they are checklists used to gauge information on contextual variables that act as triggers for challenging behaviour. Only CAIPB [13] has been tested for convergent and predictive validity. The effect size, using Cohen's d , was 0.76 for log entries (convergent) and 0.85 for direct observation (predictive) [20]. CAIPB and CHABA have been tested for reliability. The Cronbach's alpha for the total CAIPB scale was 0.95, and coefficients for the subscales ranged from 0.75 to 0.93. On the other hand, the coefficients for CHABA's subscales varied between 0.65 to 0.87 [18]. SEI and CAIPB have been tested for inter-rater reliability. Inter-rater reliability of CAIPB can be considered good, with a mean intraclass correlation coefficient of 0.63 [21], while SEI can be considered excellent, with a median of 0.86 [15].

Table 3. Prevalence of themes and subthemes detected at stage 1 [36].

Theme/ Subtheme	Number of Carers Mentioning Theme (n = 100)
External Environment	92
Physical Environment	54
Social Environment	75
Internal Environment	76
Aversive Physical States	22
Medical Conditions	28
Mental Health Problems	15
Emotional States	58
Expression of Volition	65
Goal-Directed Behaviour	8
Limits To Volition	63
Characteristics of ID	57
Problems With Adaptability/Uncertainly	54
Communication Difficulties	16
Specific Activities/Events	26
Specific Activities	16
Specific Events	13

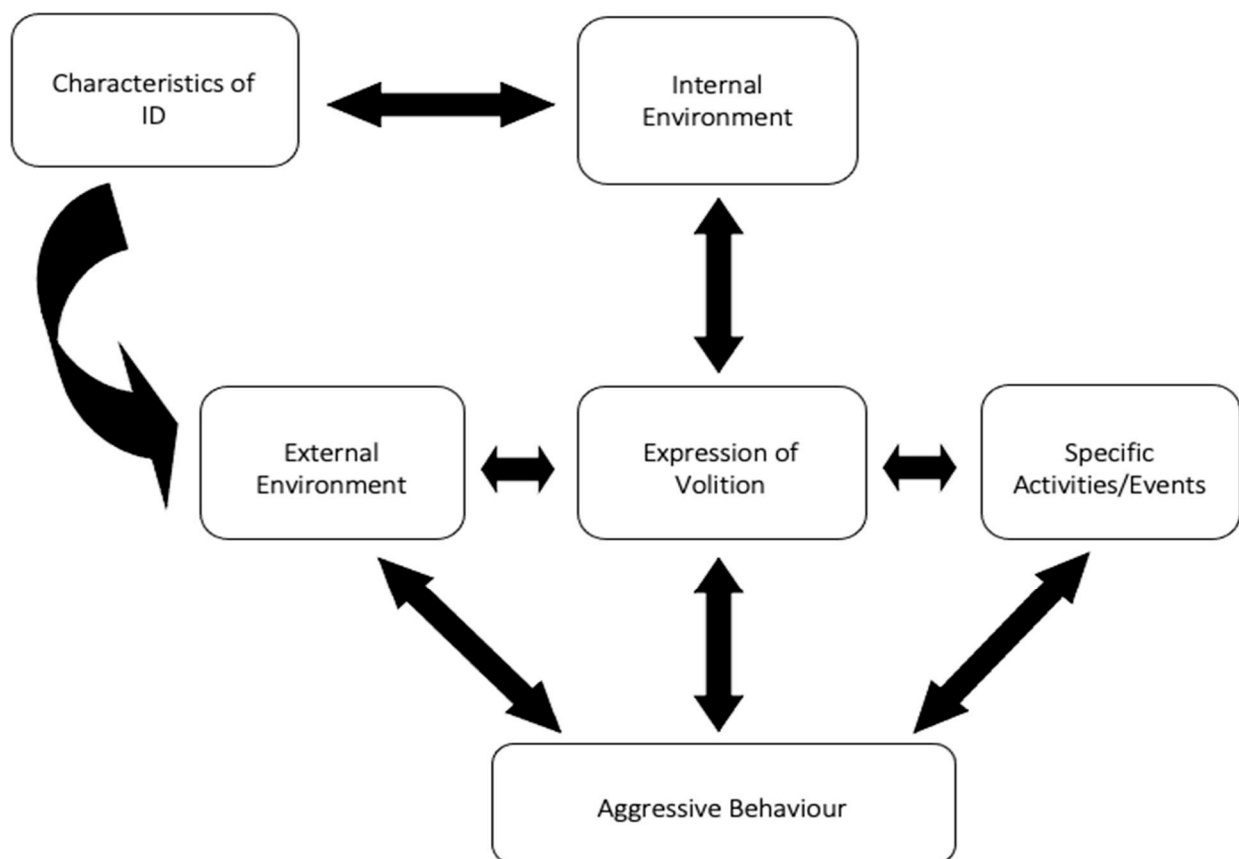


Figure 1. Schematic map of triggers and motivations for challenging behaviour identified by the caregivers [36].

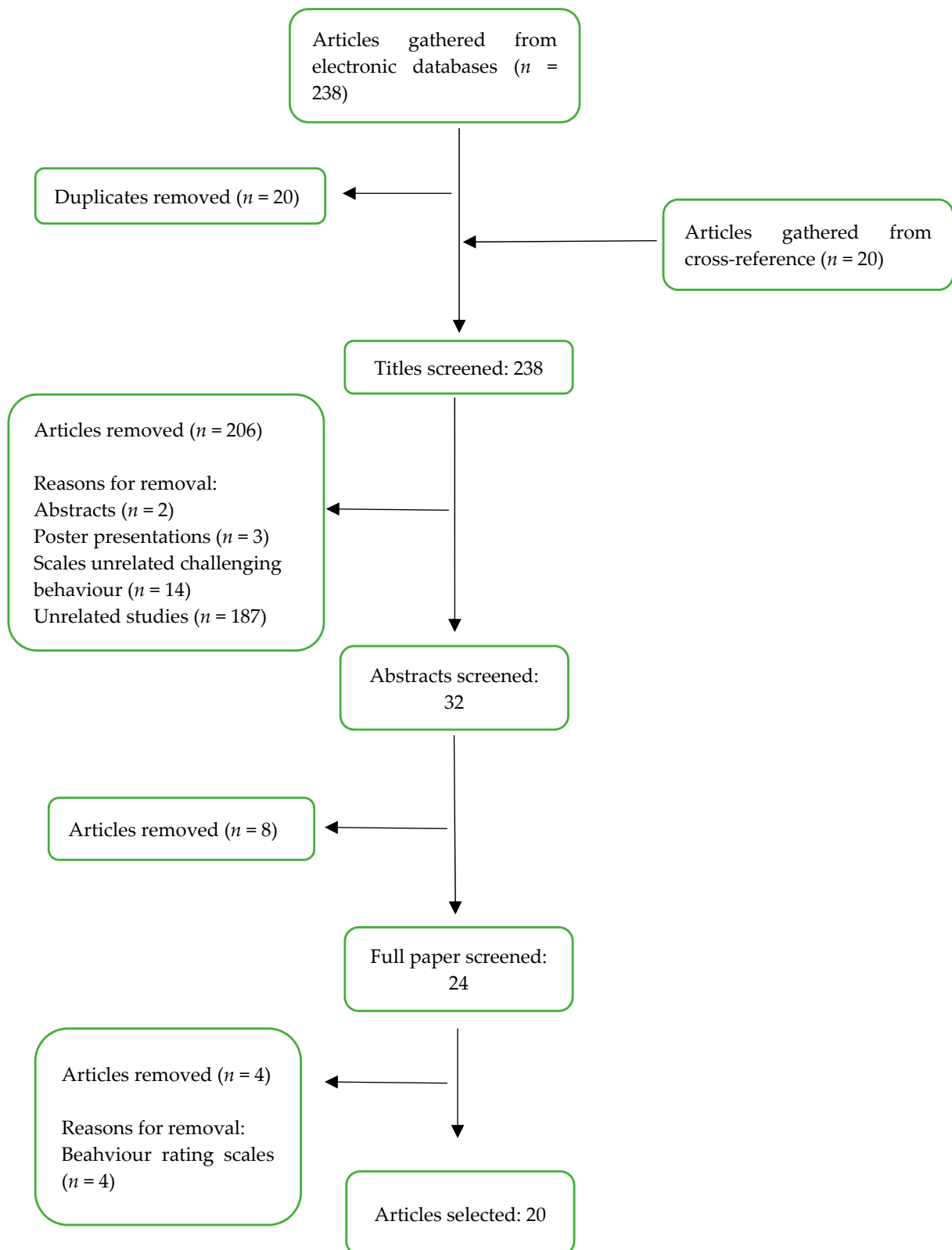


Figure 2. Preferred reporting items for systematic review and meta-analysis (PRISMA) flow chart of paper selection.

3.1. Generating Contextual Triggers Item Pool and Categorising Items

In this phase, items gathered from the literature review and from existing checklists were reviewed and included in the item pool. Over and above the contextual triggers

identified at stage 1, further 183 items were added at stage 2 from the literature review data. Common contextual triggers within the item pool were then identified and a decision was made to remove, rephrase, or combine common items. The final number of trigger items included in CATS is 333 (see Appendix C). The items are rated as either present or absent.

3.2. Stakeholder Feedback on CATS

No major changes were made at this stage. CATS was found to be a comprehensive and helpful prompt for support staff to complete antecedent–behaviour–consequence (ABC) charts needed for functional assessment [10], as support staff often struggle to perceive the triggers for challenging behaviour.

All participants involved in the focus group interviews ($n = 5$) to evaluate SPECTROM [19] training found CATS, as a resource, useful and relevant to the trainees. One participant found it will be useful for agency workers who might not know the person with ID well enough to identify causes of challenging behaviour. Another mentioned that it is difficult to identify triggers of challenging behaviour and seeing trigger examples on paper can help caregivers understand what factors can trigger challenging behaviour in an adult with ID. One participant found CATS useful but stated that in his service only psychologists are allowed to identify triggers and assess challenging behaviour. Finally, the remaining two participants thought it was relevant to their work as they need to complete behaviour reports during an incident and record triggers for challenging behaviour.

4. Discussion

We developed a checklist called CATS for caregivers to identify triggers for challenging behaviour in adults with ID. CATS has 333 items categorised under five contextual categories; (a) external environment, (b) internal environment, (c) expression of volition, (d) characteristics associated with ID or autism, and (e) specific activities/events. Each of the main categories is further subdivided in many subcategories (Appendix C). Challenging behaviour is a means of communication and has a function [1]. Identifying the triggers will help to understand the issue that the person wants to communicate through her or his challenging behaviour. Inability to recognise triggers or antecedents can act as a barrier to functional assessment and development of intervention plans based on functional assessment and analysis. Therefore, CATS can be used to identify triggers/antecedents and aid understanding of function of behaviour and functional analysis. This would help to develop an intervention leading to a reduction in challenging behaviour and improvement in the person's quality of life. This should subsequently help to reduce the staff's own stress and burnout and improve their quality of life, thus setting a positive cycle.

4.1. CATS and Other Contextual Assessments

CATS, similar to other identified assessment of contextual triggers [13–18], considers items related to biological, physical, social/cultural, and instructional variables related to an activity or a task. However, a key difference is that for CATS we have chosen not to categorise items under these identified categories. Instead, the items related to biological variables have been categorised under medical conditions found under internal environment, while items related to social and physical variables have been categorised under external environment in CATS.

Triggers such as specific activities and events are missing in both CAIPB, and SEC. Specific activities especially relating to personal care may act as contextual triggers to challenging behaviour. Therefore, CATS includes a range of identified activities/events that may trigger challenging behaviour. However, it is important to note that many contextual variables/triggers are linked with each other, hence the categories and subcategories may overlap. For instance, personal care, which is a specific activity, may trigger aggression due to the nature of the task, which requires physical contact, which is an external, spatial trigger.

CATS provides information on the triggers for challenging behaviour that occurs at the present moment. CAIPB, in contrast, determines how likely it is that a person will display challenging behaviour based on the items scored using a 5-point scale from never to always. This means it is not specific to the challenging behaviour displayed at present time but rather identifies generic classes of contextual variables commonly associated with different challenging behaviours that an individual already presents. However, it may be difficult to remember triggers from the past, so some may be missed. SEC is completed prior to the manifestation of challenging behaviour, which may not happen on the same day the checklist is completed and thus, may be futile. Furthermore, SEC has only 17 items compared with 333 items in CATS. The SEL and SEI are similar to CAIPB, which does not provide information on triggers at the present moment.

4.2. Associations of Item to Challenging Behaviour

Medical and mental health conditions are known to affect challenging behaviour [37–41]. Of the 17 items in the SEC, only two cover medical conditions (menstrual period and appeared or complained of being ill) and no item on mental health. Of the 76 items in the SEL, two include mental health conditions (when depressed or sad and when tense or anxious), and three include medical conditions (around menstrual period, around seizures, and when ill). Of the 93 items in the CAIPB, two are on mental health (related to bipolar disorder and hallucinations) and three are on medical conditions (to specify acute and chronic illnesses, and menstrual discomfort). Of the 155 items in the SEI, only one item is related to medical conditions categorised under refusal category (client has complained of feeling unwell). CHABA has six medical items under the subheading 'biomedical' and seven psychological state items such as anger, unhappy, etc. under the subheading 'emotional', but no specific medical or psychiatric disorders. CATS has 54 trigger items on medical conditions and 10 on mental health issues, thus providing a much wider coverage of these issues compared with the existing scales.

Bowring and colleagues (2017) [42] found that being nonverbal or having limited understanding of communication were significantly associated with self-injurious behaviour, overall rate of challenging behaviour, aggressive–destructive behaviour, and stereotyped behaviour. Caregivers are not always aware of the better expressive (saying things) than comprehensive (understanding what has been said) skills that some people with ID may have. As a result, they may put inappropriate demands on the person that lead to challenging behaviour. In the SEI [15], SEL [17], and CAIPB [13], there are very few items (1–2 items) related to communication difficulties. CHABA [18] and SEC [16], in contrast, have no specific item relating to communication. CATS has 12 items on communication, including difficulties communicating and understanding speech.

Psychological traumas such as abuse may lead to challenging behaviour [1]. Therefore, this issue has to be identified and addressed to help reduce challenging behaviour. CATS includes triggers that occur in the present moment such as going to the dentist or feeling frightened, etc., along with triggers from the past, such as abuse a person may have experienced in the past. However, the existing scales do not include any items on abuse, thus neglecting the effects of psychological trauma on people with ID.

4.3. CATS and the Environment

CATS allows caregivers to carry out a broad assessment of a person's social and physical context, and also consider medical and mental health needs when developing a person-centred positive behaviour support plan. Identification of triggers will help caregivers to understand the causes of challenging behaviour and adjust their support accordingly. This will subsequently reduce their stress from having to address challenging behaviour and will lead to a nonconfrontational approach. This itself will help to reduce the frequency and the severity of challenging behaviour.

McGill and colleagues [43] suggested 12 environments that should be capable to reduce challenging behaviour. For example, consistency in care and predictable routine

are necessary to prevent challenging behaviour. These issues are covered in CATS under triggers associated with ID or autism, particularly problems with adaptability/uncertainty that might be causing challenging behaviour. CATS will help caregivers identify areas in the person's environment that require improvement and build a capable environment for people with ID. This will help reduce challenging behaviour and improve the quality of life for a person with ID.

4.4. Strengths

CATS is much more comprehensive than the existing contextual assessment scales and caters for a range of contextual triggers that can be found in everyday life. CATS will act as an aide memoire and will facilitate the identification of triggers that caregivers may not have previously considered. This will help caregivers understand the reasons for challenging behaviour, help with the functional analysis, and aid in developing and implementing a person-centred intervention, such as a positive behaviour support plan. Functional assessment and analysis require training and are carried out by experts. Therefore, it is not available to caregivers and not always easy to implement by caregivers. Whereas CATS can easily be used personally by caregivers without any training, giving them a feeling of ownership of intervention programmes that might be developed using triggers identified by CATS assessment. This will also help with the implementation of the intervention. It is important to clarify that CATS will not replace functional analysis but will help with that process by identifying the antecedents of challenging behaviours. It can serve as an initial step towards a functional assessment of behaviour.

All participants involved in the focus group ($n = 5$) to evaluate SPECTROM [19] training found CATS, as a resource, useful and relevant to the trainees.

Existing scales were developed based on participants in residential settings and often data from children. The development of CATS involved adults with ID who lived in all types of community settings. The existing scales were developed by experts, whereas CATS was developed using a 'bottom-up' approach by interviewing caregivers and analysing interview data using a thematic analysis. This helps to provide a better face validity. The 'bottom-up' approach was complemented by a comprehensive literature review to add any missing items from the interview data.

4.5. Weakness

CATS has not been investigated for its applicability, acceptability, relevance, practicality, and psychometric properties such as reliability and validity. Although very comprehensive, CATS can still miss triggers that are not in the list. Given the comprehensive nature of the scale, caregivers may find the number of items to consider is overwhelming and time-consuming to complete, which may put them off from using the scale. However, we envisage that once the caregivers familiarise themselves with the scale, it will become easy for them to use CATS on more than one person and on a regular basis. Additionally, the layout of CATS with examples under each subcategory and coloured background should help with scoring. CATS can identify more than one trigger, thus not confirming the causality of the triggers for the challenging behaviour. To find a causal relationship, further functional analysis may be needed for hypothesis testing. In that way, CATS should be used to support functional behaviour analysis and not replace it. Similarly, the same or similar triggers may lead to more than one type of challenging behaviour or challenging behaviours in different settings and different time of the day/week. This may be confusing. Further research is needed to establish CATS' psychometric properties and applicability, practicality, and relevance in day-to-day practice.

5. Conclusions

CATS is a comprehensive trigger checklist and can be used to assess challenging behaviour to identify triggers—contextual or antecedent variables that maintain challenging behaviours. The identification of antecedent variables can be used to assist functional

assessment and develop an appropriate intervention. Any caregiver, either family members or paid support staff or nurses in hospitals, can use CATS without any prior training. CATS was developed using a stringent methodology that provides good face validity. However, its psychometric properties and validity need to be tested in a future study. In a recent field trial, CATS was found to be useful by a small number of staff who support adults with ID in community settings.

Author Contributions: G.U. and S.D. were involved in the conception and design of the study. B.L. was involved in the development of CATS, including literature search. S.D. also went through CATS to identify any duplicates. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement: The stage 1 of the study was approved by the national ethics service in the UK (Reference: 07/H1210/154). Stage 2 of the study did not require any ethics approval as no new or patient related data were collected.

Informed Consent Statement: For stage 1, written informed consent was gathered from the participants and their caregivers. No informed consent was necessary for stage 2 of the study.

Data Availability Statement: Data supporting reported results from stage 1 can be found at <https://theses.bham.ac.uk/id/eprint/4735/1/Unwin14PhD.pdf> (accessed on 12 September 2021).

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Appendix A

Table A1. BMPPS model of challenging behaviour.

Behaviour (B)	A list and clear description of the target behaviour(s) to be addressed.
	The type and the nature of the behaviour(s).
	Past history of similar behaviour.
	Baseline behaviour prior to the onset of current problem behaviour.
	The onset of the behaviour(s) to describe whether they appeared gradually over time or relatively abruptly perhaps precipitated by an acute event.
	The frequency, severity, and duration of the behaviour(s).
	Reactions to the behaviour by the person/ others/ services.
	Associated behaviours (other relevant behaviour than the target behaviours).
	The impact of the behaviour(s) on the person's life, other's life, and the environment.
	Consequences of problem behaviour e.g., reduced quality of life for the individual and her/his caregivers; reduced access to services including education, day service, and employment opportunity and may lead to a threatened or actual loss of placement in a residential setting or day placement; reduced social activities including leisure activities, access to friends, etc.; physically restraint; medicated; in severe cases, hospitalised or prosecuted.
	Assessment of risks of behaviour e.g., risk to others; risk to the individual; risk to the environment and other risks.
	Previous risk assessment.
	Review of previous and current measures taken to reduce risks to assess their effectiveness.
	The function of the behaviour (what does the behaviour want to achieve?).

Table A1. Cont.

Medical and Organic Factors (M)	Physical symptoms (toothache, tummy ache, heartburn, headache etc.).
	Acute or chronic physical /medical conditions (cardiovascular, respiratory, endocrine, gastrointestinal, musculoskeletal, dental, skin and genito-urinary).
	Physical disabilities.
	Problem with sleep, appetite, weight, bowel, bladder.
	Epilepsy, and other neurological conditions (spasticity, movement disorders, multiple sclerosis, brain tumour etc.).
	Genetic conditions (Lesch-Nyhan syndrome, Prader-Willi syndrome, Fragile X syndrome, Smith-Magenis syndrome etc.).
	Sensory impairment.
	Communication/speech problems.
	Drug and alcohol related factors.
	Current medication, previous medication, polypharmacy and high dose medication use, adverse effects including anticholinergic burden.
Relevant histories (Person)	Family, occupational, relationship.
	Current accommodation, daytime occupation, leisure activities, family circumstances.
	Patient's interests, strengths-abilities, likes, dislikes and preferences and how they express these opportunities, impact of disabilities, needs (including mental and physical health), and service and resource gaps.
	Their history-social, developmental, psychological and history of use of services.
	Difficulties in developing fulfilling relationships.
Psychological/ Psychiatric Factors (P)	Daily/ weekly diary.
	Psychiatric Disorders: Psychoses, Bipolar disorders, dementia, Depressive disorders, and anxiety related disorders etc.
	Psychological/ emotional issues (such as bereavement, recurrent stress and relationship difficulties leading to loss of self-esteem and isolation, abuse, etc.).
	New/ ongoing/ recurrent stress.
	Difficulty in developing fulfilling relationships.
	Developmental disorders, like Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD), including impulsivity, Neuropsychological factors.
	Relevant history of psychological development.
	Psychological symptoms: depression, anxiety etc.
	Personality traits.
	Dysregulated arousal and affect.
Social/environmental Factors (S)	Crowded/noisy/uncomfortable environment.
	Demanding activities, lack of interesting activities, too many changes in the activities etc.
	Personalities of other people/ staff and interactions with other people.
	Change in the environment, activities of daily living at home (e.g., washing, cleaning), activities of daily living outside home (e.g., shopping), relationships, influence of life events, occupation and activities including leisure activities and financial situation, therapeutic interventions.
	Under- or over-stimulating environment.
	Issues relating to integration within the wider society, stigmatisation and discrimination.
	Carer issues, including levels of stress and lack of support for carers.
	Changes required in the level of supervision and support, major life events including abuse.
	Adequate support for patients and also their caregivers (both family caregivers and paid care staff).

Appendix B

Table A2. Quotes to illustrate categories of triggers/motivations.

Theme/ Subtheme	Illustrative Quotes
External Environment	
Physical environment	P does not like loud people, the noise will agitate him.
	People being noisy.
	P does not like noisy environments.
	Excessive noise.
	Loud, unexpected noises, sneezing, coughing.
	Loud noises will make P jump. P gets verbally aggressive and cross when there are loud, unexpected noises [for example], fireworks.
	Things on TV, favourite shows like Casualty and Holby City: gruesome things and seeing blood on TV.
	Violent videos, P would watch them over and over again and get wound up and aggressive himself. P would be aggressive when asked to turn them off.
	Busyness around the home. P lives in a large group home, and it is generally quite busy and noisy; P does not tolerate this very well.
	Staff changeover: this is because it is a busy time in the house with lots of noise.
	P does not like crowds or being in groups.
	P does not like being in busy places, large shopping centres. He will start pacing and shouting as he becomes more distressed in his surroundings.
	People invading her personal space—P will tend to lash out.
	P does not like being touched.
	P does not like too much sensory input and can become overloaded which leads to anxiety and agitation.
Social environment	P will act out to become the centre of attention. P will physically attack other residents to become the centre of attention.
	P will have temper tantrums to seek company and attention. This is a learnt behaviour as P knows it will get her what she wants—attention from someone.
	Seems P is always looking for a reaction, for example, his banging will escalate more and more until he has been told to stop it.
	P likes to get a reaction. To provoke negative reactions in other people, especially other service users. This is part of P exerting his power and authority over people.
	Being ignored or observing others getting all the attention.
	Jealousy over other residents getting more attention from staff.
	Jealousy over other service users especially around staff attention, going out and family visits.
	P does not see her family very often and she can get jealous when other residents see their family and go to stay with them... this can lead to aggression.
	When relatives visit, approximately twice a year—exacerbates the problem as P gets excited.
	Family visits: P can become anxious when he knows his family are due to visit.
	Going to his parents; P's last severe outburst was related to the build-up in agitation before he went home.
	Family contact—pre and post; P seems to get upset around family visits, could be because she feels rejected.
	Family rejection can be a key trigger; because of this, P can interpret a lot of things as rejection and this then triggers her aggressive behaviour.
	Conflicting with his father; they have physical fist fights and tend to wind each other up.
	Friction with another resident exacerbates the aggression. P is always verbally aggressive towards this other resident but will take out anger on the other residents as well.
	P clashes with another service user; the other person is very able and verbal as well. They fight over the 'pecking order' in the house but do sometimes get on.
	Two certain staff members—P will be very verbally aggressive when they are on shift.
	There have been frictions with certain members of staff and the way they supported P.
	People disagreeing with P—you are better off agreeing with some things.
Being reminded he has done something wrong. Being caught out when he has done something wrong.	
When she is accused of lying.	
Criticism and being corrected.	
Other people's behavioural problems [for example], screaming or anxiety-related behaviours. P does not like to sense other people's anxiety as it upsets him.	
Verbal aggression—if other service users are shouting.	
P gets upset when he hears his parents arguing.	

Table A2. Cont.

Theme/ Subtheme	Illustrative Quotes
Internal Environment	
Aversive physical states	When P is hungry or thirsty. When poorly. When tired. When P gets too hot. Pain; most of P's behaviour is related to pain. Pain, hence paracetamol prn [pro re nata/as needed] is often effective as a first line intervention.
Medical conditions	The menopause. PMT [pre-menstrual tension]. UTIs [urinary tract infections]. Hyper or hypo related to diabetes. Constipation and irritable bowel syndrome. Epilepsy. Leading up to a seizure.
Mental health problems	P's mental health—P will be more irritable and more inclined to shout and slam doors when she is in a hypomanic phase. Paranoia is P's key trigger; thinking others are talking/spying/staring or looking at him. P can be very violent when his paranoia is bad. Increase in schizophrenia symptoms leads to increase in aggression. When P is depressed, she will be more likely to self-injure. SIB related to depression.
Emotional states	Excitability can lead to an outburst as P gets mixed up with his emotions. P can get anxious when he gets really excited; the increasing emotion can get misinterpreted. The build up, anticipation and excitement of activities can lead to aggression. P will become anxious when waiting for an activity. Things that cause anxiety, then agitation, then they can cause aggression. Behaviour is anxiety related—all to do with this. Anxiety; all of P's behaviours are anxiety related. This leads to frustration and then possibly aggression. P will act out when bored. P does not tolerate boredom—P can be aggressive when bored. Boredom—P needs to be kept busy and needs things to look forward to. Feeling he has made a fool of himself. P gets annoyed with himself if he thinks he has made a fool of himself, if someone bumps into him, he will say sorry and be cross with himself. P also gets really upset if he feels like he has caused a fuss. Some days P can be very sensitive. P gets wound up easily and worries over people talking about her.
Expression of Volition	
Goal-directed behaviour	A lot could be learned behaviour as it is very effective for P as he gets what he wants. Can be task avoidance—will shout to get out of doing something. To get his own way. To get out of doing things.
Limits to volition	Usually because P wants something and is unable to get it quickly enough or not at all—demands not being met. Demands must be met immediately, if P cannot find a video he wants, this can be a trigger. Requests being turned down, P not getting what he wants straight away and demands not being met. When P thinks he is going out or wants to go out and is told he is not going out; when other residents get to go out but he does not. P will go and put his coat on and say is he going out but will spit and shout and scream when told he is not. Not going out. A lot of P's behaviours centre around going out—wanting to and not being able to. There are tensions in the evening with P wanting to go out. Aggression tends to occur when demands are not met—usually around drinks. Not getting chocolate when he wants it. Saying 'no' or P being stopped from doing what he wants to do. Encouraging P to do more, especially activities, when he does not want to. Being asked to do something he does not want to—feeling that he is being nagged.

Table A2. Cont.

Theme/ Subtheme	Illustrative Quotes
Specific Activities/Events	
Specific activities	<p>Personal care, especially combing P's hair; six out of every seven mornings, P is difficult. P's physical aggression is often around her personal care in the morning.</p> <p>If P feels he is being interfered with—issues around personal care, however, staff have a duty of care to P so this is unavoidable.</p> <p>Encouraging P to take his medications.</p> <p>P will get agitated and aggressive when going to the doctors or dentists.</p> <p>Chiroprody visits.</p> <p>Build up to special occasions, visits, appointments, et cetera.</p>
Specific events	<p>Christmas can be very stressful for P; there is often a build up of angry and loud behaviour. P has expectations and sees others getting presents and gets jealous.</p> <p>Christmas is a difficult time for P; this can increase her aggressive behaviour. P will throw decorations off the tree et cetera—largely due to the excitement of it all, not intentionally aggressive.</p> <p>Christmas—Christmas holidays; P will get excited and then anxious. Other events have this effect as well, even day trips out. P will repetitively ask what day Christmas is and what is happening.</p>
Characteristics of ID	
Problems with adaptability/uncertainty	<p>Changes to routine, feeling things are out of his control.</p> <p>Changes to routine—P needs to be prepared, for example, if someone is calling at the house, otherwise P would start spitting at them.</p> <p>Unexpected changes in staff—when P not informed of these.</p> <p>When things are late or not going to plan—everything has to have a time, for example, when a phone call is late, P will chunter and bang things et cetera.</p> <p>People not keeping appointments or keeping P waiting; this used to be a problem in the past but is less so now.</p> <p>Uncertainly around change—P needs to know what she is doing every day.</p> <p>Anxiety around feeling like he does not know what will happen next.</p> <p>Changes to routine, this causes anxiety. This is P's key trigger.</p> <p>Everything has to have its own place. Someone moving P's belongings, especially in her room.</p> <p>P does not like change very much [for example], changes to furniture in home whilst she is away at college.</p> <p>Cancelled activities could be a big trigger for P. However, if P is provided with plenty of information, verbally and pictorially, and an alternative activity provided, then P can avoid getting anxious.</p>
Problems with Communication	<p>Feeling like he has not been understood or someone telling P they have not understood him.</p> <p>People not understanding P and therefore leading to frustration and aggression.</p> <p>When P does not understand what others are saying.</p> <p>P's aggression is communicative.</p> <p>To indicate a need – due to communication difficulties; P cannot say what she needs or wants.</p>
Predictability of Behaviour	
Behaviour is unpredictable	<p>Currently, there are often not the obvious triggers that there used to be. The behaviour is becoming more unpredictable. P is having unpredictable mood swings—P can be very happy and content one minute and then he might lash out for example, he hit another service user three times across the face.</p> <p>P can be very unpredictable.</p> <p>Outbursts are often unprecedented.</p> <p>P has random outbursts.</p> <p>Often [you] cannot find a trigger.</p> <p>Really varied, hard to tell what the trigger is.</p> <p>Sometimes it is not always clear what sparks the behaviour.</p>
Behaviour is predictable	<p>P is not usually aggressive for no reason.</p> <p>When P has been unhappy and angry, there is always a reason.</p>

Appendix C

Comprehensive Assessment of Triggers for behaviours of concern Scale (CATS)

Person's name: _____ Carer's name: _____

Type of challenging behaviour displayed: _____

Date and duration of challenging behaviour: _____

Instructions:

This is a list of triggers that may be associated with challenging behaviour/behaviour that challenges/behaviour of concern in people with learning (intellectual) disabilities. We have listed them under several categories and subcategories and within each subcategory we have provided examples of common triggers. However, these are only examples, therefore, if none of the triggers in the list applies to the person you support then make a note of your own example within a specific subcategory.

There can be more than one triggers associated with a behaviour of concern. In that case tick all those examples. There may be some similarities among triggers, in which case tick all. Similarly, same trigger may be associated with more than one type of behaviours of concern (for example, aggression towards others and self).

Fill in the personal factors section first to gain an understanding of the person you support before looking into the triggers list. This trigger checklist should help with the functional assessment of behaviour and completion of an A-B-C (antecedent-behaviour-consequence) chart. So, when a behaviour takes place, the carer/caregiver can go through this list to decide if any of the triggers acted as an antecedent.

You can complete this checklist together with the person you support to have a shared understanding of triggers for behaviours. You can answer DK (Don't know) or NS (Not sure) or NA (Not applicable).

Personal factors	Answer
Age	
Gender	
Severity of intellectual disabilities (mild or moderate or severe)	
Cause of learning (intellectual) disabilities (if known) including genetic syndromes.	
Does the person have autism (ASD-autism spectrum disorder)?	
Does the person have ADHD (attention deficit hyperactivity disorder)?	
Mental health diagnosis (if any)	
Physical health problems/ medical condition	
Current medication	
Presence of any abuse or neglect (current and/or past)	
Preferred communication style	

Figure A1. Cont.

External Environment			
Sub-categories	Trigger items	Tick if present	Provide trigger example
Physical environment	Visual		
	<i>Seeing lights or colours</i>		
	<i>Examples</i>		
	<ul style="list-style-type: none"> Bright lights or flashing lights such as fireworks Specific colours (as in clothes/walls) 		
	<i>Seeing specific objects</i>		
	<i>Examples</i>		
	<ul style="list-style-type: none"> Police cars Pictures of things Certain images or programmes on TV Violent videos Seeing patterns 		
	<i>Related to seeing others</i>		
	<i>Example</i>		
	<ul style="list-style-type: none"> Seeing people in uniform such as doctors, nurses, police etc. 		
	<i>Any other visual trigger (give example)</i>		
	Auditory		
	<i>Loud noise</i>		
	<i>Examples</i>		
	<ul style="list-style-type: none"> Ambulance sirens or other sirens, repetitive music/noise Loud music Loud TV Doorbell 		
	<i>Unpredictable noise was heard</i>		
	<i>Example</i>		
	<ul style="list-style-type: none"> Loud sneeze Loud cough Burst balloon Burst tyre 		
	<i>Any other auditory trigger (give example)</i>		

Figure A1. Cont.

	<p>Taste</p> <p><i>Abnormalities in taste sensation</i></p> <p><i>Examples</i></p> <ul style="list-style-type: none"> • Certain food (fruits, vegetables etc.) • Texture of food (such as crunchy or lumpy foods) • Certain tastes (such as sour, sweet, spicy etc.) • Was eating non-edible food or was prevented from doing this 		
	<p><i>Any other taste related trigger (give example)</i></p>		
	<p>Smell</p> <p><i>Abnormalities in smell sensation</i></p> <p><i>Examples</i></p> <ul style="list-style-type: none"> • Strong smell • Certain/specific smell (smell of flowers, perfumes, burnt coal, deodorant scents, chemical smells etc.) • Hyposensitive to smell and was not allowed to seek out strong inappropriate smell (such as faeces) 		
	<p><i>Any other smell related trigger (give example)</i></p>		
	<p>Touch</p> <p><i>Abnormalities in touch sensation</i></p> <p><i>Examples</i></p> <ul style="list-style-type: none"> • Feel of certain textures or surface (rough or smooth) (clothes etc.) • Being touched by others • Hyposensitive to touch • Was hugging people/strangers • Was wearing tight clothing/shoes 		
	<p><i>Any other touch related trigger (give example)</i></p>		
	<p>Spatial</p> <p><i>Being in a confined space</i></p> <p><i>Example</i></p> <ul style="list-style-type: none"> • Being in the car, taxi, train, bus, aeroplane etc. 		
	<p><i>People invading personal space</i></p> <p><i>Examples</i></p> <ul style="list-style-type: none"> • People coming too close • Someone bumps or pushes the person 		

Figure A1. Cont.

	<p>Related to the environment</p> <p><i>Examples</i></p> <ul style="list-style-type: none"> • Busy environment • Hustle and bustle • Unpleasant environment • Temperature in the environment (too hot or too cold or humid) • Physical layout of the environment • Poor ventilation • Poor quality living accommodation • Specific locations • No space to retreat when stressed • No access to open space such as a garden • Noisy environment • Noisy children or loud people 		
	<i>Uncomfortable seating or sleeping</i>		
	<i>Any other space related trigger (give example)</i>		
Social environment	<i>Being singled out</i>		
	<p><i>Example</i></p> <ul style="list-style-type: none"> • Feeling ignored or left out • Parent/carer/support staff sets strict limits applying only to the person 		
	<i>Criticism</i>		
	<p><i>Examples</i></p> <ul style="list-style-type: none"> • Being 'told off' • Being bossed around • Being accused of lying • Being told they have done something wrong • Feeling 'talked down to' / nagged • Corrected or teased • Warned about consequences of a misbehaviour 		
	<i>Any other criticism (give example)</i>		
	<i>Confrontation or conflicts with others</i>		
	<p><i>Examples</i></p> <ul style="list-style-type: none"> • Near someone who is upset or angry • Others in conflict such as hearing parents or peers argue or fight with each other • Conflict/confrontation with peers/family/care staff/others 		
<i>Any other conflict (give example)</i>			
	<i>Disturbed while resting</i>		

Figure A1. Cont.

	<p><i>Interaction variables</i></p> <p><i>Examples</i></p> <ul style="list-style-type: none"> • Seeking interaction, reassurance or sympathy • Get reaction from others following the behaviour • Disagreements with family, staff, or peers • Seeing someone they dislike • Hearing people talk about the person in a negative light • People saying “No” to them • People saying something in ‘the wrong way’ • People speaking to them in a way they don’t like • Poor interaction with others • Staff talking to each other and not enough interaction with the person 		
	<p><i>Any other interaction issue (give example)</i></p>		
	<p><i>Losing in a competitive activity</i></p> <p><i>Example</i></p> <ul style="list-style-type: none"> • Losing in a game • Not allowed to watch favourite channel on the TV 		
	<p><i>Any other example of losing in a competitive activity</i></p>		
	<p><i>Loss/broken personal items</i></p> <p><i>Example</i></p> <ul style="list-style-type: none"> • Lost iPad • Broken music centre/PlayStation etc. 		
	<p><i>Any other example of lost/ broken personal item</i></p>		
	<p><i>Needing assistance</i></p>		
	<p><i>Specific people visiting</i></p>		
	<p><i>Lack of family visits</i></p>		
	<p><i>Punishment</i></p> <p><i>Examples</i></p> <ul style="list-style-type: none"> • Punished/reprimanded/told off in front of others • Recently punished or physically restrained • Something pleasant is taken away • Something unpleasant is presented 		
	<p><i>Any other punishment (give example)</i></p>		
	<p><i>Related to peers</i></p> <p><i>Examples</i></p> <ul style="list-style-type: none"> • Absence of a peer they like • Presence of a peer they dislike • Fails to dominate others 		

Figure A1. Cont.

	<i>Any other peer related issue (give example)</i>		
	<i>Retaliation</i>		
	<i>Example</i>		
	<ul style="list-style-type: none"> • To get a reaction from others • Others upsetting or annoying the person 		
	<i>Any other retaliation (give example)</i>		
	<i>Sense of rejection from families, staff, or peers</i>		
	<i>Examples</i>		
	<ul style="list-style-type: none"> • Jealousy over others seeing family • When a parent/support staff leaves • When a peer or a staff or a family member does not approve of them 		
	<i>Any other issue related to sense of rejection (give example)</i>		
	<i>Someone forgets to do something for the person</i>		
	<i>Someone irritating</i>		
	<i>Presence of strangers/new people</i>		
	<i>Support staff variables</i>		
	<i>Examples</i>		
	<ul style="list-style-type: none"> • Absence of favourite support staff • Presence of support staff they do not like • Support staff' style of communication • Presence of certain staff or specific type of staff members • New staff • Staff leaving 		
	<i>Any other support staff related issue (give example)</i>		
	<i>Unhappy with current situation</i>		
	<i>Example</i>		
	<ul style="list-style-type: none"> • Unhappy with support given by carers • Unhappy in certain places/situations (if applicable), school, cafes, cinemas, crowded places, shopping malls, local clubs etc. 		
	<i>Any other example of unhappy situation (give example)</i>		
	<i>Unwanted attention from others or wanting attention from others</i>		
	<i>Example</i>		
	<ul style="list-style-type: none"> • People staring • People talking about the person • Too much interaction/ attention from others • Others are getting attention 		

Figure A1. Cont.

	<ul style="list-style-type: none"> Wants to develop a relationship with other people or peers 		
	<i>Any other example of unwanted attention from others (give example)</i>		
	<i>Was expected to work or do things independently</i>		
	<i>Was hurried or rushed</i>		
	<i>Worried about loved one's health or loved one's problems e.g., family, friends etc.</i>		
	<i>Any other social situation (give example)</i>		

Internal Environment			
Sub-categories	Trigger items	Tick if present	Provide trigger example
Aversive physical states	<i>Discomfort</i>		
	<i>Examples</i> <ul style="list-style-type: none"> New shoes After meals-feeling bloated Not being clean after going to the toilet Feeling too hot or cold Hypersensitivity Hypo-sensitive Feeling tired or sleepy Feeling unwell or in pain Hunger or thirst or diet related 		
	<i>Any other type of discomfort (give example)</i>		
	<i>Sexual frustration</i>		
	<i>Any other aversive physical state (give example)</i>		
Physical health/medical conditions	<i>Allergies</i>		
	<i>Chronic health conditions</i>		
	<i>Examples</i> <ul style="list-style-type: none"> Constipation Dental condition Haemorrhoids (piles) Heartburn/reflux disorder Infections (including chest and urine infection) Irritable bowel syndrome Tumour, cancer 		
	<i>Any other chronic health condition (give example)</i>		
	<i>Common health problems</i>		
	<i>Examples</i> <ul style="list-style-type: none"> Headache Flu 		

Figure A1. Cont.

	<ul style="list-style-type: none"> • Cold • High temperature 		
	<i>Any other common health problem (give example)</i>		
	<i>Injuries</i>		
	<i>Known medical condition/ problems/ disorders</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Asthma/ respiratory problems • Difficulties swallowing/ aspiration • Hearing problem • Vision problems • Obesity • Epilepsy (before, during or after a seizure) • High or low blood sugar related to diabetes • Problems with bowels (constipation, diarrhoea etc.) • Problems with bladder • Problem with blood pressure • Arthritis • Other physical deformities/disabilities 		
	<i>Linked to hormonal changes</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Around menstrual cycle • Contraceptive use • Menopause 		
	<i>Medication related</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Starting a new medicine • Changes in medicine dose • Side effects of medicine (see accessible medication leaflets https://spectrom.wixsite.com/project) • Interaction between different medicines • Not happy to take medicine • Missed medicine • Does not like the taste of the medicine • Difficulty in swallowing medicine • Does not like blood tests, blood pressure monitoring etc. • Does not like to see a doctor 		
	<i>Mobility problems</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Muscular/ joint problems, • Paralysis • Weak muscle • Shakes in the body 		

Figure A1. Cont.

	<ul style="list-style-type: none"> • Unsteady on walking • Spasticity/stiffness in joints 		
	<i>Any other medical or medication related condition (give example)</i>		
	<i>Sleep related problems</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Lack of sleep/disturbed sleep • Too much sleep (daytime drowsiness) • Sleep apnoea (common in Down’s syndrome and obesity) 		
	<i>Any other sleep related problem (give example)</i>		
Mental health	<i>Deterioration in mental health</i>		
	<i>Low self-confidence and self-esteem</i>		
	<i>Related to known mental health conditions</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Depression • Obsessive Compulsive Disorder (OCD) (Remember obsession with certain objects is common in ASD/autism) • Phobia (Remember the person may develop phobia for some ordinary things such as water, pet, dog, stairs, storm etc. which may not be the cause of any concern for others) • Bipolar disorder (manic or hypomanic state, may seem too excited or talkative or agitated or hyperactive than his/her usual self) • Anxiety • Psychotic disorders/schizophrenia (feeling paranoid about other people in the house) • Dementia 		
	<i>Any other mental health problem (give example)</i>		
Emotional states	<i>Due to unpleasant emotions experienced by the person</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Agitation • Excitement • Anger • Irritation • Anxiety • Distressed • Sad or depressed • Frightened • Feeling sensitive • Stressed • Upset 		

Figure A1. Cont.

	<ul style="list-style-type: none"> • Frustrated • Jealousy • Feeling out of control • Hyperactivity or impulsivity (can also be related to ADHD) • Feeling embarrassed • Being bored • Feeling frightened or insecure • Feeling disappointed • Fed up 		
	<i>Feeling disrespected</i>		
	<i>Feeling under pressure</i>		
	<i>Feeling over-aroused emotionally</i>		
	<i>Mood swings (happy to sad to irritable to angry etc.)</i>		
	<i>Any other emotion (give example)</i>		

Expression of Volition (free will)			
Sub-categories	Trigger items	Tick if present	Provide trigger example
Goal-directed behaviour	<i>Task avoidance</i> <i>Examples</i> <ul style="list-style-type: none"> • To get out of doing something • Refusing to do something (Remember that the person may not have the skills to perform the task, or the task may provoke anxiety and/or cause distress) 		
	<i>To get own way</i> <i>Example</i> <ul style="list-style-type: none"> • To get people to leave him/her alone • Demand not being met 		
	<i>Due to any other goal-directed behaviour (give example)</i>		
Limits to volition	<i>Choice related</i> <i>Examples</i> <ul style="list-style-type: none"> • Not getting what they want quickly • Not getting the wanted response • Lack of choice (given non-preferred food or being asked to do some tasks, which they don't want to do or can't do or go to places where the person does not want to go) • Being asked to make a choice (what to have for lunch, where to go out etc.-remember use of pictures may help the person with her/his choice) 		

Figure A1. Cont.

	<ul style="list-style-type: none"> • Something is taken away from them • Not being able to go out when wanted • Not being able to see family or friends when wanted • Earned rewards or something they like not given to the person • Asked to take part in repetitive tasks/activities which they do not like • Rushed to do things • Not being able to leave a situation/ environment/ setting 		
	<i>Any other choice related issue (give example)</i>		
	<i>Feeling of being controlled</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Being asked to go to his/her room • Lack of independence and autonomy • Difficulties with authority • Being asked to share things or activities with others 		
	<i>Any other examples of feeling being controlled</i>		
	<i>Any other issues with free will (give example)</i>		

Characteristics associated with learning (intellectual) disabilities or ASD			
Sub - categories	Trigger items	Tick if present	Provide trigger example
Problems with adaptability / uncertainty	<i>Any changes</i> <i>Examples</i> <ul style="list-style-type: none"> • Any change in the routine or plans (such as when a regular tea/coffee break is delayed, or an outing is cancelled etc.) • Changes in support staff • Change of seasons/weather • Major life changes • Changes to surroundings/ living arrangement/environments such as new wallpaper in the room • Family contact/visit cancelled or rescheduled • New activities/ places or environments • Objects were moved around the house 		
	<i>Any other unplanned change (give example)</i>		
	<i>Due to lack of abstract thinking or poor planning skills</i> <i>Examples</i> <ul style="list-style-type: none"> • Was unable to plan something ahead • When travelling to an event 		

Figure A1. Cont.

	<ul style="list-style-type: none"> • Not knowing what they are doing and with whom (things were not scheduled in advance) 		
	<i>Any other examples of due to lack of poor planning</i>		
	<i>Inconsistencies in support provided to the person by the same support staff or by different support staff</i>		
	<i>Interrupted when doing something</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Ritualistic or compulsive acts (which could be part of OCD or autism) • Interrupted when doing something they like 		
	<i>Any other example of interruption (give example)</i>		
	<i>Impatience/waiting for things (these could be part of ADHD)</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Queuing • Taking turn 		
	<i>Any other example of impatience or impulsivity</i>		
	<i>Rigid schedule/ routine and lack of flexibility or unstructured setting</i>		
	<i>Task/ activity related</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Told that a non-preferred activity is coming up • Transition between events e.g., returning from a day centre 		
	<i>Unwilling to leave a specific setting (e.g., does not want to leave residential home or family home when visited or any other place they like such as a café or a club)</i>		
	<i>Unable to leave a specific setting (e.g., wants to leave residential home or family home or any other place they do not like such as a café or a club but cannot)</i>		
	<i>Unwilling to leave any other setting (give example)</i>		
	<i>Unpredictability/surprises</i>		
	<i>Example</i> <ul style="list-style-type: none"> • Unexpected events • Unexpected activities • Unexpected visit from someone 		
	<i>Any other problems with adaptability / uncertainty (give example)</i>		

Figure A1. Cont.

Communication issues	<i>Difficulty in communicating in general</i> <i>Examples</i>		
	<ul style="list-style-type: none"> • Speech (articulation) difficulty such as lisping or stammering • Frustration for not being able to communicate • Difficulty in trying to get people to understand them • The person’s communication or response was blocked/not heard by staff or family members or peers or others • Difficulty with social communication 		
	<i>Any other communication issue (give example)</i>		
	<i>Not understanding requests given by others</i> <i>Examples</i>		
	<ul style="list-style-type: none"> • Difficulty in understanding others • Support staff not giving clear instructions • Pace of instructions is too fast or too slow • Support staff may wrongly assume good understanding due to good expressive speech of the person • People not using proper communication means such as sign language, pictures, accessible form of information etc. 		
	<i>Any other understanding issues (give example)</i>		

Specific activities/events			
Sub – categories	Trigger items	Tick if present	Provide trigger example
Specific activities	<i>Related to routines or specific times or activities</i> <i>Examples</i>		
	<ul style="list-style-type: none"> • During mealtimes • After mealtimes • Getting up in the morning • Getting ready in the mornings • Going to bed • Breakfast time • Lunch time • Dinner time • Bath time • Waiting for an activity (excitement/build up before an activity) 		
	<i>Any other times/activities (give example)</i>		

Figure A1. Cont.

	<i>Specific activities</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Appointments • Exercise • Going to doctors / chiropody/ dentists etc. • Administering medications if self-medicates • Personal care such as bathing, combing hair/being dressed/undressed/cutting nails/shaving • Leisure/personal/domestic activities • Personal hygiene 		
	<i>Any other activities (give examples)</i>		
Specific events	<i>Specific events</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Going out • Not going out • Time of day/ week/ month/ year • Change in routine (needs to know the day's activity in advance or any visits by others or trip out) • Change in appointment time or time of any activities such as phone call to family, meal time, shopping time etc. • Change in the way things are placed/arranged • Visitors arrived • Visitors not arrived • Staff change over time • Family visits • Anniversaries • Birthday • Christmas • New Year • Holiday 		
	<i>Past or present traumatic experience/events</i>		
	<i>Examples</i> <ul style="list-style-type: none"> • Abuse (such as physical, sexual, emotional, financial, environmental etc.) • Traumatic life events (such as bereavement, house move etc.) 		
	<i>Any other examples of experience/events</i>		

Figure A1. Comprehensive Assessment of Triggers for behaviours of concern Scale (CATS).

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