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The Assessment and Management of Challenging Behaviours following Acquired Brain Injury: A Mixed Methods Review and Cross-Cultural Study

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Submitted in partial fulfilment of the requirements for the degree of
Doctorate in Clinical Psychology

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Table of Contents

Chapter 1: Systematic Review	7
<i>The Use of Positive Behavioural Support for the Management of Challenging Behaviours in Brain Injury: A Mixed-Methods Systematic Review</i>	7
Abstract.....	8
Introduction.....	10
Methodology	13
Results.....	18
Narrative Synthesis of Findings	36
Discussion	41
Conclusion.....	46
Statements and Declaration	46
References.....	47
Chapter 2: Major Research Project.....	53
<i>Exploring the Impact of Cultural Influences on Healthcare Staff Reporting on the Presence and Severity of Challenging Behaviours Within Patient Populations with Acquired Brain Injury</i>	53
Plain Language Summary	54
Introduction.....	58
Methods	62
Results.....	68
Participant Perspectives.....	84
Discussion	89
Conclusion.....	97
References.....	98
Systematic Review Appendices.....	103
Appendix A Prospero Record	103
Appendix B Prisma Checklist for Systematic Review.....	104
Appendix C – Full Systematic Review Search Strategy.....	107
Appendix D - CCAT Quality Appraisal Guidance	119
MRP Appendices.....	120
Appendix E - Final Approved MRP Proposal.....	120

Appendix F - University of Glasgow MVLS Ethical Approval	121
Appendix G - BrainKind Ethical Approval	122
Appendix H – Participant Information Sheet	124
Appendix I - Participant Privacy Notice.....	125
Appendix J – Participant Consent Form	126
Appendix K – Sample Size Calculation	127
Appendix L – Information Contained within Qualtrics Survey.....	128
Appendix M – Fictional Vignettes	129
Appendix N – Data Analysis Plan	130
Appendix O - Annotated Syntax File	131
Appendix P - Data Availability Statement	132
Appendix Q Additional Demographic Information	133
Appendix R – Normality Tests	135
Appendix S - Example Coding and Definitions for Content Analysis of Challenging Behaviours	136
Appendix T - Frequency Counts for Qualitative Responses where behaviours are Described or Called Inappropriate	142

List of Tables

TABLE 1. STUDIES INCLUDED IN SYSTEMATIC REVIEW, GROUPED BY FAMILY	20
TABLE 2. STUDY CHARACTERISTICS OF INCLUDED QUANTITATIVE AND QUALITATIVE STUDIES	21
TABLE 3. SUMMARY TABLE OF INTERVENTION CHARACTERISTICS FOR QUANTITATIVE STUDIES	25
TABLE 4. TABLE OF INTERVENTION CHARACTERISTICS FOR QUALITATIVE STUDIES; FAMILY AND CAREGIVER STUDIES	29
TABLE 5. QUALITY APPRAISAL RATINGS FOR INCLUDED PAPERS USING THE CROWE CRITICAL APPRAISAL TOOL VERSION 1.4	34
TABLE 6. PARTICIPANT DEMOGRAPHIC INFORMATION (N = 74)	69
TABLE 7. DESCRIPTIVE SUMMARY FOR FREQUENCY AND SEVERITY RATINGS OF INDIVIDUAL CHALLENGING BEHAVIOURS	72
TABLE 8. MEAN RANKINGS OF OVERALL SEVERITY RATING FOR CHALLENGING BEHAVIOUR, BY COUNTRY OF WORK	77
TABLE 9. MEAN RANKINGS FOR SOCIAL CONSERVATISM, INDEPENDENCE AND INTERDEPENDENCE ACROSS COUNTRIES OF ORIGIN	78
TABLE 10. MEAN RANKINGS FOR INDEPENDENCE AND INTERDEPENDENCE ACROSS COUNTRIES OF WORK	79
TABLE 11. CORRELATION COEFFICIENTS BETWEEN CLINICIAN FACTORS AND RATINGS OF CHALLENGING BEHAVIOURS	79
TABLE 12. MEAN RANKINGS OF COUNTRY OF ORIGIN ON SEVERITY RATINGS FOR SEXUAL, AGGRESSIVE AND SOCIAL BEHAVIOUR	83
TABLE 13. MEAN RANKINGS FOR COUNTRY OF WORK ON SEVERITY RATINGS OF SEXUAL, SOCIAL AND AGGRESSIVE BEHAVIOURS	84
TABLE 14. CODES RELATED TO DECISIONS ON AGGRESSIVE BEHAVIOURS	85
TABLE 15. CODES RELATED TO DECISIONS ON SEXUAL BEHAVIOURS	86
TABLE 16. CODES RELATED TO DECISIONS ON SOCIAL BEHAVIOURS	88
TABLE 17. PRISMA REPORTING CHECKLIST	104
TABLE 18. APPENDED DEMOGRAPHIC INFORMATION FOR PARTICIPANT COUNTRY OF ORIGIN	133
TABLE 19. APPENDED DEMOGRAPHIC INFORMATION FOR PARTICIPANT COUNTRY OF WORK	133
TABLE 20. EXAMPLE CODING AND CODE DEFINITIONS FOR AGGRESSIVE BEHAVIOURS ..	136
TABLE 21. EXAMPLE CODING AND CODING DEFINITIONS FOR SEXUAL BEHAVIOURS	137
TABLE 22. EXAMPLE CODES AND CODING DEFINITIONS FOR SOCIAL BEHAVIOURS	139
TABLE 23. FREQUENCY COUNTS FOR CHALLENGING BEHAVIOURS - DESCRIBED	142
TABLE 24. FREQUENCY COUNTS FOR CHALLENGING BEHAVIOURS WHERE BEHAVIOUR IS LABELLED AS CHALLENGING/INAPPROPRIATE	142

List of Figures

FIGURE 1. PRISMA FLOW DIAGRAM OF PAPERS THROUGH SCREENING PROCESS.....	19
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Chapter 1: Systematic Review

The Use of Positive Behavioural Support for the Management of Challenging Behaviours in Brain Injury: A Mixed-Methods Systematic Review

Prepared with submission guidance in accordance with
Neuropsychological Rehabilitation

<https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=pnrh20#words>

Abstract

Background

Challenging behaviours are common following Acquired Brain Injury (ABI). Positive Behaviour Support (PBS) is an intervention framework aimed at reducing and preventing behaviours which are perceived to be challenging and encouraging adaptive behaviour. This review aimed to systematically review the use and efficacy of PBS interventions within ABI populations.

Methods

Inclusion criteria were full-length texts in English language peer-reviewed journals pertaining to the use of PBS interventions for challenging behaviour in adult ABI populations. Quantitative and qualitative studies were included in the review. Exclusion criteria related to other behavioural interventions, neurodegenerative conditions and paediatric populations. The six databases searched in September 2024 were Cochrane CDSR and Central, MEDLINE (OVID), EMBASE (OVID), CINAHL (EBSCO) and PsycInfo (EBSCO). The Crowe Critical Appraisal Tool (CCAT v1.4) was used to assess risk of bias. Results were synthesized in a narrative synthesis.

Results

Five quantitative and six qualitative studies were included within the review, with 299 participants in total. Mixed evidence was found for the efficacy of PBS for reducing challenging behaviours in community samples. PBS was reported to be useful by family caregivers and professionals. Recommendations for the design and implementation of PBS interventions were identified through qualitative studies.

Conclusions

Inconsistent findings were reported across studies, with mixed evidence for longitudinal gains from PBS interventions. Qualitatively, PBS was reported to be a valuable intervention for individuals with ABI and their support network. Several included studies were assessed as being at high risk of bias. Further research is required, particularly well-designed trials with robust control conditions.

Keywords: Brain Injury, Neuropsychology, Challenging Behaviour, Positive Behavioural Support

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Introduction

Challenging behaviour refers to behaviours that can cause significant difficulties for an individual and/or their families, healthcare team and wider support network (Todd et al., 2004). Acquired brain injury (ABI) refers to brain injuries which are acquired across the lifespan, excluding congenital and neurodegenerative conditions (Goldman et al., 2022). Traumatic brain injury (TBI) is one type of ABI, caused by external traumatic force to the head (Goldman et al., 2022). Challenging behaviours following ABI are common and can include disinhibition, violence, inappropriate sexual behaviour, and social inappropriateness (Kelly et al., 2008). Whilst other areas such as intellectual disability often use terminology such as distress behaviours, “challenging behaviour” remains the dominant term within ABI literature (i.e. Kelly et al., 2008), thus this term will be used in this review.

Traditionally, a range of interventions have been used for the management of challenging behaviours post ABI, which have typically included use of Applied Behavioural Analysis, (incorporating functional analysis) and ABC (Antecedents, Behaviour, Consequences) approaches to assessment, which guide modifications to antecedents and consequences of challenging behaviour (Yody et al., 2000).

Over time, using the principles of functional analysis, the Positive Behaviour Support (PBS) approach emerged (Ylvisaker et al., 2007). PBS is characterised by environmental modification and enabling individuals to engage in meaningful activity (Feeney, 2010), with a focus on empirically supported procedures and system change (Warren et al., 2003). PBS is also based on assessing and changing the antecedents of behaviour, by identifying antecedent-behaviour-consequence contingencies (Ylvisaker et al., 2005). Over time, PBS developed further, with a focus on managing executive functioning alongside challenging behaviour specifically in ABI, such as in PBS + PLUS (Gould et al., 2021). PBS is designed to be a collaborative, person-centred and holistic approach, with a focus on not only reducing challenging behaviours but encouraging more positive ones (Gould et al., 2021). PBS has been differentiated from other interventions, such as ABA, by its’ focus on valued outcomes and holistic positive change (Warren et al., 2003) and a

clear explicit focus on values such as dignity, respect and inclusion, which are more secondary in ABA (Johnston et al., 2006).

Although there are pre-existing systematic reviews on the management and intervention of challenging behaviour in ABI (i.e. systematic review of clinical practice guidelines by Block et al., 2023), there is a lack of systematic reviews specifically addressing the efficacy of PBS used within ABI. The majority of literature on the use of PBS has been carried out in intellectual disability populations, with one systematic review demonstrating that PBS interventions lead to significant reductions in behaviours which challenge and an increase in more adaptive behaviours (Beqiraj et al., 2022). Block et al. indicated that behavioural management plans and pharmacological treatments may be useful for treating challenging behaviours in ABI. The scope of the current review will be to specifically explore the use of PBS as holistic, formulation driven and person-centred approaches such as PBS are recommended in ABI rehabilitation (Winkens et al., 2019). The review by Block et al. also focused on the management of challenging behaviours in acute and inpatient settings, with an identified gap of guidance on community management.

A review by Ylvisaker et al. (2007) indicated that behavioural interventions (unspecified) could be recommended as a treatment option for adults and children with traumatic brain injury and that PBS could be considered to be an evidence-based intervention within the field of acquired brain injury. There is a lack of up-to-date systematic reviews in this area. Ylvisaker et al. (2007) highlighted some methodological difficulties, such as small participant numbers. They proposed a series of recommendations for further empirical studies examining the effects of behavioural interventions in this population. This included identification of which exact components of behavioural interventions are efficacious, the interaction between post-injury time, brain injury severity and the efficacy of behavioural interventions, and the comparison of community and inpatient interventions. The review also highlighted that it would be useful to observe the effects of behavioural interventions within more naturalistic community settings and observe the transfer of such interventions to everyday behaviour. It was recommended that participant demographics should be described in greater detail for single case studies and the

use of any other interventions used unsuccessfully prior to the described intervention reported.

PBS is often time intensive and requires specialist delivery. Examining its associated efficacy and key intervention elements is crucial, due to the development of other person-centred, formulation driven models for managing challenging behaviours of lower levels of severity in ABI in the community, such as The Empowerment Based Management Approach (EBMA; Betteridge et al., 2017). Therefore, this review seeks provide a review of existing literature on the use of PBS within brain injury settings.

Review Aim

The primary aim of this study was to systematically review, synthesise and critically appraise the use of PBS interventions for challenging behaviours following ABI in order to consolidate the current evidence base for PBS for ABI and highlight specific gaps in the literature for further research. The secondary aim of this review was to explore how PBS interventions are experienced by participants, professionals and caregivers.

Review Questions

1. What are the effects of PBS interventions on reducing challenging behaviours and/or increasing more positive behaviours?
2. How are PBS interventions experienced by participants, families and caregivers in studies of participant perspectives?
3. What is the methodological quality and risk of bias of included studies?

Methodology

This systematic review was registered prospectively on PROSPERO on the 23rd of April 2024 (Appendix A, p.103) and was conducted in line with PRISMA guidance (Page et al., 2021 (Appendix B, p.104)).

Eligibility Criteria

Inclusion Criteria

Eligibility criteria for this review were broad due to limited literature within this area and included -

- Papers in English.
- Papers pertaining to patients receiving a PBS-based intervention for challenging behaviour after ABI.
- Brain injuries of all severity (mild, moderate, and severe), in any location of the brain.
- All forms of ABI (i.e. open, closed) from all causes (i.e. cerebral trauma, stroke, anoxia, encephalitis, tumour).
- Studies inclusive of all types of design (RCTs, studies with/without a control group, single case experimental design (SCED) studies, case series and qualitative studies).
- Inpatient (specialist or non- specialist rehabilitation units) and community samples.
- Publications from peer-reviewed journals.

Challenging behaviours were broadly defined as behaviours which are disruptive/distressing to the individual and/or others. Common challenging behaviours included in literature are verbal and physical aggression, sexually inappropriate behaviours, socially inappropriate behaviours, and lack of initiation (Kelly et al., 2008) all of which were included within this review.

PBS was defined as any intervention labelled as PBS, interventions based strongly on principles of PBS (i.e. PBS+PLUS), or interventions which were described as being based on the PBS framework.

Due to differing presentations in children and adolescents with brain injuries and differing evidence bases, this review included papers related to adults only (18 years and over).

Exclusion Criteria

- Papers which do not relate to PBS in brain injury populations, for example interventions such as Applied Behavioural Analysis or the ABC method without reference to the use of Positive Behavioural Support or associated materials (i.e. PBS manual).
- Papers in which the participants have an Intellectual Disability.
- Papers related to brain injury in children and adolescents aged younger than 18 years.
- Brain injury related to neurodegenerative conditions (i.e. Multiple Sclerosis, Dementia) or congenital conditions.
- Papers not written in English.
- Papers without a full text.

Information Sources

The databases searched were Cochrane Central, MEDLINE (OVID), EMBASE (OVID), CIHAHL (EBSCO Host) and PsycInfo (EBSCO Host). Cochrane CDSR and PROSPERO were searched to establish whether there were pre-existing or planned systematic reviews adopting a mixed-methods approach to reviewing the use of PBS in adult brain injury settings. Searches were performed on the 9th and 13th of September 2024. Searches were re-run on the 22nd of May with the date September 2024-May 2025 due to the length of time elapsed between original searches and write up, yielding no further papers to be included.

Due to the pre-existing review by Ylvisaker et al. (2007), papers were searched with data parameters from January 2007 - September 2024. Filters were applied to search for papers in English. No further papers were identified.

Search Strategy

Populations included were adults with acquired brain injuries (including traumatic and non-traumatic causes). Interventions were those based on Positive Behavioural Support. Comparison conditions were interventions other than Positive Behaviour Support, treatment as usual or no comparison (for example, case series design). Outcomes were measures of challenging behaviour (such as a decrease in frequency of challenging behaviours), an increase in more positive behaviour and the psychosocial functioning of the patient and/or others such as healthcare professionals or family members (i.e. carer wellbeing).

The search strategy (Appendix C, p.107) was based on pre-existing search strategies developed by Prior et al. (2023), Magee et al. (2017), Block et al. (2023) and Filipčíková et al. (2021) and refined by the University of Glasgow subject specialist librarian. Certain search terms such as Applied Behaviour Analysis were included due to overlap between types of intervention within the field and ineligible studies were excluded at the text screening stage.

Study Selection

The primary author of this review was responsible for the study selection, and a second independent reviewer co-screened papers.

The second reviewer screened 20% of randomly selected papers at the title and abstract stage. There was an agreement of 99% between both reviewers, Cohen's Kappa = .97, $p < .001$. Inter-rater reliability was deemed to be "almost perfect" thus further discussion was not required.

After searches were run in databases, results were exported into Endnote Version 21 and duplicates were removed.

Titles and abstracts were initially screened against eligibility criteria. Studies were excluded if they were meta-analyses, literature or systematic reviews.

Papers meeting eligibility at the title/abstract stage proceeded to the full text screening and were sought for retrieval. Full texts were then compared against eligibility criteria.

Twenty per cent of randomly selected papers were sent to the second reviewer for full text screening, with an agreement rate of 85%, Cohen's kappa = .65, $p = .012$. Inter-rater reliability was therefore deemed to be "satisfactory". This was considered adequate and thus further discussion was not required.

Backward and forward hand searching was completed for included studies, identifying two further studies to be included in the review.

Data Extraction/ Study Characteristics

Key information was extracted from each study included within the review and displayed visually in structured summary tables:

- Study design
- Population type (i.e. type of ABI)

- Intervention setting
- Number of participants receiving the intervention
- Age of participants receiving the intervention
- Stage of injury/time post injury
- Type of challenging behaviour measured
- Assessment tool used
- Type of intervention
- Duration of intervention
- Outcome measure used
- Information related to professionals involved in delivering the intervention

Outcomes

- Effect sizes of interventions
- Reports from professionals, family members and participants on the efficacy of PBS interventions

Quality Appraisal

The quality of each study and risk of bias was assessed using the Crowe Critical Appraisal Tool (CCAT (v1.4), Crowe, 2013), which was selected due to the inclusion of various types of studies (i.e. RCT, qualitative perspectives, case series), as recommended by Crowe and Shepherd (2011).

Each paper was appraised across 8 domains and 22 items, with each domain scored from 0 to 5. This created an overall score from 0-40 for each paper, which was converted to a percentage. A higher percentage is indicative of higher quality within the paper. The quality appraisal process is supported by a manual detailing instructions for the usage of the CCAT (Appendix D, p.119).

A second independent reviewer rated one paper jointly with the primary author, and then independently rated 50% of included studies ($n = 5$).

No papers were excluded from the synthesis of results on the basis of their quality rating as this review aimed to explore the quality and methodological limitations of literature within this area. It was therefore necessary to include all available studies related to inclusion criteria.

Synthesis

A meta-analytic approach was not appropriate for this review due to the heterogeneity of study designs, study participants and outcomes of interest in both quantitative and qualitative studies. A narrative synthesis using the approach recommended by Popay et al. (2006) was used to report strengths and limitations of included studies and to focus on risk of bias. Studies were grouped by quantitative and qualitative designs due to differing populations, methodology and outcomes. Greater emphasis was placed on papers which achieved higher quality appraisal scores during the synthesis. Lower quality papers were included but less weight was given to conclusions and results were interpreted with caution. This allowed greater confidence in interpreting the relevant evidence base and allowed for consideration of the risk of bias.

Results

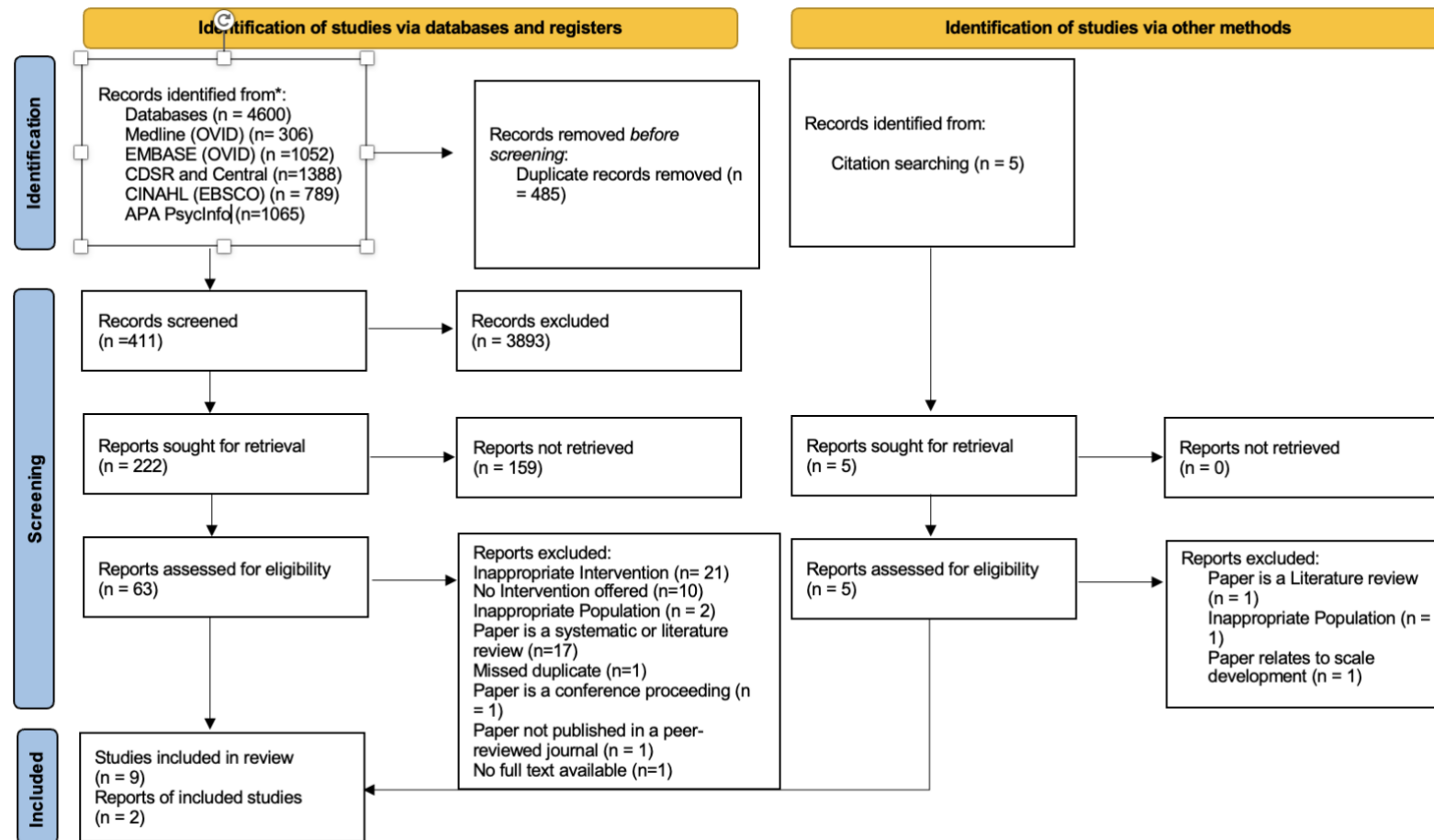
Study Selection

Papers identified from searches and their subsequent flow through the study selection process are displayed in a Prisma Flow diagram (Figure 1). A total of 11 studies were included in the final review. Four papers had initially been considered to meet eligibility criteria but were excluded on the basis of having an intervention closely resembling but not PBS itself, and one paper had appeared appropriate, but a full study had not been completed.

Figure 1

Prisma Flow Diagram of Papers Through Screening Process

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources



Study Characteristics

Several studies drew upon the same samples and are therefore described as being part of the same study family. Study families are displayed in Table 1. Other included studies drew upon their own samples. A descriptive summary of study characteristics is displayed in Table 2. Where studies do not directly relate to interventions carried out directly with brain injury patients (i.e. studies related to caregiver perspectives), this is indicated within Table 2.

One paper (Arco & Bishop, 2009) contained three case studies, with one case study meeting eligibility criteria for this review; therefore extracted data is based only on one eligible case study.

Table 1. *Studies Included in Systematic Review, Grouped by Family*

Family 1	Family 2
Ponsford et al. – RCT (2022)	Carmichael (2020)
Analytis (2023)– Clinician experiences of individuals included in Ponsford study	Carmichael (2021) – Subsample of participants from 2020 study
Gould et al. (2022) - Reporting on repeated measures gathered during Ponsford study	
Holth et al (2022) – Sample from Ponsford study; Qualitative participant perspectives	

Table 2. *Study Characteristics of Included Quantitative and Qualitative Studies*

Paper	Design	Participant Characteristics	Brain Injury Characteristics	Setting
Arco and Bishop (2009)	Single Participant Case Study	<u>N</u> = 1 <u>Age</u> = 43 <u>Sex</u> = Male	<u>Stage</u> 8 years post injury <u>Type</u> ABI - Bacterial Meningitis	Community
Gould et al. (2022)	Original parent study - Waitlist controlled trial; this paper – Reporting on outcomes of those receiving intervention; design resembles a case series	<u>N</u> = 44 <u>Age</u> = Mean – 44.44 years (SD = 11.8, range = 18-65) <u>Sex</u> = 33 male (75%) and 11 female (25%)	<u>Stage</u> Average of 9 years post injury (SD = 6.8, range = 06 – 26) <u>Type</u> All classified as severe; Non-progressive ABI; TBI (61.4%), stroke (25%), hypoxic brain injury (11.4%), Non-progressive brain tumour (2.3%)	Community
Gould et al. (2021)	Case series	<u>N</u> = 3 <u>Age</u> = Mean - 38 <u>Sex</u> = 3 males	<u>Stage</u> - Average 11 years post-injury <u>Type</u> – 2 x severe TBI, 1 x catastrophic ABI	2 x community, 1 x supported accommodation
Kelly et al. (2022)	Case series	<u>N</u> = 24 <u>Age</u> = Mean - 35.38 years (SD = 13.74, Range = 14-61) <u>Sex</u> = 19 male (79.2%), 5 female (20.8%)	<u>Stage</u> Mean 12.79 years post-injury (SD = 8.43, Range = 05 – 25.3) <u>Type</u> 11x TBI, 7x Cerebrovascular Accident, 6 x hypoxic/anoxic	13 x community, 10 x attendant/ nursing care, 1x missing data

Ponsford et al. (2022)	RCT	<u>N</u> = Intervention – 24, Waitlist Control – 25 <u>Age</u> = Mean Int – 42.92 (SD = 11.52, Range = 20 – 61), Mean TAU – 43.60 (SD = 12.06, Range = 17 – 63) <u>Sex</u> = Int - 22 male (91%), TAU - 15 male (60%)	<u>Stage</u> Intervention - Mean 8.71 years post injury SD = 1.53, Range = 20 – 61), TAU - 8.68 years (SD = 1.45, Range = 0 – 27) <u>Type</u> All severe Int - 15 x TBI, 4 x stroke, 4 x hypoxia, 1x tumour TAU - 15 x TBI, 9 x stroke, 1 x hypoxia	Community
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Paper	Design	Participant Characteristics	Brain Injury Characteristics	Setting
Analytis (2023) <i>Clinical perspectives</i>	Qualitative	<u>N</u> = 8 Professionals <u>Average years of experience</u> - 11.44 years working in ABI rehabilitation (SD = 6.83 years, Range = 0.5–22 years), <u>Sex</u> = Not specified	N/A	Community
Carmichael et al. (2021) <i>ABI Therapists perspectives of using Intervention</i>	Qualitative	<u>N</u> = 24 professionals <u>Average years of experience</u> = 14 years <u>Sex</u> = Not specified	N/A	Community
Fisher et al. (2018) <i>Family PBS Based Intervention</i>	Delphi Study; Qualitative	<u>N</u> = 11; 8 x professionals, 3 x family members <u>Average years of experience</u> = 19 <u>Sex</u> = Not specified	N/A	Family, professionals of community dwelling individuals

Fisher et al. (2021) <i>Family perspectives on Family Based PBS interventions</i>	Mixed methods – Questionnaire and semi-structured interview	<u>N</u> = 2 caregivers <u>Age</u> = Mean = 51 <u>Sex</u> = 2 x female	<u>Stage</u> At least six months post discharge from inpatient facilities <u>Type</u> 2 x MVA	Family members of individuals living in community – 1 x community dwelling, 1 x supported accommodation
Carmichael et al. (2020) <i>Therapist perspectives on the use of ABI interventions</i>	Survey – Targeted Sampling	<u>N</u> = 136 professionals <u>Age</u> = Mean - 44.14 years (SD = 11.40, Range = 25-77) <u>Average years of experience</u> = 16 <u>Sex</u> = 119 female (87.50%), 16 male (11.76%), 1 identify otherwise (0.74%)	N/A	Community ABI Therapists
Holth et al. (2022)	Qualitative <u>N</u> = 22 (individuals with brain injury) <u>Age</u> = Mean 46.18 years (SD = 12.45, Range = 21-66) <u>Sex</u> = 15 male (68%), 7 female (32%)	<u>N</u> = 22 (individuals with brain injury) <u>Age</u> = Mean 46.18 years (SD = 12.45, Range = 21-66) <u>Sex</u> = 15 male (68%), 7 female (32%)	<u>Stage</u> Average of 10.5 years post-injury (SD = 6.69, Range = 2-25) <u>Type</u> 14 x TBI, 5 x Stroke, 2 x Hypoxia, 1 x Tumour	Community

A summary of intervention characteristics for studies can be found in Table 3 (quantitative) and Table 4 (qualitative) respectively.

Table 3. *Summary Table of Intervention Characteristics for Quantitative Studies*

Paper	Type of Challenging behaviour	Assessment and Outcome Measure	Intervention Characteristics	Summary of Main Results
Arco and Bishop (2009)	Lack of initiation and motivation for self-care tasks	<u>Assessment</u> CBS ¹ , Recording of behavioural targets (frequency) <u>Outcome</u> Behaviour across 3 morning routines	<u>Intervention Offered</u> PBS <u>Professionals Involved</u> Not specified <u>Duration</u> 33 sessions <u>Follow-up period</u> No	Mixed and inconclusive evidence for the efficacy of PBS across different types of behaviour. Feedback from participant and caregiver was that the intervention was useful.
Gould et al. (2022)	5.5% of goals were related to challenging behaviour – Not specified	<u>Assessment</u> GAS ² <u>Outcome</u> GAS	<u>Intervention Offered</u> PBS + PLUS <u>Professionals Involved</u> 3 x clinical neuropsychologists, 1 x educational psychologist, 1 x speech therapist, 1 x dual neuropsychologist-occupational therapist, 1 x dual speech-therapist-occupational therapist) and one registrar neuropsychologist. <u>Duration</u> At least 6 sessions over a 3-month period; average of 31.58 hours of intervention (Range = 8 – 78) <u>Follow-up period</u> No	84.6% of overall goals achieved and 53.3% exceeding expected outcomes; no specific results related to goal attainment related to challenging behaviour.

Kelly et al. (2022)	Inappropriate sexual behaviour	<u>Assessment</u> OBS, DRS ⁴ , SPRS-2 ⁵ , CANS ⁶ <u>Outcome</u> OBS – ISX ⁷ domain	<u>Intervention Offered</u> PBS Framework <u>Professionals Involved</u> Psychologists <u>Duration</u> Individualised. Mean duration 8.4 ± 6.4 months <u>Follow-up period</u> Yes, individualised time period. Mean time from Closure to Follow-up of 2.2 ± 1.3 years	- For whole sample – sig decline in ISX⁷ from baseline to closure maintained at follow-up. Comparison of concurrent challenging behaviours (Aggression, perseveration and absconding) did not show significant change over same three time points. - Models demonstrated a statistically significant reduction from Baseline to end of intervention) for ISX Behaviour ($\beta = -1.11$ (95% CI $-1.57, -0.64$), $p < 0.001$), OBS total severity score ($\beta = -3.13$ (95% CI $-5.18, -1.08$), $p = 0.0038$), and Inappropriate Social Behaviour ($\beta = -0.88$ ($-1.53, -0.23$), $p = 0.0095$) For each of these outcomes, there was no significant change from the end of intervention to follow-up. - SMG⁸ from Baseline to end of the intervention = -0.86. From Baseline to follow-up, SMG = -1.12.*
Ponsford et al. (2022)	Verbal aggression (79%), Inappropriate social behaviour (79%), lack of initiation (75%), perseverative behaviour (38%), physical aggression against objects (42%), people (25%), self (8%), inappropriate sexual behaviour (21%),	<u>Assessment</u> OBS, CBSES ⁹ <u>Outcome</u> OBS, CBSES	<u>Intervention Offered</u> PBS + PLUS <u>Professionals Involved</u> 4 neuropsychologists, 2 OTs, 2 speech pathologists, 2 dual trained <u>Duration</u> 12 months, Mean 31.6 hours of intervention (Range 8-78)	- Intervention group showed no significant reduction in behaviours over 12 months; ($\chi^2=1.20$, $p = 0.55$) but similar to TAU group (not denied interventions elsewhere). - Gains continued at 4 months post intervention IRR=0.79, $p = 0.02$. for the group receiving the PBS intervention, however there was no control group over the additional 12-month follow-up period (up to 24 months).

wandering/absconding (13%)	<u>Follow-up period</u> 12 months post intervention	- Intervention group resulted in significantly greater gains in close others confidence in addressing challenging behaviours on the CBSES, relative to TAU. - Cohen's <i>d</i> for intervention group OBS-CWS, month 0 -12 = 0.36, for TAU group OBS-CWS month 0-12 = 0.56**
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*Calculated by review author

** Calculated by paper authors; in supplementary material

¹ Caregiver Burden Scale

² Goal Attainment Scaling

³ Overt Behaviour Scale

⁴ Disability Rating Scale

⁵ Sydney Psychosocial reintegration scale – 2

⁶ Care and Needs Scale

⁷ Inappropriate Sexual behaviour

⁸ Standardised Mean Gain = (Post-intervention mean – Pre-intervention mean) / SD Pre-Intervention

⁹ Challenging Behaviour Self Efficacy Scale

FU – Follow-Up

TAU – Treatment As Usual

Table 4. *Table of Intervention Characteristics for Qualitative Studies; Family and Caregiver Studies*

Paper	Type of Challenging Behaviour	Professionals Involved	Intervention Offered, Duration of Intervention	Summary of Results
Analytis (2023) <i>Clinical Perspectives</i>	Verbal aggression (79%), Inappropriate social behaviour (79%), lack of initiation (75%), perseverative behaviour (38%), physical aggression against objects (42%), people (25%), self (8%), inappropriate sexual behaviour	Neuropsychology (5), OT (3), speech pathology (2)	<u>Intervention</u> PBS + Plus <u>Duration</u> Parent study - 12 months; current study 1 x interview	- PBS found to be difficult to learn with some implementation challenges. - Recommendations for future implementation – thorough training, supervision and early setting of expectations. - Other themes – shifting clinical identity (related to shift of focus onto living a meaningful life) and working as equals.

Carmichael et al. (2021) <i>ABI Therapists perspectives of using Intervention</i>	Not specified	Community ABI therapists - occupational therapist (8), clinical neuropsychologist (7), clinical psychologist (5)	<u>Intervention</u> Clinicians offering behavioural interventions, including PBS <u>Duration</u> 1 x interview	- 6 themes identified, 19 subthemes. - What makes it hard to deliver – factors of individuals with ABI, difficulties with support systems and consistent intervention use. - Resources needed – Time, funding, technology and written resources. - Findings suggested a limited understanding of PBS within community ABI therapists.
Fisher et al. (2018) <i>Family PBS Based Intervention</i>	Not specified	2 x social workers, 1x psychologist, 1x registered nurse/psychologist, 1x rehabilitation physician, 1x clinician/researcher, 1x speech pathologist	<u>Intervention</u> FAB PBS ¹ <u>Duration</u> 3 rounds of Delphi Study	- Themes developed related to best practise in supporting family caregivers delivering PBS. - Themes needed in behaviour support package – <i>intervention</i> - education regarding ABI, person-centred and individualised approach, assessment and observation of behaviours of concern, strengths focus, behaviour management strategies, ongoing support for families, respite, accessing emergency support, support from specialist services. - Identified themes on education components to be included. - These themes led to refinement of PBS support plan.
Fisher et al. (2021) <i>Family perspectives on PBS interventions</i>	Perseveration, socially inappropriate behaviour, lack of motivation, agitation	Clinician/therapist	<u>Intervention</u> FAB PBS <u>Duration</u> 1. 30 weeks for one pt, with 3-month follow-up.	- Participants reported high levels of satisfaction with the programme. Reported education components and individualised sessions to be extremely helpful on Likert scale, greater understanding of CBs and ability to identify useful support strategies. - Participants reported increased confidence in providing behaviour support to family members and generalisation of skills.

			2. 23 weeks with 3 months follow-up for other	- No further developments to programme identified however both participants identified a need for further support.
Holth et al. (2022)	Verbal aggression (79%), Inappropriate social behaviour (79%), lack of initiation (75%), perseverative behaviour (38%), physical aggression against objects (42%), people (25%), self (8%), inappropriate sexual behaviour	Neuropsychology (5), OT (3), speech pathology (2)	<u>Intervention</u> PBS + PLUS <u>Duration</u> 1 x interview following 12-month PBS intervention	- Client-clinician relationship key. - Themes identified as central to the PBS experience – Openness to change, embeddedness (integrated to everyday life), clinician connection (positive relationships enhanced engagement with intervention) and preparedness for future (participants reported increased confidence) – intervention led to reductions in behaviour noted by participants. Also renewed sense of hope. - Difficulties with transitioning to post-intervention life identified as a theme.
Carmichael et al. (2020)	Not specified	136 Community ABI therapists – 37 x OT, 30 x clinical neuropsychologists, 20 x clinical psychologists, 19 x speech pathologists, 11 x case coordinator, 10 x physiotherapists, 8 x social worker, 5 x other psychologist, 3	<u>Intervention</u> Behavioural interventions with a focus on PBS <u>Duration</u> 1 x online survey	- Identified as important in addressing CB: Teamwork and collaboration, person-centred practise, working with antecedents and environmental modification, improving quality of life and skill building. - 80% of participants identified barriers to the use of behavioural interventions. - Study identified need for further training; and identified how to introduce PBS to community settings (i.e. through use of more concrete structures or scripting).

x counsellor, 2 x
rehabilitation
physician, 2 x nurse

¹ Family-directed Approach to Brain Injury Positive Behaviour Support

Critical Appraisal

All studies included were critically appraised using the CCAT v1.4. The results are displayed in Table 5.

For this review, an overall percentage of 80% and above was classified as “good” quality (highlighted in green), 70-79% as “moderate” (yellow) and 69% or lower was classified as “low” (red).

Discrepancies between the primary and second raters were discussed. Regarding the six papers that were reviewed by the second rater, two ratings raised significant discrepancies as the second rater had indicated a rating which placed the paper into a different quality classification as the primary rater. Discrepancies in scores were across two domains: preliminaries and data collection, which were discussed between reviewers. The discrepancy related to preliminaries was associated with stylistic preferences between reviewers and was not felt to significantly impact the quality of papers, thus the primary reviewer’s scores were not changed.

Discrepancies related to data collection were related to the interpretation of data reporting in control conditions. Consensus was reached between both reviewers through discussion and the primary reviewer highlighting the impact of missing data on overall conclusions which could be drawn from the paper.

Table 5. *Quality Appraisal Ratings for Included Papers using the Crowe Critical Appraisal Tool Version 1.4*

Paper	Preliminaries	Intro	Design	Sampling	Data Collection	Ethics	Results	Discussion	Total	%
Fisher et al. (2018)	4	3	5	4	4	3	2	4	31	78
Analytis (2023)	5	5	4	4	3	5	5	5	36	90
Arco & Bishop (2009)	2	3	4	5	4	1	2	4	25	63
Carmichael et al. (2021)	5	4	4	3	4	2	3	3	28	70
Carmichael et al. (2020)	4	5	2	2	3	1	4	4	25	63
Fisher et al. (2021)	4	4	3	3	2	4	3	5	28	70
Gould et al. (2022)	5	5	3	3	3	5	3	4	31	78
Gould et al. (2021)	5	5	3	2	4	5	4	5	33	83

Holth et al. (2022)	5	3	5	2	3	5	3	5	31	78
Kelly et al. (2022)	5	5	3	5	3	4	5	5	36	88
Ponsford et al. (2022)	5	4	4	3	5	5	4	4	36	85

Narrative Synthesis of Findings

Five quantitative studies and six qualitative studies with a total of 299 participants were included in the review. There was one single participant case study, one randomised waitlist-controlled trial, two case series, and one study reporting on outcomes of those receiving intervention in the waitlist-controlled study with a design resembling a case series. In line with study design classification outlined by Ylvisaker et al. (2007), the waitlist-controlled study represented the highest quality design study and the two case series and single participant case study represented a lower quality study design. There were six qualitative studies with three incorporating professionals' perspectives, one incorporating family views, one containing both family and professionals' perspectives and one focusing on patient views. All studies included ($n=11$) were based on community samples. There were no inpatient studies represented in the review. All studies were carried out in Australia.

Several papers related to challenging behaviours in general, without specifying the type. Namely, one paper related to the use of Goal Attainment Scaling in PBS for challenging behaviour without specifying the type of behaviour (Gould et al., 2022) and four qualitative papers related to perspectives of using PBS for challenging behaviour in general (Analytis, 2023; Carmichael et al., 2020; Carmichael et al., 2021; Fisher et al., 2018).

Brain injury symptoms can broadly be defined as positive symptoms (such as aggression) and negative symptoms (such as apathy and withdrawal). Papers covered a mixture of positive and negative symptoms of brain injury. Negative symptoms such as a lack of initiation and perseveration were targets of intervention in six papers (i.e. Arco & Bishop, 2009, Gould et al., 2021, Ponsford et al., 2022, Analytis, 2023, Fisher et al., 2021, Holth et al., 2022). Overt aggression was targeted in four studies (Gould et al., 2021, Ponsford et al., 2022, Analytis, 2023, Holth et al., 2022) and sexually inappropriate behaviours were targeted in four studies (Kelly et al., 2022, Ponsford et al., 2022, Analytis, 2023, Holth et al., 2022). Socially inappropriate behaviours were discussed in three papers (Gould et al., 2021; Holth et al., 2022 and Ponsford et al., 2022).

Comments on adherence to principles of PBS were noted in several studies, with the incorporation of a protocol document, session integrity documents and independent rating of individuals delivering the interventions in one study (Gould et al., 2021) and specialised training provided in three studies (Gould et al., 2022; Gould et al., 2021; Ponsford et al., 2022).

There was no outcome measure commonly used across quantitative studies. The Overt Behaviour Scale (OBS; Kelly et al., 2006) was used in three studies (Gould et al., 2021; Kelly et al., 2022; Ponsford et al., 2022). This scale measures a range of challenging behaviours such as sexually inappropriate behaviours, aggression, and negative behaviours such as apathy and lack of initiation. The scale has been demonstrated to have strong inter-rater reliability and adequate validity (Kelly et al., 2006). As only one study (Ponsford et al., 2022) reported effect sizes, the sensitivity of the OBS to the effects of PBS intervention could not be determined.

In order to measure specific goal attainment, the Goal Attainment Scale (Kiresuk & Sherman, 1968) was used by Gould et al. (2022) to measure attainment in goals related to an increase in positive behaviours. The study authors acknowledged that this scale had not traditionally been used as a measure of challenging behaviours.

One study (Kelly et al., 2022) integrated the use of the Disability Rating Scale (DRS; Rappaport et al., 1982), Sydney Psychosocial Reintegration Scale -2 (SPRS-2; Tate et al., 2011) and Care and Needs Scale (CANs; Tate, 2004) for sample characterisation. These measures were not repeated pre- and post-intervention, and thus could not assess change after PBS, although the SPRS-2 is noted to include questions regarding social skills and behaviour.

The Caregiver Burden Scale (CBS; Knight et al., 1998) was used in one study (Arco and Bishop, 2009). This scale specifically addresses the needs of caregivers for individuals with ABI and was only used pre-intervention.

One study (Ponsford et al., 2022) used the Challenging Behaviour Self-Efficacy Scale (CBSES; Hastings et al., 2002) as a secondary outcome measure to assess caregivers'

self-efficacy in managing challenging behaviours. This scale was originally used to measure self-efficacy for caregivers in the management of challenging behaviours in autism.

1. Efficacy of Quantitative Interventions

In terms of efficacy, mixed and inconclusive evidence was found for the use of PBS in reducing the frequency of challenging behaviours across study types.

In the case series by Gould et al. (2021) the efficacy of PBS was mixed. This could be partially attributed to participant heterogeneity in the small number of participants involved ($n = 3$), thus individual characteristics of one participant may have potentially influenced study results. The case series by Kelly et al. (2022) which involved 22 participants, demonstrated that results were more consistent and indicated that PBS was a useful intervention for treating inappropriate sexual behaviours. Thus, studies from the case series design demonstrated mixed efficacy in that PBS may be efficacious, but results were not consistent and are limited by the case series design.

In the only waitlist-controlled trial in this review (Ponsford et al., 2022), there was no significant difference between intervention and control groups in reductions in challenging behaviour. The control group was able to access behavioural interventions from other sources. The intervention group resulted in significantly greater gains in close others confidence in addressing challenging behaviours as measured by CBSES, compared to the TAU group. However, there were no significant improvements in behaviours in the most rigorously designed study.

Gould et al. (2022) reported that, in the group receiving the PBS intervention, 84% of GAS goals set were achieved at the expected, or better than expected, level.

Consistent with PBS principles, most goals did not relate to specific reductions in challenging behaviours, and GAS goal setting was not a component of TAU, so specific attribution of goal success to the PBS intervention is not possible. Regarding positive goals, Arco and Bishop study (2009) referenced a goal that was related to positively achieving a new morning routine. Holistic and positive goals were achieved

in the two Gould et al. (2022 and 2021) studies, for example improvements in relationships. Positive goal achievement was not reported in two studies (Kelly et al. , 2022) or Ponsford et al., 2022).

Positive gains appeared to be maintained at follow-up in a subset of studies, both deemed to be high quality on the CCAT (Ponsford et al., 2022; Gould et al., 2021), but not others (Kelly et al., 2022, Fisher et al., 2021). However, it was noted in the study by Ponsford et al. (2022) that there were similar improvements to the waitlist control group at follow-up.

Effect sizes were reported in the supplementary materials for one study, where there was a small effect size for pre-and post-intervention changes in the intervention group on the OBS-CWS between months 0-12 and a medium effect size for the TAU group (Ponsford et al., 2022). Effect sizes calculated for this review for the Kelly et al. (2022) study demonstrated a large effect size for PBS in reducing behaviours on the OBS from baseline to closure and a very large effect from baseline to follow-up. The limitations of the case series design and lack of control group limits conclusions which can be drawn related to efficacy. Other studies did not report effect sizes or did not have available data allowing these to be calculated (Gould et al., 2021, Fisher et al., 2022, Arco and Bishop, 2010).

2. Experiences of PBS Interventions

Family members reported high levels of satisfaction with PBS interventions (Fisher et al., 2021) and found it an effective intervention for increasing confidence in managing challenging behaviours. Particularly useful elements were educational components and individualised sessions, consistent across studies (Fisher et al., 2018, Fisher et al., 2021). Useful components were congruent with the PBS approach such as a focus on individual strengths and the use of behaviour management strategies.

Brain injury participants in Holth et al. (2022) reported a reduction in challenging behaviours post PBS intervention but identified difficulties with transitioning to post-intervention life.

For professionals, structural barriers to the implementation were identified and recommendations for the use of PBS with challenging behaviour, such as further training (Analytis, 2023) and resources (Carmichael et al., 2021) were discussed across studies. Specific characteristics related to the delivery of PBS interventions were identified, for example individual differences between patients and difficulties with the consistency of intervention delivery across professional perspectives (Carmichael et al., 2021; Analytis, 2023). Important factors for addressing challenging behaviours related to collaboration, improving quality of life and person-centred practice (Carmichael et al., 2020), which are highlighted as key to the PBS approach (Feeney, 2010). Quality of life and positive patient-professional relationships were identified as important across both participant and professional studies (Holth et al., 2022, Carmichael et al., 2020), indicating key themes integral to the PBS framework are important to both professionals and patients.

3. Quality of Studies

The quality of included studies varied. Four studies were identified as being high quality, five as being of moderate quality and two of low quality, however there was variation in overall study design quality.

In the only RCT by Ponsford et al. (2022), there were no significant differences between the intervention and control groups for the use of PBS addressing challenging behaviours, but the intervention group resulted in significantly greater gains in close others' (family or carers') confidence in managing challenging behaviours, relative to TAU. The control group was permitted to access other interventions.

There was one single participant study (low quality) and three case series studies; one of moderate quality and two of high quality. Overall, case series designs

consistently reported positive effects of PBS interventions in reducing challenging behaviours but are nevertheless limited in determining efficacy due the lack of an experimental and control conditions.

With regards to qualitative studies, four studies were of moderate quality, one of low quality and one of high quality. Similar themes were identified across studies, irrespective of quality.

Limitations which were identified were a lack of power calculations across studies and comments regarding the suitability of the sample size. Another common limitation was potential bias in the recording and reporting of challenging behaviours as in some studies the intervention was delivered by, and data collected by, the same therapist, resulting in a lack of independence of the person measuring the behaviour (Fisher et al., 2021; Kelly et al., 2022).

Challenging behaviours vary in severity and presentation. As such, PBS interventions often vary in nature and length. Whilst this aligns with guidance developed within the person-centred framework, it results in difficulties drawing reliable conclusions from included studies. This is due to substantial variance not only between study designs but also in the levels of intervention participants are exposed to; alongside which outcomes are considered an improvement (i.e. verbal aggression in place of physical aggression).

A common strength of included studies was adherence to ethical standards. Discussions indicating study strengths and weaknesses were generally of a good quality.

Discussion

Summary of results

This systematic review evaluated the use and efficacy of PBS interventions for challenging behaviours in ABI populations. The current review complements the new

clinical practice guidelines by Block et al. (2023), who indicated that behavioural interventions could be recommended for the management of challenging behaviours following brain injury. It is also consistent with results from Beqiraj et al. (2022) as some studies demonstrated a reduction in challenging behaviours following PBS and an increase in more adaptive behaviours, although there was also a lack of consistent reporting of achievement of positive goals. Routine collection and reporting of data related to positive goal achievement would enhance the quality of research within this area.

All studies included were based on community samples. It may therefore be that patients presenting with the highest level of need (i.e. those requiring specialist inpatient care) were not captured within the review. Furthermore, many samples were reliant on monitoring of behaviour by family members without rigorous training in the observation of behaviours, therefore the accuracy of results may not be exact. However, as PBS is designed to be an individualised intervention used in everyday situations, the included studies may lack rigorous validity but carry high levels of ecological validity as they represent the way PBS would likely be delivered in everyday life.

PBS was found to reduce challenging behaviours over time in case studies, as measured by the OBS (Kelly et al., 2022) and for specific behaviours such as aggression, sexually inappropriate behaviour, perseveration and apathy (Gould et al., 2021, Kelly et al., 2022). Mixed results for the efficacy of PBS were noted within another case series (Arco & Bishop, 2009). There was only one high-quality RCT wherein there was no significant effect of PBS compared to TAU for reducing challenging behaviour. Therefore, there is a lack of robust evidence to support the use of PBS for reducing challenging behaviour.

Due to ethical issues, studies lacked robust control conditions. For example, participants were permitted to access other interventions whilst in TAU arms and intervention participants were allowed to access other interventions in addition to PBS (i.e. other behavioural interventions, pharmacological interventions), which may explain similarities between results for intervention and control groups in the Ponsford et al. (2022) trial. Ethical practice should be prioritised, but a standardised

collection and reporting of interventions accessed by control conditions would allow for conclusions to be drawn with greater accuracy, and approaches such as the SCED may be useful.

Qualitative studies demonstrated that PBS is a valuable intervention for participants, professionals and family caregivers (Fisher et al., 2021; Holth et al., 2022).

Identification of features specific to PBS such as a focus on the relationships between antecedents and behaviours, person-centred practice, skill building, and the benefit of the flexible delivery format were found to be useful to family caregivers (Fisher et al., 2021; Carmichael et al., 2019) suggesting that the PBS approach offers additional benefits beyond general behavioural strategies.

Considering the recommendations which emerged from the previous review by Ylvisaker et al. (2007), the current review highlighted that some recommendations have been incorporated into this field. Studies within the current review were carried out in community settings, as recommended by Ylvisaker et al. (2007), and patient demographics were described in detail across quantitative studies. Studies of higher quality (Kelly et al., 2022; Ponsford et al., 2022) which used larger sample sizes mark positive developments within the area and are in line with Ylvisaker et al.'s recommendations. Specific interactions between brain injury characteristics (i.e. post-injury time) and interventions have not been investigated in detail within most of the studies included within the review, but a greater focus on collecting detailed demographic characteristics has begun and will facilitate this in future research. Ponsford et al. (2022) did not find significant effects of variables such as age of injury on primary outcomes. Further RCTs and large-scale, well-designed studies are required to allow for statistical analysis designs to examine the effects of specific characteristics on intervention effects. The results of the current review are consistent with Ylvisaker et al. (2007) in that there is some evidence for the efficacy of the use of PBS, but methodological issues limit the generalisability.

Strengths

A strength of this review was a focus on quality appraisal, particularly in relation to intervention outcomes.

Studies were mainly carried out within community samples thus cannot directly complement the review of clinical practice guidelines for the management of challenging behaviours in inpatient settings by Block et al. (2024). The review does however address an identified gap in review literature, in line with recommendations by Ylvisaker et al. (2007).

Limitations

Studies included in the review were heavily Australian dominated and often drew from the same samples, limiting generalisability.

Only one study included within the review reported effect sizes, and raw data was not readily accessible in a range of studies resulting in a lack of conclusions drawn on the effect sizes of treatments. Kelly et al. (2022) employed measures such as the DRS, SPRS-2 and CANs and Arco and Bishop (2009) used the Caregiver Burden Scale for sample characterisation, however these measures were not repeated pre and post intervention, which would likely have been beneficial.

Finally, due to time constraints, the review only included studies from peer-reviewed publications and did not include grey literature. The search start date of January 2007 limits the number of papers identified within the review, as does inclusion of only PBS based studies for challenging behaviour in ABI, as there are other interventions which closely resemble PBS but which are not titled as such (for example, the ABC Approach). A narrative synthesis was completed for this review due to heterogeneity of study types, however future reviews could also conduct a thematic synthesis of results, for example by completing line by line coding of results and reporting themes across studies in the approach described by Thomas and Harden (2008).

Implications

Although there is mixed evidence for the efficacy of PBS interventions quantitatively, particularly in the largest trial (Ponsford et al., 2022), where there was no significant difference between intervention and TAU on primary outcome measures, they are reported to be highly useful qualitatively. One potential explanation may be that PBS contains structure and cohesiveness, which other interventions lack, and this may confer benefits above and beyond other interventions. PBS can be beneficial for the service user, family and professional network, however, may prove to be a high-cost intervention with the duration of treatment and level of highly skilled professional involvement needed; thus cost-effectiveness studies may prove useful.

Practical barriers to the implementation of PBS have been identified such as lack of resources (Carmichael et al., 2021), along with an identified need for further staff training within this area (Analytis et al., 2023), indicating practical implications arising from this review. Considering the wider context of research of behavioural interventions, this is particularly important as Winkens et al. (2019) demonstrated that nurses delivering a behavioural intervention for individuals with ABI experienced difficulty integrating ABC principles within clinical practice. Gould et al. (2022) highlighted that in the Ponsford et al. (2022) trial, clinicians received high levels of training and supervision, which in most clinical environments would be unlikely, thus understanding the key features of support to clinicians delivering PBS interventions is essential.

Future Research

Future research should aim to conduct further well-designed trials, which could include the use of Single Case Experimental Design methodology, as recommended by Cattalani et al. (2010). Future studies should aim to report previous interventions accessed by participants and expand the setting of interventions delivered to include inpatient facilities. Further qualitative studies would be useful to examine in which contexts PBS interventions are felt to be most helpful (i.e. with sexually inappropriate behaviours; physical aggression). Furthermore, as qualitative studies have reported that improving quality of life is important when working with

challenging behaviours (Carmichael et al., 2020), outcome measures should focus holistically on quality of life and wellbeing rather than solely on the reduction of challenging behaviour.

Conclusion

This review aimed to investigate the use and efficacy of PBS for challenging behaviours within ABI populations. Evidence for the effects of PBS was mixed. Findings highlight implications for clinical practice regarding which elements of PBS are found to be useful, and challenges in the implementation and delivery of PBS interventions. Further research with longitudinal follow-up and robustly designed control conditions is indicated.

Statements and Declaration

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Chapter 2: Major Research Project

Exploring the Impact of Cultural Influences on Healthcare Staff Reporting on the Presence and Severity of Challenging Behaviours Within Patient Populations with Acquired Brain Injury

Prepared in Accordance with Submission Requirements for
Neuropsychological Rehabilitation

<https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=pnrh20#words>

Plain Language Summary

What We Did

After brain injuries, people can show behaviours that can be hard for others to manage. This can include aggression and acting in inappropriate ways.

We looked at how healthcare staff from different countries understand these behaviours.

Why We Did It

Consistency is important after brain injury. We wanted to explore differences between staff. Different ways of working could impact treatment.

Social rules and behaviours are different in different countries. What may be considered challenging in one country may not be in another.

People have different personal values. For example, interdependence. This means valuing harmony and group belonging. Social conservatism means placing importance on traditional values. For example, marriage and family. We expected staff with high scores on these values to see behaviours as more challenging.

How We Did It

Participants were healthcare staff (e.g. nurses, psychologists). They worked in brain injury teams around the world.

They read short stories about people in brain injury units. These were based on real life cases. They were asked to pick out challenging behaviours and rated how difficult they were. They also wrote short answers about their choices.

What We Found

Staff with high scores on social conservatism and interdependence were more likely to rate behaviours as severe. Some countries, such as Portugal and Spain, had higher scores than the UK.

Different countries of work had differences in severity ratings on behaviours. Portuguese staff rated behaviours as more severe than UK staff.

This shows that decisions on challenging behaviours differ between countries and are affected by personal values.

Staff focused on boundaries and the impact of behaviours on relationships and community living. The impact of challenging behaviours on others and the person themselves was noted.

What It Means

Advice on managing social and sexual behaviour may be useful. Culture can influence how care is given. It is important that this is considered during treatment.

Abstract

Challenging behaviours are common following Acquired Brain Injury (ABI) and refer to behaviours causing distress to an individual and/or their social network. Cultural differences between assessors may influence interpretations of whether behaviours are considered challenging, particularly regarding social inappropriateness. This may result in differences in treatment approaches between countries/cultures, or within countries when clinicians with different cultural backgrounds assess challenging behaviours. This study aimed to examine if clinician cultural factors influence the assessment of challenging behaviour in ABI and to examine the interpretation of different types of behaviours, particularly social behaviours, using a concurrent quantitative and qualitative design. Healthcare staff working with brain injury patients ($n = 63$ completed responses, $n = 74$ partially completed) around the world (primarily in the UK, Spain and Portugal) were asked to rate novel vignettes containing potentially challenging behaviours to determine if challenging behaviours were present and to rate their severity, using an assessment tool developed from pre-existing scales for the assessment of challenging behaviours. They also completed the Singelis Self Construal Scale (SCS) as a measure of independence/interdependence and the Everett Social and Economic Conservatism (SECS) Scale as a measure of social conservatism. Variance between country of work and origin led to differences in severity ratings on challenging behaviour scales, with Portuguese participants scoring more highly than UK participants across behaviour types ($p < .05$). There was a positive relationship between social conservatism and interdependence with number of overall behaviours perceived to be challenging (Social Conservatism; $r = .23$, $p < .05$; interdependence, $r = .22$, $p < .05$), and overall median severity rating (Social Conservatism; $r = .31$, $p < .05$; interdependence, $r = .29$, $p < .05$). There were positive relationships with interdependence and social conservatism and severity ratings on low-level social behaviours (Social Conservatism; $r = .27$, $p < .05$; interdependence, $r = .32$, $p < .05$). Content analysis of qualitative data demonstrated that participants focused on boundaries and the impact on relationships and reintegration when assessing challenging behaviours, and that results were consistent across participants with varying degrees of interdependence. The development of valid scales, focusing on the assessment of social and sexual

behaviours is indicated, specifically those sensitive to cross-cultural differences such as language. Areas of particular difficulty in working with challenging behaviours, such as managing boundaries, highlight areas for staff support and training across cultures. Rehabilitation services should consider the impact of cultural factors in the assessment and management of challenging behaviour.

Keywords

Cross-Cultural Differences, Brain Injury, Challenging behaviour

Funding: NHS Education for Scotland

Introduction

The consequences of acquired brain injury (ABI) can include emotional, cognitive and physical health difficulties (Kelly et al., 2008; Wilson et al., 2017). Changes in behaviour are common following brain injury which can present a challenge to the person, family, healthcare staff and society (Todd et al., 2004).

Challenging behaviour has been defined in a range of ways. The Royal College of Psychiatrists (2007; 2016) proposed that “Behaviour can be described as challenging when it is of such intensity, frequency or duration as to threaten the quality of life and/or the physical safety of the individual or others and is likely to lead to responses that are restrictive, aversive or result in exclusion” (p.13). Challenging behaviour can include physical, verbal and sexual aggression (James & Young, 2013) or can be more subtle and infringe on a nuanced set of social norms such as violation of personal space (Milders et al., 2003) and social disinhibition (Osborne-Crowley & McDonald, 2018).

The importance of understanding how clinicians assess and understand challenging behaviours following ABI is pertinent as it may be a driver for decision-making from a healthcare and legal standpoint (i.e., more severe challenging behaviour leading to more restrictive placements for rehabilitation or conditions of security), and influence formulation, care planning and discharge destination (Langone et al., 2023). It also yields implications for outcome measurement in neurorehabilitation (Alderman et al., 2018), as it is important to have clear tools for assessment to measure improvements from interventions.

Scales for the measurement of challenging behaviour exist such as the Overt Behavioural Scale – Adult (OBS; Kelly et al., 2006), which measures verbal and physical aggression, inappropriate sexual and social behaviour, repetitive behaviour, initiation difficulties and wandering/absconding. The St Andrew’s Swansea Neurobehavioural Outcome Scale (SASNOS; Alderman, 2018) measures the severity of various components of neurobehavioural disability following ABI by measuring the frequency of a range of behaviours. The St Andrew’s Sexual Behaviour

Assessment Scale (SASBA Scale; Knight et al. 2008) and the Overt Aggression Scale – Modified for Neurorehabilitation (OAS-MNR; Alderman et al., 1997) measure sexually inappropriate behaviours and aggression respectively. However, scales vary in how they define challenging behaviours, ranging from a focus on presence over varying time periods, as well as daily reporting of behaviours and their antecedents. The scales contain examples of challenging behaviours, thus guide users on how to select specific ratings related to challenging behaviours, but clinicians may have different perspectives on challenging behaviours from how they are represented in existing tools due to cultural differences. The scales are only available in English, resulting in difficulties in their use across cultures and languages.

Categorisation difficulties are apparent in relation to behaviours such as sexual disinhibition following ABI. Behaviours of varying degrees of severity are often described as being “challenging” within research literature (Simpson et al., 2013) but often do not detail different levels of severity (i.e. sexually inappropriate remark versus inappropriate sexual touching). A lack of consistency regarding what constitutes challenging behaviour may lead to different management approaches. Furthermore, literature often combines challenging behaviours observed within community and residential settings, although there are epidemiological differences linked to levels of severity between the two (i.e., Kelly et al., 2008; Simpson et al., 2013), thus it is difficult to draw conclusions from literature as to how behaviours of varying levels of severity are classified and treated.

Linked to limited research, there are currently no evidence-based treatment guidelines for the management and treatment of challenging behaviours post ABI (Gould et al., 2021), although the use of Positive Behavioural Support (PBS) has been indicated (Gould et al., 2021). Interventions may be influenced by the interpretation of behaviours and whether they are perceived as challenging or not, and there is a lack of literature around interventions for socially inappropriate challenging behaviour.

The importance of cultural factors in social behaviour and decision-making is well documented (i.e. Smith & Bond, 1999). Sorokowska et al. (2017), for example,

suggested that cultural norms are important factors in the perception of preferred social distance. In cultures which are more collectivist rather than individualistic, it has been demonstrated that social norm violations are perceived as more socially disruptive (Stamkou et al., 2019).

Individualism and collectivism are closely related to independence and interdependence. Independence refers to an individual's perception of their level of autonomy and distinctiveness from others, in contrast to interdependence which refers to the individual perception of their degree of connectedness to others and group relationships (Singelis, 1994). A need for exploratory research into how individuals view their self-construals of independence and interdependence across cultures has been identified (Vignoles et al., 2016). Preliminary research has indicated that there may be differences between British and Iberian samples on interdependence and independence (Green et al., 2005), with Iberian samples scoring more highly on interdependence than countries such as the US. British and US samples have been demonstrated to score significantly lower on interdependence than eastern cultures such as India (Deng et al., 2023).

Social conservatism places importance on traditional values, such as those related to state and family life, and was defined by Kirk (1953) as a construct which leads to the "Preservation of ancient moral traditions of humanity" (p.8). It has been demonstrated that the perceived importance of social stability is linked to social conservatism (Kerry et al., 2022), thus socially disruptive behaviours (such as in the case of challenging behaviours) may be more challenging to individuals who have higher levels of social conservatism.

Finally, alongside variation *between* cultures in the classification of challenging behaviour, there may be variation of how challenging behaviours are perceived *within* broad cultural contexts due to variation in staff cultural background and other characteristics such as years of experience and professional background (Pryor, 2007). Staff groups have been demonstrated to vary in levels of interdependence and interdependence (Voyer & Reader, 2013). Differences in how behaviours are interpreted may lead to variation in care and rehabilitation.

Aims and Research Questions

This study aimed to examine the effects of clinician cultural background on the assessment of challenging behaviours following brain injury.

The study aims were:

1. To examine whether decisions regarding whether or not behaviours are considered challenging, and if so, how severe they are, are associated with demographic variables of age, years of experience, years of education, sex and professional background.
2. To examine whether there are differences between countries included in the study on self-perceived independence/interdependence, and self-perceived social conservatism.
3. To identify if there are associations between the frequency of and severity ratings of challenging behaviours and independence/interdependence, and social conservatism for different forms of challenging behaviour (social, sexual and aggressive behaviours) and overall level of challenging behaviour.
4. To examine whether the number of behaviours identified as challenging, and severity ratings overall and for different types of behaviour differ between countries of origin and work.
5. To examine participants' perspectives on factors underlying why behaviours are felt to be challenging.

Based on social collectivist theory, it was hypothesised that perceived social norm violation would lead to a higher overall frequency of behaviours being classified as challenging in participants who score highly on interdependence and social conservatism. It was also hypothesized that the overall severity rating for challenging behaviours would be higher in participants scoring more highly on interdependence and social conservatism.

It was hypothesised that as social norms vary between cultures, decisions regarding frequency and severity ratings in behaviours linked to social inappropriateness would be ones that are most influenced by cultural factors such as country of origin.

It was also hypothesised that decisions regarding behaviours contained in novel fictional vignettes, which were based on those classified as less severe on standardised challenging behaviour scales (The SASBA, OBS and OAS-MNR), would be more influenced by cultural factors than those considered more severe, as these are more nuanced and influenced by social norms.

Methods

This project was granted ethical approval by the University of Glasgow School of Medical, Veterinary and Life Sciences ethics committee (Approval Number 200230285; Appendices E and F, p.120-121), and the Brainkind ethics committee, a collaborating organisation (Appendix G, p.122). Participants read an information sheet (Appendix H, p.124), and a privacy statement (Appendix I, p.125) and completed a consent form prior to study completion (Appendix J, p.126).

Design

The study employed a concurrent quantitative and qualitative design. Both quantitative and qualitative data was gathered in parallel but were analysed separately.

Context and Setting

The study was carried out in collaboration with Brainkind, a UK-based brain injury rehabilitation group with a range of specialist inpatient units and residential homes for brain injury rehabilitation across the UK. The survey was also distributed to individuals working in international brain injury rehabilitation organisations (for example, rehabilitation units in India). This was achieved through requesting

Brainkind staff and members of the research team to distribute the study to personal connections working within this area.

Participants

Participants were recruited by emails sent via Brainkind channels to Brainkind staff, emails sent to contacts members of the research team had pre-established relationships with and recruitment adverts on social media platforms (LinkedIn, appropriate Facebook groups).

Inclusion criteria for participants were professionals aged 18+ who are currently paid to care for individuals with ABI. Participants from a range of healthcare backgrounds were invited to complete the study (i.e. nursing, psychology, AHPs, support workers). Exclusion criteria were participants under the age of 18, who are not in paid employment caring for individuals with ABI, and who solely work with neurodegenerative conditions such as dementia.

Participants were asked to provide information about years of clinical experience working with challenging behaviours, work setting, professional background, age, years of education, sex and country of work and origin.

Sample Size

A sample size calculation can be found in Appendix K (p.127). A multiple regression was initially planned for this piece of work with a minimum sample size of 98 but was not carried out as there were no significant differences between demographic variables and decisions related to challenging behaviours on the Kruskal-Wallis test. Thus, a calculation for the sample size required for Spearman's correlation was carried out (Appendix K, p.127).

Procedure

Data was collected anonymously using the online survey platform Qualtrics. Four versions of the study link were used: English, Portuguese, Spanish (European) and Spanish (South American).

Examples of challenging behaviours were described in vignettes related to a range of potentially aggressive, socially inappropriate and sexually inappropriate behaviours of varying degrees of severity. Clinicians were asked to identify challenging behaviours and rate these behaviours on questionnaires indicating the severity of the challenge posed by the behaviour and were accompanied by free text sections to gain information on clinical decision-making (Appendix L, p.128).

Materials and Measures

For countries where Spanish or Portuguese is the principal working language, vignettes, consent forms and information sheets were translated by members of the research team who are fluent in English, Spanish and Portuguese, as there are no standardised Spanish/Portuguese versions of these questionnaires available due to them being novel to the study.

As the translators were both native language speakers and experts in the field of challenging behaviour, this allowed for a good level of linguistic and conceptual translation from English. For increased validity, the Spanish translations were checked for linguistic accuracy by an independent expert.

Vignette Measure Development

Nine fictional vignettes (Appendix M, p.129) were developed by the primary study author, including challenging behaviour related to sexual, social and aggressive behaviours commonly seen in brain injury presentations. The behaviours ranged in severity and included behaviours described in the SASBA Scale (Knight et al., 2008), OAS-MNR (Alderman et al., 1997) and the OBS (Kelly et al., 2006). Differences in patient characteristics within the vignettes were minimal to control for potential bias (no information on sexuality, race or age on the fictional patients was provided).

Fictional patients were male, and the pronouns of fictional professionals were included. There were a series of control behaviours (non-challenging behaviours) contained within the vignettes.

Vignettes were developed by the author of this paper following a visit to a Brainkind inpatient facility. They were then sent to the other two members of the research team for feedback, and vignettes were refined. Vignettes were sent to independent clinicians working with patients with ABI for feedback on how realistic they were and were subsequently revised.

There were 41 challenging behaviours overall, comprising of 17 social, 12 aggressive and 12 sexual behaviours. There were 11 filler behaviours. All 52 behaviours (41 challenging and 11 filler) were listed underneath the vignette they were contained in, for example “Barry stares at your groin”. Participants were asked to rate each of the behaviours in the vignettes on a 0-4 scale, where zero represents not challenging, and 1-4 refer to different levels of perceived severity of challenge. As the original descriptive response categories vary by scale, for the purposes of this study, new labels were used where zero is labelled “not challenging”, one is “behaviour poses minor challenges”, two is “moderately challenging”, three is “quite severely challenging” and four is “very severely challenging”. The classification of whether a behaviour is challenging was measured by participants recording either zero (challenging behaviour not present) or 1-4 (behaviour present).

For each behaviour listed in vignettes, participants were asked, “Are there any aspects of the following behaviour you find challenging, and if so, why?”, underneath each included behaviour, which was listed, and provided a free text response, generating qualitative data.

Measures

The Singelis Self-Construal Scale (SCS; Singelis, 1994) was used to measure independence/interdependence. This 30-item questionnaire is comprised of two subscales. One 15-item subscale measures independence (i.e. “I act in the same way

no matter who I am with”) and one 15-item subscale measures interdependence with others (i.e. “I feel good when I cooperate with others”). Responses are provided on a 1-7 Likert scale ranging from “strongly disagree” to “strongly agree.” The scale has demonstrated satisfactory reliability and validity in English (Singelis, 1994). In initial validation using a population of ethnically diverse undergraduate students at the University of Hawaii ($n = 364$, mean age = 22), Cronbach’s alpha for the independent subscale was .73, and for the interdependent subscale .74. The SCS has previously been translated into Spanish and Portuguese (Singelis et al., 2007; Gouveia et al., 2005). A validated version of the scale was used in Spanish, with some minor grammatical changes as the scale was used originally with South American participants and this was amended for the purposes of European Spanish. A Portuguese translation was obtained from the original scale author, although this was not separately validated.

The 12-item Social and Economic Conservatism Scale (SECS; Everett, 2013) was used to measure social conservatism. Seven items relate to social conservatism (i.e. “traditional values”) and five to economic conservatism (i.e. “fiscal responsibility”). Responses are provided on a 0-100 scale where participants rate their perception of each item, ranging from complete negativity (0) to full positivity (100). Scales are comprised of the average for all socially conservatism items, and the average of all economically conservative items. Both items can then be combined for an overall total conservatism score. The SECS was initially validated within an American adult population, recruited via MTurk, an online survey platform. Participants ($n = 291$) were predominantly white, and mean age was 37 years. The scale has demonstrated adequate validity and good reliability; with a Cronbach’s alpha of .88 for the complete 12-item scale, .70 for the economic conservatism subscale, and .87 for social conservatism subscale (Everett, 2013). The SECS has previously been used in cross-cultural research (Kerry et al., 2022). SECS was translated into Spanish and Portuguese by members of the research team as there were no validated equivalents available. Only items related to social conservatism were used for data analysis.

Variable Creation

A total frequency score of how many behaviours in total were classified as challenging was calculated for each participant. A behaviour was classified as challenging if it scored 1-4 (behaviour poses minor challenges and above). A behaviour was not classified as challenging if it was scored as zero ("behaviour is not challenging"). A total frequency score was calculated from the total number of behaviours which were scored 1-4.

A median severity rating overall was calculated for each participant, with filler behaviours excluded. Median severity ratings for each participant were calculated for each type of challenging behaviour (social, aggressive and sexual behaviours). For each type of behaviour a median was calculated for lower and higher levels of severity. This was calculated by grouping behaviours which would score a 1 or 2 on challenging behaviour scales together (low level severity) and those which would score a level 3 or 4 together (higher level severity).

Country of origin was divided into four groups: UK and Ireland (Scotland, England, Wales, Ireland; labelled as UK) Spain, Portugal, and English Speaking – Other (India, South Africa, Philippines Germany, USA, Africa, Greece, France, Singapore). Country of current work was comprised of three groups as the UK (Scotland, England and Wales) Portugal and Spain. India was excluded as $n = 1$.

Data Analysis

Quantitative

A detailed data analysis plan for this study can be found in Appendix N (p. 130). Kruskal-Wallis tests were used to explore differences between demographic variables and decisions related to challenging behaviour. A regression was planned for this piece of work but was not carried out as data did not meet parametric assumptions and there were no significant differences between any demographic variables and overall frequency of behaviours perceived to be challenging, and median severity rating.

The Kruskal-Wallis test was used to explore differences between countries of origin and work and social conservatism, independence and interdependence.

A Kruskal-Wallis test was also used to explore differences between participant country of work and origin and frequency and median severity ratings for specific types of challenging behaviour, and overall levels of challenging behaviour.

Spearman's correlations (one-tailed) were used to explore the relationships between social conservatism, independence and interdependence on overall ratings of challenging behaviour and specific challenging behaviours. Data was not normally distributed (Appendix R, p.138), thus non-parametric tests were used.

Qualitative

A content analysis of responses on the free text section of the survey was completed to explore participant perspectives on reasons why behaviours were felt to be challenging. The nature of responses was such that there was a substantial quantity of brief responses gathered, thus a content analysis was used.

Participant responses were split into two groups (higher and lower interdependence), rank ordered by participants scoring in the lower half of interdependence scores and participants scoring in the higher half. This was to explore similarities and differences in participant perspectives by interdependence, as it was hypothesised that cultural differences such as interdependence would influence decision-making related to challenging behaviour. Participants were not compared between countries, as the participant perspectives section sought to explore perspectives by interdependence rather than making pan-cultural comparisons.

Results

Data was imported into IBM SPSS 29.0.2.0. A d syntax file and data availability statement can be found in Appendices O (p.131) and P (p.132).

The total data set contained incomplete data responses ($n = 80$). Sixty-three data responses were complete, 74 participants completed a minimum of all demographic information and the SCS.

Participant Demographics

Demographic results were based on participants who had completed a minimum of all demographic information and the SCS ($n = 74$), as this was the minimum amount of information needed to answer at least one research question. A summary of demographic information for complete responses ($n= 63$) can be found in Appendix Q (p.133).

Fourteen responses (19%) were completed in Spanish, 15 (20%) in Portuguese and 45 in English (61%).

Participant demographic information is displayed in Table 6.

Table 6. Participant Demographic Information ($n = 74$)

Variable	Category	<i>n</i>	%
Age (years)	18–29	24	33
	30–41	15	20
	42–53	15	20
	54–65	20	27
Sex	Female	49	66
	Male	16	22
	Undisclosed	9	12
Country of Origin	Scotland	8	11
	Ireland	3	4
	Wales	1	1
	England	19	26
	Spain	14	19
	Portugal	15	20
	India	4	5
	South Africa	2	3
	Philippines	1	1
	Germany	2	3
	USA	1	1

Country of Work	African country (Unspecified)	1	1
	Greece	1	1
	France	1	1
	Singapore	1	1
	Scotland	21	28
	Wales	2	3
	England	22	30
	Spain	13	18
	Portugal	15	20
	India	1	1
Work Setting	Nursing and care homes	6	8
	Supported living	3	4
	General inpatient	15	20
	neuro/neurosurgical/rehab		
	Specialist inpatient brain injury	35	48
	Specialist outpatient/community brain injury	6	8
	General outpatient	13	18
	neuro/neurosurgical/rehab		
	Other	8	11
	Clinical/Counselling/Forensic	35	47
Profession	Psychologists & Neuropsychologists		
	Assistant Psychologists	10	14
	Psychiatrists	3	4
	Other Medical Doctors	4	5
	Nurses	4	5
	Support Workers	5	7
	Speech and Language Therapists	2	3
	Occupational Therapists	1	1

Education	Physiotherapists	4	5
	Social Workers	2	3
	Ward Managers	2	3
	Counsellors	1	1
	High school certificate	1	1
	College level	3	4
	Undergraduate	12	16
	Postgraduate	29	39
	Doctoral	28	38
Years of Experience Working with Challenging Behaviours	0–6	24	33
	6–13	16	22
	14–21	10	14
	22–29	12	17
	30–37	10	14
	38–45	3	3

Challenging Behaviour Descriptive Summary

A list of all included challenging behaviours is displayed in Table 7, along with percentage of participants who rated the behaviour as challenging, and median severity rating for each behaviour.

Table 7. *Descriptive Summary for Frequency and Severity Ratings of Individual Challenging Behaviours*

Category	Behaviour	Low or High Severity (According to SASBA, OBS or OAS- MNR)	Percentage of Participants Classifying Behaviour as Challenging (N=63)	Median Severity Rating (1- 5)
Aggressive	Picks at skin on hands	Low	76	2
	Verbal insult towards another patient	Low	100	3
	Kicks the wall	Low	97	3.5
	Tells you to “Go to hell!”	Low	87	3
	Slams the door	Low	84	2
	Begins banging head against wall	Low	97	4
	Exclaims “For god’s sake!”	Low	68	2
	Strikes another service user	Low	98	5
	Spits at another service user	Low	98	4
	Threatens to kill another service user	High	98	4
	Self-harms deeply requiring medical attention	High	95	5
	Kicks another service user causing bruising	High	100	4
Sexual	Hugs a staff member	Low	82	2

Social	Holds onto staff member's hand	Low	89	2
	Asks if staff member has a boyfriend	Low	58	2
	Touches arm of staff member	Low	65	2
	Stares at groin of staff member	Low	90	3
	Patient places hands on own genitals, over clothes	Low	94	2
	Accidentally exposes genitals	Low	86	3
	Touches staff member's arm	Low	94	3
	Asks if staff member is married	Low	63	2
	Announces he is horny	Low	94	3
	Exposes genitals to staff member	High	100	4
	Says "I want to have sex with you" to staff member	High	99	3.5
	Service user repeatedly interrupts professional	Low	69	2
	Service user is uncooperative	Low	97	3
	Service user does not engage in conversation with you	Low	86	3
	Service user is perseverative in conversation	Low	48	1
	Laughs awkwardly	Low	66	2

Filler	Discusses previous drug use with another service user	Low	58	2
	Repeatedly says he is hungry	Low	69	2
	Service user says he doesn't want to follow any rules	Low	87	3
	Service user says "I love you"	Low	79	2
	Service user tries to interfere in others' care plans	Low	65	2
	Laughs hysterically	Low	76	2
	Blows kisses	Low	95	2
	Will not share equipment with others	Low	76	2
	Tells the same joke repeatedly	Low	63	2
	Steals from another service user	High	95	3
	Sets fire to bin when confronted about stealing	High	99	5
	Impersonates another service user to bank	High	95	4
	Makes tea and watches TV		11	1
	Asks what your favourite football team is		7	1
	Talks about an upcoming event on the ward		5	1
	Plays a videogame		8	1
	Smokes in outdoor communal smoking area		32	1

Asks to speak to family on telephone	16	1
Plays a board game	3	1
Listens to music	2	1
Walks down hall humming to self	6	1
Accidentally drops pan on the floor	11	1
Walks around outdoor area	29	1

Relationship Between Demographic Variables and Decisions on Challenging Behaviour

Only complete data responses were included, $n = 63$. Data was not normally distributed (Appendix R, p.135).

The Kruskal-Wallis test demonstrated no significant difference between age groups on total frequency of behaviours classified as challenging; $H(7) = 6.75, p = .455, \varepsilon^2 < .01$ or on overall median severity rating of challenging behaviours; $H(7) = 9.12, p = .244, \varepsilon^2 = .03$. No significant differences were found between sexes on total frequency of behaviours classified as challenging; $H(2) = .04, p = .980, \varepsilon^2 = .03$ or on overall median severity rating of challenging behaviours; $H(2) = 2.68, p = .262, \varepsilon^2 = .01$.

The Kruskal-Wallis test demonstrated no significant differences between job roles on total frequency of behaviours classified as challenging; $H(11) = 8.57, p = .662, \varepsilon^2 = .04$ or on overall median severity rating of challenging behaviour; $H(11) = 11.22, p = .425, \varepsilon^2 < .01$. No significant differences were found between years of experience working with challenging behaviours on total frequency of behaviours classified as challenging; $H(10) = 9.74, p = .464, \varepsilon^2 < .01$ or on overall median severity rating; $H(10) = 10.73, p = .379, \varepsilon^2 = .01$. There was also no significant difference between level of education on total frequency of behaviours classified as challenging; $H(3) = 1.83, p = .609, \varepsilon^2 = .02$ or on overall median severity rating; $H(3) = 5.00, p = .172, \varepsilon^2 = .03$.

Relationship Between Country of Origin and Work, and Decisions Related to Challenging Behaviour

Only complete data responses were included, $n = 63$. The Kruskal-Wallis test demonstrated no significant differences between countries of origin on overall frequency of behaviours classified as challenging; $H(3) = 1.83, p = .609, \varepsilon^2 = .02$. There were no significant differences between countries of origin on overall median severity rating of challenging behaviours, $H(3) = 7.58, p = .510, \varepsilon^2 = .08$.

There were no significant differences between countries of work and total frequency of behaviours classified as challenging; $H(2) = 2.14, p = .343, \varepsilon^2 < .01$. The Kruskal-Wallis test demonstrated a significant difference with a medium effect size between current country of work on overall median severity rating of challenging behaviours; $H(2) = 7.63, p = .022, \varepsilon^2 = .10$. A post-hoc Bonferroni-corrected Dunn test indicated that these differences lay between Portugal and the UK, $p = .010, padj = .031$, with Portuguese participants demonstrating a higher overall median level of severity for decisions related to challenging behaviour than UK participants. Mean rankings are displayed in Table 8.

Table 8. *Mean Rankings of Overall Severity Rating for Challenging Behaviour, by Country of Work*

Country of Work	Mean	N	SD
UK	2.49	39	.56
Spain	2.95	10	.90
Portugal	3.17	12	1.03

Relationship between Social Conservatism, Independence and Interdependence and Country of Origin and Current Work

For this analysis, $n = 74$. There were significant differences between countries of origin on social conservatism, with a medium effect size, $H(3) = 9.03, p = .029, \varepsilon^2 = .09$. A post-hoc Bonferroni-Corrected Dunn Test indicated that the UK mean was significantly lower than English-Speaking other, $p = .013, padj = .076$, and the UK mean was significantly lower than Portugal, $p = .020, padj = .117$. A comparison of mean rankings for social conservatism across country of origin is displayed in Table 9.

There were significant differences with medium effect size between countries of origin on independence; $H(3) = 8.04, p = .045, \varepsilon^2 = .07$. A post-hoc Bonferroni-

Corrected Dunn test demonstrated that Spanish participants scored more highly than UK participants, $p = .019$, $padj = .107$, and Portuguese participants scored more highly than UK participants, $p = .023$, $padj = .137$. A comparison of mean rankings for independence by country of origin can be found in Table 9.

There were significant differences with large effect size between countries of origin on interdependence, $H(3) = 13.44$, $p = .004$, $\epsilon^2 = .15$. A post-hoc Bonferroni-Corrected Dunn Test indicated that Spanish participants scored more highly than UK participants, with a significant difference, $p < .001$, $padj = .005$. Portugal also scored significantly higher than the UK ($p = .030$, $padj = .179$), and English-Speaking other scored significantly higher than the UK ($p = .023$, $padj = .137$). A comparison of mean rankings for interdependence by country of origin can be found in Table 9.

Table 9. Mean Rankings for Social Conservatism, Independence and Interdependence Across Countries of Origin

Country	N	Social Conservatism – Mean (SD)	Independence – Mean (SD)	Interdependence – Mean (SD)
UK	30	5.70 (1.63)	4.56(.60)	4.55 (.70)
Spain	15	6.48 (1.08)	5.05(.83)	5.35 (.63)
Portugal	15	6.76 (1.61)	5.04(.57)	5.06 (.57)
English- Speaking, Other	14	7.13 (2.38)	4.80(.70)	5.17 (.91)

The Kruskal-Wallis test demonstrated no significant difference between countries of work on social conservatism; $H(2) = 5.94$, $p = .051$, $\epsilon^2 = .06$.

There were significant differences with medium effect size between countries of work on independence; $H(2) = 7.58$, $p = .023$, $\epsilon^2 = .08$. This difference was between the UK and Spain, with Spain scoring more highly, $p = .011$, $padj = .032$. There was a

significant difference with medium effect size between countries of work on interdependence, $H(2) = 8.75$, $p = .013$, $\varepsilon^2 = .10$, again with this difference being between the UK and Spain, with Spain scoring more highly, $p = .003$, $p_{adj} = .010$. Mean rankings for independence and interdependence by country of work can be found in Table 10.

Table 10. *Mean Rankings For Independence and Interdependence Across Countries of Work*

Country	N	Independence – Mean (SD)	Interdependence – Mean (SD)
UK	45	4.64 (.63)	4.77 (.81)
Spain	13	5.16 (.90)	5.44 (.60)
Portugal	15	4.98 (.54)	5.00 (.59)

Relationship between Social Conservatism, Independence and Interdependence on Overall Ratings of Challenging Behaviour

Results for the relationships between social conservatism, independence, interdependence and frequency and severity ratings for overall challenging behaviours and specific behaviour types are displayed in Table 11.

Table 11. *Correlation Coefficients Between Clinician Factors and Ratings of Challenging Behaviours*

Behaviour Type	Clinician Factor	Low-Level Severity	High-Level Severity	Overall Severity	Frequency
Overall Challenging Behaviours	Independence	-	-	.09	.17
	Interdependence	-	-	.29*	.22*

	Social	-	-	.31*	.23*
	Conservatism				
Aggressive	Independence	.08	.10	.07	-.12
Behaviours	Interdependence	.40**	.24*	.35*	.11
	Social	.33*	.26*	.31*	.30*
	Conservatism				
Sexual	Independence	.08	.17	.14	.20
Behaviours	Interdependence	.26*	.30*	.28*	.29*
	Social	.26*	.35*	.30*	.24*
	Conservatism				
Social	Independence	.15	-.11	.11	.20
Behaviours	Interdependence	.32*	.04	.28*	.29*
	Social	.27*	.16	.27*	.24*
	Conservatism				

* $p < .05$, ** $p < .01$. $N = 62$

There was a significant positive relationship between social conservatism and overall frequency of behaviours perceived to be challenging (with small effect size), and with overall median severity rating (medium effect size). There was a significant positive relationship between interdependence and frequency of behaviours perceived as challenging, and median severity rating, both with a small effect size. Thus, higher levels of social conservatism and interdependence were associated with more behaviours being rated as challenging and as being a higher level of severity.

There was a significant positive relationship with a medium effect size between social conservatism and frequency of aggressive behaviours rated as challenging. There were significant positive relationships with medium effect sizes for social conservatism with low level and overall severity rating for aggressive behaviours. There was a significant positive relationship with small effect size between social

conservatism and median rating on high level severity behaviours. Thus, a higher level of social conservatism was associated with aggressive behaviours being perceived as challenging more frequently and of a higher level of severity.

There were significant positive relationships with interdependence and overall and low-level severity ratings, with medium effect size, and a significant positive relationship with small effect size between interdependence and severity ratings for high-level aggressive behaviours. Thus, a higher level of interdependence was associated with aggressive behaviours being perceived as challenging more frequently and of a higher level of severity.

Social conservatism was significantly positively associated with median severity rating of all levels and total frequency rating of sexual behaviours (with a small effect size on low and overall levels and frequency, and a medium on high level of severity). Therefore, a higher level of social conservatism was associated with sexual behaviours being perceived as challenging more frequently and of a higher level of severity.

There were significant positive relationships between interdependence with sexual behaviours across all levels of severity (with a small effect size on low level and overall levels, and a medium effect size on high level of severity). There was a positive relationship with small effect size between interdependence and total number of sexual behaviours perceived to be challenging. Thus, a higher level of interdependence was associated with sexual behaviours being perceived as challenging more frequently and of a higher level of severity.

There were significant positive relationships with a small effect size between social conservatism and severity ratings related to low and overall level of social behaviour. There was also a significant relationship with a small effect size between social conservatism and total frequency of social behaviours classed as challenging. Therefore, a higher level of social conservatism was associated with social behaviours being perceived as challenging more frequently and of a higher level of severity overall and on behaviours scored as low severity in original scales.

There was a significant positive relationship with medium effect size between interdependence and low-level severity, and a significant positive relationship with small effect size between interdependence and overall severity and frequency of social behaviours perceived to be challenging. Thus, a higher level of interdependence was associated with social behaviours being perceived as challenging more frequently and of a higher level of severity overall and on behaviours scored as low severity in original scales.

There were no significant relationships between independence and severity or frequency ratings for aggressive, sexual and social behaviours.

Comparison of Differences between Countries on Decisions Related to Specific Behaviours

There were no significant differences between countries of origin on total frequency of aggressive behaviours perceived to be challenging, $H(3) = .38$, $p = .944$, $\varepsilon^2 = .05$. There were significant differences with a medium effect size between countries of origin on median severity ratings of aggressive behaviour, $H(3) = 8.99$, $p = .029$, $\varepsilon^2 = .10$. These differences were seen with Portugal and Spain scoring more highly than the UK (between the UK and Portugal, $p = .010$, $p_{adj} = .059$; between the UK and Spain, $p = .025$, $p_{adj} = .152$). Mean rankings for aggressive behaviour are displayed in Table 12.

There was no significant difference between countries of origin and frequency ratings of sexual behaviours, $H(3) = 4.37$, $p = .224$, $\varepsilon^2 = .02$. The Kruskal-Wallis test demonstrated a significant difference with medium effect size between country of origin on median severity rating of sexual behaviour; $H(3) = 8.73$, $p = .032$, $\varepsilon^2 = .10$, with Portugal scoring more highly than the UK, $p = .004$, $p_{adj} = .027$, and Spain scoring more highly than the UK, $p = .048$, $p_{adj} = .286$. Mean rankings for social behaviour are displayed in Table 12.

There were no significant differences between countries of origin on frequency of social behaviours rated as challenging, $H(3) = 3.24$, $p = .357$, $\varepsilon^2 < .01$. There were

significant differences with medium effect size between countries of origin on median severity rating of social behaviour, $H(3) = 9.49$, $p = .023$, $\varepsilon^2 = .11$. A post-hoc Bonferroni-Corrected Dunn test indicated this difference lay between the UK and Portugal, $p = .006$, $p_{adj} = .038$, with Portugal scoring more highly than the UK. Spain also scored more highly than the UK ($p = .048$, $p_{adj} = .286$). Mean rankings for social behaviour are displayed in Table 12.

Table 12. Mean Rankings of Country of Origin on Severity Ratings for Sexual, Aggressive and Social Behaviour

Country	N	Mean Sexual (SD)	Mean Social (SD)	Mean Aggression (SD)
UK	25	2.32 (.70)	2.00 (.50)	3.34 (.52)
Spain	11	2.73 (1.01)	2.64 (.98)	3.86 (1.05)
Portugal	12	3.25 (.97)	2.88 (.98)	3.88 (1.07)
English Speaking, Non-UK	14	2.57 (1.02)	2.21 (.96)	3.71 (.78)

There were no significant differences between countries of work on frequency ratings for aggressive behaviours, $H(2) = .79$, $p = .675$, $\varepsilon^2 = .02$. There were significant differences with a medium effect size between country of work on median severity rating of aggressive behaviour, $H(2) = 7.06$, $p = .029$, $\varepsilon^2 = .09$. A post-hoc Bonferroni-corrected Dunn test demonstrated that this difference lay between the UK and Portugal ($p = .021$, $p_{adj} = .064$), with Portugal scoring more highly on median severity rating. Mean rankings for aggressive behaviour are displayed in Table 13.

There were no significant differences between groups on frequency ratings of sexual behaviours, $H(2) = .5.03$, $p = .081$, $\varepsilon^2 = .05$. There were significant differences with medium effect size between countries of work on median severity rating of sexual behaviour; $H(2) = 8.54$, $p = .014$, $\varepsilon^2 = .11$, with a Bonferroni-corrected Dunn test

identifying that Portugal scored more highly than the UK, $p = .005$, $p_{adj} = .014$. Mean rankings for sexual behaviour are displayed in Table 13.

There were no significant differences between countries on frequency ratings of social behaviours, $H(2) = 3.30$, $p = .191$, $\epsilon^2 = .02$. There were significant differences with a medium effect size between countries of work on median severity rating of social behaviour, $H(2) = 9.75$, $p = .008$, $\epsilon^2 = .13$. A post-hoc Bonferroni-corrected Dunn test identified that this difference lay between Portugal and the UK, $p = .005$, $p_{adj} = .014$, with Portugal scoring more highly. Mean rankings for social behaviour are displayed in Table 13.

Table 13. *Mean Rankings for Country of Work on Severity Ratings of Sexual, Social and Aggressive Behaviours*

Country	N	Mean, Sexual (SD)	Mean, Social (SD)	Mean, Aggressive (SD)
UK	39	2.39 (.78)	2.04(.62)	3.45 (.59)
Spain	10	2.70 (1.06)	2.65 (1.03)	3.85 (1.11)
Portugal	12	3.25 (.92)	2.88 (.98)	3.88 (1.07)

Participant Perspectives

Data from Portuguese free text responses was minimal, thus the summary of results below reflects the researcher's interpretation of Spanish and English free text responses.

Firstly, data was read through several times to ensure familiarity. Initial codes were generated using a thematic analysis approach and applied to survey items. Content analysis was then carried out, using an inductive approach. An example of this process with examples and definitions for all included codes is provided in Appendix S (p.136). A number of codes (Appendix T, p.142) reflected purely descriptive statements (i.e. "behaviour is violent" for an aggressive behaviour, or "behaviour is

challenging”) thus codes presented in the analysis reflect responses with additional richness beyond description.

A member of the research team (MM) reviewed the coding of 20% of survey responses. MM agreed with all codes used, and suggested refinement of the coding process specific to one code that referred to 'boundaries'. MM suggested dividing this code into personal and professional boundaries in the sample of 20% of coding. Consensus was reached through discussion, and on this basis, the primary author reviewed and revised all codes related to boundaries.

Reflexivity

The primary author acknowledged her position as a Scottish Trainee Clinical Psychologist. She noted that she completed the quantitative data analysis prior to the content analysis which may have influenced her interpretation of participant perspectives.

Aggression

The reasons why aggressive behaviours were considered challenging related to eight themes, as displayed in Table 14.

Table 14. *Codes Related to Decisions on Aggressive Behaviours*

Code	Low-Level Interdependence - Frequency of Codes (Percentage of Codes)	High-level Interdependence – Frequency of Codes (Percentage of Codes)
Potential escalation	11 (19%)	8 (16%)
Impact on Others	20 (34%)	25 (51%)
Community	1 (2%)	0
Unpredictable	3 (5%)	1 (2%)
Risk to Self	19 (33%)	11 (22%)
Dynamics	1 (2%)	0

Safeguarding	2 (3%)	3 (6%)
Socially Isolating	1 (2%)	1 (2%)
Total	58	49

A large proportion of responses related to the impact of aggressive behaviours on others, particularly within the high-level interdependence group. Examples of the impact on others include responses such as “*John is being verbally aggressive, and this poses a threat to the emotional wellbeing of others*” (low-level interdependence) and “*Harming other service users or staff is not acceptable*” (high-level interdependence).

The ‘risk to self’ theme was also prominent in both groups, but especially in the low-level interdependence group. Examples of risk to self were reflected by responses such as “*This is a high-risk behaviour and poses a significant risk to self*” (low-level interdependence) and “*Worries about him harming himself, and how I can help/ get him to stop*” (high-level interdependence).

Sexual Behaviours

The reasons why sexual behaviours were considered challenging related to twelve themes, as displayed in Table 15.

Table 15. *Codes Related to Decisions on Sexual Behaviours*

Code	Low-Level Interdependence - Frequency of Codes (Percentage of Codes)	High-level Interdependence - Frequency of Codes (Percentage of Codes)
Boundaries - <i>general</i>	11 (15%)	17 (26%)
<i>Professional</i>	6 (8%)	1 (2%)
<i>Personal</i>	6 (8%)	1 (2%)
Dependent on context	13 (18%)	19 (29%)
Mitigating personal Factors	7 (10%)	6 (9%)

Risk in Community/Reintegration	16 (23%)	3 (5%)
Impact on Others	8 (11%)	13 (20%)
Disruptive to relationships	2 (3%)	2 (3%)
Criminal charges	2 (3%)	0
Consent	0	2 (3%)
Culture	0	1 (2%)
Total	71	65

One prominent theme related to participants' comments that interpretation of whether sexual behaviours are challenging or not is context dependent. This was illustrated within the low interdependence group through responses such as "*I think it depends on the context this is brought up, i.e. intentions behind question but generally I would probably feel like it is slightly inappropriate*" and in the high-level interdependence group through participants noting "*Depends on the mood of the situation.*"

Another theme related to the concept of social boundaries. Boundaries were mentioned more frequently as a general concept in the high interdependence group. Boundaries were often mentioned in the low interdependence group, but with a greater differentiation between personal and professional boundaries. Personal boundaries were illustrated through responses such as "*Personal boundaries crossed*" and professional boundaries through "*This behaviour is not appropriate and may pose a challenge to sense of safety and boundaries in professional/therapeutic relationship.*"

Risk in the community and reintegration were also considered to be factors underlying why sexual behaviours were perceived to be challenging, particularly within the low interdependence group, as illustrated through "*Poor social awareness, possible risk/vulnerability in community.*"

Social Behaviours

The reasons why social behaviours were considered challenging related to ten themes, as displayed in Table 16.

Table 16. *Codes Related to Decisions on Social Behaviours*

Code	Low-Level Interdependence - Frequency of Codes (Percentage of Codes)	High-level Interdependence – Frequency of Codes (Percentage of Codes)
Lack of Engagement	0	5 (10%)
Requires Monitoring	8 (16%)	5 (10%)
Community Reintegration	1 (2%)	3 (5%)
Impact on Others	12 (24%)	13 (24%)
Inconsistent Intent	3 (6%)	1 (2%)
Impact on Relationships	6 (12%)	7 (13%)
Impact on Environment	2 (4%)	6 (11%)
Mitigating factors (i.e. awareness)	9 (18%)	3 (5%)
Legal Implications	6 (12%)	9 (16%)
Total	49	55

The impact on others was the most common reason for a social behaviour being considered challenging, in both the high and low interdependence groups, i.e. “*Causing high distress to other service users*” (low interdependence group) and “*Could potentially cause harm to other person*” (high interdependence group). A negative impact on relationships from social behaviours was noted by both groups, for example “*Damaging to relationships*” (high interdependence group) and “*Lack of social awareness which may impact on his relationships and interactions with others*” (low interdependence group).

The legal implications of behaviours were considered and felt to be challenging to work with, “*This relates to criminal behaviour*” (low interdependence) and “*May result in legal implications*” (high interdependence). The importance of monitoring low-level behaviours was important as illustrated by one participant who noted “*I would be concerned this may escalate further.*” This indicated that participants at times did not perceive low level behaviours to be challenging but identified that they had the potential to become so.

Mitigating factors of features of individuals with ABI were also noted by participants, particularly within the low interdependence group, such as “*I would assume this relates to a cognitive difficulty.*” This suggests that low interdependence individuals may be more likely to try to understand the underlying motivations for behaviour and individual factors impacting behaviour.

Discussion

This study aimed to understand variation in the assessment of challenging behaviours in clinicians working with ABI populations, across and within cultural groups. The study also aimed to understand how this may guide the assessment and treatment of challenging behaviours.

Relationship between Demographic Variables, Country of Origin and Work, and Judgments Related to Challenging Behaviour

Variance between countries of work led to differences in severity ratings for challenging behaviours with Portuguese participants scoring more highly than UK participants on overall median severity rating of challenging behaviours and on individual behaviour types. This supports the hypothesis that there would be variation in challenging behaviour ratings as what is considered challenging may vary across countries. There were significant differences between countries of origin on median severity ratings of different types of challenging behaviour, with Portuguese and Spanish participants rating specific behaviours as more challenging

than UK participants. This suggests that country of work is related to assessment of challenging behaviour, but there were no other significant relationships between demographic variables and decisions related to challenging behaviour. Literature has suggested that relationships within the workplace may influence self-construals, thus if this study had been carried out within a more naturalistic group setting, there may have been significant differences between professional groups (Voyer & Reader., 2013).

Relationship between Social Conservatism, Independence and Interdependence and Country of Origin and Current Work

There were differences between countries of origin on social conservatism, independence and interdependence. Significant differences were demonstrated by Portuguese participants scoring more highly than UK participants across all three scales and Spanish participants scoring more highly than UK participants on independence and interdependence. Notably, there was a significant difference between country of origin on interdependence, with a large effect size, with Spanish, Portuguese and English-Speaking, non-UK participants scoring more highly than UK participants. There were significant differences between country of work and independence/interdependence, with participants working in Spain scoring more highly than those working in the UK, but no significant differences between country of current work and social conservatism. This suggests that individuals may vary in their level of interdependence, independence and social conservatism across countries. Literature cautions the use of making pan-cultural assumptions around self-construals, such as that one country will necessarily be more interdependent than others (Markus & Kitayama, 2014), as there is significant variation in self-construals within countries, thus it is important to consider individual variation in interdependence.

Culture is not a static concept and country of origin and time of working in a new country may impact results, as changing culture may influence people well into adulthood (Kitayama et al., 2020), possibly explaining the differences between country of origin and country of work on interdependence and social conservatism.

This indicates that in cross-cultural research, culture should therefore be defined clearly (i.e., which aspect of culture is being studied). Furthermore, it is important to consider nuances of individual countries, for example, Vignoles et al. (2016) demonstrated that the UK scored differently to other Western European countries on self-expression, indicating that there may be factors specific to certain cultures which impact social behaviour. It should therefore be noted that the results of this study generalise only to the cultures within the study.

Research has indicated that for bilingual participants, the language of survey completion is important to consider. Marian and Kaushanskaya (2004) demonstrated that when bilinguals complete cognitive tasks in languages of more individualistic cultures, they are more likely to provide more individualistic narratives. Therefore, within this study, as there are participants from countries such as Greece, but completing the survey in English, the potential impact of language must be considered in that they may have been provided a lower response to interdependence items on the SCS.

Decisions on Challenging Behaviours and Associations with Independence, Interdependence, and Social Conservatism

There were significant positive relationships between social conservatism and interdependence with overall frequency of behaviours perceived to be challenging, and median severity rating, thus the more socially conservative and interdependent someone was the more challenging they perceived behaviours to be, supporting the study hypotheses.

There were no significant relationships with independence and overall ratings related to challenging behaviours, but there were with interdependence. The importance of considering independence and interdependence as separate constructs rather than opposite ends of one continuum (Singelis, 1994) may explain this result, in that independence is not an opposing scale to interdependence, but a separate construct, and interdependence may thus be one underlying construct explaining variance

between participants. Therefore, an individual can simultaneously score highly on both dimensions.

In terms of specific behaviours, there were significant positive relationships between social conservatism and severity ratings for all levels of severity of aggressive and sexual behaviours, meaning the more socially conservative someone was the more challenging they perceived social and sexual behaviours to be. There was a positive relationship between social conservatism and severity ratings for low and overall level severity of social behaviours. The relationship being present on low level rather than high level supports the hypothesis that more nuanced social behaviours would be more affected by cultural factors such as social conservatism.

There were significant positive relationships between interdependence and all levels of severity for aggressive and sexual behaviours. There was a significant positive relationship between interdependence and severity rating for low level, overall severity for social behaviours, and total number of behaviours rated as challenging. This also supports the hypothesis that low level social behaviours would be more affected by cultural factors such as interdependence.

In a study comparing Lebanese and UK perspectives, the correlation between interdependence/independence and cultural norms (as measured by the Reactions to Social Behaviour Questionnaire) was higher in the UK sample than the Lebanese sample (Ayyash-Abdo et al., 2016). This demonstrated that the relationship between cultural norms and self-construals varies cross-culturally. Thus, the relationship between country-level cultural norms and individual self-construals is complex, but in relation to judgements about behaviour, self-construals such as interdependence are important.

Participant Perspectives

There were similar perspectives between participants of varying levels of interdependence on different categories of challenging behaviour *within* types of

behaviour. There was, however, different themes according to different types of behaviour.

The impact of challenging behaviours on others and relationships was a theme across different types of behaviours, consistent with literature (i.e. Block et al., 2023). This indicates a focus on interpersonal relationships by participants irrespective of their level of interdependence. In aggressive behaviours, risk to self formed a higher percentage of responses in the low interdependence group, which may indicate a focus on the impact of behaviours on the individual themselves, in addition to their social relationships. However, a higher total number of responses were provided from this group related to aggressive behaviours.

The concept of boundaries was a prominent theme, particularly among participants considering that behaviours from patients may cross professional and personal boundaries, which would be difficult to manage. This was most frequently noted for sexual behaviours. This was consistent across participants regardless of their level of interdependence, indicating cultural similarities in perspectives around factors related to challenging behaviours. Low-level interdependence individuals were more likely to differentiate between personal and professional boundaries, suggesting that how boundaries are viewed, and possibly a degree of flexibility around this, may be associated with low levels of interdependence and that the differentiation between personal and professional identities and boundaries may be less distinguished in individuals with high levels of interdependence. Literature has suggested that self-construals and interdependence may differ across contexts (Green et al., 2005). These results suggest that individuals with low interdependence may be more flexible and account for contextual factors during decision-making related to challenging behaviour.

Culture was only explicitly mentioned in one participant response. Several themes on why behaviours were felt to be challenging related to the impact on others, relationships and community reintegration, which in turn relate to interdependence due to their focus on group dynamics and harmony. Risk to community reintegration was noted more frequently by the low interdependence group related to sexual

behaviours. This may be understood through low interdependence participants perhaps relating this as being challenging for the individual as it may lead to restrictions on liberty during discharge planning, rather than directly on the impact on others, as the theme impact on others was seen more frequently in the high interdependence group.

Potential difficulties with treatment planning related to the theme of community reintegration, indicating one area where training and practical advice for staff could be provided. For example, participants indicated that sexual behaviours pose difficulties to management. Block et al. (2023) suggested that difficulties with clinical decision-making are one barrier for staff working with challenging behaviours in ABI. The delivering staff training to support decision making regarding patient community re-integration, discharge planning, and boundaries may be useful.

Strengths

This study is one of the first to directly compare assessment of challenging behaviours in ABI across countries using a vignette approach. Another strength of the study is the exploration of variance between and within cultures, as recommended by Markus and Kitayama (2014), by the incorporation of the self-construal and social conservatism scales. The use of both quantitative and qualitative approaches allowed for a range of cross-cultural perspectives and insights into clinical decision-making to be obtained.

The study included participants with a range of professional and educational backgrounds. Different professions are centred around different philosophies, and although there were no significant effects of profession on severity ratings, the incorporation of various professional backgrounds likely enhanced the richness of participant perspectives provided.

Limitations

This study was slightly underpowered to detect medium effect sizes within the correlational analyses, and the sample size was less than anticipated, despite a lengthy recruitment period. Seventeen surveys were not fully completed, possibly reflecting the length of time required for completion.

The study aimed to compare diverse cultures, such as the UK, with culturally different countries, such as India and South Africa, but due to difficulties with recruitment, there were few responses from certain countries sampled (i.e. South Africa). This led to countries being clustered into the “English – non-UK” group for data analysis due to the lack of available data and the merging of culturally diverse countries such as Germany, Philippines and Singapore. Future research should aim to identify a key contact to promote recruitment in international recruitment sites to maximise research participation potential, as this strategy was successfully used in Portugal and Spain.

There were some limitations with the use of the SECS across all countries as it does not have validation data from all countries, but nevertheless, it was sensitive to differences in how challenging behaviour is viewed across countries. The scale author also acknowledges that the SECS requires updating approximately every decade to reflect socio-cultural change, but this study used the 2013 version of the scale (Everett, 2013). The study did not use a validated translation of this measure into Spanish and Portuguese, and the Portuguese version of the SCS has not been validated. Whilst back-translation with a subject specialist was used, it does not immediately follow that translated versions of scales perform in psychometrically equivalent ways (Singelis et al., 2006). Piloting of included surveys would be an important consideration for future research.

For qualitative perspectives, participants answered the question “Are there any elements of the following behaviour you consider to be challenging and why?”, thus the perspectives of participants who did not perceive behaviours to be challenging are unlikely to have been captured in the qualitative results.

Implications

Understanding potential clinician bias in the assessment of challenging behaviour is important as clinical impression yields significant consequences for care planning and decision making around treatment placement (Langone et al., 2023). Results from this study indicate that there are areas of commonality across cultures for decision-making around challenging behaviour, for example, that infringement of boundaries may be perceived as challenging across participants. The study also highlighted that there may be differences in how clinicians assess challenging behaviours according to individual factors. This may have implications in terms of the consistency of assessment and management approaches. Further development of tools for the assessment of social and sexual behaviours with psychometrically validated equivalents in different languages is indicated. This would enable cross-cultural research to be conducted with a higher degree of validity.

There is a lack of clinical guidance for the management of challenging behaviours in ABI, particularly those involving socially inappropriate behaviours (Gould et al., 2021). From qualitative perspectives, training for staff around managing professional boundaries and interpersonal dynamics, particularly around sexual and social behaviours, is indicated as this was noted to be an area which was described as particularly difficult in participant perspectives across cultural groups (interdependence levels).

Future Research

Further research could focus on other domains of thought and behaviour which are hypothesised to vary cross-culturally, such as relationship with authority (Boer & Fischer, 2013) and hierarchical society (Gobel & Miyamoto, 2024). More in-depth exploration of qualitative perspectives (i.e. through interviews or focus groups) with a specific focus on how socially and sexually behaviours are assessed across cultures may be useful. Further research could also examine on how patient cultural background and clinician cultural background interact, such as through considering the country of origin of the patient and staff member.

Conclusion

This study aimed to investigate if clinician factors, including culture, impact the assessment of challenging behaviour in brain injury populations. Variance between country of work and origin led to differences in severity ratings on challenging behaviour scales. There was a positive relationship between both social conservatism and interdependence with the number of overall behaviours perceived to be challenging, and the overall median severity rating. There were positive relationships with interdependence, social conservatism, and severity ratings on low level social behaviours. This suggests that factors between and within cultures influence the assessment of challenging behaviours. Qualitative results from participants demonstrated cross-cultural similarities in that participants of different levels of interdependence focused on boundary violation and the impact on others, relationships, and community reintegration when assessing the impact of challenging behaviours, particularly with regards to social and sexual behaviours. The development of practical advice around the management of challenging social and sexual behaviour is indicated from participant perspectives, for example, how professionals can manage boundary violation. Validation of assessment tools in different languages, with a particular focus on social and sexual behaviour would aid research within this field.

Declaration of Interest

The authors report no conflict of interest. Funding was provided by NHS Education for Scotland.

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Systematic Review Appendices

Appendix A Prospero Record

Reference - CRD42024500436

https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024500436).

Appendix B Prisma Checklist for Systematic Review

Table 17. *Prisma Reporting Checklist*

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Title; p.7
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Abs, p.8
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Intro; p.10- p.12
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	p.12
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	p.13 – p.14
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	p.15
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	p.185and Appendix C p.107 – p.118
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	p.16
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	p.16-19
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	P. 15
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	p.13-p.15

Section and Topic	Item #	Checklist item	Location where item is reported
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	p.17 -18 and Appendix D, p.119
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	p.17
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	p. 16 – p.28
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	N/A
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	p. 16
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	p.18
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	p.18, p.40-41
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	p. 37 – p.39
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	p.43
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	p.19
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	p.18
Study characteristics	17	Cite each included study and present its characteristics.	p.21 – p.32
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	p. 34 – p. 35
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	p. 25 – p. 32
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	p. 37 – p. 41
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g.	p. 36– p. 41

Section and Topic	Item #	Checklist item	Location where item is reported
		confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	p. 36 - 41
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	p. 39 p. 44
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	P. 41
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	p. 42 – p. 45
	23b	Discuss any limitations of the evidence included in the review.	p. 41 – p. 44
	23c	Discuss any limitations of the review processes used.	p. 44
	23d	Discuss implications of the results for practice, policy, and future research.	p. 44– p. 46
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	p. 9; p.13
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	p. 13; appendix A p.103
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	p. 9; p. 46
Competing interests	26	Declare any competing interests of review authors.	p. 46
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Data extracted; p. 21 -32

Appendix C – Full Systematic Review Search Strategy

Cochrane

#1 (mh ^"cerebrovascular disorders") OR (mh "basal ganglia cerebrovascular disease") OR (mh "brain +") OR (mh "carotid artery diseases") OR (mh "cerebrovascular trauma") OR (mh "intracranial arterial diseases") OR (mh "intracranial arteriovenous malformations") OR (mh "intracranial embolism and thrombosis") OR (mh "intracranial hemorrhages") OR (mh ^stroke) OR (mh "brain infarction") OR (mh ^"stroke, lacunar") OR (mh ^"vasospasm, intracranial") OR (mh ^"vertebral artery dissection") OR (mh "hypoxia, brain")

#2 (stroke* OR poststroke OR "post-stroke" OR apoplex* OR cerebral NEXT vasc* OR cerebrovasc* OR cva OR SAH):ti,ab

#3 ((brain OR cerebr* OR cerebell* OR vertebrobasil* OR hemispher* OR intracran* OR intracerebral OR infratentorial OR supratentorial OR middle NEXT cerebr* OR mca* OR "anterior circulation" OR "basilar artery" OR "vertebral artery") NEAR/5 (isch*emi* OR infarct* OR thrombo* OR emboli* OR occlus* OR hypoxi*)):ti,ab

#4 ((brain* OR cerebr* OR cerebell* OR intracerebral OR intracran* OR parenchymal OR intraparenchymal OR intraventricular OR infratentorial OR supratentorial OR basal NEXT gangli* OR putaminal OR putamen OR "posterior fossa" OR hemispher* OR subarachnoid) NEAR/5 (haemorrhage* OR hemorrhage* OR haematoma* OR hematoma* OR bleed*)):ti,ab

#5 (mh ^hemiplegia) OR (mh paresis) OR (mh aphasia) OR (mh "gait disorders, neurologic")

#6 (hempar* OR hemipleg* OR paresis OR paretic OR aphasi* OR dysphasi*):ti,ab

#7 (mh "brain damage, chronic") OR (mh "brain injuries") OR (mh "brain concussion") OR (mh "brain hemorrhage, traumatic") OR (mh ^"brain injury, chronic") OR (mh "diffuse axonal injury")

#8 (mh ^"craniocerebral trauma") OR (mh "head injuries, closed") OR (mh "intracranial hemorrhage, traumatic")

#9 (mh "brain abscess") OR (mh "central nervous system infections") OR (mh encephalitis) OR (mh meningitis)

#10 (encephalitis OR meningitis OR head injur*):ti,ab

#11 (mh "brain neoplasms")

#12 ((brain OR cerebr*) NEAR/5 (injur* OR hypoxi* OR damage* OR concussion OR trauma* OR neoplasm* OR lesion* OR tumor* OR tumour* OR cancer* OR infection*)):ti,ab

#13{or #1-#12}

#14 MeSH descriptor: (Acting Out)

#15 (mh "agonistic behavior")or (mh bullying)

#16 (mh "Anger")or (mh "Aggression")

#17 MeSH descriptor: (Behavior)

#18 (mh ^"behavioral symptoms")#19 (mh ^"conduct disorder")

#20 (mh ^"Dangerous Behavior")

#21 MeSH descriptor: (Disruptive, Impulse Control, and Conduct Disorders)this term only

#22 (mh ^"Problem Behavior")

#23 MeSH descriptor: (Violence)this term only

#24 ((act*) next (out or agonistic or assault* or bully* or hostile or hostility)):ti,ab,kw

#25 (anger or angry or aggressiv* or aggression or violence or violent*):ti,ab,kw

#26 (challenging or dangerous or disruptive or harmful):ti,ab,kw

#27 ((conduct or disruptive) near/1 disorder*):ti,ab,kw

#28 (impuls* near/3 disorder*):ti,ab,kw

#29 (externali*ing near/1 (behav* or disorder* or problem)):ti,ab,kw

#30 (oppositional or defiant or defiance):ti,ab,kw

#31 ((problem near/1 behav*) or behav* disorder*):ti,ab,kw

#32(mh ^"social disinhibition")

#33 (mh ^"behavio* symptoms")

#34 (mh ^"impulse control")

#35 (mh ^"disinhibit*")

#36 (mh ^" cognitive disinhibit*")

#37 (mh ^" social inappropriate*")

#38 (mh ^" impulsiv*")

#39 (mh ^" dyscontrol")

#40 (mh ^" dysregul*")

#41 (mh ^" inappropriate sexual behavio*")

#42 (mh ^"inappropriate social behavio*")

#43 (mh ^"disturbed social behavio*")

#44 {or #14-#43}

#45 (mh ^"applied behavior analysis")

#46 anger next management:ti,ab,kw

#47 (applied next behavio*r* next analysis or ABA):ti,ab,kw

#48 ((assertive* near/1 train*) or (problem next solv*)):ti,ab,kw

#49 (aversive or aversion or counterconditioning or counter next conditioning ti,ab,kw

#50 (behavio* near/3 (intervention* or method* or technique* or therap* or training or treat*)):ti,ab,kw

#51 (behavio* near/1 (contract* or modif*)):ti,ab,kw

#52 ((functional next (behavio* analys*)) or (functional next analys* near/3 behavio*)):ti,ab,kw

#53 Positive next Behavio* next Support:ti,ab,kw

#54 {or #45-#53}

#55 {or #13 AND-#44 AND #54 }

MEDLINE – OVID

1. cerebrovascular disorders/ or exp basal ganglia cerebrovascular disease/ or exp brain ischemia/ or exp carotid artery diseases/ or exp cerebrovascular trauma/ or exp intracranial arterial diseases/ or exp intracranial arteriovenous malformations/ or exp "intracranial embolism and thrombosis"/ or exp intracranial hemorrhages/ or stroke/ or exp brain infarction/ or stroke, lacunar/ or vasospasm, intracranial/ or vertebral artery dissection/ or exp hypoxia, brain/

2. (stroke\$ or poststroke or "post stroke" or "post-stroke" or apoplex\$ or cerebral vasc\$ or cerebrovasc\$ or cva or SAH).tw.

3. ((brain or cerebr\$ or cerebell\$ or vertebrobasil\$ or hemispher\$ or intracran\$ or intracerebral or infratentorial or supratentorial or middle cerebr\$ or mca\$ or anterior circulation or basilar artery or vertebral artery) adj5 (isch?emi\$ or infarct\$ or thrombo\$ or emboli\$ or occlus\$ or hypoxi\$)).tw.

4. ((brain\$ or cerebr\$ or cerebell\$ or intracerebral or intracran\$ or parenchymal or intraparenchymal or intraventricular or infratentorial or supratentorial or basal gangli\$ or

putaminal or putamen or posterior fossa or hemispher\$ or subarachnoid) adj5 (hemorrhag\$ or haemorrhag\$ or hematoma\$ or haemotoma\$ or bleed\$)).tw.

5. exp hemiplegia/ or exp paresis/ or exp aphasia/ or exp gait disorders, neurologic/

6. (hemipar\$ or hemipleg\$ or paresis or paretic or aphasi\$ or dysphasi\$).tw.

7. exp brain damage, chronic/ or brain injuries/ or exp brain concussion/ or exp brain hemorrhage, traumatic/ or brain injury, chronic/ or diffuse axonal injury/

8. craniocerebral trauma/ or exp head injuries, closed/ or exp intracranial hemorrhage, traumatic/

9. exp brain abscess/ or exp central nervous system infections/ or exp encephalitis/ or exp meningitis/

10. (encephalitis or meningitis or head injur\$).tw.

11. exp brain neoplasms/

12. ((brain or cerebr\$) adj5 (injur\$ or hypoxi\$ or damage\$ or concussion or trauma\$ or neoplasm\$ or lesion\$ or tumor\$ or tumour\$ or cancer\$ or infection\$)).tw.

13. or/1-12

14. Acting Out/

15. Anger/ or aggression/

16. agonistic behavior/ or bullying/

17. "attention deficit and disruptive behavior disorders"/

18. Behavior/

19. behavioral symptoms/

20. conduct disorder/

21. Dangerous Behavior\$/

22. "Disruptive, Impulse Control, and Conduct Disorders"/

23. Problem Behavior/

24. violence/

25. (act\$ out or agonistic or assault\$ or bully\$ or hostile or hostility).tw,kf.

26. (anger or angry or aggressiv\$ or aggression or violence or violent\$).tw,kf.

27. (challenging or dangerous or disruptive or harmful).tw,kf.

28. ((conduct or disruptive) adj1 disorder\$).tw,kf.

29. (impuls\$ adj3 disorder\$).tw,kf.

30. (externali#ing adj1 (behav\$ or disorder\$ or problem)).tw,kf.

31. (oppositional or defiant or defiance).tw,kf.
32. ((problem adj1 behav\$) or behav\$ disorder\$).tw,kf.
33. Social disinhibit\$ /
34. Impulse control /
35. Disinhibit\$ /
36. Cognitive disinhibit\$ /
37. Social inappropriate\$ /
38. Impulsiv\$ /
39. Dyscontrol /
40. Dysregulat\$ /
41. "inappropriate sexual behav\$" /
42. "inappropriate social behav\$" /
43. "disturbed social behav\$" /
44. or/14-43
45. (applied behavio?r\$ analysis or ABA).tw,kf.
46. (behavio?r\$ adj3 (intervention\$ or method\$ or technique\$ or therap\$ or training or treatment\$)).tw,kf.
47. (behavio?r\$ adj1 (contract\$ or modif\$)).tw,kf.
48. (behavio?r\$ adj3 control\$).tw,kf.
49. (functional behavio?r\$ analys\$ or (functional analys\$ adj3 behavio?r\$)).tw,kf.
50. Positive Behavio?r\$ Support.tw,kf.
51. or/44-50
52. 13 AND 44 AND 51

CINAHL – EBSCO

1. (MH "Cerebrovascular Disorders") OR (MH "Basal Ganglia Cerebrovascular Disease+") OR (MH "Carotid Artery Diseases+") OR (MH "Cerebral Ischemia+") OR (MH "Cerebral Vasospasm") OR (MH "Intracranial Arterial Diseases+") OR (MH "Intracranial Embolism and Thrombosis") OR (MH "Intracranial Hemorrhage+") OR (MH "Stroke") OR (MH "Vertebral Artery Dissections") OR (MH "Hypoxia, Brain")
2. (MH "Stroke Patients") OR (MH "Stroke Units")
3. TI (stroke OR poststroke OR "post-stroke" OR cerebrovasc* OR "brain vas*" OR "cerebral vasc" OR cva OR apoplex OR SAH) OR AB (stroke OR poststroke OR "post-stroke" OR cerebrovasc* OR "brain vas*" OR "cerebral vasc" OR cva OR apoplex OR SAH)

4. TI (ischemi* OR ischaemi* OR infarct* OR thrombo* OR emboli* OR occlus*) OR AB (ischemi* OR ischaemi* OR infarct* OR thrombo* OR emboli* OR occlus*)
5. S3 AND S4
6. TI (brain* OR cerebr* OR cerebell* OR intracerebral OR intracranial OR subarachnoid) OR AB (brain* OR cerebr* OR cerebell* OR intracerebral OR intracranial OR subarachnoid)
7. TI ((brain OR cerebr* OR cerebell* OR vertebrobasil* OR hemispher* OR intracran* OR intracerebral OR infratentorial OR supratentorial OR "middle cerebr*" OR mca* OR "anterior circulation" OR "basilar artery" OR "vertebral artery") N4 (ischemi* OR ischaemi* OR infarct* OR thrombo* OR emboli* OR occlus* OR hypoxi*)) OR AB ((brain OR cerebr* OR cerebell* OR vertebrobasil* OR hemispher* OR intracran* OR intracerebral OR infratentorial OR supratentorial OR "middle cerebr*" OR mca* OR "anterior circulation" OR "basilar artery" OR "vertebral artery") N4 (ischemi* OR ischaemi* OR infarct* OR thrombo* OR emboli* OR occlus* OR hypoxi*))
8. TI (haemorrhage* OR hemorrhage* OR haematoma* OR hematoma* OR bleed*) OR AB (haemorrhage* OR hemorrhage* OR haematoma* OR hematoma* OR bleed*)
9. S7 AND S8
10. (MH "Brain Damage, Chronic") OR (MH "Brain Injuries") OR (MH "Brain Concussion+")
11. (MH "Head Injuries")
12. (MH "Central Nervous System Infections+") OR (MH "Encephalitis+") OR (MH "Meningitis+") OR (MH "Meningoencephalitis+")
13. (MH "Brain Neoplasms+")
14. TI (encephalitis OR meningitis OR "head injur*") OR AB (encephalitis OR meningitis OR "head injur*")
15. TI ((brain OR cerebr*) N5 (injur* OR hypoxi* OR damage* OR concussion OR trauma* OR neoplasm* OR lesion* OR tumor* OR tumour* OR cancer* OR infection*)) OR AB ((brain OR cerebr*) N5 (injur* OR hypoxi* OR damage* OR concussion OR trauma* OR neoplasm* OR lesion* OR tumor* OR tumour* OR cancer* OR infection*))
16. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15
17. (MH "Acting Out")
18. (MH "Agonistic Behavior") OR (MH "Bullying")
19. (MH "Anger") OR (MH "Aggression")
20. (MH "Conduct Disorder")
21. (MH "Dangerous Behavior")
22. (MH "Disruptive, Impulse Control, and Conduct Disorders")
23. (MH "Problem Behavior")
24. (MH "Violence")

25. TI ("act* out" OR agonistic OR assault* OR bully* OR hostile OR hostility) OR AB ("act* out" OR agonistic OR assault* OR bully* OR hostile OR hostility) OR TI (anger OR angry OR aggressiv* OR aggression OR violence OR violent*) OR AB (anger OR angry OR aggressiv* OR aggression OR violence OR violent*)
26. TI (challenging OR disruptive OR external* OR harmful OR threatening) OR AB (challenging OR external* OR harmful OR threatening)
27. TI ((conduct OR disruptive) N1 disorder*) OR AB ((conduct OR disruptive) N1 disorder*)
28. TI (external* N3 (behav* OR disorder* OR problem*)) OR AB (external* N3 (behav* OR disorder* OR problem*)) OR TI ((problem N1 behav*) OR "behav* disorder*") OR AB ((problem N1 behav*) OR "behav* disorder*")
29. TI (impuls* N3 disorder*) OR AB (impuls* N3 disorder*)
30. TI (oppositional OR defiant OR defiance) OR AB (oppositional OR defiant OR defiance)
31. TI ("social* disinhibit*") OR AB ("social* disinhibit*")
32. TI ("impulse control") OR AB ("impulse control")
33. TI (disinhibit*) OR AB (disinhibit*)
34. TI ("cognit* disinhibit*") OR AB ("cognit* disinhibit*")
35. TI ("social* inappropriate*") OR AB ("social* inappropriate*")
36. TI (impulsiv*) OR AB (impulsiv*)
37. TI (dyscontrol) OR AB (dyscontrol)
38. TI (dysregulat*) OR AB (dysregulat*)
39. TI ("inappropriate sex* behav*") OR AB ("inappropriate sex* behav*")
40. TI ("inappropriate social behav*") OR AB ("inappropriate social behav*")
41. TI ("disturbed social behav*") OR AB ("disturbed social behav*")
42. S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41
43. TI ("applied behavio#r* analysis" OR ABA OR "Positive Behavio#r Support") OR AB ("applied behavio#r* analysis" OR ABA OR "Positive Behavio#r Support")
44. TI ("functional behavio#r* analys*" OR (functional analys* N5 behavio#r*)) OR AB ("functional behavio#r* analys*" OR (functional analys* N5 behavio#r*))
45. TI (behav* N3 (contract* OR control* OR modif*)) OR AB (behav* N3 (contract* OR control* OR modif*))
46. TI ("Positive Behavio*r* Support") OR AB ("Positive Behavio*r* Support")
47. S43 OR S44 OR S45 OR S46
48. S9 AND S42 AND S47

PsycInfo – EBSCO

- 1.** (MH "Cerebrovascular Disorders") OR (MH "Basal Ganglia Cerebrovascular Disease+") OR (MH "Carotid Artery Diseases+") OR (MH "Cerebral Ischemia+") OR (MH "Cerebral Vasospasm") OR (MH "Intracranial Arterial Diseases+") OR (MH "Intracranial Embolism and Thrombosis") OR (MH "Intracranial Hemorrhage+") OR (MH "Stroke") OR (MH "Vertebral Artery Dissections") OR (MH "Hypoxia, Brain")
- 2.** (MH "Stroke Patients") OR (MH "Stroke Units")
- 3.** TI (stroke OR poststroke OR "post-stroke" OR cerebrovasc* OR "brain vasc*" OR cerebral vasc OR cva OR apoplex OR SAH) OR AB (stroke OR poststroke OR post-stroke OR cerebrovasc* OR "brain vasc*" OR "cerebral vasc" OR cva OR apoplex OR SAH)
- 4.** TI (ischemi* OR ischaemi* OR infarct* OR thrombo* OR emboli* OR occlus*) OR AB (ischemi* OR ischaemi* OR infarct* OR thrombo* OR emboli* OR occlus*)
- 5.** S3 AND S4
- 6.** TI (brain* OR cerebr* OR cerebell* OR intracerebral OR intracranial OR subarachnoid) OR AB (brain* OR cerebr* OR cerebell* OR intracerebral OR intracranial OR subarachnoid)
- 7.** TI ((brain OR cerebr* OR cerebell* OR vertebrobasil* OR hemispher* OR intracran* OR intracerebral OR infratentorial OR supratentorial OR "middle cerebr*" OR mca* OR "anterior circulation" OR "basilar artery" OR "vertebral artery") N4 (ischemi* OR ischaemi* OR infarct* OR thrombo* OR emboli* OR occlus* OR hypoxi*)) OR AB ((brain OR cerebr* OR cerebell* OR vertebrobasil* OR hemispher* OR intracran* OR intracerebral OR infratentorial OR supratentorial OR "middle cerebr*" OR mca* OR "anterior circulation" OR "basilar artery" OR "vertebral artery") N4 (ischemi* OR ischaemi* OR infarct* OR thrombo* OR emboli* OR occlus* OR hypoxi*))
- 8.** TI (haemorrhage* OR hemorrhage* OR haematoma* OR hematoma* OR bleed*) OR AB (haemorrhage* OR hemorrhage* OR haematoma* OR hematoma* OR bleed*)
- 9.** S7 AND S8
- 10.** (MH "Brain Damage, Chronic") OR (MH "Brain Injuries") OR (MH "Brain Concussion+")

- 11.** (MH "Head Injuries")
- 12.** (MH "Central Nervous System Infections+") OR (MH "Encephalitis+") OR (MH "Meningitis+") OR (MH "Meningoencephalitis+")
- 13.** (MH "Brain Neoplasms+")
- 14.** TI (encephalitis OR meningitis OR "head injur*") OR AB (encephalitis OR meningitis OR "head injur*")
- 15.** TI ((brain OR cerebr*) N5 (injur* OR hypoxi* OR damage* OR concussion OR trauma* OR neoplasm* OR lesion* OR tumor* OR tumour* OR cancer* OR infection*)) OR AB ((brain OR cerebr*) N5 (injur* OR hypoxi* OR damage* OR concussion OR trauma* OR neoplasm* OR lesion* OR tumor* OR tumour* OR cancer* OR infection*))
- 16.** S1 OR S2 OR S3 OR S5 OR S6 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15
- 17.** (MH "Acting Out")
- 18.** (MH "Agonistic Behavior") OR (MH "Bullying")
- 19.** (MH "Anger") OR (MH "Aggression")
- 20.** (MH "Conduct Disorder")
- 21.** (MH "Dangerous Behavior")
- 22.** (MH "Disruptive, Impulse Control, and Conduct Disorders")
- 23.** (MH "Problem Behavior")
- 24.** (MH "Violence")
- 25.** TI ("act* out" OR agonistic OR assault* OR bully* OR hostile OR hostility) OR AB ("act* out" OR agonistic OR assault* OR bully* OR hostile OR hostility) OR TI (anger OR angry OR aggressiv* OR aggression OR violence OR violent*) OR AB (anger OR angry OR aggressiv* OR aggression OR violence OR violent*)
- 26.** TI (challenging OR disruptive OR external* OR harmful OR threatening) OR AB (challenging OR external* OR harmful OR threatening)
- 27.** TI ((conduct OR disruptive) N1 disorder*) OR AB ((conduct OR disruptive) N1 disorder*)
- 28.** TI (external* N3 (behav* OR disorder* OR problem*)) OR AB (external* N3 (behav* OR disorder* OR problem*)) OR TI ((problem N1 behav*) OR "behav* disorder*") OR AB ((problem N1 behav*) OR "behav* disorder*")
- 29.** TI (impuls* N3 disorder*) OR AB (impuls* N3 disorder*)

- 30.** TI (oppositional OR defiant OR defiance) OR AB (oppositional OR defiant OR defiance)
- 31.** TI ("social* disinhibit*") OR AB ("social* disinhibit*")
- 32.** TI ("impulse control") OR AB ("impulse control")
- 33.** TI (disinhibit*) OR AB (disinhibit*)
- 34.** TI ("cognit* disinhibit*") OR AB ("cognit* disinhibit*")
- 35.** TI ("social* inappropriate*") OR AB ("social* inappropriate*")
- 36.** TI (impulsiv*) OR AB (impulsiv*)
- 37.** TI (dyscontrol) OR AB (dyscontrol)
- 38.** TI (dysregulat*) OR AB (dysregulat*)
- 39.** TI ("inappropriate sex* behav*") OR AB ("inappropriate sex* behav*")
- 40.** TI ("inappropriate social behav*") OR AB ("inappropriate social behav*")
- 41.** TI ("disturbed social behav*") OR AB ("disturbed social behav*")
- 42.** S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41
- 43.** TI ("applied behavio#r* analysis" OR ABA OR "Positive Behavio#r Support") OR AB ("applied behavio#r* analysis" OR ABA OR "Positive Behavio#r Support")
- 44.** TI ("functional behavio#r* analys*" OR (functional analys* N5 behavio#r*)) OR AB ("functional behavio#r* analys*" OR (functional analys* N5 behavio#r*))
- 45.** TI (behav* N3 (contract* OR control* OR modif*)) OR AB (behav* N3 (contract* OR control* OR modif*))
- 46.** TI ("Positive Behavior Support") OR AB ("Positive Behavior Support")
- 47.** S43 OR S44 OR S45 OR S46
- 48.** S16 AND S42 AND S47

OVID Embase

1. cerebrovascular disease/ OR basal ganglia cerebrovascular disease/ OR brain ischemia/ OR carotid artery diseases/ OR cerebrovascular trauma/ OR intracranial artery disease/ OR intracranial arteriovenous malformations/ OR "intracranial embolism and thrombosis"/ OR intracranial hemorrhages/ OR stroke/ OR brain infarction/ OR lacunar stroke/ OR intracranial vasospasm/ OR vertebral artery dissection/ OR cerebral hypoxia/

2. (stroke\$ OR post stroke OR poststroke OR apoplex\$ OR cerebral vasc\$ OR cerebrovasc\$ OR cva OR SAH).tw
3. ((brain OR cerebr\$ OR cerebell\$ OR vertebrobasil\$ OR hemispher\$ OR intracran\$ OR intracerebral OR infratentorial OR supratentorial OR middle cerebr\$ OR mca\$ OR anterior circulation OR basilar artery OR vertebral artery) adj5 (isch?emi\$ OR infarct\$ OR thrombo\$ OR emboli\$ OR occlus\$ OR hypoxi\$)).tw
4. ((brain OR cerebr\$ OR cerebell\$ OR vertebrobasil\$ OR hemispher\$ OR intracran\$ OR intracerebral OR infratentorial OR supratentorial OR middle cerebr\$ OR mca\$ OR anterior circulation OR basilar artery OR vertebral artery) adj5 (isch?emi\$ OR infarct\$ OR thrombo\$ OR emboli\$ OR occlus\$ OR hypoxi\$)).tw
5. exp hemiplegia/ OR exp paresis/ OR exp aphasia/ OR exp gait disorders/
6. (hemipar\$ OR hemipleg\$ OR paresis OR paretic OR aphasi\$ OR dysphasi\$).tw
7. exp chronic brain damage/ OR brain injury/ OR exp brain concussion/ OR exp traumatic brain hemorrhage/ OR brain injury, chronic/ OR diffuse axonal injury/
8. craniocerebral trauma/ OR exp closed head injuries/ OR exp traumatic intracranial hemorrhage/
9. exp brain abscess/ OR exp central nervous system infections/ OR exp encephalitis/ OR exp meningitis/
10. (encephalitis OR meningitis OR head injur\$).tw
11. exp brain tumors/
12. ((brain OR cerebr\$) adj5 (injur\$ OR hypoxi\$ OR damage\$ OR concussion OR trauma\$ OR neoplasm\$ OR lesion\$ OR tumor\$ OR tumour\$ OR cancer\$ OR infection\$)).tw
13. 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12
14. Acting Out/
15. Anger/ OR aggression/
16. agonistic behavior/ OR bullying/
17. "attention deficit and disruptive behavior disorders"/
18. conduct disorder/
19. dangerous behavior/
20. "Disruptive, Impulse Control, and Conduct Disorders"/
21. Problem Behavior/
22. violence/
23. (act\$ out OR agonistic OR assault\$ OR bully\$ OR hostile OR hostility).tw,kf
24. (anger OR angry OR aggressiv\$ OR aggression OR violence OR violent\$).tw,kf
25. (challenging OR dangerous OR disruptive OR harmful).tw,kf

26. ((conduct OR disruptive) adj1 disorder\$).tw,kf
27. (impuls\$ adj3 disorder\$).tw,kf
28. (externali#ing adj1 (behav\$ OR disorder\$ OR problem)).tw,kf
29. (oppositional OR defiant OR defiance).tw,kf
30. ((problem adj1 behav\$) OR behav\$ disorder\$).tw,kf
31. social disinhibition.tw,kf
32. impulse control.tw,kf
33. disinhibit\$.tw,kf
34. cognitive disinhibit\$.tw,kf
35. social inappropriate\$.tw,kf
36. impulsiv\$.tw,kf
37. dyscontrol.tw,kf
38. Dysregulat\$.tw,kf
39. "inappropriate sexual behav\$".tw,kf
40. "inappropriate social behav\$".tw,kf
41. "disturbed social behav\$".tw,kf
42. (applied behavio?r\$ analysis OR ABA).tw,kf
43. (behavio?r\$ adj3 (intervention\$ OR method\$ OR technique\$ OR therap\$ OR training OR treatment\$)).tw,kf
44. (behavio?r\$ adj1 (contract\$ OR modif\$)).tw,kf
45. (behavio?r\$ adj3 control\$).tw,kf
46. (functional behavio?r\$ analys\$ OR (functional analys\$ adj3 behavio?r\$)).tw,kf
47. Positive Behavio?r\$ Support.tw,kf
48. 42 OR 43 OR 44 OR 45 OR 46 OR 47
49. 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26
OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 37 OR 38 OR 39
OR 40 OR 41
50. 13 AND 48 AND 49

Appendix D - CCAT Quality Appraisal Guidance

<https://conchra.com.au/wp-content/uploads/2015/12/CCAT-user-guide-v1.4.pdf>

MRP Appendices

Appendix E - Final Approved MRP Proposal

<https://osf.io/dswmc>

<https://osf.io/qk327>

Appendix F - University of Glasgow MVLS Ethical Approval



Professor Jonathan Evans

MVLS College Ethics Committee

Exploring the Impact of Cultural Influences on Healthcare Staff Reporting on the Presence and Severity of Challenging Behaviours Within Patient Populations with Acquired Brain Injury.
200230285

The College Ethics Committee has reviewed your application and has agreed that there is no objection on ethical grounds to the proposed study.

We are happy therefore to approve the project, subject to the following conditions

- Project end date as stipulated in original application.
- The data should be held securely for a period of ten years after the completion of the research project, or for longer if specified by the research funder or sponsor, in accordance with the University's Code of Good Practice in Research:
(http://www.gla.ac.uk/media/media_227599_en.pdf)
- The research should be carried out only on the sites, and/or groups or datasets as defined in the application.
- Any proposed changes in the protocol should be submitted for reassessment, except when it is necessary to change the protocol to eliminate hazard to the subjects or where the change involves only the administrative aspects of the project. The Ethics Committee should be informed of any such changes.
- For projects requiring the use of an online questionnaire, the University has an Online Surveys account for research. To request access, see the University's application procedure at <https://www.gla.ac.uk/research/strategy/ourpolicies/useofonlinesurveystoolforresearch/>.
- You should submit a short end of study report within 3 months of completion.

Yours sincerely

Dr Terry Quinn

|

Terry Quinn
FWSO, FESO, MD, FRCP, BSc (hons), MBChB (hons)

Appendix G - BrainKind Ethical Approval



Terms and Conditions of Research Approval

Research approval given by the Brainkind research group is subject to the following conditions:

- 1) The study will be conducted in accordance with relevant organisational policies.
- 2) Participant recruitment and screening for inclusion and exclusion criteria of participants identified within Brainkind (e.g. capacity to consent to take part in research), will be conducted or overseen by the Service Manager or Clinical Lead of the Brainkind service(s) in which each potential participant is based.
- 3) Any adverse events, or new information that may affect the risk to the participants or the conduct of the study must be reported to the research group within 24 hours of their occurrence, via Dr Sara da Silva Ramos, Senior Research Fellow, sara.dasilvaramos@brainkind.org, Telephone 01403 799164.
- 4) The Applicants should promptly report to the research group any:
 - i. changes in the planned duration of the study
 - ii. deviations from, or changes to the protocol
 - iii. any concerns complaints or compliments reported
 - iv. date of first participant recruited
 - v. date of last participant recruited
 - vi. completion of the study.
- 5) A Study Status Report should be submitted for the following:
 - i. study completion or termination: the Final Report is to be submitted within three months of study completion or termination.
- 6) Any dissemination of the findings should acknowledge the support of Brainkind.
- 7) Brainkind reserves the right to withdraw access to its services if:
 - i. The applicant fails to comply with the present Terms and Conditions.
 - ii. There are alterations in the services' operational capacity to host the study.

Hello Mar and Anna,

I'm pleased to confirm that the Brainkind research group did raise concerns with the proposed project and has given approval. I've enclosed the Terms and Conditions that apply. We did receive a general comment, although it was made clear that this should not prevent the study. I've copied it below for consideration.

Looks really interesting – my only comment would be on the vignettes – it would be interesting to have something maybe less clearly challenging – e.g. I think swearing is very culturally determined as to whether it is interpreted as agitation or inappropriate – e.g. someone swearing about their situation – may be very culturally normal for that person but interpreted as inappropriate by someone for whom swearing is very unusual and noticeable.

Kind regards

Sara

Dr Sara da Silva Ramos

Appendix H– Participant Information Sheet

<https://osf.io/kv6ef>

Appendix I - Participant Privacy Notice

<https://osf.io/csfqm>

Appendix J – Participant Consent Form

<https://osf.io/nf4x6>

Appendix K – Sample Size Calculation

An a priori power analysis was conducted to ascertain the required sample size for a multiple linear regression, using GPower Version 3.1.9.6 Software.

Results indicated that the required sample size to achieve 80% power for detecting a medium effect size (0.15), would be 98. This was based on an alpha significance criterion of .05, with six predictor variables incorporated into a multiple regression model. This would provide power of 0.8 to detect correlations between variables as small as 0.3 .

For Spearman's correlation, An a Priori power analysis was carried out, wherein a minimum sample size of 67 was identified to yield statistical power of at least .8, with a medium effect size ($r = .03$), and an alpha level of .05 for a Spearman's correlation.

Appendix L – Information Contained within Qualtrics Survey

<https://osf.io/stjuy>

Appendix M – Fictional Vignettes

<https://osf.io/qku38>

Appendix N – Data Analysis Plan

<https://osf.io/8kn92>

Appendix O - Annotated Syntax File

<https://osf.io/4jcfe>

Appendix P - Data Availability Statement

Data for this study was not made publicly available as this was not included in the ethics proposal. Data will be transferred to the author's University of Glasgow supervisor for use in future studies.

Appendix Q Additional Demographic Information

Summary of Demographic Information for n = 63

Participant age in years was collected in groups and was as follows: 18-29 ($n = 19$, 30%), 30-41 ($n = 14$, 22%), 42-53 ($n = 14$, 22%), 54 – 65 ($n = 16$, 25%).

Participant sex was 41 % female ($n = 41$), 15% male ($n = 15$) and 7% undisclosed ($n = 9$).

Table 18. *Appended Demographic Information for Participant Country of Origin*

Country	Frequency	Percentage
Scotland	6	10
Ireland	3	5
Wales	1	2
England	16	25
Spain	12	19
Portugal	12	19
India	4	6
South Africa	2	3
Philippines	1	2
Germany	2	3
USA	1	2
Africa	1	2
Greece	1	2
France	1	2
Singapore	1	2

Table 19. *Appended Demographic Information for Participant Country of Work*

Country	Frequency	Percentage
---------	-----------	------------

Scotland	19	30
Wales	1	2
England	20	32
Spain	10	16
Portugal	12	19
India	1	2

Participants worked in nursing and care home settings ($n = 4$, 6%), supported living ($n = 3$, 5%), general inpatient neurological, neurosurgical and neurorehabilitation services ($n = 14$, 22%), specialist inpatient brain injury settings ($n = 30$, 48%), specialist outpatient and community brain injury services ($n = 4$, 6%), outpatient general neurological, neurosurgical and rehabilitation services ($n = 10$, 16%) and other settings ($n = 5$, 8%).

Participants were primarily qualified Clinical, Counselling, Forensic Psychologists and Neuropsychologists ($n = 32$, 51%) and Assistant Psychologists ($n = 8$, 13%). Participants were also Psychiatrists ($n = 3$, 5%), other medical doctors ($n = 3$, 5%), nurses ($n = 3$, 5%), support workers ($n = 4$, 6%), Speech and Language Therapists ($n = 2$, 3%), Occupational Therapists ($n = 1$, 2%), Physiotherapists ($n = 4$, 6%), Social Workers ($n = 1$, 2%), Ward Managers ($n = 1$, 2%) and Counsellors ($n = 1$, 2%).

The educational background of participants was 5% college level ($n = 3$), 13% undergraduate ($n = 9$), 41% postgraduate ($n = 26$) and 40% doctoral ($n = 25$).

Participants ranged in the number of years of experience they had obtained in working with individuals with challenging behaviours. This information was gathered in groups and ranged from 0-6 ($n = 20$, 31%), 6-13 ($n = 15$, 24%), 14-21 ($n = 9$, 15%), 22-29 ($n = 11$, 17%), 30-37 ($n = 7$, 11%), 38-41 ($n = 1$, 2%) years.

Appendix R – Normality Tests

Overall Frequency of Behaviours Perceived to be Challenging and Overall Severity Rating

Z scores were calculated to identify potential outliers. Using a threshold of ≥ 3.29 , one response was excluded, resulting in $n = 62$. The frequency of behaviours perceived to be challenging was not normally distributed, $W=.89, p < .001$. Median overall severity rating was also not normally distributed, $W = .84, p < .001$. Data did not appear normally distributed on Q-Q plots.

Aggressive Behaviours

Median overall severity rating of aggressive behaviours was not normally distributed, $W=.84, p = .002$. Median low level severity rating of aggressive behaviours was also not normally distributed, $W = .89, p < .001$, nor was high level severity rating of aggressive behaviours, $W = .78, p < .001$. Data did not appear normally distributed on Q-Q plots.

Sexually Inappropriate Behaviour

Median overall severity rating of sexually inappropriate behaviours was not normally distributed, $W=.91, p < .001$. Median low-level severity rating was also not normally distributed, $W = .90, p < .001$, nor was high-level severity rating, $W = .93, p = .001$. Data did not appear normally distributed on Q-Q plots.

Socially Inappropriate Behaviour

Median overall severity of socially inappropriate behaviours perceived to be challenging was not normally distributed, $W=.82, p < .001$. Median low level severity rating was also not normally distributed, $W = .86, p < .001$, nor was high level severity rating, $W = .86, p < .001$. Data did not appear normally distributed on Q-Q plots.

Appendix S - Example Coding and Definitions for Content Analysis of Challenging Behaviours

Table 20. *Example Coding and Code Definitions for Aggressive Behaviours*

Code	Definition	Example
Potential escalation	Behaviour has the potential to escalate or become more challenging	<i>“Concern around retaliation and situation escalating.”</i> <i>“He is upset not clear if it could escalate.”</i>
Impact on Others	Behaviour has an impact on the safety, emotional or physical wellbeing of another person	<i>“Causing fear and alarm, threatening to others.”</i> <i>“Physical aggression can cause harm to others, especially vulnerable people.”</i>
Community	Behaviour can pose a risk to community reintegration or discharge into community	<i>“May limit options for community reintegration”</i> <i>“Would be a major risk in the community”</i>
Unpredictable	Behaviour is unpredictable	<i>“There was not a clear antecedent”</i> <i>“Challenge here seems more in relation to being unanticipated at that time”</i>

Risk to Self	Behaviour poses a risk to the physical and psychological wellbeing of the service user	<i>“Self-harm, cannot keep self safe.”</i> <i>“Resulted in actual harm to self”</i>
Dynamics	Creates a difficult interpersonal dynamic between service user and professional	<i>“This could be quite a difficult dynamic to manage and uphold professional boundaries”</i>
Safeguarding	Behaviour necessitates a safeguarding response from staff	<i>“Harm to others risk, safeguarding needed.”</i> <i>“Incident and safeguarding”</i>
Socially Isolating	Behaviour could result in social exclusion for service user	<i>“Likely to create fear and distress in others and be socially isolating.”</i>

Table 21. *Example Coding and Coding Definitions for Sexual Behaviours*

Code	Definition	Example
Boundaries - <i>general</i> <i>Professional</i> <i>Personal</i>	Behaviour infringes on professional or personal limits of interpersonal relationships	<i>“Issue with professional boundaries.”</i> (professional) <i>“Crossing personal boundaries but does not seem threatening.”</i> (personal) <i>“Poor boundaries.”</i> (general)

Dependent on context	Further contextual or background factors may influence whether this behaviour is felt to be challenging	<i>"I think this depends on the context this is brought up."</i> <i>"Could be inappropriate depending on the tone."</i>
Mitigating Personal Factors	Individual factors of service user mitigate how challenging a behaviour is felt to be	<i>"If he is unaware this may not be challenging behaviour."</i> <i>"I would assume this relates to a cognitive difficulty."</i>
Risk in Community/Reintegration	Behaviour can pose a risk to community reintegration or discharge into community	<i>"Would place at great risk in the community."</i> <i>"Poor social awareness, possible risk/vulnerability in the community."</i>
Impact on Others	Behaviour has an impact on the safety, emotional or physical wellbeing of another person	<i>"May cause others to feel discomfort/distress"</i> <i>"This would be very humiliating to me"</i>
Disruptive to relationships	Behaviour has a negative impact on relationship with other service users or professional	<i>"Unsure how to challenge this without making it awkward and disrupting relationships with others."</i> <i>"This behaviour may put both John and myself at risk with regards to safeguarding personal boundaries and professional/therapeutic relationship."</i>

Criminal charges	Behaviour is illegal; likely to result in legal ramifications	<i>“He has committed an offence”</i> <i>“This is indecent exposure which is a crime.”</i>
Consent	Behaviour is performed without consent	<i>“His act is without the consent.”</i> <i>“Touch without consent.”</i>
Culture	Participant response refers to culture	<i>“Embracing someone is not very open in our culture.”</i>

Table 22. *Example Codes and Coding Definitions for Social Behaviours*

Code	Definition	Example
Lack of Engagement	Service user is not engaging with another person	<i>“The intensity of James' laughter may pose a challenge in his engagement with staff.”</i> <i>“Lack of engagement.”</i>
Requires Monitoring	Behaviour has the potential to escalate or become more challenging, thus requires monitoring	<i>“Conversation could become challenging, requires monitoring.”</i> <i>“Inappropriate conversation that would require monitoring.”</i>

Community Reintegration	Behaviour can pose a risk to community reintegration or discharge into community	<i>“Socially inappropriate, may prevent reintegration.”</i> <i>“May limit community discharge options and increase level of support needed.”</i>
Impact on Others	Behaviour has an impact on the safety, emotional or physical wellbeing of another person	<i>“Significant risks to others.”</i> <i>“Could upset other people.”</i>
Inconsistent	Behaviour is unexpected/unpredictable/inconsistent	<i>“Disconcerting.”</i> <i>“Unclear what overwhelmed him.”</i>
Intent	Reference is made to perceived motivation behind behaviour	<i>“The question asked, and me trying to distract and then the laugh could have other intentions which can be challenging.”</i> <i>“Depends on the content of his discussions, e.g. if there is active intention to use or obtain.”</i>
Impact on Relationships	Behaviour has a negative impact on relationship with other service users or professional	<i>“Others may find this annoying, may contribute to social isolation if others withdraw.”</i> <i>“Lack of social awareness which may impact on his relationships and interactions with others.”</i>

Impact on Environment	Behaviour has a negative impact on the physical environment	<i>“Lack of respect for other belongings.”</i> <i>“Property damage.”</i>
Mitigating factors (i.e. awareness)	Individual factors mitigate how challenging a behaviour is felt to be	<i>“Indicates issues with poor awareness or difficulty acknowledging behaviour which is likely to make it more difficult to address strategies in future.”</i> <i>“Lack of awareness/insight in receiving feedback.”</i>
Legal Implications	Behaviour is illegal; likely to result in legal ramifications	<i>“It is illegal to do this and this may need to be discussed/ explained to David so it doesn’t happen again.”</i> <i>“illegal and therefore inappropriate.”</i>

**Appendix T - Frequency Counts for Qualitative Responses where
behaviours are Described or Called Inappropriate**

Table 23. *Frequency Counts for Challenging Behaviours - Described*

Behaviour	Low Interdependence	High Interdependence
Sexual	11	13
Aggression	39	17
Social	8	10

Table 24. *Frequency Counts for Challenging Behaviours where Behaviour is
Labelled as Challenging/Inappropriate*

Behaviour	Low Interdependence	High Interdependence
Sexual	7	9
Aggression	2	5
Social	1	5