

## ANGER AND AGGRESSION INTERVENTIONS FOR PFID

### **Title:**

Psychological interventions for anger and aggression in people with intellectual disabilities in forensic services

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### **Highlights**

- Sixteen controlled trials and case series studies of adapted psychological interventions were reviewed.
- Short-term improvements in problem anger were noted for CBT interventions.
- Reductions in aggressive behaviour were observed following a range of psychological therapies.
- Firm conclusions and generalisation were precluded by pervasive methodological shortcomings.
- More robust research designs are required to strengthen the evidence base for treatment of this population.

### Abstract

This systemic review investigates the current evidence for the effectiveness of anger and/or aggression interventions for people with intellectual disabilities (ID) in receipt of forensic mental health services. Due to the prevalence within this population of difficulties with anger and aggression, and the associated substantial individual and societal consequences, the provision of psychological interventions has become increasingly common. However, no critical synthesis of the empirical evidence relating to their effectiveness has previously been conducted. Sixteen peer-reviewed controlled trials or case series designs published between 2001 and 2016 met the inclusion criteria. The results highlight an emerging evidence base for the use of CBT in improving anger regulation, and for a range of psychological therapies in reducing aggressive behaviour. However, consistent methodological shortcomings limit the generalisability of findings and currently preclude firm conclusions on effectiveness. Recommendations are made for future research to address these shortcomings, including clearly-defined adaptations, adequately powered sample sizes, carefully designed baselines and follow-up periods. Despite the current status of evidence, the review provides an accessible and objective foundation to inform decision-making by service commissioners and clinicians providing anger and aggression interventions to people with ID.

*Keywords:*

Systematic review

Intellectual disabilities

Forensic

Anger management

Aggression

Psychological interventions

## 1. Introduction

Problem anger and aggressive behaviour are the most common reasons for admission to forensic services for people with intellectual disabilities (PWID) (Lindsay et al., 2103). Indeed, prevalence studies have found international rates of aggression for people in forensic ID services (PFID)<sup>1</sup> that are 2-3 times higher than for ID adults residing in the community (Taylor, Novaco, & Brown, 2016). While aggressive behaviour is typically the precursor to their involvement with forensic services, anger has been noted as a significant predictor of physical assaults perpetrated by PFID following admission to a secure hospital, controlling for other salient variables (Novaco & Taylor, 2004). Furthermore, research highlights that PFID perpetrate a significantly greater proportion of aggressive incidents (Dickens, Picchioni, & Long, 2013), and are more frequently secluded for actual or attempted assaults (Turner & Mooney, 2016), than detained individuals who do not have intellectual disabilities.

Problem anger and aggression are significant predictors of PFID being subject to prolonged periods of detention in out of area placements (Allen, Lowe, Moore, & Brophy, 2007), prescribed medications with serious potential side-effects (Lundqvist, 2013), and the use of physical restraint (Merineau-Cote & Morin, 2013). ID individuals who display aggression are also reportedly less satisfied with their lives than those who do not (Murphy, 2009).

In addition to increasing the likelihood of physical and emotional harm for the individual, a systematic review of ID adult aggression found it elicits in staff feelings of hopelessness, anger, fear and disgust, manifesting as increased indifference and restrictive practices (Lambrechts, Petry, & Maes, 2008). Furthermore, Kozak, Kersten, Schillmöller,

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<sup>1</sup> Although the terminology *ID offender* is frequently employed within the literature, this review instead utilises *people in forensic ID services* (PFID) in reference to intellectually disabled adults who are subject to forensic service pathways. This distinction acknowledges that many such individuals have not committed or been convicted of criminal offences but are deemed to have forensic needs due to judgments around the risk of harm they pose to others.

and Nienhaus (2013) found a significant association between perceived stress and burnout in staff exposed to aggression by PWID, with the majority of respondents having experienced physical aggression (64.3%) and verbal aggression (81.2%) from service users in the previous 12 months. Consequently, the aggression displayed by PFID may place further strain on already under-resourced services through the associated costs of providing greater staffing levels to manage incidents and cover sick leave following incidents or burnout, injury compensation, and recruitment due to high staff turnover (Singh et al., 2008). These personal and financial ramifications make addressing anger and aggression through effective interventions of vital importance (Tenneji & Koot, 2008).

Historically, interventions targeting anger and aggression in PWID both in the community and forensic settings involved psychopharmacological treatment. However, a review by Willner (2015) concluded “there is no reliable evidence that antidepressant, neuroleptic or anticonvulsant drugs are effective treatments for aggression” in PWID (p. 82). Weak evidence was suggested for an antipsychotic that has significant side-effects and, in one study, was less effective than a placebo (Tyrer et al., 2008). Given the, at best, equivocal evidence coupled with potential toxicity and expense (Unwin, Deb, & Deb, 2016), in the UK the National Institute for Health and Care Excellence (NICE<sup>2</sup>, 2015) recommend antipsychotic medications should only be prescribed should psychosocial interventions prove ineffective.

Such psychosocial interventions typically draw on applied behaviour analysis (ABA), with meta-analyses having shown some evidence of the effectiveness of such behavioural approaches in reducing aggression (Heyvaert, Maes, Van den Noortgate, Kuppens, & Onghena, 2012). However, this evidence is largely drawn from interventions for individuals

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<sup>2</sup> The UK's National Institute for Health and Care Excellence (NICE) produce guidelines for health and social care services and practitioners, which provide evidence-based recommendations on a wide range of topics.

with severe ID, targeting self-injurious and stereotypic behaviours. This has led Taylor and Novaco (2005) to question the transferability of behavioural approaches to PFID who tend to be relatively high functioning and display more outwardly-directed aggression. Furthermore, interventions guided by ABA are usually implemented by staff, limiting opportunity for PFID to develop self-regulation skills, which are commonly a necessary requisite to achieve progression to lower conditions of security or community discharge (Kitchen, Thomas, & Chester, 2014).

### *1.1. Psychological interventions*

Within non-ID forensic services, the most frequently delivered approach to addressing problem anger and aggression are psychological interventions (Howells et al., 2005). These typically utilise cognitive behavioural therapy (CBT) and have amassed a substantial evidence base producing medium-large effect sizes (Henwood, Chou, & Browne, 2014). In comparison, PWID in both the community and forensic services have historically been denied access to direct psychological therapy, although this is now improving in the UK (Beail, 2016). The interventions available tend to mirror those for the general population, yet if delivered without adaptation can prove inaccessible, obstruct treatment gains and increase attrition (Pitman & Ireland, 2003).

An evidence base for adapted psychological approaches for PWID is emerging, within which the treatment of anger has become one of the most widely researched areas (Willner, 2007) and includes a number of systematic reviews (see Ali, Hall, Blickwedel, & Hassiotis, 2015; Borsay, 2013; Hamelin, Travis, & Sturmey, 2013; Nicoll, Beail, & Saxon, 2013; Vereenoghe & Langdon, 2013). However, none of these reviews have focussed specifically on PFID and some have actively excluded studies employing forensic samples due to the differences that this population and their environment present. Narrative reviews that have been undertaken relating to interventions for PFID (Taylor, 2002; Lindsey & Taylor, 2005)

have tended to focus on the author's own studies, and provide no rigorous quality assessment of the evidence on which they base their conclusions. No published systematic synthesis of the available empirical evidence has been conducted, despite the clear need for evidence-based interventions at the individual, service and societal levels.

Thus, the aim of this review is to systematically locate and summarise current relevant research through a methodologically rigorous investigation. In doing so, the review addresses the question: What is the evidence for the effectiveness of psychological interventions targeting anger and/or aggression in PFID?

## **2. Method**

To ensure rigour and transparency, the review was guided by recommendations of the Centre for Reviews and Dissemination (CRD, 2009) and the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA; Moher, Liberati, Tetzlaff, & Altman, 2009), with all PRISMA systematic review checklist items reported on.

### ***2.1 Inclusion/exclusion criteria***

To be included in the review, articles had to: (a) be published in English language; (b) have recruited a sample of adults ( $\geq 18$  years) with ID; (c) have recruited participants in community or inpatient forensic services; (d) report on the effectiveness of a psychologically-based intervention addressing anger and/or aggression.

Articles were excluded if they: (a) did not report on an intervention (e.g. descriptive papers), (b) did not provide outcome data relating to anger or aggression, or (c) included undifferentiated data from both forensic and non-forensic services.

### ***2.2 Search procedure***

Relevant studies were identified by means of comprehensive searches of the electronic databases PsycINFO, Academic Search Complete, Scopus, PubMed and Web of

Science, up to and including May 2016. Databases were selected for providing comprehensive coverage of the literature published in this area.

The key concepts under review—ID, anger and aggression interventions, and forensic settings—were explored, where available, within database thesauri to identify the subject headings used to index these concepts and generate search terms for explosion. Subject headings and their exploded terms differed according to specific database indices. Free text searches were also performed using three sets of terms (see Table A.1) drawn from examination of related reviews and their included studies.

[INSERT TABLE A.1]

For both the thesaurus and free text searches, sets were linked with the Boolean operator “AND” and the terms within linked with the instruction “OR” and a truncation asterisk applied to account for permutations. With awareness of the variability of terminology and general paucity of research within the relatively new field of forensic ID, coupled with this being the first systematic review in this area, no restrictions other than that of adult participants were applied.

The thesaurus/subject mapped searches yielded 665 papers, while the free text searches produced 713 articles, published between June 1914 and May 2016. After duplicated papers and those not published in English language were removed, 194 articles remained. Subject headings and free text terms were combined, with search sets again linked by “AND” and terms within linked with “OR” and truncation asterisks applied. The combined search yielded 823 articles; however, after duplicates and non-English language papers were removed, the combined compared against the original search provided no new

articles. The grey literature, book chapters and Cochrane Library were explored: No new articles were highlighted.

The 194 articles generated were screened using the inclusion criteria, leading to 138 exclusions. Hand searching the reference sections of relevant reviews and the papers selected for inclusion, followed by examination of their citations, authors and of two journals commonly publishing relevant articles, identified a further 25 potential articles; 16 of which were excluded following screening. The full text papers of the remaining 65 studies were assessed, and further exclusions guided by inclusion criteria resulted in 16 studies being included in this review. An overview of this process using the PRISMA flow diagram template is depicted in Figure A.1.

[INSERT FIGURE A.1]

### ***2.3 Quality assessment***

The methodological strengths and weaknesses of studies under review were assessed using the Effective Public Health Practice Project Quality Assessment Tool (EPHPP; Thomas, Ciliska, Dobbins, & Micucci, 2004). This standardised evaluation framework was designed for application against all quantitative designs, making it appropriate for appraisal of the selected papers, which included four controlled trials (CTs) and 12 case series studies. Furthermore, the EPHPP has demonstrated content and construct validity (Thomas et al., 2004) and been endorsed by The Cochrane Collaboration (Higgins & Green, 2011).

Using the EPHPP, studies were rated “strong”, “moderate” or “weak” on six methodological components: selection bias, study design, confounders, blinding, data collection methods, and withdrawals/dropouts. All studies were rated by a second, independent reviewer. High levels of agreement were found (94%) and minor disagreements



discussed and resolved. The EPHPP dictionary was used to guide ratings except those for the study design component due to its automatic rating of CTs as “strong”. Scoring of this component was modified: If a CT did not describe its randomisation method or allocation concealment, it was downgraded from “strong” to “moderate”.

The six EPHPP component ratings were aggregated to assign each study a global quality rating. Studies classified as “strong” on overall quality achieved no weak component ratings, those classified “moderate” had one weak rating, and those classified “weak” had two or more weak ratings. As this review aimed to comprehensively evaluate the literature and report on the relationship between study quality and yielded outcomes, no studies were excluded following quality appraisal.

### **3. Results**

Table A.2 provides an overview of the methodological characteristics and key findings of included studies, referred to hereafter by the number assigned within the table for brevity.

[INSERT TABLE A.2]

Two studies (9a-9b) report on the same group of participants and are regarded as a single study. Both were retained due to their differing contributions to assessing effectiveness: Study 9a examined associations between reductions in anger and aggression, whereas 9b focussed on reductions in specific categories of aggressive behaviour.

Additionally, the experimental group (EG) in study 11 comprised the combined control and experimental cohorts from study 12, resulting in data overlap for nine participants receiving intervention.

#### ***3.1 General characteristics***

Adjusting for data overlap of the aforementioned studies, a total of 274 participants took part in the 15 studies, with an additional 52 acting as controls. Studies were published between 2001 and 2016, and conducted in the UK, USA, and New Zealand. Two studies (11, 12) were RCTs and a further two (7, 13) non-randomised controlled trials (NRCTs): All had a waiting list control group (CG) who went on to receive the intervention. The remaining papers utilised pre-post case series designs. Eight studies provided self-report follow-up data from their entire sample for periods ranging from 1-15 months.

The level of ID was reported by all studies, with most participants described as having mild ID; none had severe or profound ID. The samples of two studies included participants who would not be classed as having an ID. In study 2, 17.5% of participants had full-scale IQs (FSIQs) in the Borderline range of ability; the remainder had mild or moderate ID. Three participants in study 5 had mild ID, while the remaining four had Asperger syndrome and FSIQ's ranging from 77-111; individual data were provided and only that relating to participants with mild ID considered within this review

### ***3.1.1 Measures***

Specific outcome measures utilised in the studies are detailed in Table A.2. Ten studies employed self-report anger measures, completed at least pre- and post-treatment. Seven of these studies (3, 6, 7, 9a, 11, 12, 14) utilised multiple measures of anger. None of the remaining three papers (1, 5, 13) discussed why only a single measure had been used. The majority of the measures employed were developed for use with PWID and have shown to be valid and reliable measures of anger and of anger-related treatment gains in the forensic ID population (i.e., Dundee Provocation Inventory: Alder & Lindsay, 2007; Imaginal Provocation Test: Taylor, Novaco, Guinan, & Street, 2004; Novaco Anger Scale: Novaco, 1994; Provocation Index: Novaco, 2003). Accompanying such measures, four studies also employed the State-Trait Anger Expression Inventory (Spielberger, 1996, 1999), which

whilst not developed for use with PWID, has shown to be a reliable and valid measure of anger and related treatment gains in the forensic ID population (Novaco & Taylor, 2004). Finally, study 5 employed as their sole measure the Anger Inventory for Mentally Retarded Persons (AI-MRP; Benson, 1992); a self-report instrument noted as having acceptable test-retest reliability (0.62) and a single factor solution accounting for much of the variance (Hendryx, 1983, cited in Benson & Ivins 1992). Given that no further and recent investigations of the AI-MRP's psychometric properties appear to have been undertaken, it is unclear as to why the authors of study 5 did not employ one of the more empirically robust measures utilised by the other studies included within this review.

In addition to completing validated self-report anger measures, participants in two studies also provided self-reported daily anger ratings and performed anger-provoking roleplays that were rated by independent observers. A further four studies also utilised a scale found to have high reliability and validity (Novaco & Taylor, 2004) that was completed by ward staff who rated participants' anger over the past week.

Nine studies employed some measure of pre- and post-treatment aggression, including violent recidivism or staff-observed aggressive incident data. In addition, study 8 utilised the self-report and ward staff completed Profile of Anger Coping Skills (PACS; Willner, Brace, & Phillips, 2005); a measure designed for use with PWID that has shown good test-retest reliability (Willner et al., 2005), congruence between client and carer ratings and sensitivity to change following intervention (Willner et al., 2013). Study 3 utilised only the facilitator-completed Modified Overt Aggression Scale (MOAS; Kay, Wolkenfield, & Murrill, 1988); a measure developed to assess aggression in a psychiatric population, which has shown good reliability and suitability for evaluating the effectiveness of aggression interventions in PWID (Oliver, Crawford, Rao, Reece, & Tyrer, 2007).

### ***3.1.2 Interventions***

Eleven studies employed CBT-based interventions, one of which also incorporated dialectical behaviour therapy (DBT) principles and exercises (8). The remainder delivered DBT (2), mindfulness-based approaches (4, 10), or behavioural skills training (BST; 15). Six studies did not discuss whether facilitators were trained to deliver the intervention (1, 3, 6-8, 10). Studies 9-15 were delivered on an individual basis; study 2 incorporated individual and group sessions; and the remainder were group-based. Sessions ranged from 30 to 150 minutes, delivered over three weeks to 82 months.

All studies made reference to providing manualised or protocol-based treatment; 12 of which were developed specifically for PWID, while a further two (2, 5) described adaptations made to mainstream programmes to meet the needs of their participants. These modifications included simplification of written materials and terminology, the introduction of visual aids, and the augmentation of explanations. Study 3 delivered a non-modified mainstream intervention and reflected on the need to introduce adaptations to improve accessibility.

Five of the CBT studies originated from a single research group (9a-9b, 11-14) and all employed the same individual 24-session format, based on the ID-specific anger management manual by Taylor and Novaco (1999, 2005). A further three CBT studies were produced by another research group (1, 6, 7), all utilising a group-based 40-session treatment format also informed by the work of Novaco. The final three CBT studies were all group-based; 3 and 5 having a treatment duration of 12-weeks and study 8 of 22 weeks. As with the CBT studies delivered by two research groups, these independent studies also had core components of cognitive re-structuring, arousal reduction and behavioural skills training.

Although the two mindfulness interventions did not teach their participants identical exercises, both describe their interventions as adhering to the principles of mindfulness. The key difference between the mindfulness approaches was delivery format, with study 4's intervention provided within an open group, and study 10 individually.

### **3.2 Quality**

Using the EPHPP quality appraisal tool, six studies obtained an overall “weak” quality rating, 10 scored “moderate”, and none achieved “strong” (see Table A.3<sup>3</sup>). Across the studies, strengths included the use of valid and reliable measures, low attrition rates and explanations for drop-outs.

#### **3.2.1 Confounders**

There was a consistent pattern of certain limitations amongst the papers reviewed, the most prevalent being a failure to consider possible confounding variables. The potential for confounding is to be expected when designs less robust than an RCT are adopted, and there may be little that can be done to control for such variables. However, many of the studies reviewed did not recognise the possible influence of potential confounders on their findings. For example, no study considered the effects of comorbidity and psychotropic medication, although studies 5, 11 and 12 excluded participants with acute mental health difficulties. Additional potential confounders, such as physical difficulties, pain, or life events such as recent admission, were not mentioned by any study, although study 3 considered the impact of seasonal factors through descriptive data comparisons. Despite the substantial reliance on self-report measures, no study measured or controlled for social desirability in responses. This confound is particularly relevant to both PWID and clients in forensic settings, where external, discharge-related factors may influence answers on outcome measures (Jobson, Stanbury, & Langdon, 2013) and conceal or decrease intervention effectiveness (Schamborg & Tully, 2015). However, it is also recognised that addressing this issue is fraught with conceptual complexities regarding the relationship between anger and social desirability measures.

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<sup>3</sup> Studies 9a and 9b were scored separately due to their use of different outcome measures and, therefore, different data collection methods.

### **3.2.2 Study design**

Three of the controlled trials (11-13) highlighted no significant differences between their EG and CG participants at baseline on age, IQ, length of detention, legal status, offence history, anger screening scores, or psychiatric diagnoses. Trials 11 and 12 further reported having balanced the groups on these variables following random allocation of participants. However, allocation concealment was not described, non-completer data not analysed, and intention-to-treat analyses not conducted, thereby reducing the original comparability of the treatment groups. The fourth trial (7) used a CG unmatched in respect of age and gender and did not control for pertinent variables, thus potentially introducing substantial error (Reeves, Deeks, Higgins, & Wells, 2011). In all trials EG and CG participants resided in the same inpatient settings. EGs may have shared intervention learning, or their improved self-regulation reduced anger-provoking incidents, therefore, it is difficult to conclude that treatment effects were confined to EGs.

### **3.2.3 Blinding**

It was not feasible to ensure participants were blind to the nature of the interventions. Independent observers blind to group allocation rated the roleplays in study 7, and research assistants again not involved in treatment delivery conducted the evaluations in the remaining controlled trials (11-13); however, they were not blind to participants' condition. Finally, eight of the 15 studies were conducted by researchers who wrote the treatment protocols utilised, potentially increasing bias due to researcher allegiance.

### **3.2.4 Analyses**

No studies reported examining treatment fidelity or researcher allegiance, nor assessment of suitability for treatment. Eight studies included participants ranging from mild to borderline intellectual functioning and a further two included a small number with borderline to high average IQs, increasing heterogeneity and difficulty with sample

comparisons. Four studies (2, 9a, 11, 14) included intellectual functioning as an analysis covariate, with only study 9a finding a significant association between IQ and reduction in assaults. Finally, only study one discussed power calculations (4) and six reported effect sizes (4, 8, 9b, 11, 13-14). Attention to statistical power is particularly important in clinically relevant research, especially with the majority of studies having small sample sizes.

Therefore, where available data permitted, effect sizes and 95% confidence intervals (CI) were calculated as part of this review.

[INSERT TABLE A.3]

### ***3.3 Effectiveness of anger and aggression interventions for PFID***

#### ***3.3.1 Anger regulation***

The ten studies (1, 3, 5-7, 9a, 11-14) measuring changes in anger experience all utilised CBT-based interventions. Of these, the two RCTs (11, 12), both rated “moderate” in quality, found greater decline in self-reported anger pre- to post-treatment for participants in the EG than CG. These between-group differences were statistically significant on the one measure utilised in study 12, and CG anger scores also worsened significantly. Effect size calculated for review exceeded Cohen’s (1992) convention for a large effect, thus the significant finding was strong in magnitude, although partly masked by low measurement precision due to the small sample, as reflected by the wide CI [16.693, 40.107]. In comparison, study 11 employed three self-report anger measures and found significant interaction effects with medium effect sizes only for the NAS Total and Arousal subscale and the PI Unfairness subscale, maintained at four-month follow-up. Given the small sample size, the non-significant findings potentially reflect the study’s acknowledged limited statistical power. However, the study’s authors also observed confounders, namely positive

differences in direct-care staff responses to anger displayed by both EG and CG, and the sharing of skills by the EG with the CG. These likely contributed to the unexpected improvement in CG anger scores, and masked intervention effectiveness.

The staff-rated anger measure employed by these two RCTs similarly noted improvements for the EGs compared to CGs; however, these were non-significant. In addition to lacking precision, both studies highlighted a potential floor effect of low anger ratings during the 7-day baseline period, due to the highly supervised secure setting, thus rendering post-treatment improvement difficult to demonstrate within the 7-day post-treatment period.

The two NRCTs (7 & 13) offered similarly positive overall findings, albeit of reduced value due to their “moderate” quality ratings. Study 7 found no significant pre- to post-treatment difference between the EG and CG on the validated self-reported anger measure, although a 30% improvement in EG scores was noted from baseline to post-treatment, whereas CG scores over this period were static. Furthermore, participants’ anger diary ratings showed significant between-groups difference post-treatment with large effect sizes. Insufficient CG data were collected to facilitate follow-up comparisons; however, statistically significant improvement was found for self-rated EG anger from pre-treatment to the nine month follow-up period assessed, and for staff-rated anger pre- to 15-month follow-up, both with medium effect sizes. The inconsistency within this study’s findings may reflect its “weak” quality, with significant age and gender difference between the unmatched groups, a clear lack of measurement precision reflected in the wide CI [-12.85, -0.09] and the study being underpowered. The second NRCT (13) found significant differences between their EG and CG on three of the four self-report measure subscales. The authors suggest the non-significant finding reflects limited statistical power, which may be supported by the medium-large effect sizes that were obtained and not adjusted for during analysis. Both NRCTs found



a significant improvement in scores obtained for the CG once they had completed treatment, suggesting treatment was responsible for improvements in self-reported anger.

All remaining anger-focussed studies utilised pre-post case series. Two (1, 6) provided only descriptive data. Both noted overall improvements post-treatment in participants' self-reported anger, maintained or further improved at 15-months follow-up. For study 6, these findings were further supported by reductions in staff-ratings of participant anger maintained at follow-up; study 1 did not collect staff-report data.

The final studies (3, 5, 9a, 14) demonstrated contrasting outcomes. Two of the three participants' self-reported anger improvements in study 3 were significant pre- to post-treatment; however, small effect sizes were calculated and the study was insufficiently powered to detect change. Study 5 found no significant effect on anger scores pre-post treatment; however, all participants scored below the mean of the AI-MRP measure utilised, suggesting none had clinically significant anger difficulties prior to intervention. Using the AI-MRP means as normative data, participants' anger scores did reduce from the 13<sup>th</sup> to 6<sup>th</sup> percentile pre-post treatment, indicating treatment gains. Conversely, statistically significant improvements were found across all self-report measures in studies 9a and 14, maintained at 12-month follow-up, and corroborated by statistically significant staff-rated outcomes. The adequately powered medium-large and large effects sizes reported are bolstered by these studies use of the largest samples of all reviewed ( $n=50$  and  $n=83$  respectively).

### ***3.3.2 Changes in aggression***

Nine studies (1-4, 6, 8, 9a-9b, 10, 15) assessed reductions in aggression following treatment. All used pre-post case series designs with no control or comparison groups and, with the exception of study 2, employed a multiple baseline comparison period. Five of the studies provided CBT interventions, with all but one (9a-9b) delivered in a group format.

**3.3.2.1 CBT interventions.** Studies 1 and 6 were the only interventions to utilise reconviction data as a measure of aggression. Both highlighted no violent convictions or aggressive incidents for participants in the time following referral to treatment, which ranged from 2-10 years at the point of publication. Reconviction and recidivism data can underestimate the prevalence of aggressive behaviour (Larkin, Sylvester, & Jones, 1988); however, these studies emphasise the close monitoring of participants and confidence in the identification of incidents.

Statistically significant reductions in aggressive behaviours were found by the CBT studies analysing incident data (8, 9a-9b) with medium-large effect sizes, and gains maintained at study 9a-9b's 12-month follow-up period. In study 8, incidents of verbal aggression increased with a small effect size reported; however, this should be viewed with caution given the wide CI [-24.01, 32.91] indicating the study was underpowered. Incident recidivism data were collected by both studies according to operationally-defined categories and 100% inter-rater reliability reported. Study 9a-9b further reduced potential bias with data collected by independent assistants, and categorisation uncertainties resolved through anonymous discussion. Despite these overall robust processes, the absence of CGs impedes firm conclusions on effectiveness.

Statistically significant reductions in self- and/or staff-rated aggression pre- to post-CBT were also found. For study 3, this decrease was noted for only one participant, while the other two participants scored low on aggression throughout treatment and no significant pre-post differences were found. It is of note that the measure was rated by intervention facilitators, thus is a subjective tool that may have introduced bias, and was completed retrospectively for the past week using case-note data. The study does not state by whom case-notes were completed, and no discussion of the accuracy of incident data is made. Inter-rater reliability for one participant was low due to subtle differences in the interpretation and

scoring of incidents. The statistically significant findings of study 8 were observed across all participants; however, staff ratings were consistently lower than participants', indicating the benefit of measuring social desirability responding.

**3.3.2.2 DBT intervention.** Statistically significant reductions in aggression were found in study 2 and maintained over the four years that participants were in treatment. The majority of reductions occurred in the first year; however, physical violence reduced more gradually. Incident data were categorised using coding rules by direct-care staff; however inter-rater reliability was not evaluated and the accuracy and objectivity of data is questionable. The lack of CG and lengthy treatment duration further prohibit conclusions on whether the intervention was responsible for aggression reduction or remission may have otherwise occurred over time.

**3.3.2.3 Mindfulness interventions.** Study 4 found significant reductions in the use of staff observation, physical intervention and seclusion from pre to post-completion of a ward-based mindfulness group. This reduction is suggested to reflect fewer incidents of participant aggression, hence the reduced need for formal staff responses. The study acknowledges that, especially with inter-rater reliability not evaluated and in the absence of a CG, the reduction in staff responses to aggression cannot be causally linked to the intervention. Furthermore, attendance of several participants was low due to the group's voluntary nature; however, some still achieved a decrease in incidents. This was considered unrelated to the intervention and perhaps associated with the care pathway participants were on to reduce the need for staff responses.

A second, individually-delivered, mindfulness intervention (10) reported the elimination of physical aggression from pre- to post-treatment, with no incidents for at least six months prior to intervention end. Verbal aggression was not eliminated but reduced

substantially. Incident data were collected by direct-care staff and a mean inter-rater agreement of 92% achieved.

**3.3.2.4 BST intervention.** The three participants in study 15 all demonstrated significant decreased aggression pre- to post-intervention, occurring with novel antecedents and generalisable outside of treatment. Strategies were employed to improve reliability and validity, including postponing baseline data collection until 90% inter-rater agreement was sustained; with subsequent treatment rating achieving 100% agreement. Treatment integrity was operationalised and measured, aggression baselines carefully conceived to ensure accuracy and detection, and antecedents and consequences consistently presented to ensure aggression reductions were treatment-related. However, the lack of follow-up precludes knowledge of whether gains were maintained post-treatment.

### **3.3.3 Association between reductions in aggression and improvements in anger**

Study 9a was the only intervention to examine this, with aggression reduction (odds ratio 2.57, CI [1.12, 5.90]) found to be significantly associated with improvements in anger over the course of treatment. Of particular note is the statistically significant relationship between aggression reduction and the NAS Total, which previous research has highlighted as the greatest predictor of inpatient assaultive behaviour (see Novaco & Taylor, 2015), and the STAXI Anger-Out and NAS Behavioural; the subscales most germane to aggression. A limitation, pertinent to all the case series reviewed, is this study's lack of control or comparison group.

## **4. Discussion**

In respect of interventions targeting anger, the findings across studies of similar quality currently suggest that longer or more intense interventions do not appear to be needed for improvements to occur. Individual and group CBT also produced similar outcomes, as has been reported in past research (Nicoll et al., 2013; Rose, O'Brien, & Rose, 2009).

Overall, there is some evidence for the short-term effectiveness of these interventions, with all studies obtaining either statistically significant improvement or outcomes in the desired direction. However, all of these studies were deemed of weak-moderate quality.

All ten anger studies were conducted in the UK, and eight of these originate from two research groups, potentially impacting generalisability. Of the six studies reporting statistically significant results, only two were adequately powered to detect with precision the medium-large effect sizes obtained. The remainder, whether achieving significance or not, all had small samples with no reported use of a power calculation to determine size, and suffered a lack of statistical power and wide CIs, rendering their findings equivocal. Two studies provided descriptive data only.

A significant limitation identified by the review was the reference made by only five studies (1, 9a-9b, 11-13) to their samples as having clinically significant anger difficulties prior to treatment. It is of interest that the one study (5) that stated participants did not have clinically significant anger difficulties pre-treatment did observe statistically significant reductions in aggression. This may reflect the acknowledgment within the literature that aggression does not require anger (Novaco, 1994), and rejects Nicoll and Beail's (2013) assertion that anger interventions may not reduce aggression in PFID who do not have high levels of anger.

Overall, the results suggest anger-focussed interventions for PFID, specifically CBT-based treatment, might offer short-term anger improvement; however, methodological issues preclude firm conclusion being drawn. No inference can be made regarding long-term effectiveness as follow-up data for both EG and CGs was obtained by only one of the trials for a period of four months, and by only three of the single-group interventions; two of which were the descriptive studies.

Turning to treatments targeting aggression, there was some heterogeneity in duration and mode (i.e., individual or group-based; CBT, mindfulness, DBT or BST); however, no format produced noticeably better outcomes over another. Two studies, delivering CBT, reported mixed outcomes on participant and staff-rated aggression, although these findings are questionable. The measure utilised by the first study was completed by potentially biased facilitators, while the intervention was not adapted for PWID. The second study's findings indicated social desirability responding; however, this was the only intervention to validate responses against actual behaviour and found statistically significant reductions on all forms except verbal aggression.

The remaining interventions employed "socially validated" (Lindsay & Hastings, 2004) outcomes of violent reoffending and incidents of aggressive recidivism. Reoffending data were provided by the two descriptive CBT studies, which reported zero police charges or convictions for violence with relatively long follow-up periods of 2-10 years. The further five studies that collected data on aggressive recidivism that did not result in police charges or conviction all reported statistically significant reductions in incidents, with medium-large effect sizes. All employed robust incident data collection processes, thus it can be argued that the findings of reduced post-treatment aggression are the most robust within this review. However, all suffered limited statistical power as discussed, and none had comparison groups, preventing conclusive attribution of gains solely to treatment. Only one study mentioned clinical significance but again did not comment on how this was established, while the majority did not provide follow-up data, precluding consideration of the long-term effectiveness of aggression interventions for PFID.

The one study (9a) to assess association found a statistically significant relationship between reductions in aggression and improved anger ratings. This study offers promising evidence for the effectiveness of anger interventions for PFID in reducing aggression.

However, firm conclusions are limited by the study's absence of a comparison group and its lack of consideration of the potential confounders of positive staff responding or other reductions in antecedents, given that anger and aggression are situationally triggered.

#### ***4.1 Limitations of the review***

A single reviewer searched and selected papers, therefore, reliability was not cross-checked. The review of articles published only in English language may have further neglected relevant research and be considered a source of bias. Tools such as the EPHPP are subjective and can lead to underestimation of quality. For example, journal-enforced word count limitations may account for the failure of studies to document certain procedures, and non-reporting does not confirm omission (Soares et al., 2004); however, a number of studies received "weak" ratings due to absences of information assessed. Moreover, while the EPHPP is designed for use against all quantitative designs, it includes factors that were less applicable to the studies reviewed. Modifications were made to address the "hierarchy of evidence" that favours RCTs, while "unclear" or "weak" ratings of blinding did not reduce the global score achieved by any study. The independent scoring of all included studies is hoped to have controlled for subjective bias, and the EPHPP provided important insights on confounding variables and attrition, which were useful during analysis.

#### ***4.2 Future research***

While the feasibility of RCTs with PWID has been demonstrated (e.g., Willner et al., 2013), concerns pertinent to forensic settings remain around informed consent and the ethics and validity of control groups (Erlen et al., 2015). Other ecologically-valid research designs can provide the strong evidence base required by delivering clearly-defined interventions with adequately powered sample sizes; reporting of clinical levels of pre- and post-treatment anger levels; carefully designed baselines to ensure detection of treatment effects; and

consideration of confounders such as social desirability and changes to pre- and post-treatment antecedents.

Follow-up periods of longer duration, coupled with robust collection of aggressive incident data, are necessary to explore whether gains are maintained, especially given the concerns of PWID that progress made in therapy may not be maintained beyond discharge (Pert et al., 2013). This is of particular importance in forensic settings where “successful” completion of anger and aggression interventions may dictate an individual’s reintegration back into the community, where continued desistance is required to prevent readmission. Longitudinal studies with recidivism data would further provide insight into the influence of forensic settings and whether skill-use is motivated by release rather than interpersonal change. Such studies should also report on implementation costs versus treatment-as-usual so that service commissioners can recognise the cost, as well as clinical, effectiveness of these interventions.

Of vital importance is the explicit documentation of how interventions are adapted to improve engagement, comprehension and outcomes to provide replicable evidence for the effectiveness of anger and aggression interventions for PFID. Furthermore, measures of acquisition would contribute towards ensuring participants understand and thus are able to apply target skills. Component studies and qualitative exploration of mechanisms for change, therapeutic process and engagement would offer valuable understanding of what impedes or facilitates effectiveness of anger and aggression interventions for this population (Jahoda, Dagnan, Stenfert Kroese, Pert, & Trower, 2009). Finally, this review calls for more international research, given that despite the delivery of psychotherapeutic anger and aggression interventions to PFID in many parts of the world, the majority of studies reviewed were UK-based ( $n=11$ ).

#### ***4.3 Clinical implications***



Current evidence-based practice guidance for anger and aggression in PWID constitutes two sentences within the UK's NICE challenging behaviour guideline (NICE, 2015): "interventions for adults with an anger management problem...should be based on cognitive-behavioural principles and delivered individually or in groups over 15–20 hours" (p. 31). This document was not developed with consideration of PFID and, therefore, its brief guidance is unlikely to meet the potentially differing personal and environmental needs and challenges of this population. Indeed, the shortest duration of a CBT study within the current review spanned a total of 48-hours and was the one intervention that had not been adapted for PWID. Although the current review does not reject the NICE recommendation of CBT, it also cannot offer unequivocal support.

Forensic ID services and practitioners must, therefore, rely heavily on published studies such as those reviewed, along with professional judgement, when deciding how best to work in this area. Those receiving treatment within forensic ID settings may be placed far from home and their support network, and their detention is costly; yet often prolonged due to the threshold of risk reduction required for release (Davoren et al., 2015). Therefore, a main focus of interest are interventions that will reduce recidivism (Lindsay & Beail, 2004) while being cost-effective. While the review offers no firm conclusion in respect of clinical effectiveness, it does suggest the utility of psychological interventions for addressing anger and aggression, which although relatively resource-intensive are preferable to reliance on psychopharmacology and its significant side-effects (Willner, 2015). The review also provides a more accessible and objective foundation for informed decision-making, and calls for practitioners to disseminate their implementation of anger and aggression interventions for PFID, adhering to the recommendations made and reporting on costs, to develop clinical practice.

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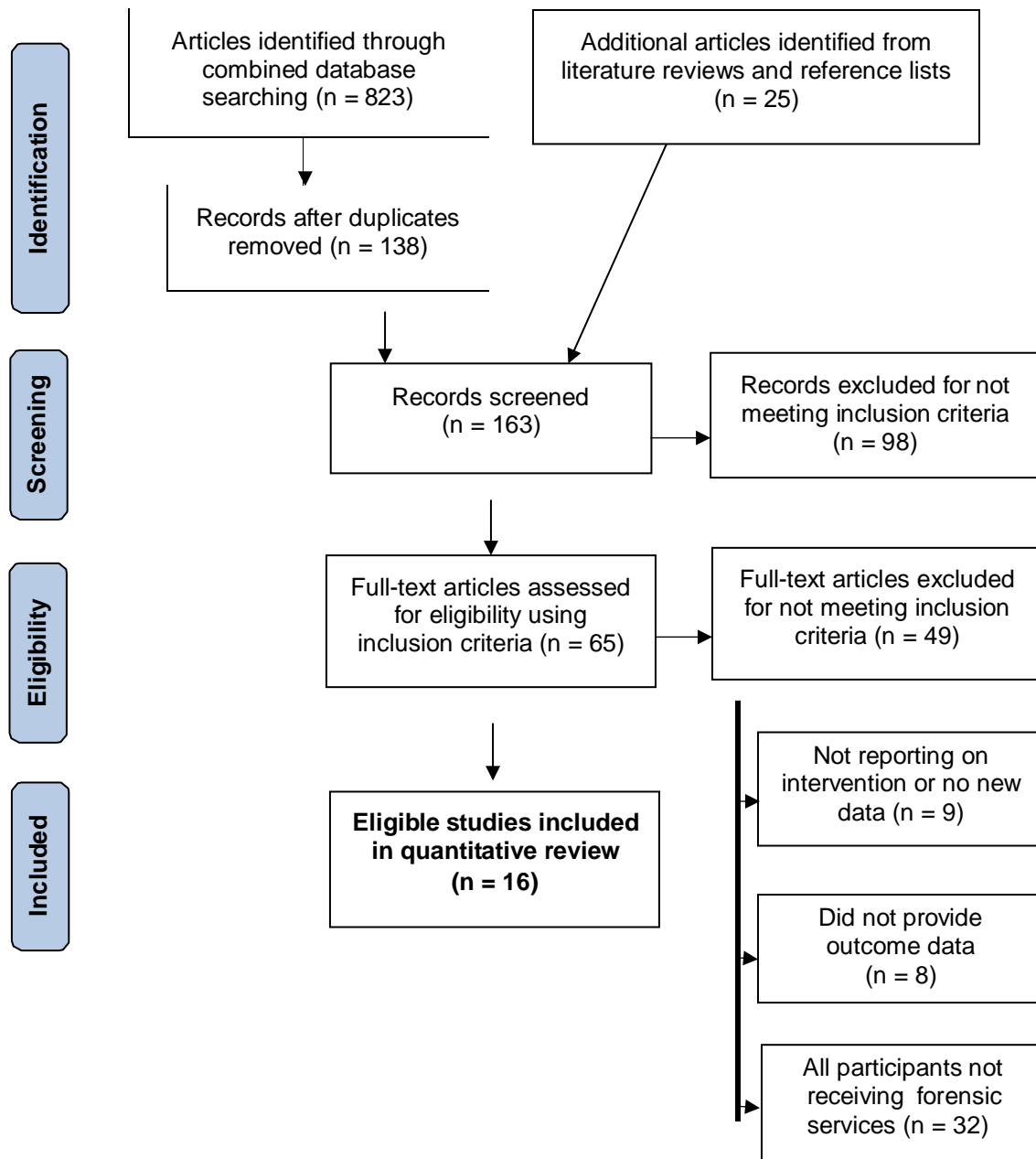
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**Tables and Figures**

**Figure A.1:** Systematic search process depicted using PRISMA flow diagram template



**Fig. A.1.** PRISMA flow diagram of systematic search process.

**Table A.1.** Free text search set terms

1 <sup>st</sup> search set	2 <sup>nd</sup> search set	3 <sup>rd</sup> search set
“learning disab*”,	“forensic”,	“intervention”,
“intellectual disab*”,	“secure”,	“therapy”,
“intellectual handicap”,	“offend*”	“management”,
“mental defic*”,		“treatment”
“mental handicap”,		
“mental retardation”		
“developmental disab*”		

**Table A.2.** Relevant characteristics and findings of included studies on anger and aggression interventions adapted for PFID

Authors, year, country	Design	Setting	N	Sample demographics	Intervention type and duration	Anger measure	Aggression measure	Outcomes	Follow up
1. Allen, Lindsay, MacLeod, & Smith (2001) UK	Case series	Outpatient ID forensic mental health service	5	All women Age range 18-44 (M = 26, SD = 10.4) WAIS FSIQ range 64-75 (M = 69.2, SD = 4.8) Race/ethnicity not reported All involved with CJS All committed violent offence	Group-based, CBT-framework: cognitive reappraisal of anger-provoking situations, cognitive reappraisal of personal arousal and arousal reduction techniques (relaxation). 9 months total duration/approx. 40 weekly sessions lasting 40 to 60 minutes	DPI* (SR)	Recidivism - charges or convictions for aggressive behaviour	Reductions in DPI scores at the end of treatment for all participants	Reductions maintained at 9 & 15 months No recidivism 2.5+ years
2. Brown, Brown, & Dibiasio (2013) USA	Longitudinal case series	Outpatient ID forensic mental health service	40	35 men, 5 women Age range 19-63 (M = 30.8, SD = 10.1) FSIQ± range 40-95 (M = 60.8, SD = 11.5; 82.5% IQ <70) Race/ ethnicity not reported Legal status not reported 88% history of aggression, 45% past arrests for violence	1 hour of individual DBT and 1 hour of DBT Skills System group skills training per week using Linehan’s manual Average participant received 82 months of treatment (M = 6.9 years, SD = 3.5)	None	3 categories of behavioural incident data: Red Flags (verbal outbursts), Dangerous Situations (threats of violence), and Lapses (actual violence)	Statistically significant reductions in all 3 categories of behaviour over 4 years	None
3. Burns, Bird, Leach, & Higgins (2003) UK	Case series	ID inpatient Medium Secure Unit	3	All men Age range 33–37 (M = 35.5, SD = 2.1) 2 Mild and 1 Borderline ID range (FSIQ± not reported) Race/ethnicity not reported All detained under civil and 2 also under criminal MHA Sections Index offences of arson and indecent assault	Group-based manualised CBT: anger psychoeducation, cognitive reappraisal and self-management skills 12 week total duration of 2 sessions per week lasting a total of 2 hours 30 minutes	NAS (SR) STAXI-2 (SR)	MOAS (completed by group facilitators)	Case 1 – mixed improvement Case 2 – mixed improvement Case 3 - increase in anger scores	None
4. Chilvers, Thomas, & Stanbury (2011) UK	Case series	ID inpatient Medium Secure Unit	15	All women Age range 18-47 (M = 30; ¶) 11 Mild and 4 Moderate ID (FSIQ± not reported) Race/ethnicity not reported 7 under civil and 8 under criminal MHA Sections Forensic/aggression history not reported	Open (optional attendance) mindfulness group 6 month total duration of 1-2 group sessions per week lasting 30 minute	None	Data on incidents leading to (a) staff observations, (b) physical intervention by staff, and (c) seclusion	Reductions in the use of (a) observations, (b) physical intervention, and (c) seclusion	None



Authors, year, country	Design	Setting	N	Sample demographics	Intervention type and duration	Anger measure	Aggression measure	Outcomes	Follow up
5. Langdon, Murphy, Clare, Palmer, & Rees (2013) UK	Case series	ID inpatient Medium Secure Unit	7	All men Age range 21-36 (M = 28.1, SD = 5.6) FSIQ± range 65-111 (M = 78.9, SD = 16.4) 3 Mild ID and 4 Asperger's Race/ethnicity not reported All detained under criminal MHA Sections All had previous or index convictions for violence	Manualised CBT 'EQUIP' group - psychoeducation, distortion challenging & strategies, including relaxation; social skills & social decision-making training. 12-week total duration, 4 sessions per week lasting 1 hour	AI-MRP (SR)	None (This study did employ the HIT questionnaire, which has a physical aggression subscale; however, this captures predilection towards aggression not actual aggressive behaviours).	No significant reduction in anger scores.	None
6. Lindsay, Allan, MacLeod, Smart, & Smith (2003) UK	Longitudinal case series	Outpatient ID forensic mental health service	6	All men Age range 18-42 (M = 28.3, SD = 10.7) WAIS-R FSIQ range 64-70 (M = 67.3, SD = 2.3) Race/ethnicity not reported All serving Probation sentences All had convictions for violence	Group-based, CBT framework: behavioural relaxation, stress inoculation, group discussions about anger responses, and roleplays 9 months total duration/approx. 40 weekly sessions lasting 40 to 60 minutes	DPI* (SR) Daily anger diary (SR) Anger-provoking roleplays	Recidivism - charges or convictions for aggressive behaviour	Reduction on DPI scores and diary reports of anger Reduction in aggressive responses	Reductions maintained at 9 & 15 months No recidivism 4+ years
7. Lindsay, Allan, Parry, MacLeod, Cottrell, Overend, & Smith (2004) UK	Controlled trial 1 EG, 1 CG	Outpatient ID mental health service receiving Court and community referrals for aggression	EG: 33 CG: 14	33 men (EG = 75%, CG = 57.15%) 14 women (EG = 25%, CG = 42.85%) EG age§ (M = 28.4; ¶) CG age§ (M = 23.9; ¶) WAIS-R / WAIS-III FSIQ§ (EG M = 65.4; ¶; CG M = 66.2; ¶) Race/ethnicity not reported Legal status not reported Aggression history not reported	EG: Group-based, CBT framework: behavioural relaxation, stress inoculation, group discussions about anger responses, and roleplays 9 months total duration/ approx. 40 weekly sessions lasting 40 to 60 minutes CG: 6-months, delayed routine care waiting-list	EG & CG: DPI (SR) Daily anger diary (SR) EG: Anger-provoking roleplays	None	Reductions in DPI scores and diary reports for EG, but not for CG Reductions in aggressive responsive for EG (not assessed in CG)	EG DPI reductions maintained at 3, 9 & 15 months EG diary followed up 3 & 9 months – reductions maintained
8. McWilliams, de Terte, Leathem, & Malcolm (2014) New Zealand	Case series	Outpatient forensic mental health & ID service providing secure care	5	3 men, 2 women Age range 17-42 (M = 29; ¶) Mild to moderate ID (FSIQ± not reported) 2 New Zealand Māori descent, 3 New Zealand European descent Most under IDCC&R Act (2003) Most had serious offending histories/ imprisonable index offence	Group based CBT: relaxation, behavioural chain analysis, wise mind thinking, arousal reduction & distraction techniques, using Stepping Stones manual 22 weeks total duration of weekly, 2 hour long sessions	None	Modified PACS (SR) Modified PACS (CV) Incident data	Improvements in SR PACS scores No improvement of CV PACS scores Moderate-large group reductions in incidents Individual data showed increases and decreases in verbal & physical incidents	Not all gains maintained at 3 month follow up

Authors, year, country	Design	Setting	N	Sample demographics	Intervention type and duration	Anger measure	Aggression measure	Outcomes	Follow up
9a. Novaco & Taylor (2015) UK	Case series	Inpatient forensic mental health hospital with ID Medium Secure, Low Secure, and rehabilitation Units	50	44 men, 6 women Age§ (M = 30; SD = 9.6) WAIS-R / WAIS-III FSIQ§ (M = 68.6; SD = 6.7) All Caucasian All detained under civil or criminal MHA Sections 84% previous convictions for or history of violence	Individual, manualised CBT: stress inoculation paradigm: cognitive re-structuring, arousal reduction and behavioural skills training 6 session preparatory phase then 12 week intervention of 18 once or twice weekly sessions	NAS (MSI) STAXI (MSI) PI (MSI) WARS	Physical assault data	Significant reductions in assaults Reductions on STAXI AO, NAS Total, NAS AR, NAS Behavioural subscales & WARS significantly related to the change in assaults STAXI Trait Anger & PI approached significance STAXI Anger Control not significant	Reductions maintained at 12 months
9b. Taylor, Novaco, & Brown (2016) UK	See 9a	See 9a	See 9a	See 9a	See 9a	None	Incident data on Damage to property; Verbal abuse; Verbal threat to assault; Physical assault	Significant reductions in all incident types	Reductions in frequency of incidents maintained during 7–12 month follow-up
10. Singh, Lancioni, Winton, Singh, Adkins, & Singh (2008) USA	Case series	ID forensic inpatient mental health facility	6	All men Age range 23-34 (M = 28.5; SD = 5.3) All ID but severity reported only for 1 = Mild ID (FSIQ± not reported) 3 Caucasian, 1 African American 1 White Hispanic, 1 non-White Hispanic Legal status not reported All had violent index offences & high numbers of assaults on staff	Individual, Meditation on the Soles of the Feet mindfulness training 27 months total duration of twice-daily 30 minute practice sessions	None	Incident data (SR & staff report) Use of restraint by medication data Use of physical restraint data Staff or peer injury data	Physical aggression incidents eliminated in final six months Verbal aggression decreased substantially No medication or physical restraint required throughout No staff or peer injuries throughout	None
11. Taylor, Novaco, Gillmer, Robertson, & Thorne (2005) UK	RCT 2 sequential EG cohorts, 1 CG EG in this study are EG & CG from 12. Taylor (2002)	Inpatient forensic mental health hospital with ID Medium Secure, Low Secure, and rehabilitation Units	EG: 16 CG: 20	All men EG age§ (M = 29.4; SD = 7.6) CG age§ (M = 29.9; SD = 8.6) EG WAIS-R FSIQ§ (M = 67.1; SD = 4.5) CG WAIS-R FSIQ§ (M = 70.7; SD = 4.0) Race/ethnicity not reported EG: 5 under civil and 11 under criminal MHA Sections CG: 4 under civil and 16 under criminal MHA Sections All had past or current anger control problems or convictions	EG: Individual, manualised CBT: stress inoculation, relaxation training, roleplay, cognitive restructuring and psychoeducation 6 session preparatory phase then 12 week intervention of 18 once or twice weekly sessions CG: routine care delayed waiting-list	NAS (SR) STAXI AX (SR) PI (SR) WARS	None	Greater reductions made on all measures by EG; however, only statistically significant reductions on NAS Total & Arousal subscale and 1 index of the PI	Further reductions on WARS at 4 month follow up

Authors, year, country	Design	Setting	N	Sample demographics	Intervention type and duration	Anger measure	Aggression measure	Outcomes	Follow up
12. Taylor, Novaco, Gillmer, & Thorne (2002) UK	RCT 1 EG, 1 CG	Inpatient forensic metal health hospital with ID Medium Secure, Low Secure, and rehabilitation Units	EG: 9 CG: 10	All men EG age§ (M = 29; SD = 5.5) CG age§ (M = 29.3; SD = 8.8) EG WAIS-R FSIQ§ (M = 69.3; SD = 3.7) CG WAIS-R FSIQ§ (M = 66.7; SD = 5.2) Race/ethnicity not reported EG: 2 under civil and 7 under criminal MHA Sections CG: 3 under civil and 7 under criminal MHA Sections All had past or current anger control problems or convictions	EG: Individual, manualised CBT: relaxation training, roleplay, cognitive restructuring and psychoeducation 6 session preparatory phase then 12 week intervention of 18 one-hour long, twice weekly sessions CG: routine care delayed waiting-list	EG & CG: PI (SR) WARS	None	Reduction in PI scores for EG, increase in PI score for CG Reductions in WARS ratings for EG, increase for CG	Improvements maintained to one month follow-up
13. Taylor, Novaco, Guinan, & Street (2004) UK	Controlled trial 1 EG, 1 CG	Inpatient forensic metal health hospital with ID Medium Secure, Low Secure, and rehabilitation Units	EG: 9 CG: 8	All men EG age§ (M = 29; SD = 5.5) CG age§ (M = 29.4; SD = 9.6) EG WAIS-R FSIQ§ (M = 69.3; SD = 4.2) CG WAIS-R FSIQ§ (M = 66.4; SD = 6.2) Race/ethnicity not reported EG: 2 under civil and 7 under criminal MHA Sections CG: 2 under civil and 6 under criminal MHA Sections All had past or current anger control problems or convictions	Individual, manualised CBT: relaxation training, roleplay, cognitive restructuring and psychoeducation 6 session preparatory phase then 12 week intervention of 18 one-hour long, twice weekly sessions CG: routine care delayed waiting-list	IPT	None	IPT indices significantly lower in EG compared to CG	None
14. Taylor, Novaco, & Johnson (2009) UK	Case series	Inpatient forensic metal health hospital with ID Medium Secure, Low Secure, and rehabilitation Units	83	67 men, 16 women Age range 19-62 (M = 32.4; SD = 10.9) WAIS-III FSIQ (M = 68.4; SD = 5.7) Race/ethnicity not reported All detained under MHA & past or current anger/aggression issues	Individual, manualised CBT: stress inoculation, relaxation training, roleplay, cognitive restructuring and psychoeducation 6 session preparatory phase then 12 week intervention of 18 twice weekly sessions	NAS (SR) STAXI TA & AX (SR) PI (SR) WARS	None	Significant improvements on all measures	Significant improvements maintained at 12 month follow up
15. Travis & Sturmeay (2013) USA	Case series	Inpatient locked ID forensic facility	3	All men Age range 32-46 (M = 39; SD = 7) FSIQ± range 58-63 (M = 60.6; SD = 2.5) Race/ethnicity not reported Legal status not reported All had histories of criminal charges and current aggression problems	Individual behavioural skills training focussing on target and replacement responses and utilising staff modelling, a token economy system and positive reinforcement. 1 hour observations, 3 per day every other day over 3 weeks	None	Observation data	Reduction in aggressive responses and increase in replacement responses	None

*Note.* ± = IQ assessment tool not stated; ¶ = *SD* not reported and insufficient information provided to calculate; § = range not reported; AI-MRP = Anger Inventory for Mentally Retarded Persons (Benson, 1992); AX = Anger Expression subscale; AO = Anger Out subscale; AR = Anger Regulation subscale; CBT = Cognitive Behavioural Therapy; CG = control group; CJS = Criminal Justice System; CV = carer version; DBT = Dialectical Behaviour Therapy; DPI = Dundee Provocation Inventory (Alder & Lindsay, 2007); EG = experimental group; EQUIP = Equipping Youth to Help One Another programme; HIT = How I Think questionnaire (Barriga, Gibbs, Potter, & Liao, 2001); IDCC&R = Intellectual Disability Compulsory Care and Rehabilitation Act (2003); IPT = Imaginal Provocation Test (Taylor, Novaco, Guinan, & Street, 2004); IQ = Intellectual Quotient; MHA = England & Wales Mental Health Act (1983; 2007); MOAS = Modified Overt Aggression Scale (Kay, Wolkenfield, & Murrill, 1988); MSI = Modified to structured interview instead of self-report questionnaire; NAS = Novaco Anger Scale (Novaco, 1994); PACS = Profile of Anger Coping Skills (Willner, Brace, & Phillips, 2005); PI = Provocation Inventory (Novaco, 2003); SR = self-reported; STAXI = State-Trait Anger Expression Inventory (Spielberger, 1996, 1999); TA = Trait Anger subscale; WARS = Ward Anger Rating Scale (Novaco, 1994)

\* The studies refer to their use of an “anger inventory” with no citation; clarification sought from one of the authors confirmed that this inventory was the DPI.

**Table A.3:** Quality appraisal scores for included studies using EPHPP tool

Name of study	Selection bias	Study design	Confounders	Blinding	Data collection	Withdrawals and dropouts	Global quality rating
1. Allen et al. (2001)	Weak	Moderate	Weak	Unclear	Moderate	Moderate	<b>Weak</b>
2. Brown et al.(2013)	Moderate	Moderate	Weak	Unclear	Weak	Moderate	<b>Weak</b>
3. Burns et al. (2003)	Moderate	Moderate	Weak	Unclear	Moderate	Moderate	<b>Moderate</b>
4. Chilvers et al. (2011)	Moderate	Moderate	Weak	Unclear	Weak	Weak	<b>Weak</b>
5. Langdon et al. (2011)	Moderate	Moderate	Weak	Unclear	Weak	Moderate	<b>Weak</b>
6. Lindsay et al. (2003)	Moderate	Moderate	Weak	Unclear	Strong	Weak	<b>Weak</b>
7. Lindsay et al. (2004)	Weak	Moderate	Weak	Moderate	Strong	Weak	<b>Weak</b>
8. McWilliams et al. (2014)	Moderate	Moderate	Weak	Unclear	Moderate	Moderate	<b>Moderate</b>
9a. Novaco & Taylor (2015)	Moderate	Moderate	Moderate	Unclear	Strong	Strong	<b>Moderate</b>
9b. Taylor et al. (2016)	Moderate	Moderate	Moderate	Unclear	Moderate	Strong	<b>Moderate</b>
10. Singh et al. (2008)	Moderate	Moderate	Weak	Unclear	Moderate	Moderate	<b>Moderate</b>
11. Taylor et al. (2005)	Moderate	Moderate	Strong	Weak	Strong	Strong	<b>Moderate</b>
12. Taylor et al. (2002)	Moderate	Moderate	Strong	Weak	Strong	Strong	<b>Moderate</b>
13. Taylor et al. (2004)	Moderate	Moderate	Strong	Weak	Strong	Strong	<b>Moderate</b>
14. Taylor et al. (2009)	Moderate	Moderate	Weak	Unclear	Strong	Weak	<b>Moderate</b>
15. Travis & Sturmey (2013)	Weak	Moderate	Moderate	Unclear	Moderate	Moderate	<b>Moderate</b>