

Measures of readiness for cognitive behavioural therapy in people with intellectual disability: A systematic review

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1. Abstract

Cognitive behavioural therapy (CBT) is a promising treatment for mental health problems in people with intellectual disabilities but some may not be suited or ready. This review critically evaluates the quality and utility of measures of CBT readiness in people with intellectual disabilities. Twelve studies of six measures based on three aspects of CBT readiness were identified through systematic review. Across measures, measurement quality was largely poor or un-assessed. Only one study evaluated measurement change over the course of CBT. Not all participants with intellectual disabilities could 'pass' readiness measures and performance may be affected by levels of language and cognitive functioning. There was some evidence that CBT readiness is trainable with brief interventions. Before using readiness measures in a clinical context, further work is needed to extend initial evidence on the recognising cognitive mediation as a CBT readiness ability. Given the lack of consensus as to the definition of CBT readiness and the heterogeneity of CBT interventions, future research could also focus on developing readiness measures using a bottom up approach, developing measures within the context of CBT interventions themselves, before further refining and establishing their psychometric properties.

2. What this paper adds?

This paper is the first to systematically review measures of skills thought necessary to be ready for cognitive behavioural therapy in intellectual disabilities. The findings suggest that while readiness skills may be trainable with brief interventions, the available measures of these skills have not been fully evaluated for quality. Levels of functioning on these measures have yet to be established relative to those without intellectual disabilities and critically, there is very little evidence as to whether these skills are important in cognitive behavioural therapy process and outcome. We suggest that future research could focus on those constructs where there is preliminary evidence for utility such as recognising cognitive mediation and also on developing the concept of readiness perhaps by developing measures within the context of specific CBT interventions.

Until this is done, clinicians should exercise caution in using these measures to assess readiness for cognitive behavioural therapy in people with intellectual disabilities.

3. Introduction

Mental health problems are common in people with intellectual disabilities (Cooper, Smiley, Morrison, Williamson, & Allan, 2007) and cognitive behavioural therapy (CBT) is a promising treatment (Vereenoghe & Langdon, 2013). People with intellectual disabilities are a heterogeneous group and CBT is unlikely to be of benefit to all. For those who could use CBT, many may not be 'ready' to do so in an unadapted form (Dagnan, Chadwick, & Proudlove, 2000). These individuals may need skills training using techniques such as errorless learning to engage in CBT or the therapy may need to be adapted perhaps with greater use of scaffolding (Vygotsky, 1978) to take account of their difficulties (Willner, 2006). In light of this, researchers have sought to measure 'readiness' to help make treatment decisions about how to best adapt CBT or support individuals in accessing it. (Dagnan, Chadwick, Stenfert Kroese, Dagnan, & Loumidis, 1997)

Readiness for CBT has motivational (e.g. expectations of therapy success) and skill components (Willner, 2006). The skill components include those that relate to any talking therapy (e.g. skills in holding a conversation) and aspects specific to CBT (Willner, 2006).

Furthermore, readiness may relate to either behavioural or cognitive elements of CBT (where cognitive refers to ability to change and reflect on thoughts rather than neurocognitive ability and behavioural refers to ability to make behavioural change) (Roth & Pilling, 2008). Readiness skills related to the cognitive elements of CBT are

particularly important as these elements are the most cognitively complex elements of CBT and most affected by neurocognitive impairment (Stanley et al., 2013)

Furthermore, engagement with cognitive elements is an important aspect of CBT efficacy in people with intellectual disabilities (McGillivray & Kershaw, 2015). The focus of this review is thus on the cognitive elements of CBT.

CBT is not a unitary therapy, but an umbrella term encompassing interventions which have commonality in drawing on behavioural and cognitive models, but differ as to the precise theoretical framework underpinning them (Roth & Pilling, 2008) and thus have potentially different associated readiness skills (Doherr, Reynolds, Wetherly, & Evans, 2005). In the intellectual disabilities literature, measures of readiness (Dagnan et al., 1997) have focussed on an Antecedent Belief Consequence (ABC) model (Ellis, 1991). This model was originally outlined within Rational Emotive Behaviour Therapy (REBT) rather than CBT. Although REBT differs in application from traditional CBT, particularly in its use of disputation as a therapeutic technique (Ellis, 1980), its theoretical underpinnings have significant overlap with CBT (Ellis, 1980). In particular the ABC model, and its claim that beliefs mediate the relationship between antecedent events and their emotional or behavioural consequences can be seen as a central construct in CBT and REBT (Hyland & Boduszek, 2012). Consequently, it is the ABC model that has informed three skills (at a minimum) being identified as critical to being ready for CBT (Oathamshaw & Haddock, 2006).

These are:

1. Discriminating between emotions, thoughts and behaviours,

2. Making links between emotions and events; and
3. Understanding the mediating role of cognitions between an antecedent event and its consequences.

Consequently, while there may be other cognitive skills necessary for readiness and motivational components will be essential in accessing CBT, the current review is a critical evaluation of measures of these three skills and findings related to them

As with any tools, useful measures of CBT readiness must have strong psychometric properties (Mokkink et al., 2010). Additionally, for any measure purporting to assess CBT readiness, measurement change should mediate CBT outcome (Hundt, Mignogna, Underhill, & Cully, 2013). It is also important to understand the performance of people with intellectual disabilities on these measures, as CBT should be adapted based on readiness skills that are affected in people with intellectual disabilities rather than those that are unaffected (Oathamshaw & Haddock, 2006). Finally, the trainability of CBT readiness skills is important as this determines adaptation; whether we remove elements from the therapy or train people to increase their skill level (Vereenoghe, Reynolds, Gega, & Langdon, 2015). Consequently, the questions addressed by this review are:

1. What are the measurement properties of tasks assessing the above CBT readiness skills?
2. What is the relationship between performance on measures of these skills and CBT outcome in people with intellectual disabilities?

3. What is the level of performance of people with intellectual disabilities on these measures?
4. What is the evidence for trainability of readiness skills in people with intellectual disabilities?

4. Methods

4.1 Search Strategy

Electronic searches of the following databases: PsycINFO, MEDLINE, SCOPUS were conducted. Search terms were identified based on previous similar reviews in other populations (Muse & McManus, 2013) and recent reviews of the intellectual disability literature (Davies & Oliver, 2013). Search terms varied slightly according to databases due to differences in the keyword systems used, but were variants of developmental/learning/intellectual disabilities/mental handicap/retardation; Ability/readiness/suitability/preparedness/skills; CBT/Cognitive therapy/Cognitive behavioural therapy, combined using the Boolean terms 'OR' and 'AND'. An example of the full Medline search strategy is given in a supplementary file. Of the 311 papers identified in the initial search, duplicate or irrelevant articles were deleted, leaving 27 papers. After running citation searches in Web of Science and inspecting reference lists of remaining articles, four further papers were added. The full text of all potentially relevant (N=31) articles was reviewed against inclusion and exclusion criteria. See Figure 1 for details.

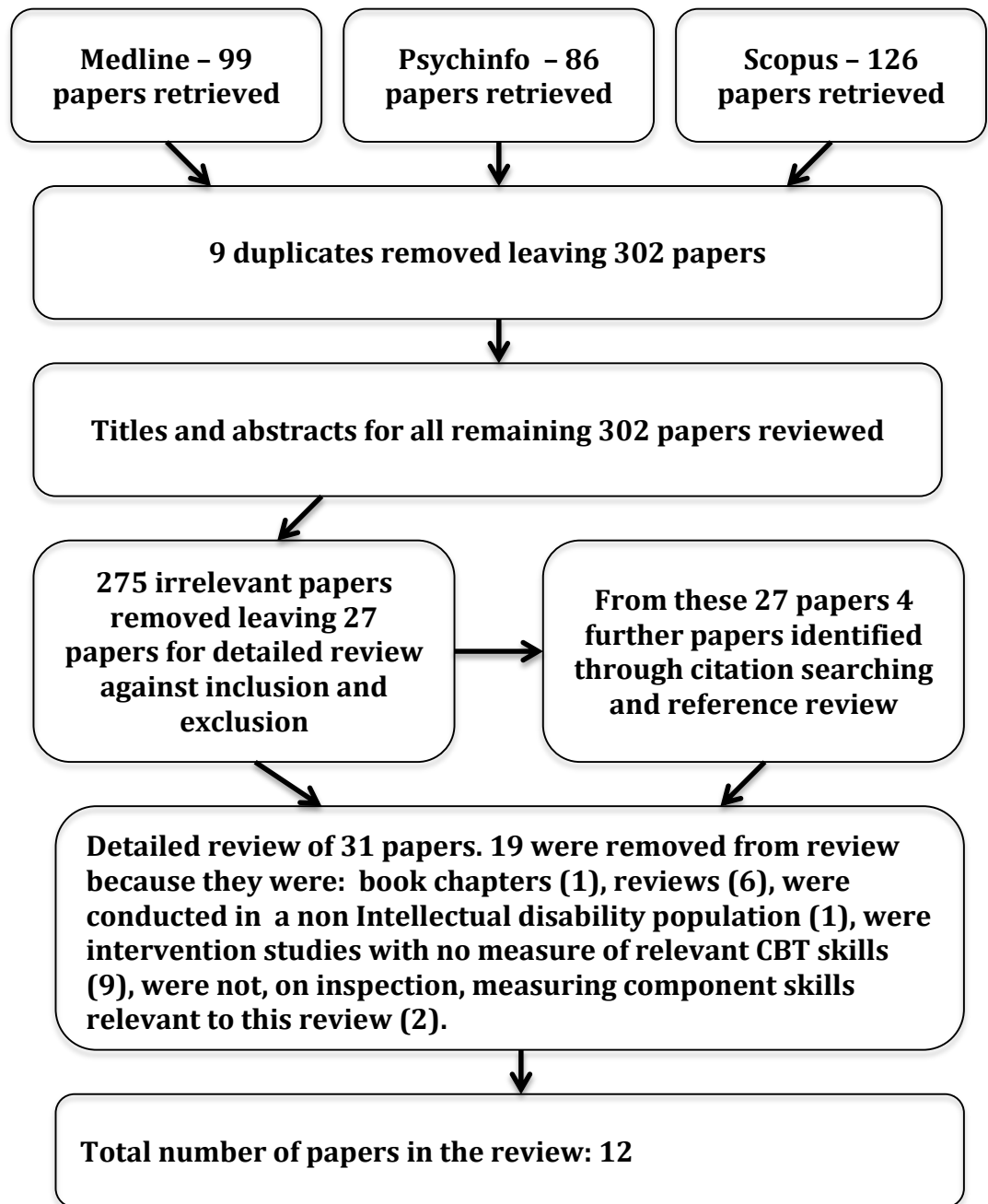


Figure 1 – Flow diagram of search strategy procedure

4.2 *Inclusion and exclusion criteria*

Studies were included if they were empirical studies with a population identified by authors as having an intellectual disability using quantitative measures of either discrimination between thoughts feelings and behaviours; linkage of emotions to events or the recognition of cognitive mediation. Only studies in English in peer-reviewed journals were considered.

4.3 *Quality assessment*

The first aim was to assess measurement quality. This is a multi faceted concept (Mokkink et al., 2010). To ensure consistent coverage of measurement properties, all measures were evaluated with reference to domains identified in an international consensus framework (Mokkink et al., 2010) :

1. Reliability, subdivided into internal consistency, measurement error and consistency across raters/time.
2. Validity, subdivided into content (including face) and construct (including structural validity/hypothesis testing) and cross-cultural validity.
3. Responsiveness (no subdivision).

This review also evaluated evidence as to the relationship of skill level to CBT outcome, level of skill performance in an intellectual disability population, and the trainability of these skills. Given the heterogeneity of designs used to answer these questions, quality was assessed by the quantitative scale of the QualSyst (Kmet et al., 2004), a 14 item tool specifically designed for assessing quality of primary

quantitative research articles of varying designs. QualSyst items are scored as having not been met (0), partially met (1), totally met (2) or not relevant to the article being rated (N/A). Inter-rater reliability for items varied from 40 percent to 100 percent (Kmet et al., 2004). Figure 2 gives details of all areas assessed by items. An overall quality score between 0 and 1 was generated for each article by summing the article score and dividing it by the total possible score (i.e. $28 - (\text{number of 'n/a'} \times 2)$). As recommended by National Institute for Clinical Excellence (NICE, 2014), quality assessment was supplemented by critical appraisal and an overall rating of high (++), medium (+) or low (-) quality was assigned based on QualSyst rating and critical appraisal of how likely identified issues were to alter a study's main conclusion.

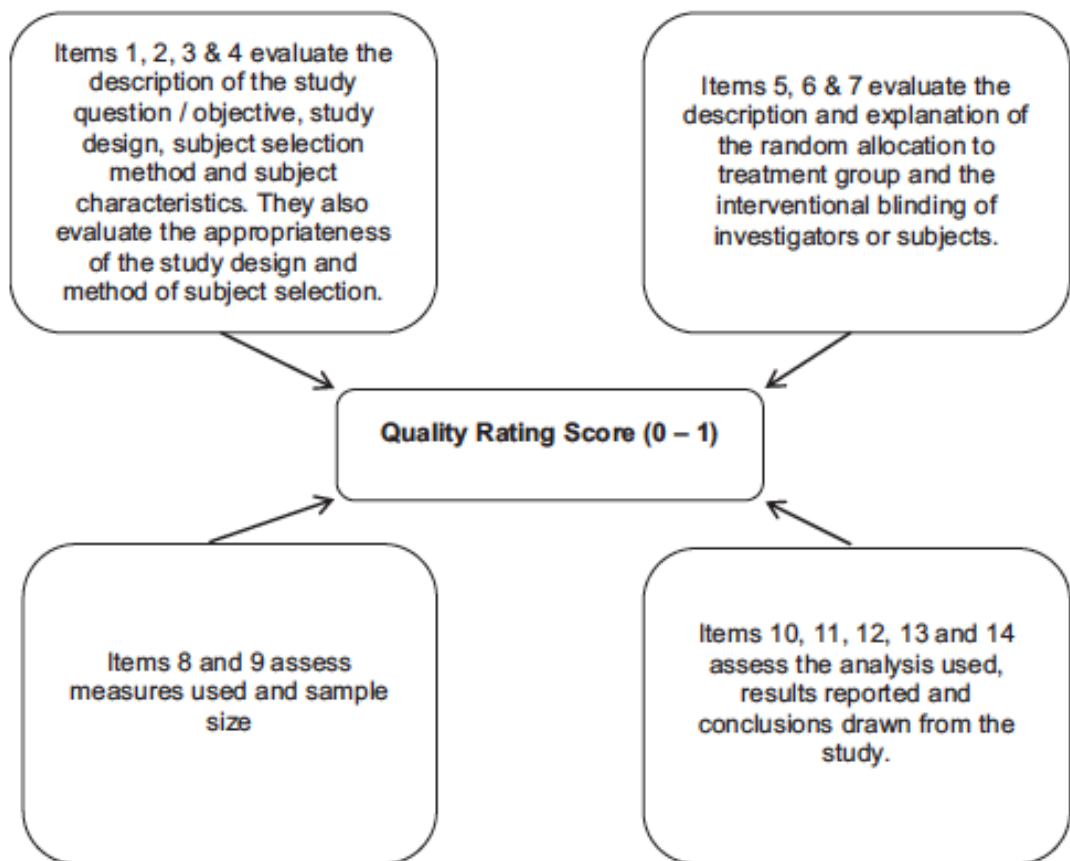


Figure 2 - Overview of the areas captured by QualSyst quantitative studies

items

5. Results

Search results with reasons for exclusion of studies are given in Figure 1.

Twelve articles reporting on results in relation to six measures were included in the review. Table 1 gives a description of all measures used. Table 2 provides an overview of all studies included and Table 3, their quality assessment scores. Most

studies (eight) were judged to be of at least medium quality, with studies looking at trainability being of higher quality. Discussion of quality is integrated into the results presented below.

- Insert Table 1 about here -

5.1 Study setting and sample characteristics

All studies were carried out in the UK. Most were of cross sectional design (N= 7). Four employed randomised experimental designs and one (Hartley et al., 2015) used a non-randomised pre-post design. The use of convenience samples of volunteers in 11 of the reviewed studies, and the lack of detail as to whether participants differed from non-participants limits generalisability to the wider intellectual disability population.

Sample sizes ranged from 19 to 59. The total number of participants with intellectual disability across studies was 462. Most studies only included participants over 18 years old (although one study had participants as young as 14 (Reed & Clements, 1989)). The percentage of female participants varied from 35.1 (Dagnan et al., 2000) to 79.3 percent (Vereenoghe, Gega, Reynolds, & Langdon, 2016). Where measured, mean full scale IQ varied from 50 (Vereenoghe et al., 2016) to 60.1 (Hebblethwaite, Jahoda, & Dagnan, 2011). Most studies explicitly excluded non verbal participants and participants' mean receptive language score on the British Picture Vocabulary Scale (BPVS) (Dunn, Dunn, Whetton, & Pintille, 1982) ranged from 12.87 (Joyce, Globe, & Moody, 2006) to 88 (Oathamshaw & Haddock, 2006). Only three studies explicitly state that they excluded those with current (Vereenoghe

et al., 2016; Vereenooghe et al., 2015) or prior CBT exposure (Sams, Collins, & Reynolds, 2006). This is important as CBT exposure may enhance performance, biasing results. Five studies (Dagnan et al., 2000; Dagnan, Mellor, & Jefferson, 2009; Joyce et al., 2006; McEvoy, Reid, & Guerin, 2002; Reed & Clements, 1989) did not check the intellectual disability status of their participants. This is important, as where cognitive functioning was checked, some participants were not in the intellectual disability range and excluded (Hebblethwaite et al., 2011). Finally, sensory problems, which might affect tasks, were not routinely excluded.

- Insert Tables 2 and 3 about here -

5.2 Measurement quality of tasks used to assess readiness skills

Measurement quality assessment was very limited. In terms of reliability only inter-rater reliability was assessed. As for validity, limited aspects of face, content and construct validity were assessed for some measures. Neither structural (factor analysis), nor cross-cultural validity, nor responsiveness were assessed for any measure.

There was a lack of clarity as to whether readiness skills are discontinuous or continuously distributed constructs, with some measures adopting a pass/fail criterion (Dagnan et al., 2000; Oathamshaw & Haddock, 2006) and others a mean score (Dagnan et al., 1997; Quakley, Reynolds, & Coker, 2004).

Two measures were used to assess thought-feeling-behaviour discrimination; the Behaviour Thought Feeling Questionnaire (BTFQ) (Oathamshaw & Haddock, 2006) asks respondents to identify if a prompt word or sentence is a thought, feeling

or behaviour. It was used in three studies (Hartley et al., 2015; Oathamshaw & Haddock, 2006; Vereenoghe et al., 2016). The Thought Feeling Behaviour task (TFB) (Quakley et al., 2004) asks participants to identify the thought, behaviour and feeling elements of a set of standardised sentences about a person's reaction to scenarios. It was used in two studies (Bruce, Collins, Langdon, Powlitch, & Reynolds, 2010; Sams et al., 2006). Both measures have been scored as a single total, reflecting ability to recognise thoughts/feelings/behaviours as a whole (Bruce et al., 2010; Hartley et al., 2015; Vereenoghe et al., 2016) or as three separate subscales reflecting ability to recognise thoughts, feelings or behaviours separately (Oathamshaw & Haddock, 2006; Sams et al., 2006; Vereenoghe et al., 2016). A clear theoretical rationale was not given for either scoring method.

Given forced choice scoring, inter-rater reliability for both measures is likely to be high, particularly for computerised versions as there is no space for documentation or interpretation errors. Inter-rater reliability of the computerised versions may be further enhanced through the use of standardised recorded instructions and associated reduction in response bias and suggestive questioning. The content validity of the BTFQ was enhanced through involving people with intellectual disabilities in developing items and basing the BTFQ on a measure routinely used in CBT (Greenberger & Padesky, 1995). Forced choice responses affect the face validity of both the BTFQ and TFB as CBT requires free generation of response. The errorless performance of 20 CBT experts on the BTFQ provides some evidence of expert criterion validity (Oathamshaw & Haddock, 2006). There is mixed evidence of concurrent validity of the BTFQ through correlations with some subscales of Dagnan

et al. (2000)'s recognition of cognitive mediation measure in a high quality study (Vereenooghe et al., 2016). The TFB has not been assessed for reliability or validity with an intellectual disability population.

One measure, the Reed Clements Task has been used to evaluate event-emotion-linkage (Reed & Clements, 1989). Participants are asked if they would feel happy or sad in a given scenario and it has been used in six studies (Dagnan et al., 2000; Dagnan et al., 2009; Joyce et al., 2006; McEvoy et al., 2002; Reed & Clements, 1989; Vereenooghe et al., 2015). The forced choice response between two emotions enhances inter-rater reliability but reduces face validity. There is some evidence of concurrent validity through correlations with measures of recognition of cognitive mediation described below.

Three measures have been used to examine recognition of cognitive mediation (Dagnan et al., 2000; Dagnan et al., 1997; Doherr et al., 2005):

The first measure (Dagnan et al., 1997) requires the participant to generate their thoughts given an emotion and a prompt event. Responses are subsequently coded and thoughts deemed congruent with the valence of the emotion scored as correct. This measure has been used in two studies of mixed quality with good evidence for inter-rater reliability of coding (Dagnan et al., 2009; Hebblethwaite et al., 2011). Free response generation and 'CBT like' prompt questions give good face validity. Evidence for concurrent validity is mixed; the measure correlates with the Reed Clements Task (Reed & Clements, 1989) as expected in a study assessed as of low quality (Dagnan et al., 2009) but not with an analogue of a CBT-like conversation in a high quality study (Hebblethwaite et al., 2011).

The second measure (Dagnan et al., 2000) has two sections. The first requires participants to select which thought they would think from two choices given an event and an emotion. The second section requires the selection of the emotion that they would feel from two choices (happy/sad) on presentation of an event and a thought. For both sections, the ‘correct’ answer can be either congruent or incongruent with the valence of the prompt event. Correct incongruent answers are interpreted as reflecting strong evidence of cognitive mediation as they require ignoring event valence and making a choice based on the valence of the presented thought or emotion. Six subscales are generated and include overall scores for thought and emotion response modes and scores for subscales from each response mode based on response congruence or incongruence. Subscale validity has not been assessed through factor analysis.

This measure has been used in six studies in pencil and paper (Dagnan et al., 2000; Hartley et al., 2015; Joyce et al., 2006; Oathamshaw & Haddock, 2006) and computerised (Vereenoghe et al., 2016; Vereenoghe et al., 2015) formats. The forced choice response format decreases face validity, but inter-rater reliability is likely to be high, particularly for computer-based versions for reasons described above. There is evidence of concurrent validity through correlations with some aspects of the BTFQ (Vereenoghe et al., 2016).

The thoughts-to-feeling task (Doherr et al. 2005) has been used in one study (Bruce et al. 2010), as the outcome measure in a randomised experiment. It has good face validity, but no other aspects of measurement quality have been assessed in this population

5.3 Relationship of these skills to the process of CBT

Whether scores on measures change in the process of CBT has only been examined in one study assessed as of low quality (Hartley et al., 2015). Recognition of cognitive mediation (Dagnan et al., 2000), but not the BTFQ was found to change over the course of a CBT group intervention for people with intellectual disabilities, which also reduced depressive symptomatology. Critically, his study did not examine the relationship of readiness skill level to CBT outcome.

5.4 Performance on readiness skills measures

The most common goal of studies was to establish whether those with intellectual disabilities can ‘do’ aspects of CBT readiness. Seven studies provided information as to ‘pass rates’ in people with intellectual disabilities in terms of pre-defined cut-off scores (see Table 1 for scores) (Dagnan et al., 2000; Joyce et al., 2006; McEvoy et al., 2002; Oathamshaw & Haddock, 2006; Reed & Clements, 1989; Vereenoghe et al., 2016; Vereenoghe et al., 2015), Six studies (Bruce et al., 2010; Dagnan et al., 2009; Hartley et al., 2015; Hebblethwaite et al., 2011; Vereenoghe et al., 2016; Vereenoghe et al., 2015) provided mean scores.

One study (Hebblethwaite 2011) examined performance relative to a non intellectual-disability control group. Consequently, it is unclear in most cases whether skill level is low relative to a general population. No study controlled for cognitive demands of tasks through use of a control task so it is unclear how much ‘failure’ is

specific to the skills being measured and how much is a function of general task complexity.

Oathamshaw and Haddock (2006) hypothesised that event-emotion linkage is easier than thought-feeling-behaviour discrimination, which in turn is easier than recognition of cognitive mediation. This is supported here in terms of overall ‘pass’ rates and mean scores on measures.

Pass rates for thought-feeling-behaviour discrimination varied across studies. When the ability to identify thoughts, feelings or behaviours was examined separately (Oathamshaw & Haddock, 2006; Sams et al., 2006; Vereenoghe et al., 2016) each study showed different overall pass rates and different patterns of results emerged in relation to whether thoughts, behaviours or feelings were easier to identify.

Studies differed in population characteristics and mode of administration (computer vs. pencil and paper) and exact measure used, but given that two groups of people with intellectual disabilities matched for IQ reported highly discrepant pass rates for the total score on the BTFQ (71 percent vs. 48 percent) (Vereenoghe et al., 2016) measurement reliability or some unidentified factor may be influencing performance.

There is mixed evidence as to the relationship between thought-feeling-behaviour discrimination language or cognitive difficulties. In two studies assessed as of medium and high quality, higher Verbal IQ (Sams et al., 2006) and total IQ (Sams et al., 2006; Vereenoghe et al., 2016) were related to higher total, feelings and behaviour scores. In two medium quality studies, higher receptive language was related to higher behaviour and feelings scores on the BTFQ (Oathamshaw &

Haddock, 2006) and with higher behaviour and total scores on the TFB measure (Sams et al., 2006). Thoughts subscales did not correlate with either IQ or language in either study and provision of visual cues did not enhance performance (Sams et al., 2006)

Pass rates for event-emotion linkage were examined in six studies (Dagnan et al., 2000; Joyce et al., 2006; McEvoy et al., 2002; Oathamshaw & Haddock, 2006; Reed & Clements, 1989; Vereenooghe et al., 2015). They varied between 41 percent (McEvoy et al., 2002) and 75 percent (Dagnan et al., 2000; Reed & Clements, 1989). One study used random sampling (Joyce et al., 2006). Consequently, the 50 percent rate found in their study is perhaps most representative.

Pass rates vary with the mean receptive language ability across and within studies, with poor language skills associated with fewer passes. (Dagnan et al., 2000; Dagnan et al., 2009; Joyce et al., 2006; McEvoy et al., 2002; Oathamshaw & Haddock, 2006; Reed & Clements, 1989). To date, no study has examined the relationship of IQ to this measure, an omission, given that IQ may mediate the relationship with language.

Pass rates for the Dagnan et al. (2000) recognition of cognitive mediation task were examined in five studies (Dagnan et al., 2000; Joyce et al., 2006; Oathamshaw & Haddock, 2006; Vereenooghe et al., 2016; Vereenooghe et al., 2015). As predicted, pass rates were lower for incongruent (2.5–12.5 percent) than congruent (14-37.5 percent) scales. Pass rates did not systematically differ according to whether the response was a thought or an emotion. Task demands appeared to influence performance on this measure with overall pass rates much higher for a computerised

version of the task (45- 59 percent) (Vereenooghe et al., 2015) compared to a non-computerised version (10-25% percent) (Dagnan et al., 2000; Joyce et al., 2006; Oathamshaw & Haddock, 2006). This may be due to the greater use of pictorial cues or greater engagement with computerised versions (Vereenooghe et al., 2015).

When thought feeling behaviour linkage was conceptualised as a continuous construct using Dagnan et al. (1997)'s measure, all (Dagnan et al., 2009) or most participants (Hebblethwaite et al., 2011) gave some correct responses, indicating at least some level of better than chance ability given the open response format. A study assessed as of high quality found that performance on the Dagnan et al. (1997) measure was lower in people with than without intellectual disabilities who were matched for age and socioeconomic status (Hebblethwaite et al., 2011).

There is some evidence for association of recognition of cognitive mediation with language; BPVS scores differ between task passers and failers on some subtests of the Dagnan et al. (2000) task in three medium quality studies (Dagnan et al., 2000; Joyce et al., 2006; Oathamshaw & Haddock, 2006). They are also correlated with correct responses on the Dagnan et al. (1997) measure (Dagnan et al., 2009). There is mixed evidence as to associations with IQ in two studies assessed as of high quality. No correlations were found by Hebblethwaite et al. (2011), but the study's statistical power was low. In contrast, Vereenooghe et al. (2015) found correlations with IQ for some subscales but not others of the Dagnan et al. (2000) measure.

For both event-emotion linkage and recognition of cognitive mediation, facial emotion recognition is not correlated when measured using Dagnan and Proudlove (1997)'s measure (Dagnan et al., 2000; Dagnan et al., 2009). However Event-emotion

linkage performance and some subscales of Dagnan et al. (2000)'s measure are related when a more comprehensive measure of emotion recognition is used (Joyce et al., 2006).

5.5 Trainability of readiness skills

Three well-designed studies have examined whether it is possible to train people with intellectual disabilities to improve thought-feeling-behaviour discrimination and recognition of cognitive mediation. Interventions have focussed on developing event-feeling links (Vereenoghe et al., 2015), developing thought-feeling-behaviour discrimination (Vereenoghe et al., 2016) or both (Bruce et al., 2010). Studies training recognition of cognitive mediation (Bruce et al., 2010; Vereenoghe et al., 2015) found evidence of improved ability relative to a control group both immediately (Vereenoghe et al., 2015) and, on novel items, after a week (Bruce et al., 2010). Evidence for training in thought-feeling-behaviour discrimination was more mixed. Training improved performance on some measures but not others in one study (Vereenoghe et al., 2016) but not in another less well powered study (Bruce et al., 2010). There was no evidence that training in one skill (thought-feeling-behaviour discrimination) would have an effect on another (recognition of cognitive mediation) (Vereenoghe et al., 2016)

6. Discussion

This review critically examined measures of CBT readiness skills in relation to four areas; measurement quality, relationship to CBT outcome, level of functioning in people with intellectual disabilities, and trainability. It considered evidence from 12 studies using two measures of the ability to distinguish between thoughts, feelings and behaviours, one measure of the ability to link events to emotions, and three measures of the ability to recognise cognitive mediation. The use of convenience samples, and lack of checking of intellectual disability status of participants, hinders the ability to generalise results to a wider intellectual disability population.

The measurement quality of tasks used to assess CBT readiness skills was largely indeterminate (Mokkink et al., 2010) with two measures having no assessment of measurement quality (Doherr et al., 2005; Quakley et al., 2004). Structural validity was unclear, as factor analysis has not been conducted on any of the tasks. The division of measures into subscales is thus hard to justify (Mokkink et al., 2010) and has been inconsistently applied across studies.

Relative levels of performance on the tasks are in line with conceptual models (Oathamshaw & Haddock, 2006) but pass rates vary widely across studies, possibly due to poor reliability of measurement, or differences in populations with mixed evidence that language and IQ may be related to performance. Only one study has examined performance in comparison to people without intellectual disability. As those without intellectual disability may also not 'pass' some measures (Harter, 2003) the degree to which having an intellectual disability effects performance as opposed to the measures being difficult for all adults, is unknown.

To be of clinical utility, strong psychometric properties are insufficient. CBT readiness measures must meaningfully tap underlying constructs. A key test of this is how measures relate to CBT outcome. The one study examining this (Hartley et al., 2015) offers provisional evidence that recognition of cognitive mediation changed over the course of an efficacious intervention. Before using measures of recognition of cognitive mediation clinically, however, more methodologically robust studies which assess whether change in skill level mediates change in CBT outcome are necessary, as change over an intervention does not, in itself, indicate a mechanism of action (Hundt et al., 2013)

Furthermore, only a small minority of those with intellectual disabilities were able to perform well or ‘pass’ on all tasks. This is at odds with the good efficacy of CBT for those with anger and depression (Vereenoghe & Langdon, 2013). This may be due to the measurement issues described above compromising validity, but another explanation is that ‘pass’ rates don’t fully capture performance and that ‘partial’ ability is possible with partial ability ‘enough’ to be ready for CBT.

There is evidence that performance on measures is trainable using simple interventions offered over brief time periods, with stronger evidence for training recognition of cognitive mediation than thought-feeling-behaviour discrimination. This is interesting given the higher baseline pass rates in the latter and could suggest that thought/feeling/behaviour measures do not tap a component of the skill of recognising cognitive mediation as would be suggested by conceptual models (Oathamshaw & Haddock, 2006) but may tap a parallel skill, which is less difficult at baseline, but harder to train.

There were some limitations to the review. Thorough assessment of the identified articles against inclusion and exclusion criteria and quality assessment were carried out by the first author alone. Although the other authors were consulted in relation to queries and experts in the field were consulted to avoid missing articles, these are limitations as is the fact that further information was not requested from primary studies. Finally, grey literature was not searched so potentially pertinent unpublished literature was not included.

7. Conclusions and recommendations

There is little evidence for the clinical utility of CBT readiness measures reviewed here, which are also of indeterminate measurement quality. However, given that recognising cognitive mediation changes over efficacious CBT and is trainable, future research might focus on this ability. Given the lack of a priori definition of what constitutes a CBT intervention (Doherr et al., 2005) and the multiplicity of interventions falling under the CBT umbrella (Roth & Pilling, 2008) it might also be useful to move away from conceptualising readiness within an ABC model and to start with specific CBT interventions themselves, developing and evaluating measures and training procedures specifically based on the skills judged important within particular interventions, for example, behavioural experiments in CBT for social phobia (Roth & Pilling, 2008). This would automatically improve face validity and feasibility, allowing refinement of the concept of readiness and preliminary assessment of specific skills associated with therapy outcomes. More rigorous

psychometrically sophisticated measures of relevant constructs could then be developed.

Table 1: Measures of CBT readiness used in studies included in the review

Instrument (Author/year)	Construct assessed	Dimensions (number of items)	Response options (range)	Pass criterion (Cut-off score)	Ease of scoring/ administration	Sample items
Behaviour Thought Feeling Questionnaire (BTFQ) (Oathamshaw & Haddock, 2006)	Thought-feeling- behaviour discrimination	Total (23) Thoughts (7), Feelings (8) Behaviours (8)	Forced choice between, 'thought', 'feeling' or 'behaviour'	Overall (12) Thoughts (5) Feelings (6) Behaviours (6)	Easy to administer with clear instructions	Participant asked: ' <i>sad</i> ' is that a <i>thought, feeling or a behaviour</i> '
Recognition of cognitive mediation 1 (RCM1) (Dagnan et al., 1997)	Recognition of cognitive mediation	One dimension (6 items) (Dagnan et al., 1997) or (12 items - prompt repeated with opposite emotion) (Hebblethwaite et al., 2011)	Free generation of thought given a prompt event and emotion	N/A – mean score	Medium – requires coding using guideline	Participant told: ' <i>You walk into a room where there are a group of your friends; as you walk in they start to laugh and you feel happy</i> ' Then shown a happy Makaton face and asked: ' <i>What would be thinking or saying to yourself?</i> '
Recognition of cognitive mediation 2 (RCM2) (Dagnan et al., 2000)	Recognition of cognitive mediation	Six subscales, three each for thoughts as responses and emotions as responses. Scales are: Overall (10) Congruent (5)	Forced choice (from two thoughts or two emotions), responses are either congruent or incongruent	Overall (8) Congruent (5) Incongruent (5)	Easy to administer with clear instructions	Participant told: ' <i>Your friend shouts at you and you feel sad</i> ' Then shown sad Makaton face and asked: ' <i>would you be thinking 'I'm a good person or I am a bad person</i> '

Table 1: Measures of CBT readiness used in studies included in the review

Instrument (Author/year)	Construct assessed	Dimensions (number of items)	Response options (range)	Pass criterion (Cut-off score)	Ease of scoring/ administration	Sample items
		Incongruent (5)	with prompt event			
Reed Clements Task (Reed & Clements, 1989)	Event-emotion linkage	One dimension (6)	Forced choice (Happy or sad)	Errorless performance	Easy with clear instructions	Participant told ' <i>You take your dog for a walk. The dog breaks the lead. You have lost your dog.</i> ' Then shown happy/sad Makaton faces and asked: ' <i>Do you feel happy or sad?</i> '
Thought Feeling Behaviour task (TFB) (Quakley et al., 2004)	Thought-feeling- behaviour discrimination	Total score (18) Thoughts (6) Behaviours (6) Feelings (6)	Forced choice	N/A – mean score	Easy to score and administer	Participant read scenario: <i>Peter knew it was the last day of his holiday. Peter went to pack his suitcase. Peter felt sad that he was going home today.</i> Participant then given/read cards with each sentence element and asked to identify which card has a thought, which a feeling and which a behaviour

Table 1: Measures of CBT readiness used in studies included in the review

Instrument (Author/year)	Construct assessed	Dimensions (number of items)	Response options (range)	Pass criterion (Cut-off score)	Ease of scoring/ administration	Sample items
Thought to feeling task (Doherr et al., 2005)	Recognition of cognitive mediation	One Dimension (6)	Free generation of feelings and thoughts	N/A – mean score	Difficult – requires coding with no identified coding system.	Stick man/thought bubble and Makaton faces used Participant told: <i>Imagine that you are going away for a while. You say goodbye to your family</i> (indicate stick person) <i>You think: 'I can't wait for my holiday'</i> . (indicate thought bubble). <i>How do you think you would feel if you thought, 'I can't wait for my holiday'?</i> (indicate Makaton faces) After answering, participants were asked <i>'Why do you think you would feel (insert answer)?'</i>

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
Bruce et al. (2010)	UK PWID* Sample; day service/college attenders N= 34; mean age = 40.5 (SD**, 13.8); 47% female; mean IQ = 55 (SD 3.3) in intervention group and 56 (SD, 4.9) in control group	Impact of training on CT*** skills	Pre post stratified Randomised experiment, ID participants identified by ‘local services’ Intervention: 1 hour on linkage and discrimination of behaviours, thoughts and feelings Control: Relaxation training Measures done up to a week before and a week after	Thought, feeling, behaviour task (TFB)(Quakley et al., 2004) Thought to feeling task (Doherr et al., 2005)	IQ - Wechsler Abbreviated Scale of Intelligence (WASI) (Wechsler, 1999) Language - British Picture Vocabulary Scale-II (BPVS-II) (Dunn et al. 1997)	Recognition of cognitive mediation but not discrimination of thoughts/feelings behaviours improved post training and generalized to novel task

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
Dagnan et al. (2000)	UK PWID sample in day services N = 40; mean age 35.1 (SD, 9.5); female 52.5%; mean BPVS 64 (SD, 27)	Pass rates on CT measures, Associations with language and emotion recognition	Cross sectional design, participants identified by day centre staff	Reed Clements Task (Reed & Clements, 1989) Recognition of Cognitive Mediation-2 (RCM2) (Dagnan et al., 2000)	Emotion recognition (Dagnan & Proudlove, 1997) Language - BPVS (Dunn et al., 1982)	<p><i>Pass rates:</i></p> <p>1. Reed Clements Task -75%</p> <p>2. RCM2 (Choose thought/choose emotion): Overall - 25%/10%; Congruent - 20%/37.5%; Incongruent - 12.5%/2.5%</p> <p><i>Associations:</i> BPVS differed across passers and failers for Reed Clements Task and RCM2 choose emotion overall and congruent subscales, and choose thought incongruent subscale. No correlations with emotion recognition</p>

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
Dagnan et al. (2009)	UK PWID N = 41; mean age = 39.2(SD,11.7); female = 34%; mean BPVS 61.48 (SD, 26.56)	Inter-rater reliability of Recognition of Cognitive Mediation 1 (RCM1) (Dagnan et al., 1997) Associations with language and emotion recognition	Cross sectional design, not clear how sample recruited	Reed Clements Task RCM1 - 6 item version	Recognition of emotions - (Dagnan & Proudlove, 1997) Language - BPVS	Mean score on cognitive mediation was 2.16 (SD =2.1, Range 0 -6) Kappa for items = 1. <i>Associations:</i> BPVS correlated with Reed Clements Task/RCM1 Reed Clements Task correlated with elements of RCM1 as hypothesised No correlations between facial emotion recognition and CT measures
Hartley et al. (2015)	UK PWID and depression sample, living in a variety of settings.	Improvement of CT skills in a CT intervention	Pre-post non-randomized study with 3 month follow up	RCM2 BTFQ	Depression: Self report depression questionnaire (Reynolds & Baker, 1988)	<i>Effect of intervention</i> Significant differences in depression and behaviour problems maintained on 3 month follow up.

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
	Intervention N = 16; mean age 33.8 (SD, 10.92); female = 50%; IQ = 62.4 (SD, 7.4). Control N = 8, Mean age; 40.3 (SD, 11.5); female = 47.5%; IQ = 61.1 (SD, 6.6)		Sample recruited via Fliers to case managers Intervention: ‘Empower’ group CBT with caregivers also involved Control: treatment as usual		Behaviour problems: Scales of Independent Behaviour-Revised (Bruininks, 1996) Social skills the social performance survey (Matson & Hammer, 1996)	<i>Effect of intervention on CT measures</i> RCM1 but not BTFQ improved in CBT relative to control.
Hebblethwaite et al. (2011)	UK PWID sample – day centre attendees.	Ability on CT measures relative to controls without ID	Cross sectional between groups design	RCM1 -12 item version	IQ - WASI Cognitive emotive interview –	ID sample mean score on RCM1 = 7.63 (SD= 1.8, range = 3-11). Kappa 0.86.

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
	N=19; mean age = 42 (SD, 10.96); female = 63%. IQ = 60.1 (SD, 6.22)	Associations with IQ/’real life’ conversation	PWID participants recruited via keyworkers		measure designed for study to simulate real life ‘CBT like conversation	Significantly lower RCM1 for ID than controls. <i>Associations</i> No correlations between RCM1 and IQ or cognitive emotive interview.
	Controls: Staff/students at a college without ID. N= 19; mean age = 43 (SD, 11.37); female; 57%; IQ = 95.44 (SD, 12.16)					
Joyce et al. (2006)	UK PWID sample in day services	Pass rates on CT measures	Cross sectional design Participants ‘randomly selected’	Reed Clements Task	Language - BPVS	<i>Pass rates</i> 1. Reed Clements Task – 50%

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
	N =52; mean age 40 (SD 11.6); female = 53% (range 21-81); mean BPVS =12.87 (SD, 6.9)	Associations with language and Emotion recognition		RCM2	Communication Assessment Skills Profile (Gaag, 1998) Emotion recognition 12 facial emotion recognition measure designed for study	2. RCM2 (Choose thought/choose emotion) Overall - 13%/11%; Congruent - 21%/19%; Incongruent - 6%/4% <i>Associations</i> BPVS and CASP differed across passers and failers for Reed Clements Task and some RCM2 subtests Reed Clements Task passers performed better than failers on identifying and labelling emotions. RCM2 passers had better performance than failers on labelling but not identifying emotions.

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
McEvoy et al. (2002)	UK PWID Sample in one day service N= 41; mean age 36.8 (SD, 10.8); 39% female; BPVS mean 13.7 (SD, 5.9)	Pass rates on CT measures Associations with language/concept of death	Cross sectional study, sample identified by care staff.	Reed Clements Task	Language BPVS Story task designed for study to look at understanding of death. Pictorial task designed for study to assess emotional response to bereavement	<i>Pass rates</i> Reed Clements Task – 41% <i>Associations</i> Reed Clements Task passers had higher BPVS and concept of death scores than failers

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
Oathamshaw and Haddock (2006)	UK People with intellectual Disabilities (PWID) and psychosis community and hospital N= 50; age =46 (SD, 11.3); 43% female; mean BPVS 88 (range 66-99.75),	Pass rates on CT measures Associations with language	Cross sectional design, participants suggested by clinicians	Reed Clements Task Behaviour Thought Feeling Questionnaire (BTFQ) RCM2	Language - BPVS Emotion Recognition (Dagnan & Proudlove, 1997)	<i>Pass rates:</i> 1. Reed Clements– 72% 2. BTFQ Feelings - 52%, Behaviours - 32%, Thoughts - 9% 3. RCM2 (Choose thought/choose emotion) Overall 10%/12%. Congruent 14%/30% Incongruent 4%./2% <i>Associations:</i> BPVS score higher in passers than failers for Reed Clements Task, TFB Feelings and behaviours and some RCM2 subscales

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
Reed and Clements (1989)	UK 'Mental Handicap' sample N=55; age range 14-25; female = 52%; mean BPVS 65.4 (Range 27-104)	Pass rates on CT measures Association with language	Cross sectional design, not clear how sample recruited.	Reed Clements Task	Language - BPVS	<i>Pass rates:</i> 75% passed Reed Clements task <i>Associations:</i> BPVS score higher in passers than failers for Reed Clements Task
Sams et al. (2006)	UK PWID sample in day centres and colleges N= 59; age = 17-60 Female = 52.5%; mean IQ = 58 (range, 50-72); mean BPVS	Ability to 'do' TFB measure and enhancement of this by cues Associations with IQ and language	Cross-sectional and experimental (for cue enhancement component), participants identified by key workers.	TFB	Language - BPVS-II Recognition of emotion (Dagnan & Proudlove, 1997) IQ - WASI	TFB mean (SD) scores: Thoughts - 3.9(1.6); behaviours -3.12 (2.1); Feelings - 2.76(1.89) No enhancement of performance on TFB by cues. <i>Associations</i> FSIQ/VIQ correlated with TFB total feelings (0.38, 0.4) and behaviours (0.51, 0.5).

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
	85.4 (SD, 27.7)					BPVS II correlated with TFB total (0.53), behaviours (0.5).
Vereenooghe et al. (2015)	UK PWID Sample from day services, Intervention N=32; mean age 38.53 (SD, 12); female, 65%, IQ 53.3 (SD, 8.4) Control N= 33, mean age = 38. 2 (SD, 14.1); female 64%; IQ = 52.5 (SD, 8.5)	Impact of training on CT skills Pass rates on CT tasks Associations with IQ	Pre post stratified (on IQ) randomized experiment, staff at day centres identified participants. Intervention: one hour computerized training on event-emotion linkage. Control group - attention control task using similar stimuli. Pre and post measures	Computerised version of RCM2	IQ – WASI	<i>Training effect:</i> RCM2 - choose emotion/ but not choose thought improved by training for congruent but not incongruent items <i>Pass rates:</i> Reed Clements. – 65% RCM2 subtest pass rates (Choose thought/choose emotion)– overall ,45%/59% (other rates not given) <i>Associations:</i> IQ correlated with RCM2 choose emotion and choose thoughts scores

Table 2 – Overview of studies included in the review

Study Author (date)	Location and sample characteristics	Relevant areas examined	Method	CBT readiness skills measures	Non CBT measures	Main relevant findings
Vereenooghe et al. (2016)	UK PWID Sample from day services Intervention N=26; mean age 41 (SD, 14); female, 57.6%; IQ = 50 (40-69) Control N= 29 mean age = 36 (SD, 13); female = 79.3%; IQ = 50 (40-67)	Impact of training on CT measures. Associations between CT measures and with IQ.	immediately before and after training. Randomised pre post experimental design Staff signposted users to study Intervention: computerized version of TFB task Control: Attention control using similar stimuli.	Computerised version of BTFQ Computerised version of RCM2	IQ – WASI-II	<i>Training effect:</i> Effect on BTFQ overall but not other subscales <i>Associations:</i> IQ correlated with BTFQ total, behaviours and feelings RCM2 choose thought was correlated with the aggregate BTFQ and feelings subtest. BTFQ participants identified 5 feelings, 5 behaviours, 2 thoughts on average

Note *PWID = People with intellectual disabilities, **SD = Standard Deviation, ***CT = CBT readiness

Table 3: Quality of included studies

Study	Qualsyst score - score/number of items, (ratio of score to items)	Main limitations:	Rating of Overall quality
Bruce et al. (2010)	23/26 (0.88)	Small sample size and power not calculated	++
Dagnan et al. (2000)	14/22, (0.64)	Congruence and incongruence of presented scenario emotion/thought pairings central, but not clearly defined, previous/Current CBT not excluded, ID status not checked. No control group/task,	+
Dagnan et al. (2009)	12/20 (0.60)	Very limited information re sample, current/Previous CBT not excluded, ID status not checked. No control group/task,	-
Hartley et al. (2015)	16/26 (0.62)	Small sample size and power not calculated, non-randomized, non-blind design and involvement of assessors in treatment	-
Hebblethwaite et al. (2011)	20/22 (0.90)	Low power for correlational elements, current/previous CBT not excluded	++
Joyce et al. (2006)	13/22 (0.59)	Current CBT not excluded, ID status not checked, order of measures not counterbalanced.	+
McEvoy et al. (2002)	11/20(0.55)	Poorly defined sample, limited description of results, rationale for statistics used unclear	-
Oathamshaw and Haddock (2006)	15/22 (0.68)	No control group/task, order of measures not counterbalanced. Previous/current CBT not excluded,	+
Reed and Clements (1989)	14/22 (0.64)	No control group or task, no counterbalancing, current/Previous CBT not excluded, ID status not checked no control group/task	-
Sams et al. (2006)	18/26 (0.69)	Multiple correlations with no corrections for type 1 error	+
Vereenooghe et al. (2015)	22/28 (0.79)	N/A	++
Vereenooghe et al. (2016)	22/28 (0.79)	Power calculated but not achieved	++

Note: ++ = High quality; + = medium quality and - = low quality

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