Article:
Hammond, S. and Beail, N. orcid.org/0000-0002-7916-9313 (2020) The relationship between cognitive variables and offending behaviour in adults with intellectual disabilities : a systematic review. Journal of Applied Research in Intellectual Disabilities. 12738. ISSN 1360-2322

https://doi.org/10.1111/jar.12738

Received: 4 February 2019 | Revised: 2 March 2020 | Accepted: 19 March 2020

DOI: 10.1111/jar.12738

SPECIAL ISSUE

JARID Journal of Applied Research in Intellectual Disabilities bild WILEY

The relationship between cognitive variables and offending behaviour in adults with intellectual disabilities: A systematic review

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Abstract

Background: Interventions for offenders with intellectual disabilities (ID) have used cognitive variables as measures of treatment outcome. However, the relevance of cognitive variables to offending in people with intellectual disabilities is unclear. This review aimed to evaluate the evidence for a relationship between cognitive variables and offending in people with intellectual disabilities.

Method: A systematic search identified studies comparing offenders and non-offenders with intellectual disabilities on an aspect of cognition. Seven cognitive variables were found and compared across 15 studies. These were appraised for their quality using an adapted quality appraisal checklist. The reliability and validity of cognitive measures were also considered.

Results and conclusions: Other than for cognitive distortions, the evidence for a relationship between cognitive variables and offending in people with intellectual disabilities is currently limited due to methodological weaknesses and the small number of studies assessing each variable. Clinicians are advised to focus on cognitive distortions until better evidence is available.

KEYWORDS

cognitive variables, effectiveness, intellectual disabilities, offending, outcome

1 | INTRODUCTION

Over the last decade, there has been an increasing amount of research focusing on people with intellectual disabilities (ID) who have committed offences (Hayes, 2018). Offenders with intellectual disabilities have often historically been excluded from mainstream criminal justice programmes due to the cognitive demands of treatment (Loucks, 2007). However, increasingly, they are being diverted to specialist inpatient provisions or community intellectual disability services as an alternative to a custodial sentence. Concurrently, adapted interventions for offending behaviour in people with intellectual disabilities have been developed (Beail, 2018). In line with mainstream interventions, adapted programmes mainly draw upon cognitive behaviour therapy (CBT) approaches. There is now an emerging literature on the effectiveness of these interventions (Jones and Chaplin, 2017). There are a wide number of risk factors linked to offending, including socio-demographic factors, historical factors such as offence history and history of abuse; current factors such as anger management, substance misuse, empathy and also mental health problems (Lofthouse, Totsika, Hastings, Totsika,

Hastings, & Lindsay, 2018; Nicholas, Gray, & Snowden, 2018). However, outcomes for interventions for offenders who have intellectual disabilities have focussed on cognitive variables (Beail, 2018, Jones and Chaplin, 2017). These include, for example, information processing, cognitive distortions and moral reasoning. Further, empathy (Marshall, Hudson, Jones, Hudson, Jones, & Fernandez, 1995) and anger (Taylor and Novaco, 2005) have been conceptualized in cognitive terms and have also been the targets of cognitive behavioural interventions for offending. Basically, all these variables broadly fall under the conceptual framework of social cognition, which refers to the way in which people understand themselves and others (Leffert & Siperstein, 2002). The assumption being that by developing or improving such cognitive skills and abilities in offenders with intellectual disabilities, it would improve their understanding of the impact of their behaviour on others and therefore reduce recidivism. However, the extent to which offenders with intellectual disabilities and people with intellectual disabilities with no offence history compare on such measures has not been explored. The purpose of this systematic review is to examine the evidence for discriminative validity between those with and without offending histories on measures of these cognitive factors.

Offender treatment programmes for the general offender population often include empathy training (Jolliffe & Farrington, 2004). Empathy has been conceptualized as a four-stage linear process which involves recognizing another persons' emotions, seeing their point of view (perspective taking), feeling the same emotion as them, and deciding how to respond (Marshall et al., 1995). It has been suggested that perspective taking may be conceptually similar to theory of mind (ToM; Keenan & Ward, 2000), which has been defined as an individual's ability to reflect on other people's mental states in addition to their own (Baron-Cohen, 1989). First-order ToM has been defined as the ability to "infer the thoughts of another person" (Baron-Cohen, Jolliffe, Mortimore, Jolliffe, Mortimore, & Robertson, 1997, p. 813), whereas second-order ToM involves "reasoning about what one person thinks about another person's thoughts" (Baron-Cohen et al., 1997, p. 813). Lower levels of these abilities are thought to reduce a person's inhibition to cause harm to others, therefore giving rise to aggressive/offending behaviour (Ralfs & Beail, 2012).

High levels of anger are also thought to impact upon levels of aggression (Taylor, Novaco, Gillmer, & Thorne, 2002). Novaco's (1994) model of anger was developed with the general offender population. It proposes that the cognitive appraisal of an event determines whether a person will experience anger and/or present with aggressive behaviour. Anger management is often included in treatment programmes, particularly for people who have committed violent offences (Schamborg & Tully, 2015). Anger interventions focus on teaching offenders to recognize their feelings of anger, to manage these feelings more effectively, and to implement more socially acceptable ways of resolving conflict (Beck & Fernandez, 1998).

Gibbs (2003) and Palmer (2003) theorized that less developmentally mature moral reasoning increases the risk of offending due to associated deficits in empathy and increased cognitive distortions, which refer to the justifications a person develops to manage the conflict between their offending behaviour and societal norms (Abel et al., 1989). A strong relationship has been found between moral reasoning and offending in adolescents in the general population (Blasi, 1980), whereby young offenders demonstrate lower levels of moral maturity than non-offenders (Stams et al., 2006). The Equipping the Youth to Help One Another Programme (EQUIP; Gibbs, Potter, & Goldstein, 1995) has been developed for young offenders and aims to improve moral reasoning and reduce cognitive distortions through enhancing skills in perspective taking and anger management. In work with people who have intellectual disabilities, moral reasoning has been found to be less developmentally mature than their age-matched peers (Langdon, Clare, & Murphy, 2010). However, moral decisions made by people functioning at the earliest developmental stage tend to be based on avoiding punishment and following rules, making offending less likely (Langdon, Clare, et al., 2010; Langdon, Murphy, Clare, & Palmer, 2010).

Ward, Hudson, Johnson, and Marshall (1997) and Ward (2000) argued that cognitive distortions and attitudes which might be considered to support sexual offending are important in the development of incidents of sexual assault. Ward (2000) argued that such cognitive distortions emerge from underlying causal theories the offender holds about the nature of their victims. Such implicit theories are purported to be relatively coherent and consist of interlocking beliefs, attitudes and their component categories and concepts. As a result, assessments of cognitive distortions and attitudes have been developed for use with general population sex offenders and sex offenders who have intellectual disabilities. Broxholme, and Lindsay, (2003) developed an assessment for attitudes consistent with sexual offending for use with offenders who have intellectual disabilities (QACSO). Due to literacy problems in people who have intellectual disabilities, all the questions are easier to understand and are read to the respondent. Example questions on the QACSO include "if a man rapes a woman it is just a bit of fun" and "can you show you love a child by having sex with them." The altering of such cognitive distortions and attitudes through cognitive restructuring is considered to be an important aspect of treatment and so has also become a targeted outcome in treatments for people who have intellectual disabilities (Broxholme & Lindsay,(2003).

It has been also argued that treatment programmes for people with intellectual disabilities who have committed sexual offences should also aim to enhance sexual knowledge (Michie, Lindsay, Martin, & Grieve, 2006). The sexual knowledge of people with intellectual disabilities is thought to be less developed than their age-matched peers (McGillivray, 1999), and they often lack normative experiences (Lunsky, Frijters, Griffiths, Watson, & Williston, 2007). The "counterfeit deviance" hypothesis (Hingsburger et al., 1991) suggests that less developed sexual knowledge and associated naivety may increase the risk of committing sexual offences (Michie et al., 2006).

Locus of control (LoC) refers to the attributions a person makes about the cause of events (Rotter, 1966). A person is said to have internal LoC if they attribute the cause of events to their own behaviour, whereas external LoC is the perception that events are

beyond a persons' control (Goodman, Leggett, & Garrett, 2007). A shift to internal LoC through treatment is thought to indicate increased personal responsibility, therefore reducing the likelihood of re-offending (Fisher, Beech, & Browne, 1998).

The majority of the studies evaluating interventions for offenders with intellectual disabilities have found statistically significant improvements on cognitive outcome measures at the end of treatment (Taylor & Lindsay, 2018). However, intervention studies have focused exclusively on clinical samples without including non-offending intellectual disability comparison groups (Lindsay, 2002). Inclusion of control groups of people with intellectual disabilities who have not committed offences would help to determine whether, prior to treatment, there are any differences between people with intellectual disabilities who have and have not offended on the aspects of cognition under evaluation. Without such control groups, it is unclear whether improvements on measures post-treatment indicate a clinically significant change from an offending to a non-offending range (Nicoll & Beail, 2013) and thus whether the likelihood of recidivism is reduced. Moreover, importantly, some offenders with intellectual disabilities have not demonstrated deficits on cognitive variables prior to treatment (Langdon, Murphy, Clare, Murphy, Clare, Palmer, & Rees, 2013). The relevance of cognitive variables to offending in people with intellectual disabilities is therefore unclear. In order to inform and develop evidence-based practice, further clarity is required. To date, no reviews have evaluated the empirical evidence for a relationship between cognitive variables and offending in people with intellectual disabilities.

2 | AIMS

This systematic review aims to evaluate the empirical evidence for a relationship between cognitive variables and offending in people with intellectual disabilities. A positive relationship between cognition and behaviour is expected. Studies comparing offending and non-offending intellectual disability groups on an aspect of cognition are systematically reviewed, and the findings considered within the context of their methodological quality.

3 | METHOD

3.1 | Search strategy

Relevant articles were identified by searching electronic databases in September 2019: Web of Science, PsychINFO, PsychARTICLES, Medline and CINAHL. The search terms were generated in line with existing literature. Primary search terms anywhere in the title were as follows: *intellectual disabilit**[1] OR *developmental disabilit** OR *learning disabilit** OR *mental retardation*. Primary search terms were combined with secondary search terms anywhere in title *offend** OR *crime*, *crim** OR *forensic*. This paper focused on people with intellectual disabilities who had been convicted of a criminal offence; papers concerning people diagnosed with autism spectrum disorder were excluded. Whilst behaviour such as hitting other people constitutes an offence; when conducted by a person with intellectual disabilities, often the behaviour is labelled as "challenging" and no criminal investigation is pursued. This is because in many jurisdictions people with intellectual disabilities are not considered to have criminal responsibility for their actions (Lindsay, Hastings, & Beail, 2013). The search term *"aggression"* was therefore not included to ensure clarity regarding the definition of offending.

The method of identifying relevant articles was based on PRISMA guidance (Moher, Liberati, Tetzlaff, & Altman, 2009). The database search generated 6,499 records. Citation and ancestry searches were conducted on key articles and two further records were identified. Following the removal of duplicates, the titles and abstracts of 1,826 records were screened, leading to an exclusion of 1804 non-relevant records. Three published abstracts were excluded following contacting the first author to confirm that no further publication had been made. Nineteen full-text articles were assessed against eligibility criteria. Three further papers were excluded; two had no comparison group, and one was not on offending. Sixteen full-text articles were reviewed for methodological quality and one further article was excluded due to lack of information on the participants and measures. Fifteen articles were included in the review.

3.2 | Eligibility criteria

The review included data from full papers published in English in a peer-reviewed journal reporting studies evaluating differences between offending and non-offending intellectual disability groups on aspects of cognition. Some of the reviewed studies also included participants who had previously received interventions for offending behaviour. The outcome of these interventions was not the focus of the present review and any differences between treatment and no-treatment offending groups were used for comparative purposes only. Studies were excluded if they solely focused on evaluating the outcome of an intervention; did not include a non-offending intellectual disability comparison group; focused on a child or people without intellectual disabilities; focused on challenging rather than offending behaviour, and abstracts with no further publication.

3.3 | Methodological quality evaluation

An adapted version of the Downs and Black (1998) checklist for non-randomized studies was developed to assess the methodological quality of each paper (see Table 1). The Downs and Black (1998) checklist was selected because of its applicability to assessing the

[1]Asterisk (*) indicates truncated search terms were used to capture word variations (e.g. disabilities, disability).

TABLE 1 Adapted methodological quality appraisal checklist

Paper	(1) Are the aims/ hypotheses clearly described?	(2) Are the main outcomes to be measured clearly described in the intro/ method? (*i.e. cognitive variable*).	(3) Are the characteristics of participants clearly described? (*i.e. gender, IQ and age (mean and SD) reported separately for each group*).	(4) Are the main findings clearly described? (*Main findings clearly reported (means and SD), use of data tables etc*).	(5) Were the service users asked to participate in the study representative of the entire population from which they were recruited? (*Must state how participants were selected*).	(6) Were these service users representative of the entire population from which they were recruited? (*The proportion of those asked who agreed should be stated*).
Broxholme and Lindsay (2003)	1	1	1	1	0	0
Hammond and Beail (2017)	1	1	1	1	1	0
Lindsay et al. (2007)	1	1	1	1	0	0
McDermott and Langdon (2014)	1	1	1	1	1	0
Proctor and Beail (2007)	1	1	1	1	1	0
Ralfs and Beail (2012)	1	1	1	1	1	1
Hockley and Langdon (2015)	1	1	1	1	0	0
Langdon et al. (2011)	1	1	1	1	1	0
Langdon and Talbot (2006)	1	1	1	1	0	0
Nicoll and Beail (2013)	1	1	1	1	0	0
Lunsky et al. (2007)	1	1	0	1	0	0
Goodman et al. (2007)	1	1	0	0	0	0
Michie et al. (2006)	1	1	1	1	0	0
Rogers et al. (2018)	1	1	0	1	0	0
Talbot and Langdon (2006)	1	1	0	1	0	0
Parry and Lindsay (2003)*	1	1	0	1	0	0

quality of non-randomized studies, and its ability to generate a profile of individual studies' strengths and weaknesses. In particular, it enables clear appraisal of the representativeness of the sample and the reliability/validity of the measures used.

The methodological quality of 15 articles was assessed. Four articles were second-rated by an independent researcher. Inter-rater reliability was calculated using the kappa statistic, showing a good level of agreement ($\kappa = 0.83$) (Landis & Koch, 1977). Discrepancies in quality ratings were discussed until a consensus was reached. One study achieved a score two standard deviations below the mean and was therefore excluded (Parry & Lindsay, 2003). The methodological quality scores of the 15 included studies ranged from 6 to 9 ($M = 7.85$, $SD = 1.21$). See Table 2 for data extraction. Only details regarding the comparison of cognitive variables between offending and non-offending intellectual disability groups were extracted. These data were grouped according to cognitive variable and the key findings of the studies summarized with their strengths and weaknesses including reliability and validity of the measures employed.

3.4 | Reliability and validity of measures used by each study

Table 3 shows whether the measures used by each study to assess different aspects of cognition were developed specifically for use with people with intellectual disabilities, or whether they were originally intended for use in the general population. Where reliability and validity of measures used for an intellectual disability population were reported/calculated; this was extracted from each study. Reliability of a measure is assessed by its internal consistency (extent to which

(7) Was it clear whether the study was conducted in typical settings for participants? (*I.e. secure/ community ID setting. Setting must be stated for all groups*).	(8) Were the statistical tests used to assess the main outcomes appropriate? (*Statistical test used must be stated*).	(9) Have actual probability values been reported (e.g. 0.035 rather than < 0.05) for the main outcomes?	(10) Was reliability reported/ calculated for all measures? (*reports actual values or cites reference. Must be for ID population*)	(11) Was validity reported/ calculated for all measures? (*Must be for ID population*)	(12) Was it stated how the sample size was determined (e.g. power calculation)?	Total (/12)
1	1	1	1	1	0	9
1	1	1	0	0	1	9
1	1	1	1	1	0	9
1	1	1	1	0	0	9
1	1	1	0	0	1	9
1	1	1	0	0	0	9
1	1	1	1	0	0	8
1	1	1	0	0	0	8
1	1	1	1	0	0	8
1	1	0	1	0	1	8
1	1	0	1	1	0	7
1	1	0	1	1	0	6
1	0	1	0	0	0	6
1	1	1	0	0	0	6
1	1	0	1	0	0	6
0	1	0	0	0	0	4

items in a measure correlate) and test–retest reliability (equivalent scores achieved over multiple administrations) (Fitzpatrick, Davey, Buxton, & Jones, 1998). Where reviewed studies reported/calculated internal consistency and/or test–retest reliability for the measures used, results were assessed against statistical guidelines (Cicchetti, 1994). Whilst there are no clear statistical standards for evaluation of validity (Strauss, Sherman, & Spreen, 2006), the number of validity tests used indicates quality (Fitzpatrick et al., 1998).

4 | RESULTS

Table 2 shows that offenders and non-offenders with intellectual disabilities have been compared on seven cognitive variables. The empirical evidence for each variable and how it relates to offending in people with intellectual disabilities is evaluated. The reliability and validity of the measures used by each study are also considered (see Table 3).

4.1 | Distorted cognitions

Four studies compared offenders and non-offenders with intellectual disabilities on measures of cognitive distortions (Langdon, Murphy, Clare, Murphy, Clare, Steverson, & Palmer, 2011; Langdon & Talbot, 2006; Broxholme & Lindsay, 2003; Lindsay, Whitefield, & Carson, 2007). All four studies found that offenders demonstrated significantly more cognitive distortions than non-offenders. Two studies achieved the joint highest methodological quality rating

TABLE 2 Data extraction

Author (year)	Participants					Cognitive Variable	Measure	Main Findings	Quality Rating (/12)
	Group	Setting	*N*, Gender	Age (years) *M* (*SD*)	FSIQ *M* (*SD*)				
Broxholme and Lindsay (2003)	Sex offenders	CP services	17, M	37.4 (13.5)	65.5 (8.4)	Cognitive distortions	QACSO	Sex offenders scored significantly higher than non-offenders, indicating more cognitive distortions.	9
	Non-offenders	Resource centre/ hospital workshops/ CP services	19, M	31.2 (12.2)	69.5 (6.8)				
Hammond and Beail (2017)	Offenders	Secure/community services	21, M	33.7 (11.3)	59.9 (5.4)	Moral awareness	SMAT	No significant differences between groups.	9
	Non-offenders	Day/social care/CP services	21, M	45.9 (12.0)	59.7 (5.1)		Marble story		
						ToM	Ice cream story	No significant differences between groups.	
Lindsay et al. (2007)	Sex offenders	Treatment service	41, M	35.6 (14.2)	64.7 (7.3)	Cognitive distortions	QACSO	Sex offenders scored significantly higher than non-sexual offenders and non-offenders, indicating more cognitive distortions.	9
	Non-sexual offenders	Treatment service	34, M	28.4 (11.1)	68.4 (5.8)				
	Non-offenders	Treatment service	30, M	33.0 (9.3)	68.2 (8.0)				
McDermott and Langdon (2014)	Offenders	Inpatient forensic	17, M	35.8 (14.2)	61.9 (4.6)	Moral reasoning	SRM-SF	No significant differences between males and females. Offenders demonstrated significantly more mature moral reasoning than non-offenders.	9
	Offenders	Inpatient forensic	17, F	34.1 (12.3)	62.0 (5.7)				
	Non-offenders	Community	17, M	39.7 (12.9)	60.1 (6.2)				
	Non-offenders	Community	17, F	33.1 (10.9)	55.1 (4.2)				
Proctor and Beail (2007)	Offenders	Secure	25, M	31.0 (11.0)	64.2 (7.3)	Empathy ToM	IRI TEP Deceptive box Sally–Anne Ice cream story	No significant differences between groups. Offenders performed significantly better on emotion recognition. No significant differences between groups on first-order ToM. Offenders performed significantly better on second-order ToM.	9
	Non-offenders	Community day/CP services	25, M	41.0 (12.0)	60.8 (6.1)				
Ralfs and Beail (2012)	Sex offenders	Secure/probation/CP services	21, M	39.6 (3.4)	62.1 (6.7)	Empathy	TEP	No significant differences between groups. Sex offenders who had received treatment scored significantly better on emotion recognition, emotion replication, and response decision.	9
	Non-offenders	Community/day	21, M	45.0 (14.0)	63.4 (8.8)				

(9/12) of all included studies (Broxholme & Lindsay, 2003; Lindsay et al., 2007).

Three of the four studies compared sex offenders and non-offenders using the Questionnaire on Attitudes Consistent with Sexual Offending (QACSO), which was specifically developed for sex offenders with intellectual disabilities. Broxholme and Lindsay (2003) reported discriminant and construct validity, and excellent internal consistency and test–retest reliability of the QASCO. Lindsay et al. (2007) revised the QACSO and whilst discriminant validity was reported, internal consistency ranged from unacceptable to good for different sub-scales. The revised QACSO therefore seems to be a less robust measure of cognitive distortions for people with intellectual disabilities. Langdon et al. (2011) used the How I Think (HIT) questionnaire which is a measure of cognitive distortions developed for adolescents. No reliability or validity data were reported for people with intellectual disabilities, meaning that the extent to which HIT measures cognitive distortions in people with intellectual disabilities is unclear. Langdon et al.'s (2011) findings were further limited as offence type was not reported.

Lindsay et al. (2007) included two offending groups: sex offenders and non-sexual offenders. Whilst sex offenders showed significantly more cognitive distortions than non-sexual offenders and non-offenders, it was unclear whether there were any differences in cognitive distortions between non-sexual offenders and non-offenders. This is pertinent as Broxholme and Lindsay (2003) included five non-sexual offenders and two alleged offenders within their non-offending group, which may have confounded their results. Langdon and Talbot (2006) identified that sex offenders with intellectual disabilities who had not received treatment showed significantly more cognitive distortions than non-offenders and sex offenders who had received treatment. There was no significant difference between the treatment group and the non-offending group.

All four studies were limited by lack of information regarding the representativeness of their samples. Whilst IQ was consistent across groups in two studies (Langdon & Talbot, 2006; Broxholme & Lindsay, 2003), the mean IQ of offenders was significantly greater than non-offenders in Langdon et al.'s (2011) study. The mean IQ of sex offenders in Lindsay et al.'s (2007) study was significantly lower than non-offenders. As IQ was not controlled for in the analysis in either study, it is unclear what impact IQ has on cognitive distortions.

Regardless of differences in methodological quality and measures used, all four studies found that offenders demonstrated significantly more cognitive distortions than non-offenders, indicating that distorted cognitions are implicated in offending in people with intellectual disabilities.

4.2 | Empathy

Four studies compared offenders and non-offenders with intellectual disabilities on measures of empathy (Hockley & Langdon, 2015; Langdon et al., 2011; Proctor & Beail, 2007; Ralfs & Beail, 2012), with two focusing specifically on sex offenders. Hockley and Langdon (2015) found that sex offenders demonstrated significantly less empathy than non-offenders on the Empathy Quotient (EQ). Using the Test of Emotional Perception (TEP), Ralfs and Beail (2012) found no significant difference between sex offenders and non-offenders pre-treatment.

Hockley and Langdon (2015) gained a methodological quality rating of 8/12 and Ralfs and Beail (2012) achieved 9/12. Both studies excluded people with autism spectrum conditions (ASC) due to potential atypical empathy and matched groups according to IQ. However, neither study reported on validity. The EQ, originally developed for people with ASC, was described as complex, which was reflected in the unacceptable level of internal consistency reported. Whilst TEP is an intellectual disability-specific measure, it was further adapted and no new reliability information was reported. The extent to which EQ and TEP measure empathy in people with intellectual disabilities is therefore uncertain and limited conclusions can be drawn.

Two studies compared mixed groups of offenders and non-offenders with intellectual disabilities on measures of empathy. Proctor and Beail (2007) used the TEP and found that offenders achieved significantly higher scores on emotion recognition. However, using the Interpersonal Reactivity Index (IRI), there was no significant difference between groups. Langdon et al. (2011) also found no significant difference between groups using the Bryant Empathy Index (BEI). Proctor and Beail (2007) achieved a methodological quality rating of 9/12 and Langdon et al. achieved 8/12. Proctor and Beail did not report reliability or validity for the TEP or IRI. The BEI, which was adapted from a measure for children, had unacceptable internal consistency and validity was not reported. The extent to which TEP, IRI and BEI measure empathy in people with intellectual disabilities is therefore unclear.

In addition to general empathy, Hockley and Langdon (2015) assessed victim empathy. Using the Victim Empathy Scale Adapted (VESA), it was found that sex offenders demonstrated significantly less empathy for their own victim than for victims of sexual and non-sexual crimes who were unknown to them. Sex offenders also showed significantly less empathy than non-offenders for victims of sexual crimes. There was no significant difference in empathy between groups for victims of non-sexual crimes. The validity of the VESA was not reported and internal consistency ranged from fair to excellent.

The results of the four studies were mixed, where three studies showed that there were no significant differences in empathy between offenders and non-offenders. Hockley and Langdon (2015) suggested that the lower empathy of sex offenders found in their study was a reflection of the higher risk presented by their participants. However, inconsistency in results may be attributable to the different measures used. Reliability and validity were either not reported or unacceptable for general empathy measures. Moreover, two studies specifically assessed sex offenders (Hockley & Langdon, 2015; Ralfs & Beail, 2012), whereas offence

TABLE 3 Reliability and validity of measures reported/calculated by included studies

Author (year)	Measure used	General population or specific intellectual disability measure	Reliability reported/calculated for intellectual disability population		Validity reported for intellectual disability population
			Internal consistency (α)	Test–retest reliability (r)	
Broxholme and Lindsay (2003)	QACSO	Specific (experimental)	0.95	0.90	Discriminant, Construct
Hammond and Beail (2017)	SMAT Marble story Ice cream story	Specific General (child) General (child)	0.75–0.85 Unclear	Unclear	
Lindsay et al. (2007)	QACSO	Specific	0.68–0.86		Discriminant
McDermott and Langdon (2014)	SRM-SF	General	Substantial	Good	
Proctor and Beail (2007)	IRI TEP Deceptive box Sally–Anne Ice cream story	General (adapted) Specific General (child) General (child) (adapted) General (child)	Unclear	Unclear	
Ralfs and Beail (2012)	TEP	Specific (adapted)			
Hockley and Langdon (2015)	EQ VESA	General (ASC) Specific (adapted)	0.64 0.70–0.90		
Langdon et al. (2011)	BEI SRM-SF HIT	General (adapted) General General (adolescents)	0.64 Substantial	Good	
Langdon and Talbot (2006)	QACSO ANSIES	Specific General		Good 0.83	Discriminant
Nicoll and Beail (2013)	NAS PI	Specific Specific	0.93 0.86	Good	
Lunsky et al. (2007)	SSKAAT-R	Specific	Strong	Strong	Discriminant
Goodman et al. (2007)	Unnamed	Specific (experimental)	0.53	0.66	Construct
Michie et al. (2006)	SSKAAT	Specific			
Rogers et al. (2018)	SPSI-R	General (adapted)			
Talbot and Langdon (2006)	GSKQ	Specific (experimental)	0.94		

type was not reported in the remaining two studies (Langdon et al., 2011; Proctor & Beail, 2007). The extent to which empathy relates to offending for people with intellectual disabilities is therefore unclear.

Two studies assessed differences in first- and second-order ToM between offenders and non-offenders with intellectual disabilities (Hammond & Beail, 2017; Proctor & Beail, 2007). Both studies achieved a high methodological quality rating (9/12), largely due to clear reporting of the recruitment process and participant characteristics. Both studies matched groups according to IQ and excluded people with ASC. Hammond and Beail (2017) reported offence type, whereas this information was not included in Proctor and Beail's (2007) study.

Proctor and Beail (2007) found no significant difference between offending and non-offending groups on two first-order ToM tasks (Sally–Anne and Deceptive Box). Hammond and Beail (2017) also found no significant difference between offending and non-offending groups on a first-order ToM task (Marble Story, which is the same as the original Sally–Anne task). Whilst the majority of participants passed both first-order ToM task in Proctor and Beail's study, Hammond and Beail found that fifteen participants in total did not achieve first-order ToM. Proctor and Beail created a video version of the Sally–Anne task to maximize understanding. However, it was proposed that, as people with intellectual disabilities often fail first-order ToM tasks (Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998), the video presentation may have created a ceiling effect. No new reliability or validity data were reported for the adapted Sally–Anne task, making it difficult to determine how accurately it assessed ToM. Moderate reliability was reported for the Deceptive Box and Marble Story tasks, although the type of reliability this referred to was unclear in both cases. Validity was not reported for either task.

Proctor and Beail (2007) found that offenders performed significantly better than non-offenders on a second-order ToM task (Ice Cream Story). The difference between the two groups remained when IQ was accounted for and three participants were excluded

from the analysis due to general comprehension failures. Hammond and Beail (2017) found no significant differences between offending and non-offending groups on the Ice Cream Story task. However, ten participants overall were excluded due to not passing control questions meaning that the analysis was based on a small sample size. Of note, only two participants in Hammond and Beail's study achieved second-order ToM. Proctor and Beail did not state how many of their participants achieved second-order ToM. No reliability or validity data were provided for the Ice Cream Story in either study, therefore limiting the interpretation of results.

No significant differences between offending and non-offending groups were found using first-order ToM tasks across two studies (Hammond & Beail, 2017; Proctor & Beail, 2007). However, differences in task presentation and lack of reliability and validity data for an intellectual disability population indicate that findings should be interpreted with caution. Whilst offenders demonstrated significantly better second-order ToM than non-offenders in Proctor and Beail's (2007) study, this finding was not replicated by Hammond and Beail (2017) using the same second-order ToM test (Ice Cream Task). Due to the lack of reliability and validity data for the Ice Cream Task for an intellectual disability population and the fact that numerous participants were excluded due to comprehension difficulties in both studies, limited conclusions can be drawn.

4.3 | Sexual knowledge

Three studies assessed the sexual knowledge of sex offenders and non-offenders with intellectual disabilities (Lunsky et al., 2007; Michie et al., 2006; Talbot & Langdon, 2006). Using the Socio-Sexual Knowledge and Attitudes Test (SSKAAT), Michie et al. (2006) identified that sex offenders had significantly greater sexual knowledge than non-offenders. Michie et al. (2006) achieved a quality rating of 6/12, which was the lowest of all included studies. A key limitation of Michie et al.'s (2006) study was that no reliability or validity data were reported for the SSKAAT, meaning that its accuracy in measuring sexual knowledge for people with intellectual disabilities is unclear. Talbot and Langdon's (2006) study also achieved a relatively low-quality rating (6/12). Talbot and Langdon (2006) developed and used the General Sexual Knowledge Questionnaire (GSKQ), which had excellent internal consistency, although validity was not reported. Talbot and Langdon (2006) found that sex offenders with intellectual disabilities who had received treatment achieved significantly higher scores on sexual intercourse and sexuality sub-scales than non-offenders. However, it was not stated whether there was a significant difference between the no-treatment sex offending group and non-offenders. Moreover, previous sex education for the no-treatment and non-offending groups was not reported.

Lunsky et al. (2007) achieved a slightly higher methodological quality rating of 7/12. Lunsky et al. (2007) used a revised version of the SSKAAT and reported strong reliability and discriminant validity, suggesting that the SSKAAT-Revised is a more robust measure of sexual knowledge for people with intellectual disabilities. Lunsky et al. (2007) found that participants who had committed more serious offences had significantly greater sexual knowledge than non-offenders. However, there was no significant difference between participants who had committed minor sexual offences and non-offenders. When previous sex education was controlled for, the three groups did not differ significantly on sexual knowledge. Whilst the role of previous sex education appeared to be important, sex education was only controlled for in one study (Lunsky et al., 2007), and partially addressed in another (Talbot & Langdon, 2006). Michie et al. (2006) stated that no participants in their study had previously received sex education.

None of the three studies reported on the representativeness of their sample. Whilst Michie et al. (2006) clearly reported participant characteristics, Talbot and Langdon (2006) and Lunsky et al. (2007) reported demographics collectively. It is therefore difficult to assess whether the groups within the latter two studies were equivalent. Lack of information regarding IQ equivalence is pertinent as Talbot and Langdon (2006) found that IQ was positively correlated with GSKQ scores and Michie et al. (2006) found that IQ was strongly related to sexual knowledge in the non-offending group. The GSKQ uses a semi-structured interview which relies on verbal ability (Talbot & Langdon, 2006). It is therefore unclear whether higher GSKQ scores related to greater sexual knowledge, or simply better verbal ability/IQ. Whilst the SSKAAT-Revised relies more on non-verbal responses, Lunsky et al. (2007) did not assess the impact of IQ, limiting the interpretation of results.

The findings across the three studies were consistent, whereby offenders demonstrated greater sexual knowledge than non-offenders. However, the methodological quality of studies was relatively low and the reliability and validity of measures were not always reported. It is therefore possible that greater sexual knowledge of sex offenders was, in part, due to confounding factors such as previous sex education and greater IQ.

4.4 | Locus of control

Two studies examined differences in LoC between offenders and non-offenders with intellectual disabilities (Langdon & Talbot, 2006; Goodman et al., 2007). Using the Adult Nowicki-Strickland Internal-External Scale (ANSIES), Langdon and Talbot (2006) found no significant difference between sex offenders who had received CBT, sex offenders who had not received treatment, and non-offenders, with all groups demonstrating an external LoC. Whilst ANSIES is a general measure of LoC, Langdon and Talbot (2006) reported good test–retest reliability for people with intellectual disabilities, although no further reliability or validity data were reported. Overall, the study's methodological quality was relatively high (8/12).

Goodman et al. (2007) criticized the ANSIES for its use of complex language and abstract concepts. Using their own LoC measure, Goodman et al. (2007) found that convicted offenders had significantly greater external LoC than alleged offenders and

non-offenders. However, it was unclear from the results whether alleged and non-offenders also had external LoC. Whilst this new measure had good test–retest reliability, its internal consistency was unacceptable and only one type of validity test was reported. Its accuracy for measuring LoC in a people with intellectual disabilities is therefore unestablished. Goodman et al. (2007) achieved the shared lowest methodological quality score of 6/12.

The different measures used and their unclear psychometric properties makes comparing the results across the two studies problematic. Furthermore, the offending group in the two studies were not comparable in that Langdon and Talbot (2006) recruited male sex offenders from secure facilities, whilst Goodman et al. (2007) recruited males and females with histories of a range of offences from community services. Due to the disparity in findings and recruitment populations, it is difficult to ascertain whether there are any differences in LoC between offenders and non-offenders with intellectual disabilities.

4.5 | Anger

A single study compared anger in offenders and non-offenders with intellectual disabilities (Nicoll & Beail, 2013). No significant differences were identified between groups on two measures of anger (Novaco Anger Scale [NAS]; Provocation Inventory [PI]). Nicoll and Beail (2013) concluded that their findings questioned the treatment rationale that a reduction in anger in offenders with intellectual disabilities would decrease aggression to non-offending levels.

Nicoll and Beail's (2013) study achieved a methodological quality score of 8/12. Groups were matched according to IQ and, importantly, the offending group had not received anger management interventions. Levels of anger in the offending group were therefore not due to treatment effects. The anger measures used were adapted specifically for people with intellectual disabilities and whilst they were found to have excellent (NAS) and good (PI) internal consistency, validity was not reported. The NAS and PI rely upon self-report and it is possible that concern regarding possible ramifications of revealing angry thoughts could have led to under-reporting in the offending group.

Nicoll and Beail (2013) suggested that the lower NAS scores in their study compared with scores in a treatment outcome study for offenders with intellectual disabilities (Taylor, Novaco, Gillmer, Robertson, & Thorne, 2005) could have been due to the inclusion of a greater number of sex offenders. It has been found that sex offenders demonstrate less aggression than non-sexual offenders (Lindsay et al., 2012). However, Nicoll and Beail (2013) did not report offence type or the proportion of sex offenders they recruited. Moreover, the fact that anger management was not part of the treatment package for offenders may have indicated that anger was not a presenting difficulty for these participants. This is pertinent as it was unclear how participants were selected. Participants with lower levels of anger may have been more able/willing to take part.

Whilst Nicoll and Beail's (2013) study was one of the most methodologically robust included in the review, limited conclusions can be drawn based on a single study.

4.6 | Moral Reasoning

Three studies compared moral reasoning in offenders and non-offenders with intellectual disabilities (Hammond & Beail, 2017; Langdon et al., 2011; McDermott & Langdon, 2014). Langdon et al. (2011) and McDermott and Langdon (2014) both used the Socio-Moral Reflection Measure-Short Form (SRM-SF) and found that all participants displayed developmentally immature moral reasoning, and offenders showed significantly more mature moral reasoning than non-offenders. Both studies achieved relatively high methodological quality ratings (8/12 and 9/12, respectively). However, studies were limited by not reporting offence type. Using the Social-Moral Awareness Test (SMAT), Hammond and Beail (2017) did not find a significant difference between offending and non-offending groups on social-moral rule knowledge (SMAT-A) or reasoning (SMAT-B). Hammond and Beail's study also achieved a high-quality rating score (9/12).

Whilst the SMAT was developed specifically for an intellectual disability population and good internal consistency was noted, further work to establish its reliability and validity is required. Its ease of understanding and pictorial presentation introduced the possibility of a ceiling effect on social-moral rule knowledge scale (SMAT-A). The SRM-SF was reported to have adequate reliability for males with intellectual disabilities. The SRM-SF was described as valid because it is positively correlated with the Moral Judgement Interview and discriminates between children of different ages and between adolescents who are "delinquent" and "non-delinquent" (Gibbs, Basinger, & Fuller, 1992).

Non-offenders in both Langdon et al. (2011) and McDermott and Langdon's (2014) studies demonstrated less mature moral reasoning than offenders on items relating to the law and legal justice. Langdon et al. (2011) and McDermott and Langdon (2014) both argued that this finding supported the theoretical notion that moral decisions at developmentally earlier stages are based on rule adherence (Gibbs, 1979; Gibbs et al., 1992), making offending less likely (Langdon, Clare, et al., 2010; Langdon, Murphy, et al., 2010). The more advanced but still developmentally immature moral reasoning demonstrated by offenders has been linked to decision making based on personal gain, making offending more likely (Gibbs, 1979; Gibbs et al., 1992). However, neither study reported whether offenders had received interventions that may have enhanced their moral reasoning. The SMAT does not provide clear guidance on how scores relate to different developmental stages. Comparisons between the findings of Hammond and Beail (2017) to the findings of Langdon et al. (2011) and McDermott and Langdon (2014) regarding developmental stages of moral reasoning are therefore difficult.

Langdon et al. (2011) reported that the mean IQ of their offending group was significantly higher than their non-offending group

and that IQ and moral reasoning scores were positively correlated. When IQ was controlled for, differences between groups on three of the seven SRM-SF constructs were no longer significant. Hammond and Beail (2017) matched their offending and non-offending groups for IQ, and no significant differences in moral awareness or reasoning were found.

Langdon et al. (2011) and McDermott and Langdon (2014) offered methodologically robust evidence that offenders present with developmentally more mature moral reasoning than non-offenders. However, this difference was not replicated by Hammond and Beail (2017). Hammond and Beail's study was also of good methodological quality and they used a measure that relied less heavily on abstract questioning (SMAT). However, the theoretical underpinnings of the SMAT are unclear, making comparisons across studies problematic. It is possible that IQ could account for differences in scores between offending and non-offending groups.

A further paper explored social problem solving (Rodgers, Robertson, Marriott, and Belmonte (2018)) between offending and non-offending intellectual disability groups using an adapted version of the Social Problem-Solving Inventory (SPSI-R). Rodgers et al.'s (2018) findings were consistent with Langdon et al. (2011) and McDermott and Langdon (2014), whereby offenders scored better than non-offenders on social problem solving. However, Rodgers et al. scored 6/12 on the methodological quality measure. The sample size was small (six offenders, five non-offenders), there was no reliability or validity information regarding the SPSI-R, and no IQ data for participants were provided. There was also a difference in testing conditions between offending and non-offending groups (offenders were tested over multiple sessions), and treatment effects for the offending group cannot be ruled out. The difference in social problem solving between groups therefore needs to be interpreted with caution.

5 | DISCUSSION

This review aimed to evaluate the empirical evidence for a relationship between cognitive variables and offending in people with intellectual disabilities. Seven cognitive variables have been compared across 15 studies. The critical appraisal indicated that the amount of evidence was limited, with between one and four studies assessing each variable. In summary, studies assessing sexual knowledge found that offenders performed significantly better than non-offenders. Offenders were also found to have significantly more cognitive distortions. There were fewer consensuses between studies assessing empathy, moral reasoning, ToM and LoC, and a single study found no significant difference between offending and non-offending intellectual disability groups on measures of anger.

The methodological quality of studies varied, with ratings ranging from six to nine out of a possible score of 12. However, studies assessing the same cognitive variable tended to score similarly. There was a larger discrepancy in quality between studies assessing LoC, where one study achieved the lowest rating of 6/12 (Goodman et al., 2007) and the other achieved 8/12 (Langdon & Talbot, 2006). Differences in study quality may have contributed to the inconsistency in findings. Studies assessing sexual knowledge achieved the lowest quality ratings overall (6/12; 7/12). Whilst findings relating to sexual knowledge were consistent, it is unclear whether results would differ using more robust methodology.

Some studies used or adapted measures intended for the general population and did not report reliability or validity for a people with intellectual disabilities. Adapting measures for individuals with intellectual disabilities can be problematic in terms of ensuring adequate psychometric properties (Ralfs & Beail, 2014). Where measures were developed or adapted for people with intellectual disabilities, reliability and validity were not always reported or did not meet quality standards (Cicchetti, 1994). Lack of reliability and validity information means the extent to which some measures assessed the variables under evaluation was unestablished, therefore limiting the interpretation of results.

Whilst most studies clearly reported demographic information, some reported demographics for offending and non-offending groups collectively meaning that group equivalence could not be assessed (Goodman et al., 2007; Lunsky et al., 2007; Talbot & Langdon, 2006). Moreover, some studies did not report offence type (Langdon et al., 2011; McDermott & Langdon, 2014; Nicoll & Beail, 2013; Proctor & Beail, 2007), making comparisons across studies problematic. One study did not report the IQ scores of their participants (Rodgers et al., 2018).

Some studies found that offenders who had received treatment demonstrated significantly better scores than offenders who had not received treatment (Langdon & Talbot, 2006; Ralfs & Beail, 2012; Talbot & Langdon, 2006). The majority of studies did not account for previous treatment. It is therefore possible that better scores for offenders were a reflection of treatment effects, which are inherently difficult to control for (Lunsky et al., 2007).

The fact that sex offender's demonstrated greater sexual knowledge than non-offenders undermines the notion that less developed sexual knowledge is implicated in sexual offending for people with intellectual disabilities (Michie et al., 2006). However, it is possible that greater knowledge was due to post-offence sex education (Talbot & Langdon, 2006). Similarly, anger treatment studies for offenders with intellectual disabilities aim to decrease anger to non-offending levels in order to reduce recidivism (Taylor et al., 2002). However, Nicoll and Beail (2013) found that there was no significant difference between offenders and non-offenders on measures of anger. As this was the only study assessing anger, however, firm conclusions cannot be drawn.

Whilst offenders and non-offenders with intellectual disabilities both demonstrated developmentally immature moral reasoning in two studies, offenders showed more mature reasoning on items relating to the law and legal justice (Langdon et al., 2011; McDermott & Langdon, 2014). This finding is consistent with the theory that people with intellectual disabilities who have lower levels of moral reasoning are more likely to adhere to rules and therefore not

offend (Langdon, Clare, et al., 2010; Langdon, Murphy, et al., 2010). Differences in moral reasoning between offending and non-offending groups were not replicated by Hammond and Beail (2017). However, the theoretical underpinnings of the assessment used (SMAT) have yet to be established.

Gibbs (2003) and Palmer (2003) theorized that developmentally immature moral reasoning is associated with empathy deficits and cognitive distortions, increasing the risk of offending. In line with this theory, reviewed studies consistently found that offenders demonstrated more cognitive distortions than non-offenders. However, only one study found that offenders showed less empathy (Hockley & Langdon, 2015). The inconsistency in findings regarding the relationship between empathy and offending reflects inconsistencies within the mainstream forensic literature (Jolliffe & Farrington, 2004), particularly relating to sexual offending. It has been suggested that sex offenders do not lack general empathy, but specifically empathy for their own victim (Marshall et al., 1995).

Inconsistencies were also found between studies assessing LoC (Goodman et al., 2007; Langdon & Talbot, 2006). Theories from mainstream forensic literature suggest that a shift to internal LoC following treatment reduces the risk of re-offending due to increased personal responsibility (Fisher et al., 1998). However, Langdon and Talbot (2006) argued that people with intellectual disabilities generally have an external LoC (Gardner et al., 1977) whereas only a minority offend (Jones, 2007).

Crime is a social construct, and in some jurisdictions, it is impossible for people with moderate, severe or profound intellectual disabilities to commit offences (Lindsay et al., 2013). Thus, there cannot be a relationship between information processing and crime for these individuals. However, it may be that within the context of certain social factors, people with borderline/mild intellectual disabilities are at increased risk of committing a crime. This may explain why, in several studies, offenders have a degree of developmental maturity over their non-offending counterparts. As such, a linear relationship between information processing and crime would not be expected, but rather a curvilinear relationship moderated by intellectual ability as outlined by Langdon, Murphy, et al. (2010), Langdon, Clare, et al. (2010).

Numerous factors are likely to be implicated in offending for people with intellectual disabilities, so individual assessment and formulation is essential (Ralfs & Beail, 2012). However, consistency in the finding that sex offenders demonstrated significantly more cognitive distortions than non-offenders indicates the need to continue to target cognitive distortions within offender treatment programmes. The relationship between the other six cognitive variables reviewed and offending in people with intellectual disabilities is less clear. Due to methodological limitations, lack of attention to psychometric evaluations of cognitive measures, and the small number of studies assessing each variable, firm conclusions cannot be drawn. In order to clarify the relationship between cognitive variables and offending further in order to develop evidence-based treatment programmes, more robust research is required using reliable and valid measures specifically developed for people with intellectual disabilities. Clarity regarding demographic variables, including offence type, is also required. The assessment of IQ is particularly important to ensure that any differences found cannot be accounted for by cognitive ability. Moreover, studies should only include participants with IQs within the intellectual disability range to ensure that findings are generalisable to people with intellectual disabilities. Finally, this review has focussed on cognitive factors which only form a part of the wider range of risk in offending behaviour. Further research is also needed on the relationship between these wider risk factors and cognitive factors.

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How to cite this article: Hammond S, Beail N. The relationship between cognitive variables and offending behaviour in adults with intellectual disabilities: A systematic review. *J Appl Res Intellect Disabil*. 2020;00:1–14. https://doi.org/10.1111/jar.12738