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The relationship between problem-solving ability and self-harm amongst people with mild intellectual disabilities

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### Abstract

*Background.* The purpose of this study was to investigate the relationship between depression, hopelessness, problem-solving ability and self-harming behaviours amongst people with mild intellectual disabilities (IDs). *Methods.* Thirty-six people with mild IDs (77.9% women,  $M_{age} = 31.77$ ,  $SD = 10.73$ ,  $M_{IQ} = 62.65$ ,  $SD = 5.74$ ) who had a history of self-harm were recruited. Participants were asked to complete measures of depression, hopelessness and problem-solving ability. *Results.* Cutting was most frequently observed, and depression was prevalent amongst the sample. There was a significant positive relationship between depression and hopelessness, while there was no significant relationship between self-harm and depression or hopelessness. Problem-solving ability explained 15% of the variance in self-harm scores. *Conclusions.* Problem-solving ability appears to be associated with self-harming behaviours in people with mild IDs.

*Keywords:* Self-injury; self-harm; learning disabilities; neurodevelopmental disorders; Problem-Solving Task (PST), depression.

The relationship between self-harm and problem solving ability amongst people with mild intellectual disabilities

Lovell (2007) suggested that the distinction often drawn between people with intellectual disabilities (IDs) who engage in self-injury, and people with mental health problems who engage in self-harm is unhelpful, as the behaviours are likely to have a shared aetiology. Certainly, recent theoretical conceptualisations of self-harming behaviour incorporate genetic, social, and psychological risk factors, including aetiological factors familiar to those working with people with severe or profound (IDs), such as communication skills, and operant conditioning, as well as factors that are in no doubt also relevant to people with IDs, but perhaps more familiar to those working with people without severe or profound IDs, such as childhood abuse and poor problem-solving (Nock, 2013). It has been suggested that there may be a shared genetic aetiology behind both self-harm or self-injury amongst people with and without IDs (Ernst, Morton, & Gusella, 2010).

Traditionally, the aetiology of self-injurious behaviour amongst people with severe and profound IDs has received a great deal of attention, which has been understood using principles of operant conditioning (Furniss & Biswas, 2012; McClintock, Hall, & Oliver, 2003; Tureck, Matson, & Beighley, 2013). Self-harm amongst people with mild IDs has received less attention, and although operant conditioning is highly relevant in our understanding of this behaviour, two phenomenological studies have reported that emotional regulation difficulties, abuse and interpersonal context are also important factors to consider when examining the function of self-harm amongst people with mild IDs (Brown & Beail, 2009; Duperouzel & Fish, 2010), notwithstanding that these factors could be skilfully incorporated into any clinical formulation using principles of learning theory.

Self-harm amongst adolescents and adults without IDs has been related to psychiatric disorders, including depression and personality disorder (Haw, Hawton, Houston, & Townsend, 2001), as well as hopelessness and problem-solving ability (McLaughlin, Miller, & Warwick, 1996; Milnes, Owens, & Blenkiron, 2002). Depression, hopelessness and hostility have also been associated with recurrent instances of self-harm (Brittlebank et al., 1990; Hawton, Kingsbury, Steinhardt, James, & Fagg, 1999;

McMillan, Gilbody, Beresford, & Neilly, 2007), and further, there is some evidence that people who engage in cutting behaviour have higher levels of hopelessness than those who have taken an overdose (Larkin, Di Blasi, & Arensman, 2013). There is also evidence to suggest that problem-solving treatments are effective at improving depression, hopelessness and problems amongst people who have engaged in self-harm (Townsend et al., 2001).

However, little is known about the relationships between depression, hopelessness, problem-solving ability and self-harm amongst people with mild IDs, although there is evidence that people with IDs have higher rates of mental illness (Deb, Thomas, & Bright, 2001a, 2001b), and problem-solving based interventions have been modified for use with people who have IDs (Ailey, Friese, & Nezu, 2012). In order to explore the relationships between these constructs, a single-group of people with mild IDs who had a history of self-harm without known suicidal intent was recruited and asked to complete measures of depression, hopelessness and problem solving ability. Considering the existing literature, the specific hypotheses investigated were as follows, (a) depression and hopelessness will correlate positively with self-harm, (b) problem solving ability will correlate negatively with self-harm, and (c) together, depression, hopelessness and problem-solving ability will predict self-harm.

## Method

### Participants

Thirty-six people with mild IDs (77.9% women,  $M_{age} = 31.77$ ,  $SD = 10.73$ ,  $M_{IQ} = 62.65$ ,  $SD = 5.74$ ) were recruited from the community and inpatient services for people with IDs in the east of England. The specific inclusion criteria were, (a) evidence of mild IDs as indicated by a Full Scale IQ that ranged from 50 to 70, and (b) evidence of past or recent self-harm behaviours defined as, “the deliberate, direct destruction or alternation of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage (e.g. scarring) to occur” (Gratz, 2001). Potential

participants were excluded if they were judged to lack capacity to consent or refuse to take part in this research study.

### **Design and Procedure**

A cross-sectional correlational design was used; following a favourable opinion from a National Health Service (NHS) Research Ethics Committee, a single group of participants was recruited and completed a set of assessment measures. Information about the study was shared with community and inpatient teams for people with IDs. Staff members were asked to identify potential participants and make the initial approach to determine whether or not participants were willing to meet with the researchers to discuss the study further. Participants who met with the researchers were provided information about the study, and for those who wished to take part, they were asked to sign a consent form indicating their willingness to participate.

### **Measures**

**General intellectual functioning.** The Wechsler Abbreviated Scale of Intelligence (WASI, Wechsler, 1999) was used to estimate the general intellectual functioning of participants. This is a shortened version of the Wechsler Adult Intelligence Scale – III (WAIS-III, Wechsler, 1998), containing four subtests which assess verbal and non-verbal reasoning. The WASI has excellent reliability and validity, and correlates highly with Full Scale IQ from the WAIS-III (Wechsler, 1999).

**Depression.** The Glasgow Depression Scale (GDS, Cuthill, Espie, & Cooper, 2003) was used to measure depression. The GDS is comprised of a 20-item assisted self-report scale and has excellent internal consistency ( $\alpha = .90$ ) and test-retest reliability ( $r = .97$ ) when used with people with IDs.

**Hopelessness.** The Hopelessness Scale for Children (HSC, Kazdin, French, Unis, Esveldt-Dawson, & Sherick, 1983; Kazdin, Rodgers, & Colbus, 1986) was originally based on the Beck Hopelessness Scale (Beck & Steer, 1988). Participants are invited to rate 17 true or false items, and the measure has

excellent internal consistency and adequate test-retest reliability (Kazdin et al., 1986). The measure has previously been used with people with IDs (Nezu, Nezu, Rothenberg, DelliCarpini, & Groag, 1995).

**Problem-Solving.** The Problem Solving Task (PST) was developed specifically for this study and for use with people with IDs. The measure was adapted from a similar set of tasks developed for use with sexual offenders with IDs (Nezu, Nezu, Good, & Saad, 1998) and has been used as an outcome measure for problem-solving training groups (Nezu, Nezu, & Arian, 1991). The original problem situations that were presented to respondents as part of the measure were amended so they were more appropriate for people with IDs who have no history of criminal offending. The PST consists of five problem situations that are read to the participant. Participants are then asked a series of questions concerning: (a) problem identification, (b) generation of solutions, (c) selection of appropriate solutions, and (d) evaluation of solutions, and scores are summed to give a total score. Responses to questions are scored by two separate raters according to a set of criteria regarding the appropriateness of each response. The revised instrument has been previously used with people with IDs and developmental disabilities (Langdon, Murphy, Clare, Palmer, & Rees, 2013). Rees (2009) reported that the test-retest reliability of the PST total score was excellent,  $r_t = .98$ , as was the case for the subscales, (a) problem identification,  $r_t = .96$ , (b) generation of solutions,  $r_t = .91$ , (c) selection of appropriate solutions,  $r_t = .96$ , and (d) evaluation of solutions,  $r_t = .99$ . For the current study, interrater reliability was calculated using a second rater, and interrater agreement was excellent for the subscales, (a) problem identification,  $r_t = .95$ , (b) generation of solutions,  $r_t = .97$ , (c) selection of appropriate solutions,  $r_t = .95$ , and (d) evaluation of solutions,  $r_t = .86$ , along with the total score,  $r_t = .94$ .

**Self-Harm.** This was measured by making use of information gained from a short interview with participants, and staff members, along with information taken from clinical notes. Using this

information, each participant was assigned a self-harm rating using a matrix that reflected both severity and frequency of self-harm (Table 1).

## Results

Eight different types of self-harm behaviour were found to exist amongst the participants recruited (Table 2). Fourteen people made use of more than one type of self-harm behaviour, and the most common form of self-harm was cutting, followed by hitting or striking oneself. Sixty-seven,  $n = 24$ , percent of the sample scored above the clinical cut-off for depression on the Glasgow Depression Scale (Cuthill et al., 2003). There was a significant positive correlation between age and self-harm,  $r(36) = .29, p = .04$ .

### *Hypothesis 1: Depression and hopelessness will correlate positively with self-harm*

There was no significant correlation between self-harm and depression,  $r(36) = -.17, p = .16$ , or self-harm and hopelessness,  $r(36) = -.20, p = .11$ . However, depression and hopelessness were positively related,  $r(36) = .69, p < .0001$ . Evaluation of Solutions, as measured using the PST, correlated significantly with depression, but this was in the positive direction,  $r(36) = .29, p = .04$  (Table 3).

### *Hypothesis 2: Problem solving ability will correlate negatively with self-harm*

Self-harm correlated negatively with all aspects of problem-solving as measured by the PST, which included Identification of Problems,  $r(36) = -.29, p = .04$ , Generating Solutions,  $r(36) = -.31, p = .03$ , Evaluating Solutions,  $r(36) = -.36, p = .01$ , as well as PST Total Score,  $r(36) = -.40, p = .009$  (Table 3). There was also significant positive relationship between IQ and problem solving ability as measured by PST total score,  $r(36) = .50, p = .001$  (Table 3).

### *Hypothesis 3: Together, depression, hopelessness and problem-solving ability will predict self-harm.*

As hopelessness and depression did not correlate with self-harm, this was not investigated within a regression model. PST total score was regressed onto self-harm using bootstrapping with 5000



samples with replacement, and the bias corrected and accelerated ( $BC_a$ ) 95% confidence interval (CI) for the parameter estimate was calculated. The results revealed that PST total score explained 15% of the variance in self-harm,  $R^2 = .15$ ;  $\beta = -.39$ ;  $B = -.06$ ;  $t = -2.44$ ,  $p = .046$  (two-tailed);  $BC_a$  95% CI [- .121, -.003].

### Discussion

The results of the study suggest that depression was prevalent amongst the sample recruited, with most having a history of engaging in cutting behaviours. While there was a relationship between depression and hopelessness, in the appropriate directions, these constructs did not correlate with self-harm behaviour. As a consequence, our first hypothesis, that depression and hopelessness would correlate positively with self-harm, was not supported. There was a relationship between self-harm and problem-solving ability as measured using the PST, in the appropriate direction, supporting our second hypothesis that problem-solving ability would be related to self-harm. Our third hypothesis, that depression, hopelessness and problem-solving ability would predict levels of self-harm was partially supported as only problem-solving ability, as measured by the PST, significantly predicted self-harm behaviour, while depression and hopelessness were not investigated further because of the lack of a relationship with self-harm.

The findings from the current study are not entirely consistent with the findings from studies that have included samples of people without IDs who engage in self-harm, where depression and hopelessness have been shown to relate to self-harm (Brittlebank et al., 1990; Haw et al., 2001; Hawton et al., 1999; McLaughlin et al., 1996; McMillan et al., 2007; Milnes et al., 2002). However, the findings that problem-solving ability does relate to self-harm is consistent with this literature (McLaughlin et al., 1996; Milnes et al., 2002).

The lack of a relationship between depression, hopelessness and self-harm is counter-intuitive. There may be several reasons for these findings. First, the findings may relate to difficulties with the validity of the measures used within the study. However, The Glasgow Depression Scale (GDS,

Cuthill et al., 2003) has good psychometric properties, while the Hopelessness Scale for Children (HSC, Kazdin et al., 1983; Kazdin et al., 1986) has been previously used with people with IDs; although this does not imply that its psychometric properties are robust when used with people with IDs (Nezu et al., 1995), bearing in mind that The Hopelessness Scale and The Glasgow Depression scale correlated strongly (Table 2). The measure of self-harm was a combined rating of severity and frequency, which may have masked some differences between participants, although self-harm related well to problem-solving as predicted, suggesting to some degree, that the measure of self-harm had some validity. As a consequence, it seems unlikely that there were marked problems with the measures used within this study. Second, it may be the case that the sample size within this study was too small and therefore relationships between depression, hopelessness and self-harm were not detected. Third, as many other studies have used between-groups cross-sectional designs, comparing those with and without a history of self-harm, the correlational design of the current study prevented the exploration of differences between those with and without a history of self-harm who have mild IDs. It was notable that 67% of the sample scored above the clinical cut-off on The Glasgow Depression Scale, and there may not have been sufficient variability within the data, which masked the true relationship between depression, hopelessness and self-harm.

However, the findings suggest that problem-solving ability is an important construct to consider when working with people with mild IDs who engage in self-harming behaviours, as it suggests that there is a relationship between problem-solving ability and self-harming behaviours, and perhaps problem-solving therapies would be helpful. While Lovell (2007) suggested that there may be a shared aetiology between self-harm or self-injury in those with mild IDs or severe and profound IDs, recent theoretical approaches have incorporated constructs which are no doubt relevant to those with mild and those with severe or profound IDs, and the findings from the current study are consistent with these models (Nock, 2013). However, this study was not a test of these theories with people with IDs, and much further future work, using larger samples, is needed to strongly establish the validity of these models for understanding self-harm or self-injury seen amongst people

with IDs. Related to this, although there is emerging evidence that psychological therapies, such as cognitive-behavioural therapy, may be helpful for people with IDs (Vereenooghe & Langdon, 2013), there is no evidence that talking psychological therapies are efficacious for people with mild IDs who engage in self-harm.

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Table 1

*Deliberate self-harm severity rating matrix. Using information about the frequency and severity the appropriate score is calculated.*

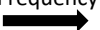

Frequency 	Infrequent (less than two incidents in the past year)	Fairly infrequent (1 to 2 incidents in the last 6 months)	Fairly frequent (at least 1 incident every couple of months)	Frequent (at least once a fortnight)	Very frequent (at least weekly)
 Severity					
Very minor self-harm (e.g. scratches, hitting objects) with little to no injury (e.g. very small scars)	1	2	3	4	5
Minor self-harm (e.g. superficial lacerations, head-banging with no evidence of injury, superficial burns)	2	4	6	8	10
Moderate self-harm (e.g. moderate lacerations, insertion of foreign objects, burns leaving scarring)	3	6	9	12	15
Serious self-harm (e.g. potential for significant injury, deep cuts, insertion of objects require medical attention, other serious physical injury)	4	8	12	16	20
Self-harm leading to disability or serious disfigurement (e.g. head-banging with possible head injury, impaired vision, lacerations to deep structures with heavy bleeding causing severe scarring, broken bones, hospital treatment required, risk of death)	5	10	15	20	25

Table 2

*Descriptive data and types of self-harm observed amongst the participants*

Measure	<i>M</i> =	<i>SD</i> =	Type of Self Harm	Frequency Count (%) <sup>a</sup>
Self-Harm	5.56	1.86	Cutting	23 (64)
Depression	18.69	9.21	Striking self	7 (19)
Hopelessness	7.50	4.25	Scratching	5 (14)
Problem Solving Task			Burning	4 (11)
Identification of Problems	16.06	5.03	Headbanging	4 (11)
Generating Solutions	8.64	2.44	Insertion of object	4 (11)
Choosing Appropriate Solutions	18.61	3.25	Picking	4 (11)
Evaluating Solutions	13.94	5.17	Biting self	2 (6)
Total Score	56.64	1.91		

*Note.* Depression = Glasgow Depression Scale. Hopelessness = Hopelessness Scale for Children. <sup>a</sup>More than one type of self-harm behaviour was observed for the same participant, meaning that the frequency count does not equal the sample size for the study. However, the % was calculated using sample size.

Table 3

*Correlations between variables*

	GDS	HSC	Ident	Gener	Choose	Evalu	Total	IQ	Age
Self-Harm	-.17	-.20	-.29*	-.31*	-.25	-.36*	-.40**	-.27	.29*
GDS		.69***	-.19	.36*	-.01	.29*	.11	-.03	-.03
HSC			-.02	.09	.05	.21	.12	.15	-.17
Ident				.15	.54***	.57***	.81***	.54***	-.31*
Gener					.25	.37*	.46**	.22	-.01
Choose						.39**	.74***	.40**	-.07
Evalu							.82***	.34*	-.26
Total								.50**	-.25
IQ									.04

Note. GDS = Glasgow Depression Scale. HSC = Hopelessness Scale for Children. Ident = Problem Solving Task – Identification of Problems. Gener = Problem Solving Task – Generating Solutions. Choose = Problem Solving Task – Choosing Appropriate Solutions. Evalu = Problem Solving Task – Evaluating Solutions. Total = Problem Solving Task – Total Score. IQ = Intelligence Quotient. \*p < .05, \*\*p < .01, \*\*\*p < .001