



Research Paper

The role of self-reported emotional regulation strategies in hoarding behaviours in a non-clinical adult sample

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ABSTRACT

Emotion regulation (ER) is implicated in various psychiatric conditions and individuals displaying hoarding behaviours report difficulties in their ER strategies. However, research has only focussed on putatively maladaptive ER strategies, and has not controlled for comorbid anxiety and depression. This study investigated whether difficulties in putatively maladaptive and putatively adaptive ER strategies are linked with hoarding behaviours in a non-clinical sample, whilst controlling for anxiety and depression. A cross-sectional online survey recruited 136 participants who answered questionnaires about their hoarding behaviours and cognitions, emotional regulation, anxiety, depression, and positive and negative affect. A hierarchical regression found that after controlling for anxiety, depression, and current affect, increases in hoarding behaviours were linked with increased difficulties with ER, but not significantly linked with the use of putatively maladaptive and putatively adaptive ER strategies. Future research is still needed to fully understand the cognitive mechanisms, such as executive function, underpinning the relationship between ER and HD as this relationship may have therapeutic implications.

1. Introduction

Hoarding Disorder (HD) is characterised by difficulty discarding possessions, leading to overly cluttered living spaces (Frost and Hartl, 1996). Living conditions can become unsanitary and may contribute to fire-related deaths in older adults (Frost and Steketee, 2010; Aufero et al., 2011). Alongside these physical risks, HD is associated with social impairments, financial difficulties, and occupational problems (Tolin et al., 2008). Prevalence is around 2.5% (Postlethwaite et al., 2019), higher than obsessive-compulsive disorder, and similar to psychotic disorders (Perälä et al., 2007; Adam et al., 2012). Despite the high prevalence and detrimental impact on functioning, there is little research on the psychological mechanisms underlying hoarding behaviours.

Research into underlying cognitive and behavioural processes of psychopathologies is invaluable in the development of psychological therapies (Ingram, 2007; Harvey et al., 2004), including HD (Frost and Hartl, 1996; Wheaton, 2016). In HD, the content of dysfunctional beliefs is specifically related to possessions e.g., feeling responsibility for them, needing to be in control of them, and being emotionally attached to

them (Steketee et al., 2003). Research also highlights that transdiagnostic processes are linked to hoarding, perhaps due to comorbidity with other mental health disorders. These include trauma, distress intolerance, and avoidance (Wheaton, 2016), all of which have been influential in the development of transdiagnostic CBT (Schaeuffele et al., 2021; Sloan et al., 2017).

Emotion regulation (ER) is also a key component of transdiagnostic CBT (Cludius et al., 2020; Sloan et al., 2017). ER is the attempts individuals make to inhibit, maintain, and enhance emotions (Bridges et al., 2004). ER can be a deliberate or automatic response, occurring before or after an emotionally arousing event, or in response to positive and negative emotional experiences (Gross and John, 2003; Parrot, 1993; Mauss et al., 2007). ER strategies are typically viewed as either maladaptive or adaptive. Adaptive ER allows an individual to function successfully in the environment and engage in goal-directed behaviours, whilst still allowing the emotional experience to run its course. Maladaptive ER (or emotion dysregulation) inhibits individuals from containing their emotional experience enough to engage in goal-directed behaviours (Robertson et al., 2012). Notably, the 'fallacy of uniform efficacy' argues that specific ER strategies are not unvaryingly

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maladaptive or adaptive, and that their influence depends on contextual factors (Bonnano and Burton, 2013). As such, it is more appropriate to frame specific strategies as putatively adaptive or maladaptive. Examples of putatively adaptive ER strategies include acceptance, positive refocussing, and positive reappraisal. Putatively maladaptive ER strategies are rumination, catastrophising, and self-blame.

While greater tendencies to engage in putatively maladaptive ER strategies are linked with mental health problems such as depression and anxiety, putatively adaptive strategies can be protective (Aldao et al., 2010; Hu et al., 2014). Wider difficulties with ER, for example a lack of awareness or understanding of emotions and how to deal with these emotions (Gratz and Roemer, 2004), are also associated with poorer mental health outcomes (Hallion et al., 2018).

Understanding the role of emotion regulation in hoarding disorder can provide insight into underlying processes, and aid the development of successful interventions, as has already happened for other disorders (e.g., Sloan et al., 2017). To date, most research on emotion regulation in hoarding has focused on associations with overall difficulties with ER, such as having limited awareness and understanding of emotions, a restricted repertoire of effective strategies, and avoidance or non-acceptance of emotions (Akbari et al., 2022; Barton et al., 2021). Studies have compared ER in both clinical and non-clinical samples, with hoarding behaviours being related to such difficulties, and with evidence that attachment to possessions plays a role in this association (Phung et al., 2015; Tolin et al., 2018; Raines et al., 2015). However, limited research has investigated whether tendencies to use more maladaptive (or fewer adaptive) strategies are linked with HD (de la Cruz et al., 2013; Portero et al., 2015). In addition, existing studies on hoarding and emotion regulation often focus solely on treatment-seeking clinical samples, which may be unrepresentative of hoarding samples, as clinical hoarders often do not voluntarily seek treatment (Frost et al., 2010).

Further, continuum models of psychopathology propose that all individuals fall somewhere on the continuum between clinical hoarders and non-hoarders), and non-clinical samples allow for a range of experiences across the continuum to be included (Timpano et al., 2009; Coles et al., 2003). As such, the current study focused on hoarding behaviours in a non-clinical sample (recruited from a general population), consistent with the conceptualization of hoarding as a dimensional phenomena, and with other research in this area (e.g. Raines et al., 2015; Taylor et al., 2018; Timpano et al., 2013). To date, little research has investigated emotion regulation deficits in tandem with further psychological mechanisms such as beliefs about possessions, in order to build more of a picture of an overall model. One study (Phung et al., 2015) investigated emotional attachment to possessions and variables related to tolerating distressing emotional experiences, finding that attachment influenced the relationship between ER-relevant variables and hoarding.

Therefore, the current study included measures of both emotion (dys)regulation and beliefs about possessions, in anticipation that all would play a role in hoarding behaviours, having their own unique associations with hoarding, whilst also contributing to the overall model. This study aimed to investigate the role of putatively adaptive and maladaptive ER strategies, wider difficulties in emotion regulation, and beliefs about possessions in relation to hoarding, after controlling for anxiety and depression (given high comorbidity with these conditions; Frost et al., 2015) and current affect. We hypothesised that hoarding behaviours would be:

- 1: Positively associated with overall difficulties in ER.
- 2: Positively associated with tendencies to use putatively maladaptive ER strategies
- 3: Negatively associated with tendencies to use putatively adaptive ER strategies.

It was further predicted that associations between hoarding

behaviours and emotion regulation processes would contribute to the variance in hoarding when taking beliefs into account, meaning they have a unique association with hoarding over and above such beliefs, and are therefore a psychological mechanism worth exploring further in line with beliefs, for which the relationship is more established. We also investigated if the relationship between emotion regulation and hoarding would be upheld when controlling for current anxiety, depression and current affect.

2. Method

2.1. Participants

A *Priori* power analysis using G*Power 3.1.9.7 (Faul et al., 2007), with the alpha level set at 0.05, a power of 0.80 and Cohen's *d* of 0.5, produced a minimum number of 102 participants for the study to reach adequate statistical power. An opportunity sample was recruited through social media posts. Participants had to be over the age of 18. While 197 responses were gathered, 61 responses had to be removed due to stopping participation partway through, which was considered a withdrawal of data as per the participant information sheet. The final sample was $n = 136$. The age range was 18 to 78 (Mean=33.6 years, SD=16.0). 44 participants identified as male, 86 as female and 6 as other.

2.2. Demographics

Participants were asked to provide their age and sex.

2.3. Variables

2.3.1. Outcome variable

The Savings Inventory-Revised (SI-R) is a 23-item questionnaire used to assess hoarding behaviours, including clutter, excessive acquisition and difficulty discarding (Frost et al., 2004). It has been shown to be a valid instrument in both clinical and non-clinical samples (Frost et al., 2004). Higher scores indicate higher hoarding behaviours. The SI-R has been praised for its high internal reliability when used on control and clinical samples (Cronbach's $\alpha = 0.84$ for controls, 0.94 for clinical groups; Fontenelle et al., 2010). In our data, $\alpha = 0.95$

2.3.2. Predictor variables

The Difficulties in Emotion Regulation Scale (DERS) is a 36-item scale used to assess problems with emotion regulation (Gratz and Roemer, 2004). The DERS can be used as a total score and also has six subscales: nonacceptance of emotion, difficulty engaging in goal-directed behaviour, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. A higher score is representative of an individual having more difficulties with regulating their emotions. The DERS has been found to have good internal validity as it has a Cronbach's α level of 0.80 (Kökönyei et al., 2014). In our data, $\alpha = 0.95$.

The Saving Cognitions Inventory (SCI) is a 24-item questionnaire is used to assess the beliefs individuals hold about trying to discard an object (Steketee et al., 2003). A higher score is indicative of having more dysfunctional beliefs about possessions. The SCI has good internal consistency (Coles et al., 2003). The SCI has been found to have good internal reliability with a sample of both controls and individuals with HD (Cronbach's $\alpha = 0.98$) (Steketee et al., 2003). In our data $\alpha = 0.95$.

The Cognitive Emotion Regulation Questionnaire (CERQ) is a 36-item questionnaire exploring both positive and negative cognitive ER strategies used in response to a negative event (Jermann et al., 2006). It can be split into two, measuring the individuals use of putatively adaptive and maladaptive ER techniques, or split into nine separate subscales, each measuring a different ER strategy. The putatively adaptive ER

techniques measured by the CERQ are putting into perspective, positive refocussing, positive reappraisal, acceptance and refocus on planning. The putatively maladaptive RE techniques measured by the CERQ are self-blame, catastrophising, blaming others and rumination. Higher scores indicate greater tendencies to use putatively adaptive or putatively maladaptive ER strategies (Garnefski et al., 2002). The CERQ has been found to have good internal reliability, having a Cronbach's alpha of 0.83 in a adult sample (Zhu et al., 2008). In our data alpha = 0.89.

2.3.3. Confounding variables: current affect

The Positive and Negative Affect Schedule (PANAS) is a 20-item questionnaire used to assess negative and positive affect and provides a total positive affect and a total negative affect score. (Watson et al., 1988). It has good reliability and validity (Crawford and Henry, 2004). The PANAS has very good internal reliability, with alpha scores ranging from 0.86 to 0.90 when measuring positive affect and ranging from 0.84 to 0.87 when measuring negative affect (Magyar-Moe, 2009). In our data alpha = 0.92.

The Generalised Anxiety Disorder Questionnaire (GAD-7) is a 7-item questionnaire used to screen for generalised anxiety disorder with a higher score indicating higher levels of anxiety (Spitzer et al., 2006). The GAD-7 has high validity and has strong internal reliability with a Cronbach's alpha of 0.89 (Zhong et al., 2015). In our data alpha = 0.90.

The Patient Health Questionnaire (PHQ-9) -The PHQ-9 is a 9-item questionnaire to screen for depression, with a higher score indicating increased depressive symptoms. (Kroenke et al., 2001). The PHQ-9 was selected for the study due to it being a quick and reliable measure of depression in a non-clinical sample, with a high internal reliability (Cronbach's Alpha=0.85) (Hansson et al., 2009; Maroufizadeh et al., 2019). In our data alpha = 0.91.

2.4. Procedure

Ethical approval was granted from the Department of Psychology Ethics Committee, in accordance with the Faculty of Health and Life Sciences Ethics Committee at Northumbria University. A link shared through social media took the participants to an online survey on Qualtrics. Once informed consent was obtained, they then completed the survey. Lastly, the participants were debriefed. The study took approximately 15–20 min to complete. There was no pay or other incentive for participants to complete this survey. By not including any incentive this minimised the chance of bots being used to spam responses in order to receive any incentive.

2.5. Data analysis

Prior to analysis using SPSS, all 61 incomplete datasets were removed, as participants were told that if they closed the browser before completing the survey, their data would be withdrawn. Bivariate correlations tested for relationships between each predictor and confounding variable and hoarding. After this, assumption checks for multiple regression were carried out. Following this, a hierarchical regression was performed with hoarding as the outcome variable. Beliefs about possessions and emotion regulation variables were added in the first block to test their combined and unique contribution to the variance in hoarding, as we anticipated that both would have a unique association as part of a conceptual model including both beliefs and emotion regulation factors. Positive and negative affect, and mood and anxiety symptoms, were added in the second block to test whether associations between hoarding and psychological mechanisms were upheld when controlling for current affect.

This project has been pre-registered on the OSF (link to project https://osf.io/b7eas/?view_only=08de4840c6144b13bcf84175143b527e).

3. Results

3.1. Descriptive statistics

Of the 136 responses gathered, 7 scored within the severe range for depressive symptoms, 19 scored in the moderately severe range, 22 scored within the moderate range, 34 scored between the mild range, and 54 scored within the no depressive symptoms range in the PHQ-9. As well as this, 12 participants scored within the severe range for anxiety symptoms, 17 within the moderate range, 56 within the mild range, and 51 within the minimal range for anxiety symptoms in the GAD-7 (Table 1).

3.2. Testing assumptions

All variables had a tolerance score of more than 0.1 and VIF values were < 10, which shows that the multicollinearity assumption was not violated. Scatter plots highlighted that the data were homoscedastic and had a linear relationship with one another. The Durbin-Watson test score was 2.4, exceeding 1 (Table 2).

3.3. Correlation analysis

Pearson's bivariate correlations and descriptive statistics are shown in Table 3. DERS scores and CERQ putatively Maladaptive scores are strongly positively correlated with SI-R and SCI scores. However, CERQ putatively Adaptive scores were not significantly correlated with SI-R or SCI scores. SI-R and SCI scores are both positively correlated with GAD-7, PHQ-9, PANAS Negative, and PANAS Positive scores.

3.4. Regression analysis

The regression analysis tested the hypotheses regarding relationships between predictors (SCI, DERS, and CERQ putatively adaptive and putatively maladaptive) and the outcome (SI-R). Table 4 shows that block one is able to account for 63% of the variance in SI-R score with the DERS score and SCI score being significant predictors. To test the hypotheses that these relationships would be upheld when controlling for current affect, PANAS, GAD-7 and PHQ-9 were added in the second block. This model accounted for 66% of the variance in SI-R score, a 3% increase from model one, with DERS score, SCI score and PANAS negative scores being significant contributors to the regression. This suggests that DERS scores and SCI scores predict unique variance in SI-R scores when controlling for anxiety and depression.

As the DERS total score was significantly associated with hoarding behaviours, even when controlling for current symptoms and affect, a second exploratory regression analysis was run to test which individual facets of difficulties with emotion regulation were associated with hoarding severity. In this analysis, hoarding severity was again the outcome variable, but the predictors were the six DERS subscales¹ and

Table 1

number of participants scoring above and below the clinical cut off point for the SI-R split by gender.

	Total (n = 136)	Male (n = 44)	Female (n = 86)	Other/prefer not to say (n = 6)
Below clinical cut-off	116	40	73	3
Above clinical cut-off	20	4	13	3

¹ All DERS subscales were significantly and positively correlated with hoarding severity.

Table 2
Pearson's bivariate correlations between all factors (N = 136).

Variable	SI-R Total	SCI total	GAD-7 total	PHQ-9 total	PANAS Negative	PANAS Positive	CERQ Adaptive	CERQ Maladaptive	DERS total
SI-R total	–	.70**	.59**	.60**	.64**	.19*	–0.44	.56**	.69**
SCI total		–	.49**	.48**	.54**	.3**	–0.05	.51**	.50**
GAD-7 total			–	.81**	.39**	0.05	–0.12	.55**	.67**
PHQ-9 total				–	.45**	0.09	–0.11	.57**	.72**
PANAS Negative					–	.34**	–0.09	.37**	.54**
PANAS Positive						–	.19*	.17*	0.10
CERQ Adaptive							–	0.06	–0.17*
CERQ Maladaptive								–	.57**
Mean	22.77	72.95	6.47	7.84	13.94	20.58	67.02	42.93	85.43
SD	16	35.9	5	6.37	6.64	8.48	13.97	10.53	25.06
Range	0–87	24–169	0–20	0–27	10–44	10–45	4–20	4–20	42–166

* Note: = Correlation is significant at .05 level.
** = Correlation is significant at .01 level.

Table 3
Coefficients for Model 1 and Model 2 following hierarchical multiple regression.

		B	SE B	β	F	Adjusted R ²
Block 1	(Constant)	–23.96	5.67		119.79	.63**
	DERS total	0.27	.04	.42**		
	SCI total	0.190	.03	.43**		
	CERQ Adaptive	0.05	.06	0.04		
	CERQ Maladaptive	0.16	.10	0.10		
Block 2	(Constant)	–22.19	5.78		44.43	.66*
	DERS total	0.18	0.05	.28**		
	SCI total	0.15	0.03	.34**		
	CERQ Adaptive	0.07	0.06	0.06		
	CERQ Maladaptive	0.14	0.11	0.09		
	GAD total	0.21	0.28	0.07		
	PHQ total	0.05	0.24	0.02		
	PANAS Positive	–0.14	0.11	–0.08		
	PANAS Negative	0.66	0.16	.27*		

** Note: = significant at p < .001 level.
* =significant at p < .01 level.

Table 4
Coefficients for exploratory hierarchical multiple regression including DERS subscales.

		B	SE B	β	F	Adjusted R ²
Block 1	(Constant)	–12.23	3.83		33.00**	.62
	DERS nonacceptance	0.20	0.20	0.08		
	DERS goals	–0.04	0.20	–0.01		
	DERS impulse	0.62	0.27	.19*		
	DERS awareness	–0.10	0.22	–0.03		
	DERS strategies	0.38	0.27	0.17		
	DERS clarity	0.54	0.36	0.14		
	SCI total	0.19	0.03	.43**		
Block 2	(Constant)				3.19*	0.03
	DERS nonacceptance	0.15	0.20	0.06		
	DERS goals	0.15	0.26	0.05		
	DERS impulse	0.45	0.27	0.14		
	DERS awareness	0.04	0.22	0.01		
	DERS strategies	0.09	0.26	0.04		
	DERS clarity	0.25	0.37	0.06		
	SCI total	0.16	0.03	.36**		
	GAD total	0.21	0.29	0.07		
	PHQ total	0.13	0.25	0.05		
	PANAS Positive	–0.12	0.11	–0.06		
PANAS Negative	0.58	0.18	.24**			

** Note: = significant at p < .001 level.
* =significant at p < .05 level.

the SC-I. As they were non-significant in the main analysis, the CERQ scales were not entered. All covariates were entered as before. Findings are presented in Table 4 In block 1, the DERS subscale impulse control had a significant and positive association with hoarding, as did the SCI. In block 2, only the SCI and PANAS negative scores were significant predictors.

4. Discussion

The findings from this study indicate that overall ER difficulties predict scores on a standard measure of hoarding severity, in line with our first hypothesis. This is also in accord with previous studies showing links between ER and hoarding severity in nonclinical samples (Raines et al., 2015; Taylor et al., 2018). Moreover, the association between overall difficulties in ER and hoarding was upheld when taking beliefs about hoarding into account, suggesting that difficulties with ER independently contribute to hoarding alongside an established cognitive measure. The relationship also remained significant when controlling for current anxiety, depression, and positive and negative affect. This is in line with a meta-analysis reporting a medium effect size for ER difficulties and hoarding (Akbari et al., 2022). Further, qualitative research (Taylor et al., 2019) reported that people with lived experience of hoarding believed they did not have effective ER strategies to control negative emotions or make themselves feel better. The community sample from this study had many participants that scored both above and below the clinical cut off for HD, meaning that the data gathered reflects the HD continuum fully. Findings that difficulties in ER are linked with HD add support to ER models that propose psychopathologies are underpinned by ER difficulties (e.g., Sheppes et al., 2015).

In line with increasing evidence that *putatively* maladaptive emotion regulation strategies are transdiagnostic, it was also hypothesised that *putatively* maladaptive strategies would be positively linked with hoarding behaviours, whereas *putatively* adaptive strategies would show the opposite relationship. However, while we found a significant positive correlation between hoarding severity and maladaptive emotional strategies (as assessed via the CERQ), this relationship was not upheld in the regression analysis. There was no significant relationship between hoarding severity and adaptive emotional regulation strategies in any analysis. In one meta-analysis, adaptive ER strategies had small relationships with psychopathology, suggesting their absence may not play as large a role as greater tendencies to engage in maladaptive strategies (Aldao et al., 2010). However, in contrast to existing literature (Aldao et al., 2010), maladaptive strategies were also unrelated to hoarding. There is little research focusing on specific emotion regulation strategies and hoarding for comparison, as most research on emotion regulation and hoarding has used the DERS (Akbari et al., 2022).

Nonetheless, there is some evidence that the specific strategies of rumination and experiential avoidance are linked to hoarding behaviours (Portero et al., 2015; de la Cruz et al., 2013), as is having limited

access to strategies (Akbari et al., 2022). These studies used measures developed primarily for use in psychopathology, such as the Ruminative Response Scale (RRS; Nolen-Hoeksema and Morrow, 1991) and Acceptance and Action Questionnaire-II (Bond et al., 2011) for experiential avoidance. This current study used the CERQ which asks about coping in response to stressful or threatening situations (which could include discarding possessions) rather than tendencies to engage in specific strategies in response to particular emotions. While with the CERQ is related to psychopathology (Garnefski et al., 2001), it has not been used in this context as often as measures such as the RRS (Aldao et al., 2010).

It may also be the case that hoarding behaviours are themselves a form of emotion regulation, and there is evidence that possessions are used to manage both positive and negative emotions in hoarding (David et al., 2022). For example, the act of acquiring objects and the satisfaction of being attached to objects are positive emotions attached to hoarding (Yap et al., 2020). Alternatively, the stigma associated with hoarding (Chasson et al., 2018), and the anxiety associated with discarding items (Frost et al., 2016) are negative emotions associated with hoarding. This would explain why SCI was a significant predictor of hoarding severity as it contains items addressing emotional attachments, concerns about memory, control over possessions, and responsibility towards possessions (Steketee et al., 2003), all of which influence saving and discarding behaviours in HD (Frost and Hartl, 1996).

Finally, a secondary and exploratory analysis investigated whether specific facets of difficulties with emotion regulation were associated with hoarding. Only the Impulse Control subscale had a significant association in the regression, and none of the specific facets were significantly associated with hoarding when controlling for affect and symptoms. This is not that surprising as hoarding severity is associated with aspects of impulsivity (e.g. Timpano et al., 2013), but it is also not surprising that this loses significance when bringing in measures of emotions that covary with the DERS (e.g. GAD, PANAS, GPHQ).

Only the SCI and negative affect remained significant predictors, demonstrating the important of beliefs about possessions for hoarding and suggesting that it is overall difficulties with emotion regulation rather than any specific facet of this that may play a role in hoarding.

A limitation of our study was that we did not control for executive function (EF), which refers to the cognitive processes that underlie goal-orientated behaviours (Best and Miller, 2010). Information-processing problems including attention, memory and executive functioning are components of cognitive-behavioural models of hoarding (Wheaton, 2016). Studies have found that deficits in EF are linked with HD, with for example Morein-Zamir et al. (2014) reporting that clinical hoarders had problems completing tasks designed to assess EF. Furthermore, EF is also linked with ER with Zelazo and Cunningham (2007) proposing a model of EF that demonstrates how dysfunctions in EF may lead to problems with ER. This model is in line with other research by Lantrip et al. (2016) which found that poorer executive functioning was linked with the use of more maladaptive ER strategies. A further limitation of the study is that detailed demographic data including income, ethnicity and education was not gathered from the sample. Sixty-one participants dropped out of the study by closing their browser, as instructed to do if they wished to withdraw, meaning it was not possible to compare these participants on key variables, including demographics, to look for potential bias.

This cross-sectional study is an important step towards understanding if emotional regulation (both specific strategies and general deficits) is a potential mechanism underlying hoarding. However, prospective studies (especially using Experience Sampling Methodology) and experimental designs are required to better understand the possible role of emotion regulation in the development and maintenance of hoarding difficulties over time, rather than emotion regulation being an epiphenomenon of hoarding.

Nonetheless, an implication of this study is that alongside the importance of maladaptive beliefs about hoarding, psychological therapy focused on improving difficulties with ER could be useful in treating

hoarding difficulties. This is also in line with a recent review of CBT for hoarding (David et al., 2022). More recently, the transdiagnostic emotion regulation-focused Unified Protocol has shown promise in the treatment of a range of emotional disorders, including obsessive-compulsive disorders (Cassielo-Robbins et al., 2020), and could be a potential avenue for hoarding. The UP has also shown favourable retention rates in comparison to disorder-specific CBT (Cassielo-Robbins et al., 2020). As HD interventions have suffered with high dropout rates (Williams and Viscusi, 2016), a flexible transdiagnostic therapy that can improve retention would help to increase the numbers of individuals who fully recover.

In conclusion, this study found that difficulties in ER were significantly linked with hoarding behaviours in a non-clinical sample. However, neither adaptive nor maladaptive ER strategies were significantly linked to hoarding behaviours. These findings were supported by previous research. Future research should aim to understand the direction of the relationship between hoarding behaviours and difficulties in ER to better understand which factor influences the other. However, this study was not without its limitations and future research is needed to understand the potential role of other factors, such as executive functioning, in HD. The practical implications of this study could lead to the development of more effective interventions for HD.

CRediT authorship contribution statement

Emily Bates: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. **Alyson Dodd:** Conceptualization, Methodology, Writing – review & editing, Supervision. **Nick Neave:** Conceptualization, Methodology, Writing – review & editing, Supervision.

Declaration of Competing Interest

The authors declare that there were no conflicts of interest with respect to the authorship or the publication of this article.

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