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The association between obsessive-compulsive and related disorders and experiential avoidance: A systematic review and meta-analysis

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RUNNING HEAD: OCRDs & EXPERIENTIAL AVOIDANCE

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Abstract

The associations between the distinct types of obsessive-compulsive and related disorders and experiential avoidance has received mixed evidence. We, thus, undertook this meta-analysis to i) re-examine the association between obsessive-compulsive disorder and experiential avoidance, ii) extend this association to hoarding disorder, trichotillomania, and body dysmorphic disorder, and iii) identify potential variables affecting these associations. Five databases, including Medline, Embase, PsychINFO, Web of Science and CINAHL, were searched until March 15th, 2021. Meta-analyses based on random-effect models were performed. Heterogeneity and publication bias tests were applied using the I^2 statistic and the Egger's test. Meta-regression analyses were performed to identify potential moderators affecting the strength of these associations. Thirty-six unique studies based on $n = 11,859$ participants were identified. The association between obsessive-compulsive disorder and experiential avoidance was moderate ($SMD=0.75$, 95% CI=0.57-0.92), whereas the associations between individual obsessive-compulsive symptoms, including obsessions, responsibility for harm, ordering, checking, washing and neutralizing, and experiential avoidance ranged from low to strong (SMD ranged between 0.41 and 1.06, 95% CI = 0.25 to 1.40). The associations between hoarding disorder ($SMD=0.93$, 95% CI=0.46-1.40), trichotillomania ($SMD=0.56$, 95% CI=0.48-0.63), body dysmorphic disorder ($SMD=1.55$, 95% CI=0.72-2.37) and experiential avoidance were moderate to strong. Meta-regression analyses demonstrated that studies using the AAQ/AAQ-II scales for measuring experiential avoidance, and/or self-report scales for assessing OCRDs contributed smaller effect sizes. These findings suggest that reducing experiential avoidance may be a viable way of complementing exposure strategies in alleviating obsessive-compulsive and related symptoms.

Key words: experiential avoidance; OCRDs; OCD; HD; BDD; TTM; systematic review and meta-analysis

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Abstract

The associations between the distinct types of obsessive-compulsive and related disorders and experiential avoidance has received mixed evidence. We, thus, undertook this meta-analysis to i) re-examine the association between obsessive-compulsive disorder and experiential avoidance, ii) extend this association to hoarding disorder, trichotillomania, and body dysmorphic disorder, and iii) identify potential variables affecting these associations. Five databases, including Medline, Embase, PsychINFO, Web of Science and CINAHL, were searched until March 15th, 2021. Meta-analyses based on random-effect models were performed. Heterogeneity and publication bias tests were applied using the I^2 statistic and the Egger's test. Meta-regression analyses were performed to identify potential moderators affecting the strength of these associations. Thirty-six unique studies based on $n = 11,859$ participants were identified. The association between obsessive-compulsive disorder and experiential avoidance was moderate ($SMD=0.75$, 95% CI=0.57-0.92), whereas the associations between individual obsessive-compulsive symptoms, including obsessions, responsibility for harm, ordering, checking, washing and neutralizing, and experiential avoidance ranged from low to strong (SMD ranged between 0.41 and 1.06, 95% CI = 0.25 to 1.40). The associations between hoarding disorder ($SMD=0.93$, 95% CI=0.46-1.40), trichotillomania ($SMD=0.56$, 95% CI=0.48-0.63), body dysmorphic disorder ($SMD=1.55$, 95% CI=0.72-2.37) and experiential avoidance were moderate to strong. Meta-regression analyses demonstrated that studies using the AAQ/AAQ-II scales for measuring experiential avoidance, and/or self-report scales for assessing OCDs contributed smaller effect sizes. These findings suggest that reducing experiential avoidance may be a viable way of complementing exposure strategies in alleviating obsessive-compulsive and related symptoms. *Key words:* experiential avoidance; OCDs; OCD; HD; BDD; TTM; systematic review and meta-analysis

The association between obsessive-compulsive and related disorders and experiential avoidance: A systematic review and meta-analysis

Obsessive-compulsive and related disorders (OCDs) comprise a new chapter in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). They contain five distinct mental health problems, including obsessive-compulsive disorder (OCD), hoarding disorder (HD), trichotillomania (hair-pulling disorder; TMM), body-dysmorphic disorder (BDD), excoriation (skin-picking) disorder, and four additional sub-types of OCD. OCDs are severe and incapacitating conditions characterized by preoccupations and repetitive overt and/or covert behaviors called compulsions. Although the aim of these compulsions is to reduce the distress that is triggered by the preoccupations experienced, they may, in long-term, maintain and/or aggravate the person's overall distress (McManus et al., 2008). This may be the case because individuals exhibiting symptoms of OCDs attribute their reduction to the engagement in these repetitive behaviors (Angelakis & Austin, 2015). This realization compels them to engage in similar behaviors whenever they feel distressed which creates a vicious circle that ultimately overwhelms the person (Angelakis et al., 2018).

Exposure and response prevention (ERP) is the most well-researched treatment for OCDs (McKay et al., 2015). These exercises involving exposing oneself to feared thoughts, mental images, and/or objects and situations are very effective in alleviating the symptoms associated with the various types of OCDs. However, ERP exercises are also associated with i) increased dropout rates (Ong et al., 2016), ii) poor adherence to the treatment procedures (Wheaton, et al., 2016), and iii) reduced effects sizes at follow-up (Olatunji et al., 2014). Therefore, there is a clear need for refining and/or developing new treatments for OCDs.

Experiential avoidance, defined as the inability for the person to tolerate unpleasant thoughts, emotions and/or bodily sensations, has been proposed to play a key casual role in the development and maintenance of the various types of OCRDs (Angelakis & Gooding, 2019; Arabatzoudis et al., 2017; Blakey et al., 2017). For example, experiential avoidance may be viewed as a form of any repetitive covert behavior that is emitted for the person to regulate the distress caused by their preoccupations with the miscellaneous upsetting thoughts (Eifert & Forsyth, 2005). Targeting and reducing experiential avoidance may result in immediate reductions in compulsions that maintain their emission and contribute to symptom worsening. Hence, psychological treatments for OCRDs may be improved by incorporating techniques that aim to reduce experiential avoidance (Levitt et al., 2004; Ong et al., 2020). However, the association between the symptoms of OCRDs and experiential avoidance has received mixed support (e.g., Abramowitz et al., 2009; Angelakis & Gooding, 2019; Manos et al., 2010). Furthermore, a meta-analysis conducted by Bluett et al. (2014) revealed a weak to moderate association between OCD alone and experiential avoidance based on five papers. In recent years, the number of studies examining the associations between OCRDs and experiential avoidance has been significantly increased. Therefore, we undertook a systematic review with meta-analysis that had three core aims. These were to:

- i. provide an updated examination of the association between OCD and experiential avoidance;
- ii. extend this relationship to the various types of OCRDs, and;
- iii. explore any sample and/or methodological-related factors that may affect these relationships.

Methods

This systematic review and meta-analysis was conducted in alignment with the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) statement

(Moher et al., 2009) and the Meta-analysis of Observational Studies in Epidemiology (MOOSE) reporting guidance (Stroup et al., 2000).

Eligibility Criteria

All of the studies that were included in this systematic review and meta-analysis met the following inclusion criteria: i) were published in a peer-reviewed journal and were written in English, ii) included measures of experiential avoidance and obsessive-compulsive and related disorders, iii) used a quantitative research design, and iv) reported quantitative outcomes.

Studies that i) provided data that could not be included in the meta-analyses because effect sizes could not be calculated, and ii) were taken from the grey literature were excluded from the study. These included theses, dissertations, unpublished research reports and conference papers.

Information Sources and Search Strategy

Five electronic bibliographic databases, including Medline, PsychInfo, Embase, Web of Science and CINAHL (Cumulative Index to Nursing and Allied health) were searched from January 1, 2000 to March 15, 2021. The reference lists of eligible studies were inspected to further locate eligible studies. Authors were contacted to provide relevant data, if necessary. Searches included text words and MeSH (Medical Subjective Headings) terms and combined six blocks of key terms: 1) Obsessive-Compulsive Disorder OR OCD (obsess*compuls*disorder), 2) Body Dysmorphic Disorder OR BDD OR Dysmorphophobia (body dysmorph*disorder OR dysmor*), 3) Hoarding Disorder OR Compulsive Hoarding (hoard*disorder OR compuls*hoard*), 4) Hair Pulling Disorder OR Compulsive Hair Pulling OR Trichotillomania OR TTM (hair pull*disorder OR compuls*hair pull*disorder), 5) Skin Picking Disorder OR Excoriation Disorder (skin pick*disorder OR excoriat*disorder), and 6) Experiential Avoidance OR Psychological Inflexibility OR Emotional Regulation OR

Affective Regulation (experient*avoid* OR psychology*inflexib* OR emotion*regulat* OR affect*regulat*).

Study Selection and Data Extraction Process

Two independent raters (IA and FP) examined the titles, abstracts, and the full texts of the studies identified through the searches. The interrater reliability for title/abstract screening and for the full-text screening was high ($k=0.93$). Information on the country where the study was conducted; number of participants and response rate; participants' mean age; proportion of participants self-identifying as males; type of OCRDs; targeted population (community vs those who had received formal diagnoses); research design; tools for measuring experiential avoidance; and screening tools for OCRDs was extracted. Quantitative data reporting associations between OCRDs and experiential avoidance were also extracted. Interrater agreement was high ($k=0.97$). Disagreements were resolved through discussions.

Appraisal of Methodological Quality

Each study was assessed using a set of criteria taken from the Centre for Reviews and Dissemination guidance for undertaking reviews in healthcare (Centre for Reviews and Dissemination Guidelines, 2009). These criteria were; a) research design (1, indicates cross sectional; 2, follow-up or experimental), b) baseline/follow-up response rates (1, indicates $\leq 70\%$ or not reported; 2, $\geq 70\%$), c) screening tool for OCRDs (1, indicates self-report scale or not reported; 2, structured or semi-structured clinical interviews). The overall scores per study were entered into the meta-regression models to perform sensitivity analyses.

Statistical Analysis

All analyses were performed in Stata, version 16, from December 2020 to March 2021. The relationships between the different types of OCRDs and experiential avoidance were examined by calculating effect sizes in the form of standardized mean differences (SMDs) and their associated 95% confidence intervals (CI). The pooled effect sizes across

the different comparisons with their associated forest plots were calculated using the *metaforestplot* command. For the studies that assessed for OCRDs using different screening tools and contributed multiple effect sizes or reported only effect sizes per individual OCD symptoms (e.g., obsessions, washing, checking) but not overall OCD, average effect sizes were computed and entered into the analysis. Subgroup analyses were conducted to examine the relationships between i) the individual OCD symptoms and experiential avoidance, and ii) the overall OCRDs and experiential avoidance. All meta-analyses were performed using random-effect models because of the heterogeneity across the studies (Higgins et al., 2003; Hunter & Schmidt, 2000). Conventionally, values of 25, 50, and 75% indicate low, moderate or high heterogeneity, respectively. For those comparisons contributing eight or more independent effect sizes respectively (Egger et al., 1997), formal tests for publication bias, including funnel plots and Egger's tests, were calculated using the *metafunnel* and *metabias*, *egger* commands. In case of publication bias, corrected effect sizes were estimated using the *metatrimfill* command (Duval & Tweedie, 2000). The strength of the associations was interpreted by using Cohen's (1988) guidelines, where $d = 0.20$, $d = 0.50$, and $d = 0.80$ is considered low, medium or large respectively.

Provided that there were comparisons incorporating eight or more independent effect sizes, univariate meta-regression analyses were performed using the *metaregress* command. Multivariate meta-regression analyses were also planned to be performed in case that multiple moderators, which met our significance criterion of $p < 0.20$, were identified. This allowed to examine whether participant- and/or methodological-level variables affected the strength of the relationships between OCRDs and experiential avoidance. In total ten variables were examined, including: country where the study was conducted; participants' mean age; age as dichotomous variable (1 indicates ages between 15-30; 2, 31 and above); percentage of those self-identifying as males; type of population (1 indicates individuals from

the general community; 2, psychiatric in-patients or primary care individuals; and 3, mixed sample comprising those from the community and clinical samples); percentage of response rates; research design (1 indicates cross-sectional design; 2, follow-up or experimental); screening tools for OCRDs (1 indicates self-reported measures or no reported; 2, interviews); tools used for measuring experiential avoidance (1 indicates Acceptance & Action Questionnaire [AAQ]; 2, AAQ-Revised; 3, other); and overall risk of bias scores.

Results

Searches yielded 216 citations, of which 42 were duplicates and were removed. Full texts of the remaining 174 citations were accessed and screened for eligibility; another 127 studies were excluded either because they did not i) focus on the relationships between obsessive-compulsive and related disorders and experiential avoidance, or ii) report any quantitative data on these relationships. Forty-seven studies met the eligibility criteria for inclusion; eleven of these studies were excluded because either they did not report any data of the relationships between obsessive-compulsive and related disorders and experiential avoidance, which were amendable for meta-analyses, or the authors did not provide the required data after being contacted. A total of 36 studies were included based on 11,859 unique participants (see Figure 1). The mean age was 27.6 ($SD = 9.95$), with those identifying themselves as males consisting 26.4% of the overall participants. The majority of the studies were conducted in the United States ($k = 26$; 72.2%), followed by Australia ($k = 5$; 13.9%), the United Kingdom ($k = 2$; 5.6%), Canada ($k = 1$; 2.8%), Germany ($k = 1$; 2.8%), and the Republic of Cyprus ($k = 1$; 2.8%). All studies used a cross-sectional research design but two studies that used an experimental design (Manos et al., 2010; McCabe-Bennett et al., 2020). The Acceptance and Action Questionnaires (version I and II) were the most frequent tools for measuring experiential avoidance ($k = 30$; 83.3%), followed by the Multidimensional

Experiential Avoidance Questionnaire (MEAQ, $k = 4$; 11.1%), the Avoidance and Fusion Questionnaire for Youth (AFQ-Y8, $k = 1$; 2.8%) or other relevant questions exploring experiential avoidance ($k = 1$; 2.8%). Self-report scales were the most common method for measuring symptoms of OCRDs ($k = 28$; 77.8%), whereas eight studies (22.2%) conducted interviews. Twenty studies (55.6%) focused on individuals from the community, 11 (30.6%) studies focused on individuals who had received an OCRD diagnosis, and five (13.9%) used a mixed sample comprising of people with OCRDs and healthy controls. With regard to the methodological quality, the majority of the included studies ($k = 25$; 69.4%) scored 1 point in the quality assessment exercise, with 3 studies scoring 0 (8.3%) and another 8 studies (22.2%) scoring 2 (Table 1).

Main Meta-analyses

The relationship between obsessive-compulsive disorder and experiential avoidance

The pooled effect size for the association between OCD and experiential avoidance was moderate to strong ($k = 17$, $SMD = 0.75$, 95% $CI = 0.57$ to 0.92 , $p < 0.001$) and exhibited high heterogeneity ($I^2 = 87.64\%$; Figure 2a). Twelve of the overall 17 comparisons contributed moderate to large effect sizes. The inspection of the funnel plot as well as the Egger's test (Egger's regression $p = 0.74$; Figure 3) did not reveal publication bias.

The relationship between hoarding disorder and experiential avoidance

The pooled effect size for the association between HD and experiential avoidance was large ($k = 13$, $SMD = 0.93$, 95% $CI = 0.46$ to 1.41 , $p < 0.001$) and exhibited high heterogeneity ($I^2 = 97.47\%$; Figure 2b). Three of the studies contributed small effect sizes, whereas the rest six contributed moderate to large effect sizes. The inspection of the funnel plot as well as the

Egger's test (Egger's regression $p = 0.20$; Figure 3) did not reveal any indication of publication bias.

The relationship between Trichotillomania and experiential avoidance

The pooled effect size for the association between TMM and experiential avoidance was moderate ($k = 7$, $SMD = 0.56$, 95% $CI = 0.48$ to 0.63 , $p < 0.001$) and did not exhibit any heterogeneity ($I^2 = 0.01\%$; Figure 2c). All studies contributed moderate effects sizes.

The relationship between body dysmorphic disorder and experiential avoidance

The pooled effect size for the association between BDD and experiential avoidance was large ($k = 3$, $SMD = 1.55$, 95% $CI = 0.72$ to 2.37 , $p < 0.001$) and exhibited high heterogeneity ($I^2 = 85.51\%$; Figure 2d). All three studies contributed large effect sizes.

Sub-group analyses

The relationships between specific OCD symptoms and experiential avoidance

Obsessions were strongly associated with experiential avoidance ($SMD = 1.06$, 95% $CI = 0.72$ to 1.40 , $p < 0.001$), whereas ordering, washing, checking, neutralizing, and responsibility for harm, injury, or bad luck (SMD ranged between 0.41 and 0.67 , 95% $CI = 0.25$ to 0.84 ; see Table 2) were weakly to moderately associated with experiential avoidance.

The relationship between overall OCDs and experiential avoidance

Overall obsessive-compulsive and related disorders were strongly associated with experiential avoidance ($SMD = 0.83$, 95% $CI = 0.66$ to 1.00 , $p < 0.001$) but exhibited high heterogeneity ($I^2 = 94.33\%$). The Egger's test produced (Egger's regression $p = 0.07$) did not reveal any indication of publication bias.

Meta-regression analyses

Univariate meta-regression analyses were conducted for the relationships between OCD, HD and experiential avoidance because there were sufficient comparisons to justify these analyses (Thompson & Higgins, 2002). We identified that those screening tools assessing experiential avoidance other than the AAQ/AAQ-II contributed higher effect sizes only for the relationship between HD and experiential avoidance. We did not find evidence that any of the other moderators affected the strength of these associations, which may be partly attributed to the modest number of comparisons (see Table 3). Therefore, we performed both univariate and multivariate meta-regression analyses for the relationship between overall obsessive-compulsive and related disorders, and experiential avoidance (see Table 4). The results showed that both the screening tools measuring OCRDs and experiential avoidance affected the strength of the relationship between OCRDs and experiential avoidance. For example, interviews compared to self-report scales and any tools other than AAQ/AAQ-II contributed larger effect sizes.

Discussion

With a total of 36 studies based on 11,859 unique individuals, this is the most updated systematic review and meta-analysis to examine the relationship between OCD and experiential avoidance. This relationship was also extended to the other distinct types of OCRDs, including hoarding disorder (HD), trichotillomania (TTM), and body dysmorphic disorder (BDD). We identified only one study exploring the relationship between excoriating (skin-picking) disorder and experiential avoidance (Flessner & Woods, 2006).

Our findings revealed a moderate to strong association between OCD and experiential avoidance based on 16 unique comparisons. Of the individual OCD symptoms examined, obsessions and responsibility for harm were strongly associated with experiential avoidance,

whereas the rest of the OCD symptoms, including ordering, washing, checking and neutralizing were only weakly to moderately associated with experiential avoidance. This is an important finding because it appears that those individuals who mainly report obsessions, and responsibility for harm may have increased likelihood for benefiting from reductions in experiential avoidance (e.g., Angelakis & Gooding, 2019). However, this finding should be further examined by future studies. For example, it would be interesting to test whether people who fall into the distinct types of OCD (e.g., worriers, checkers, washers etc.) are experiencing differential benefits when experiential avoidance is reduced.

Of note, three of the overall 16 studies examining the relationship between OCD and experiential avoidance contributed very small or non-significant effect sizes (Abramowitz et al., 2009; Kroska et al., 2018; Manos et al., 2010). It has been speculated that these inconsistencies may be attributed to the weak psychometric properties of some of the scales used to assess experiential avoidance, including the Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004), and the revised Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011) (Gámez et al., 2011; Wolgast, 2014). Our meta-regression analyses performed for the relationship between OCD and experiential avoidance did not verify this speculation. However, it should be noted that the majority of the studies had used either the AAQ or the AAQ-II scale, whereas only two studies (Den Ouden et al., 2020; Papachristou et al., 2018) contributing three separate effect sizes had used the Multidimensional Experiential Avoidance Questionnaire (MEAQ) or the Avoidance and Fusion Questionnaire for Youth (AFQ-Y8). To this extent, we performed univariate and multivariate meta-regression analyses for the relationship between overall OCDs and experiential avoidance ($k = 34$). The results demonstrated that those studies which used the AAQ/AAQ-II scales contributed smaller effect sizes than those which used such tools as the MEAQ. This finding was also obtained for the relationship between hoarding disorder and experiential avoidance suggesting caution

in the use of AAQ/AAQ-II scales because they may primarily assess psychological distress rather than experiential avoidance (Wolgast, 2014). Last, it should be noted that those studies using self-report scales to assess OCRDs also contributed smaller effect sizes. This finding indicates that the relationship between OCRDs and experiential avoidance may be mostly deflated by these studies that were based on self-reporting measures. To advance, future studies should further examine this possibility.

The relationship between hoarding disorder and experiential avoidance was large based on 13 unique studies. However, the range between the lower and upper confidence intervals was also large because there were studies that contributed very small or very large effect sizes. This means that these findings for the relationship between hoarding disorder and experiential avoidance need to be interpreted with caution, whereas additional examination is warranted.

The relationships between trichotillomania, body dysmorphic disorder, and experiential avoidance were moderate to large. However, the number of comparisons was low ($k = 7$ and $k = 3$ respectively). This means that additional research in this area should be encouraged to corroborate the findings of the current meta-analysis.

Although experiential avoidance has been conceptualized as a general concept of psychological inflexibility (Bond et al., 2011), the moderate to strong relationships between the various OCRDs and experiential avoidance suggest that psychological treatments aiming at reducing experiential avoidance may also be effective in alleviating the distinct OCRDs symptoms. This is in accord with previous evidence suggesting that acceptance-based psychological treatments for OCD were superior when compared to progressive relaxation techniques alone (Twohig et al., 2010), or equally effective when compared to traditional cognitive-behavioral therapy (CBT; Arch et al., 2012). With regard to the rest OCRDs, evidence is limited regarding the effectiveness of acceptance-based psychological treatments

for body dysmorphic disorder (Linde et al., 2015), hoarding disorder (Eppingstall et al., 2019), and trichotillomania (Boppana & Gross, 2019). Given the findings of the current meta-analysis demonstrating the strong relationships between these types of OCRDs and experiential avoidance, we suggest that additional randomized control trials (RCTs) examining the effectiveness of the acceptance-based protocols in alleviating the symptoms of the various types of OCRDs are encouraged.

Although exposure and response prevention exercises are considered to be the “gold standard” for improving OCRDs symptoms, there is growing evidence suggesting that low adherence to treatment protocols are associated with limited effectiveness in alleviating these symptoms (Ojalehto et al., 2020). On the contrary, because acceptance-based psychological treatments for OCRDs are not based – at least exclusively – on exposure exercises, but rather on acceptance and committed “value-based” actions, exposure techniques may have optimal results when combined with these practices (for a theoretical review see Twohig et al., 2015). Therefore, the individual with OCRDs symptoms, other than being exposed to and facing their feared internal and/or external stimuli, is also encouraged to invest more time in pursuing constructive value-based activities by being aware of and appreciating their present moment (Twohig et al., 2014). We also need to highlight that although new evidence suggests that acceptance-based practices do not appear to improve the gains of the interventions based on exposure and response prevention (Twohig et al., 2018), it would be of great interest to i) replicate these findings with additional RCTs, and ii) examine whether CBT, and acceptance and commitment therapy (ACT) for OCDs, which stem from different theoretical standpoints, share similar or different underlying mechanisms in reducing the symptoms of the various OCDs (Arch & Craske, 2008).

The current systematic review and meta-analysis had three key limitations that should be discussed. First, because OCRDs are considered to be highly heterogeneous mental health

problems (e.g., Kühne et al., 2020), there was high heterogeneity for the main comparisons examined. Therefore, random-effect models were used. Second, the number of comparisons between trichotillomania, body dysmorphic disorder, and experience avoidance was low. Furthermore, we identified only one study exploring the relationship between excoriation (skin-picking) disorder and experience avoidance, which prevented us from performing any analyses. Third, meta-regression analyses were applied only for the relationships between OCD, HD, and experiential avoidance because they provided the minimum number of comparisons needed to perform this analysis. However, the number of comparisons was still low which may have resulted in reduced statistical power (Borenstein et al., 2009). To overcome this limitation, we performed meta-regression analyses for the relationship between overall OCRDs and experiential avoidance. Future studies should examine whether i) different age groups (e.g., adolescents, adults, older adults), and ii) groups comprising mostly of male or female participants affect the strength of these relationships, because our limited data precluded us from reaching firm conclusions.

To conclude, this systematic review and meta-analysis i) provided an updated evidence on the moderate to strong relationship between OCD and experiential avoidance, ii) determined the individual OCD symptoms that were more strongly associated with experiential avoidance, including obsessions and responsibility for harm, iii) identified moderate to strong associations between HD, TTM, BDD, and experiential avoidance, and iv) demonstrated that those studies which used the AAQ/AAQ-II scales for measuring experiential avoidance, and/or self-report scales for assessing symptoms of OCRDs contributed smaller effect sizes. To advance this line of research, future studies should focus on three key priorities, including, i) the examination of the association between the individual OCD symptoms and experiential avoidance, ii) the contribution of the various sample and/or methodological-related factors that may affect the strength of the relationships between

OCRDs and experiential avoidance, and iii) the corroboration of the moderate to strong associations between HD, TTM, BDD, and experiential avoidance that will have immediate and direct clinical implications in the reduction of these symptoms.

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References

- Abramowitz, J. S., Deacon, B. J., Olatunji, B. O., Wheaton, M. G., Berman, N. C., Losardo, D., Timpano, K.R., McGrath, P.B., Riemann, B.C., Adams, T., Björgvinsson, T., Storch, E.A., & Hale, L.R. (2010). Assessment of obsessive-compulsive symptom dimensions: Development and evaluation of the dimensional obsessive-compulsive scale. *Psychological Assessment, 22*(1), 180. <https://doi.org/10.1037/a0018260>.
- *Abramowitz, J. S., Lackey, G. R., & Wheaton, M. G. (2009). Obsessive-compulsive symptoms: The contribution of obsessional beliefs and experiential avoidance. *Journal of Anxiety Disorders, 23*, 169-166. <https://doi.org/10.1016/j.janxdis.2008.06.003>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association, Washington, DC.
- Angelakis, I., & Austin, J. L. (2015). Maintenance of safety behaviors via response-produced stimuli. *Behavior Modification, 39*, 932-954. <https://doi.org/10.1177/0145445515610314>
- *Angelakis, I., & Gooding, P. (2019). Obsessive-compulsive disorder and suicidal experiences: The role of experiential avoidance. *Suicide and Life-Threatening Behavior, 50*(2), 359-371. <https://doi.org/10.1111/sltb.12593>
- Angelakis, I., Lewis, V., Austin, L. J., & Panagioti, M. (2018). Examining the effects of punishment schedule density on the development and maintenance of avoidance and safety behaviors: Implications for exposure therapies. *Journal of Behavior Therapy & Experimental Psychiatry, 61*, 172–179. <https://doi.org/10.1016/j.jbtep.2018.08.003>
- *Arabatzoudis, T., Rehm, I. C., Nedeljkovic, M., & Moulding, R. (2017). Emotional regulation in individual with and without trichotillomania. *Journal of Obsessive-Compulsive and Related Disorders, 12*, 87-94. <https://doi.org/10.1016/j.jocrd.2017.01.003>

- Arch, J.J., & Craske, M.G. (2009). Acceptance and commitment therapy and cognitive behavioral therapy for anxiety disorders: Different treatments, similar mechanism. *Clinical Psychology: Science and Practice, 15*(4), 263-279.
<https://doi.org/10.1111/j.1468-2850.2008.00137.x>
- *Ayers, C. R., Castroitta, N., Dozier, M. E., Espejo, E. P., & Porter, B. (2014). Behavioural and experiential avoidance in patients with hoarding disorder. *Journal of Behavior and Therapy and Experimental Psychiatry, 45*, 408-414.
<https://doi.org/10.1016/j.jbtep.2014.04.005>
- *Begotka, A., Woods, D., & Wetterneck, C. (2004). The relationship between experiential avoidance and the severity of trichotillomania in a nonreferred sample. *Journal of Behavior Therapy and Experimental Psychiatry, 35*(1), 17–24.
<https://doi.org/10.1016/j.jbtep.2004.02.001>
- Blakey, R., Shannon, M., Reuman, L., Buchholz, J., & Abramowitz, J. (2017). Experiential avoidance and dysfunctional beliefs in the prediction of body image disturbance in a nonclinical sample of women. *Body Image, 22*, 72–77.
<https://doi.org/10.1016/j.bodyim.2017.06.003>
- *Blakey, S. M., Jacoby, R. J., Reuman, L., & Abramowitz, J. S. (2016). The relative contributions of experiential avoidance and distress tolerance to OC symptoms. *Behaviour and Cognitive Psychotherapy, 44*, 460-471. <https://doi.org/10.1017/S1352465815000703>
- Boppana, S., & Gross, A. (2019). Behavioral treatment of trichotillomania in a college woman: A case study. *Clinical Case Studies, 18*(5), 397–409.
<https://doi.org/10.1177/1534650119864440>
- Borenstein, M., Hedges, L., Higgins, J., & Higgins, D. (2009). *Introduction to Meta-Analysis* (2nd ed.). Hoboken: Wiley.

*Briggs, E. S., & Price, I. R. (2009). The relationship between adverse childhood experience and obsessive-compulsive symptoms and beliefs: the role of anxiety, depression and experiential avoidance. *Journal of Anxiety Disorders*, *23*, 1037-1046.

<https://doi.org/10.1016/j.janxdis.2009.07.004>

*Callaghan, G. M., Deunas, J. A., Nadeau, S. E., Darrow, S. M., Van der Merwe, J., & Misko, J. (2012). An empirical model of body image disturbance using behavioral principles found in functional analytic psychotherapy and Acceptance and Commitment Therapy. *The International Journal of Behavioral Consultation and Therapy*, *7*, 16-24.

<https://doi.org/10.1037/h0100932>

Centre for reviews and dissemination (CRD) (2010). *CRD's guidance for undertaking reviews in health care*. York: CRD, University of York.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd edn). Hillsdale, NJ: Lawrence Erlbaum Associates.

*Conley, S. L., Lee, S. R., Martyn, H. F., & Wu, K. D. (2019). Facets of experiential avoidance differentially predict engagement in a contamination-based behavioural approach task. *Journal of Obsessive-Compulsive and Related Disorders*, *22*, 100453.

<https://doi.org/10.1016/j.jocrd.2019.100453>

*Den Ouden, L., Tiego, J., Lee, R.S.C., Albertella, L., Greenwood, L-M., Fontenelle, L., Yücel, M., & Segrave, R. (2020). The role of experiential avoidance in transdiagnostic compulsive behavior: A structural model analysis. *Addictive Behaviors*, *108*, 106464–106464.

<https://doi.org/10.1016/j.addbeh.2020.106464>

Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method for testing and adjusting for publication bias in meta-analysis. *Biometrics*, *56*(2), 455–463.

<https://doi.org/10.1111/j.0006-341x.2000.00455.x>

Journal Pre-proof

- Hunter, J.E., & Schmidt, F.L. (2000). Fixed effects vs. random effects meta-analysis models: Implications for cumulative research knowledge. *International journal of Selection and Assessment*, 8, 275-292. <https://doi.org/10.1111/1468-2389.00156>
- *Jacoby, R. J., Abramowitz, J. S., Buchholz, J., Reuman, L., & Blakey, S. M. (2018a). Experiential avoidance in the context of obsessions: development and validation of the acceptance and action questionnaire for obsessions and compulsions. *Journal of Obsessive-Compulsive and Related Disorders*, 19, 34-43. <https://doi.org/10.1016/j.jocrd.2018.07.003>
- *Jacoby, R. J., Blakey, S. M., Reuman, L., & Abramowitz, J. S. (2018b). Mental contamination obsessions: An examination across the obsessive-compulsive dimensions. *Journal of Obsessive-Compulsive and Related Disorders*, 17, 9-15. <https://doi.org/10.1016/j.jocrd.2017.08.005>
- *Krafft, J., Ong, C. W., Cruz, R. A., Twohig, M. P., & Levin, M. E. (2019). An ecological momentary assessment study investigating the function of hoarding. *Behavior Therapy*, 51(5), 715-727. <https://doi.org/10.1016/j.beth.2019.10.006>
- *Krafft, J., Ong, C., Twohig, M., & Levin, M. (2019). Assessing psychological inflexibility in hoarding: The acceptance and action questionnaire for hoarding (AAQH). *Journal of Contextual Behavioral Science*, 12, 234–242. <https://doi.org/10.1016/j.jcbs.2018.08.003>
- *Kroska, E. B., Miller, M. L., Roche, A. I., Kroska, S. K., & O’Hara, M. W. (2018). Effects of traumatic experiences on obsessive-compulsive and internalizing symptoms: The role of avoidance and mindfulness. *Journal of Affective Disorders*, 225, 326-336. <https://doi.org/10.1016/j.jad.2017.08.039>
- Kühne, F., Ay, D.S., Marschner, L., & Weck, F. (2020). The heterogeneous course of OCD – A scoping review on the variety of definitions. *Psychiatry Research*, 285, 112821–112821. <https://doi.org/10.1016/j.psychres.2020.112821>

- *Levin, M., MacLane, C., Daflos, S., Seeley, J., Hayes, S., Biglan, A., & Pistorello, J. (2014). Examining psychological inflexibility as a transdiagnostic process across psychological disorders. *Journal of Contextual Behavioral Science*, 3(3), 155–163.
<https://doi.org/10.1016/j.jcbs.2014.06.003>
- Levitt, J. T., Brown, T. A., Orsillo, S. M., & Barlow, D. H. (2004). The effects of acceptance versus suppression of emotion on subjective and psychophysiological response to carbon dioxide challenge in patients with panic disorder. *Behavior Therapy*, 35, 747–766.
[https://doi.org/10.1016/S0005-7894\(04\)80018-2](https://doi.org/10.1016/S0005-7894(04)80018-2)
- Linde, J., Rück, C., Bjureberg, J., Ivanov, V.Z., Djurfeldt, D.R., & Ramnerö, J. (2015). Acceptance-based exposure therapy for body dysmorphic disorder: A pilot study. *Behavior Therapy*, 46(4), 423–431. <https://doi.org/10.1016/j.beth.2015.05.002>
- *Manos, R. C., Cahill, S. P., Wetterneck, C. T., Conelea, C. A., Ross, A. R., Riemann, B. C. (2010). The impact of experiential avoidance and obsessive beliefs on obsessive-compulsive symptoms in a severe clinical sample. *Journal of Anxiety Disorders*, 24, 700–708. <https://doi.org/10.1016/j.janxdis.2010.05.001>
- *McCabe-Bennett, H., Provost-Walker, O., Lachman, R., Girard, T.A., Antony, M.M. (2020). A virtual reality study of experiential avoidance, emotional experiences, and hoarding symptoms. *Journal of Obsessive-Compulsive and Related Disorders*, 27, 100590. <https://doi.org/10.1016/j.jocrd.2020.100590>
- McKay, D., Sookman, D., Neziroglu, F., Wilhelm, S., Stein, D. J., Kyrios, M., Matthews, K., & Veale, D. (2015). Efficacy of cognitive-behavioral therapy for obsessive-compulsive disorder. *Psychiatry Research*, 225, 236–246.
<https://doi.org/10.1016/j.psychres.2014.11.058>

- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Volucella*, 339(7), e1000097. <https://doi.org/10.1371/journal.pmed.1000097>
- *Naragon-Gainey, W. (2016). What Lies Beyond Neuroticism? An Examination of the Unique Contributions of Social-Cognitive Vulnerabilities to Internalizing Disorders. *Assessment (Odessa, Fla.)*, 25(2), 143–158. <https://doi.org/10.1177/1073191116659741>
- *Norberg, M., Wetterneck, C., Woods, D., & Conelea, C. (2007). Experiential avoidance as a mediator of relationships between cognitions and hair-pulling severity. *Behavior Modification*, 31(4), 367–381. <https://doi.org/10.1177/0145445506297343>
- Olatunji, B., Davis, M., Powers, M., & Smits, J. (2013). Cognitive-behavioral therapy for obsessive-compulsive disorder: A meta-analysis of treatment outcome and moderators. *Journal of Psychiatric Research*, 47(1), 33–41. <https://doi.org/10.1016/j.jpsychires.2012.08.020>
- Ong, C. W., Clyde, J. W., Bluett, E. J., Levin, M. E., & Twohig, M. P. (2016). Dropout rates in exposure with response prevention for obsessive-compulsive disorder: What do the data really say? *Journal of Anxiety Disorders*, 40, 8–17. <https://doi.org/10.1016/j.janxdis.2016.03.006>
- Ong, C., Blakey, S., Smith, B., Morrison, K., Bluett, E., Abramowitz, J., & Twohig, M. (2020). Moderators and processes of change in traditional exposure and response prevention (ERP) versus acceptance and commitment therapy-informed ERP for obsessive-compulsive disorder. *Journal of Obsessive-Compulsive and Related Disorders*, 24, 100499. <https://doi.org/10.1016/j.jocrd.2019.100499>

- *Ong, C.W., Krafft, J., Levin, M.E., & Twohig, M.P. (2018). An examination of the role of psychological inflexibility in hoarding using multiple mediator models. *Psychology & Psychiatry Journal*, 32(2), 97-111. <https://doi.org/10.1891/0889-8391.32.2.97>.
- Ost, L., Havnen, A., Hansen, B., & Kvale, G. (2015). Cognitive behavioral treatments of obsessive-compulsive disorder. A systematic review and meta-analysis of studies published 1993-2014. *Clinical Psychology Review*, 40, 156–169. <https://doi.org/10.1016/j.cpr.2015.06.003>.
- *Papachristou, H., Theodorou, M., Neophytou, K., & Panayiotou, G. (2018). Community sample evidence on the relations among behavioural inhibition system, anxiety sensitivity, experiential avoidance, and social anxiety in adolescents. *Journal of Contextual Behavioral Science*, 8, 36–43. <https://doi.org/10.1016/j.jcbs.2018.03.001>
- *Reuman, L., Buchholz, J., & Abramowitz, J. S. (2018). Obsessive beliefs, experiential avoidance, and cognitive fusion as predictors of obsessive-compulsive disorder symptom dimension. *Journal of Contextual Behavioral Science*, 9, 15-20. <https://doi.org/10.1016/j.jcbs.2018.06.001>
- Rowa, K., Antony, M. M., & Swinson, R. P. (2007). *Exposure and Response Prevention*. In M. M. Antony, C. Purdon, & L. J. Summerfeldt (Eds.), *Psychological treatment of obsessive-compulsive disorder: Fundamentals and beyond* (p. 79–109). American Psychological Association. <https://doi.org/10.1037/11543-004>
- Sahdra, B. K., Ciarrochi, J., Parker, P., & Scrucca, L. (2016). Using genetic algorithms in a large nationally representative American sample to abbreviate the multidimensional experiential avoidance questionnaire. *Frontiers in Psychology*, 7, 1–14. <https://doi.org/10.3389/fpsyg.2016.00189>.

- *Shusterman, A., Feld, L., Baer, L., & Keuthen, N. (2009). Affective regulation in trichotillomania: Evidence from a large-scale internet survey. *Behaviour Research and therapy*, *47*, 637-644. <https://doi.org/10.1016/j.brat.2009.04.004>
- *Silkboer, R., Castle, D. J., Nedeljkovic, M., & Rossell, S. L. (2018). Types of avoidance in hair-pulling disorder (trichotillomania): an explanatory and confirmatory analysis. *Psychiatry Research*, *261*, 154-160. <https://doi.org/10.1016/j.psychres.2017.12.056>
- Stroup, D.F., Berlin, J.A., Morton, S.C., Olkin, I., Williamson, G.D., Rennie, D., Moher, D., Becker, B.J., Sipe, T.A., Thacker, S.B. (2000). Meta-analysis of observational studies in epidemiology: A proposal for reporting. Meta-analysis of observational studies in epidemiology (MOOSE) group. *JAMA*, *283*(15), 2008–2012. <https://doi.org/10.1001/jama.283.15.2008>
- *Taylor, J. K., Moudling, R., & Nedeljkovic, M. (2018). Emotion regulation and hoarding symptoms. *Journal of Obsessive-Compulsive and Related Disorders*, *18*, 86-97. <https://doi.org/10.1016/j.jocrd.2018.03.003>
- Thompson, S.G., & Higgins, J.P. (2002). How should meta-regression analyses be undertaken and interpreted? *Statistics in Medicine*, *21*, 1559–1573. <https://doi.org/10.1002/sim.1187>
- Tolin, D.F., Maltby, N., Diefenbach, G.J., Hannan, S.E., & Worhunsky, P. (2004). Cognitive-behavioral therapy for medication nonresponders with obsessive-compulsive disorder: A wait-list-controlled open trial. *Journal of Clinical Psychiatry*, *65*(7), 922–931. <https://doi.org/10.4088/jcp.v65n0708>
- Twohig, M. P., Morrison, K. L., & Bluett, E. J. (2014). Acceptance and commitment therapy for OCD and OC-spectrum disorders. *Current Psychiatry Reviews*, *10*, 296–307. <https://doi.org/10.1016/j.janxdis.2014.06.008>

- Twohig, M.P., Abramowitz, J.S., Smith, B.M., Fabricant, L.E., Jacoby, R.J., Morrison, K.L., Bluett, E.J., Reuman, L., Blakey, S.M., Ledermann, T. (2018). Adding acceptance and commitment therapy to exposure and response prevention for obsessive-compulsive disorder: A randomized controlled trial. *Behaviour Research and Therapy*, *108*, 1–9. <https://doi.org/10.1016/j.brat.2018.06.005>
- *Wetterneck, C. T., Steinberg, D. S., & Hart, J. (2014). Experiential avoidance in symptom dimensions of OCD. *Bulletin of the Menniger Clinic*, *78*(3), 253-269. <https://doi.org/10.1521/bumc.2014.78.3.253>
- *Wetterneck, C., Lee, E., Flessner, C., Leonard, R., & Woods, D. (2015). Personality characteristics and experiential avoidance in Trichotillomania: Results from an age and gender matched sample. *Journal of Obsessive-Compulsive and Related Disorders*, *8*, 64–69. <https://doi.org/10.1016/j.jocrd.2015.12.003>
- *Wetterneck, C., Singh, R., & Woods, D. (2020). Hair pulling antecedents in trichotillomania: Their relationship with experiential avoidance. *Bulletin of the Menniger Clinic*, *84*(1), 35–52. https://doi.org/10.1521/bumc_2020_84_01
- Wheaton, M., Galfalvy, H., Steinman, S., Wall, M., Foa, E., & Simpson, B. (2016). Patient adherence and treatment outcome with exposure and response prevention for OCD: Which components of adherence matter and who becomes well? *Behaviour Research and Therapy*, *85*, 6–12. <https://doi.org/10.1016/j.brat.2016.07.010>
- *Wheaton, M., Wheaton, M., Abramowitz, J., Abramowitz, J., Franklin, J., Franklin, J., Berman, N., Berman, N., Fabricant, L., & Fabricant, L. (2011). Experiential avoidance and saving cognitions in the prediction of hoarding symptoms. *Cognitive Therapy and Research*, *35*(6), 511–516. <https://doi.org/10.1007/s10608-010-9338-7>
- *Wheaton, M., Wheaton, M., Fabricant, L., Fabricant, L., Berman, N., Berman, N., Abramowitz, J., & Abramowitz, J. (2013). Experiential avoidance in individuals with

hoarding disorder. *Cognitive Therapy and Research*, 37(4), 779–785.

<https://doi.org/10.1007/s10608-012-9511-2>

*Wilson, A. C., Wilhelm, S., & Hartmann, A. S. (2014). Experiential avoidance in body dysmorphic disorder. *Body Image*, 11, 380-383.

<https://doi.org/10.1016/j.bodyim.2014.06.006>

Wolgast, M. (2014). What does the Acceptance and Action Questionnaire (AAQ-II) really measure? *Behavior Therapy*, 45(6), 831–839. <https://doi.org/10.1016/j.beth.2014.07.002>.

*Denotes studies included in the meta-analyses

Table 1.

Descriptive characteristics of the included studies (k = 36)

Study

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Conley (2019)	OCD	United States	Cross Sectional	MEAQ	VOCI-CTM	Students	117, response rate – 100%	38.5%	Mage = 19.7 S.D = 2.4	1/3
Den Ouden (2020)	OCD	Australia	Cross Sectional	MEAQ	Adapted version of YBOCS	Community participants	492, response rate – 95.3%	56.3%	Mage = 30.8 S.D = 4.9 Range = 19-48	1/3
Fernández de la Cruz (2013)	OCD/HD	United Kingdom	Cross Sectional	AAQ - II	M.I.N.I DY – BOCS OCI-R SI-R	Individuals with hoarding disorder with/without OCD diagnosis and non-clinical controls	80, response rate – 100%	25%	Mage = 47.5 S.D = 6.57	2/3
Flessner & Woods (2006)	SPD	United States	Cross Sectional	AAQ	SPS	Individuals with SPD symptoms	101, response rate – 91.1%	7%	Mage = 30.9 S.D = 10.12 Range = 18-65	1/3
Gloster (2011)	OCD/HD	Germany	Cross Sectional	AAQ -II	OCI-R	Undergraduate students	495, response rate – 100%	38.3%	Mage = 22.5 Range = 18-46	1/3
Jacoby (2018a)	OCD	United States	Cross Sectional	AAQ - II	DOCS OBQ-TRIP	Students	364, response rate – 86%	36.4%	Mage = 19.09 S.D = 1.95	1/3
Jacoby (2018b)	OCD	United States	Cross Sectional	AAQ - II	VOCI-MC DOCS	Students	340, Response rate – 89.4%	30.6%	Mage = 18.61 S.D = 1.33 Range = 17-29	1/3
Krafft (2018)	HD	United States	Cross-sectional	AAQ - II	SI-R	Students	489, response rate – 41.1%	26.4%	Mage = 20.20 S.D = 4.09 Range = 18-54	0/3
Krafft (2019)	HD	United States	Cross-sectional	Three self-report items	Four self-report items	Students	62, response rate – 96.8%	25%	Mage = 21.58 S.D = 1.65	1/3
Kroska	OCD	United	Cross	AAQ - II	OCI-R	Students	414,	34.3%	Mage = 19.16	1/3

		States	Sectional				response rate – 96.6%		S.D = 1.33	
(2018)										
Levin (2014)	OCD	United States	Cross Sectional	AAQ - II	SCID	Students	1057, response rate – 92%	37.7%	Mage = 18.14 S.D = 0.49	2/3
Manos (2010)	OCD/HD	United States	Experimental	AAQ	YBOCS OCI-R	Inpatients and outpatients receiving treatment for OCD	108, response rate – 100%	45.4%	Mage = 32.1 S.D = 12.44	2/3
McCabe-Bennett (2020)	HD	Canada	Experimental	MEAQ	SI-R CIR	Individuals with a diagnosis of HD/without HD	76, response rate – 100%	32.8%	Mage = 34.67 Range = 18-63	2/3
Naragon-Gainey & Watson (2018)	OCD	United States	Cross Sectional	MEAQ	OCI-R	Psychiatric outpatients	299, response rate – 98.9%	26.1%	Mage = 36.73 S.D = 12.19 Range = 18-73	1/3
Norberg (2007)	TTM	United States	Cross Sectional	AAQ	MGHHPS & TTM Screening Measure	Individuals with a self-reporting diagnosis of TMM	755, response rate – 55.1%	-	Mage = 29.67 S.D = 9.46 Range = 18-60	0/3
Ong et al. (2018)	HD	United States	Cross-sectional	AAQ - II	SI-R	Students	489, response rate – 100%	9.6%	Mage = 20.47 S.D = 4.38 Range = 18-54	1/3
Papachristou (2018)	OCD	Republic of Cyprus	Cross-sectional	AFQ-Y8	SCARED-R	Students	718, response rate – 100%	35.9%	Mage = 15.52 S.D = 1.12 Range = 13-18	1/3
Reuman (2018)	OCD	United States	Cross Sectional	AAQ - II	OBQ DOCS	OCD patients from psychotherapy clinic	92, response rate – 100%	52%	Mage = 30.62 S.D = 11.63 Range = 15-65	1/3
Shusterman	TTM	United	Cross	AAQ - II	MGHHPS	Participants	1671,	8.2%	Mage = 33.38	1/3

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Dimensional Yale-Brown Obsessive-Compulsive Scale; MINI = Mini International Neuropsychiatric Interview; MGHHP = Massachusetts General Hospital Hair Pulling Scale; OBQ = Obsessive Beliefs Questionnaire; OBQ-TRIP = Obsessive Beliefs Questionnaire – TRIP; OCI-R = Obsessive-Compulsive Inventory-Revised; SCARED-R = the Revised version of the Screen for Child Anxiety Related Emotional Disorders; SCID = Structured Clinical Interview for the DSM-IV-TR, Non Patient Edition; SI-R = Saving Inventory-Revised; SPD = Skin-Picking Disorder; SPS = Skin-Picking Scale; PI-WSUR = Padua Inventory-Washington State University Revision; TTM Screening Measure = Hair-pulling screening test developed to target DSM-IV diagnostic criteria for trichotillomania; VOCI = Vancouver Obsessional Compulsive Inventory. VOCI-CTM = The Vancouver Obsessional Compulsive Inventory – Contamination Subscale.

*Based on the Wetterneck (2006) study.

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*Table 3**Results of the meta-regression analyses for the relationships between overall OCD, HD, and experiential avoidance*

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Note. HD = Hoarding Disorder; OCD = Obsessive-Compulsive Disorder; SE = Standard error

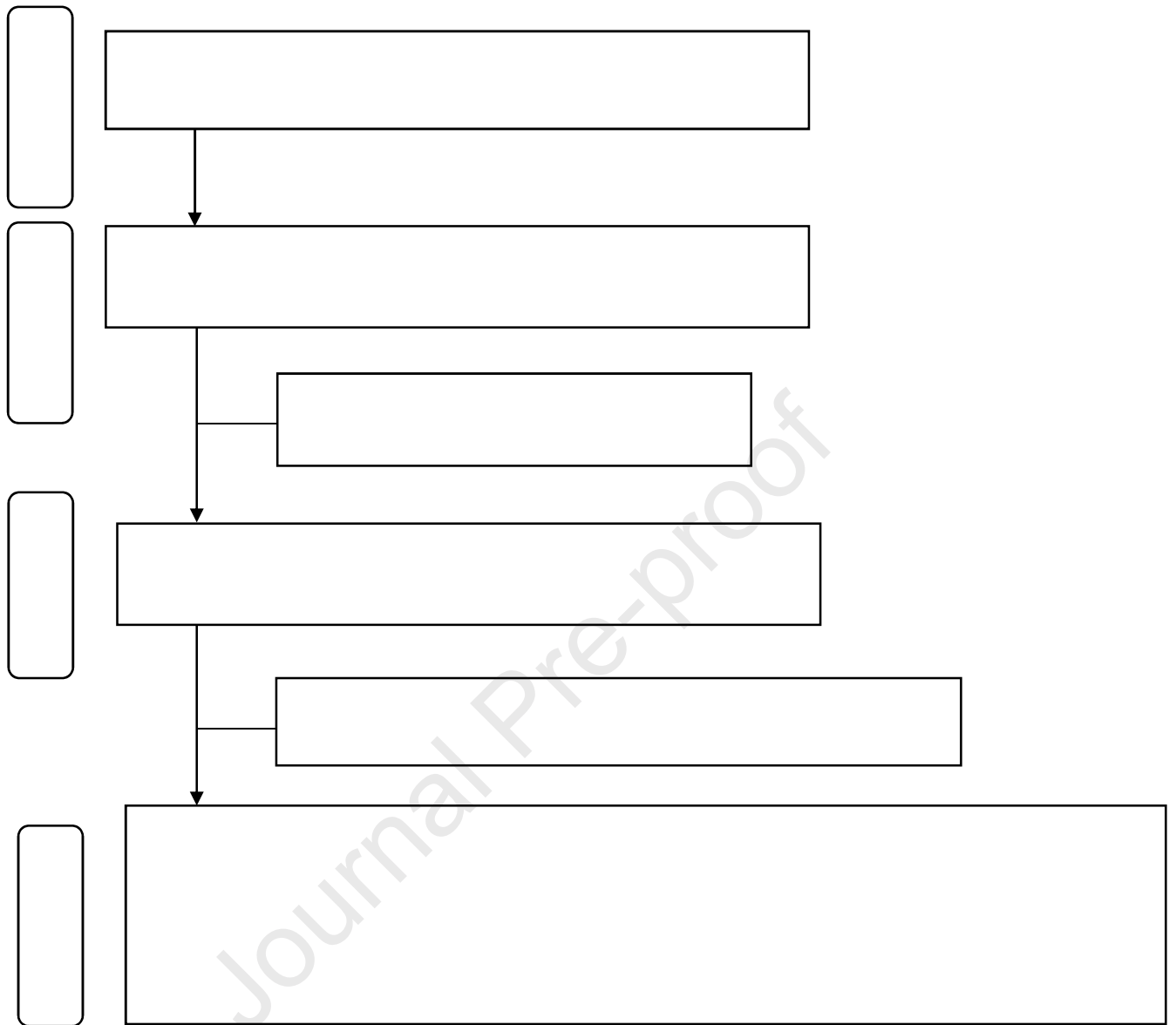
Table 4

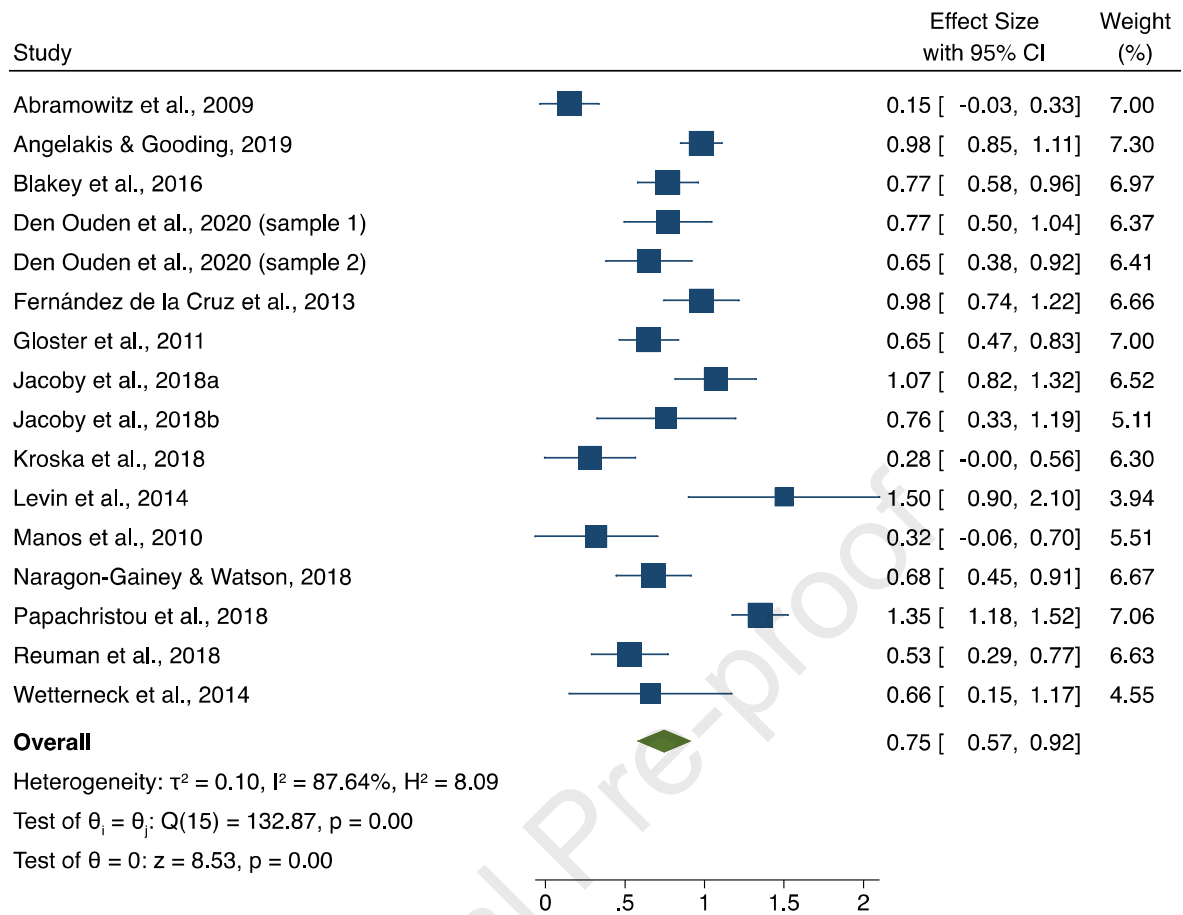
Results of the meta-regression analyses for the relationship between overall OCRDs and experiential avoidance

Journal Pre-proof

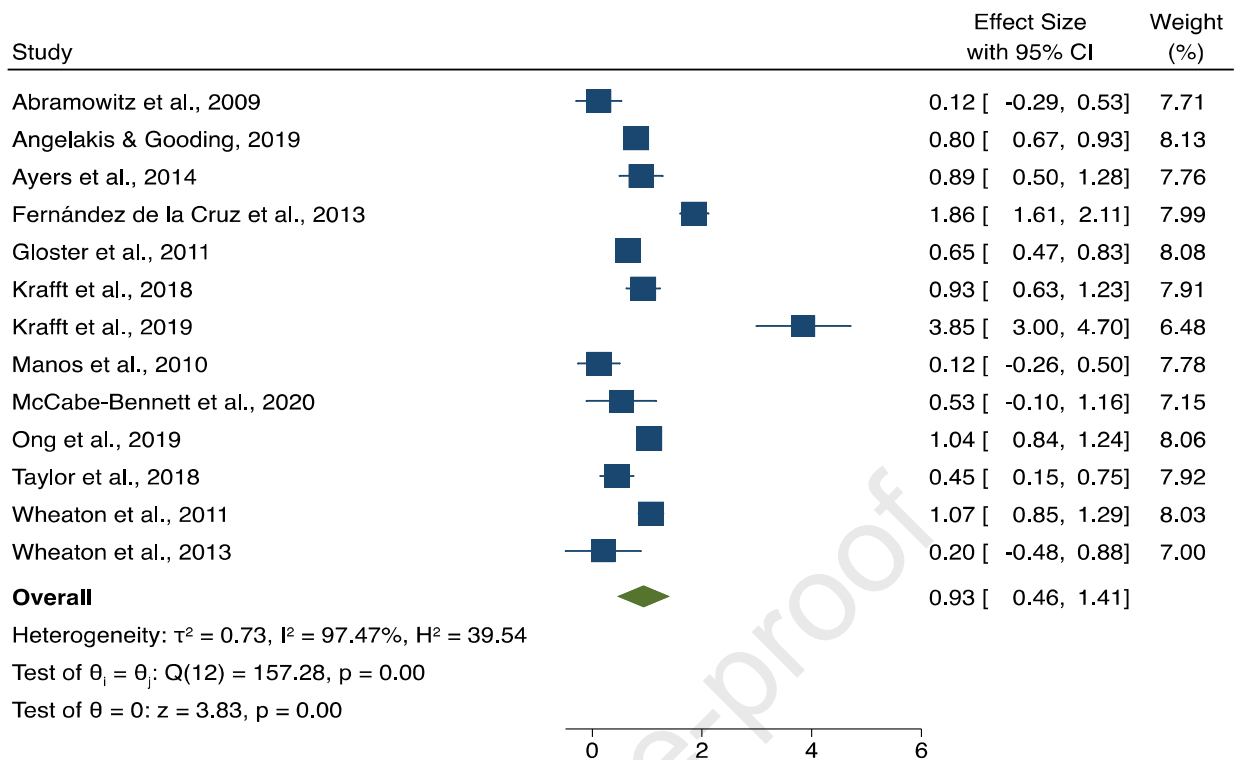
Note. OCRDs = Obsessive-Compulsive and Related Disorders; SE = Standard error.

Journal Pre-proof



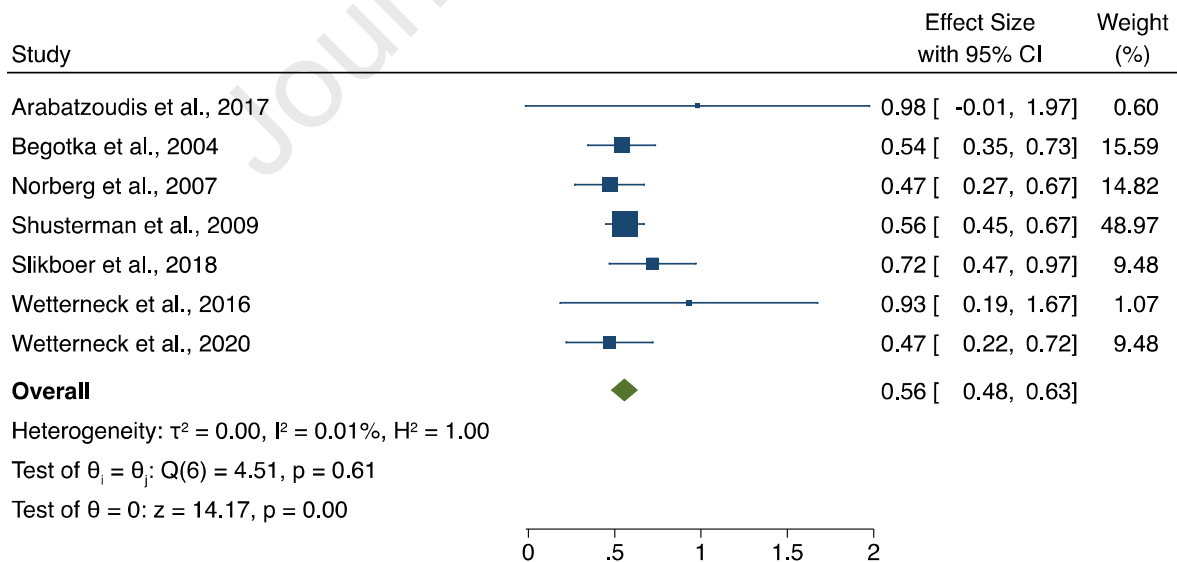


Random-effects REML model



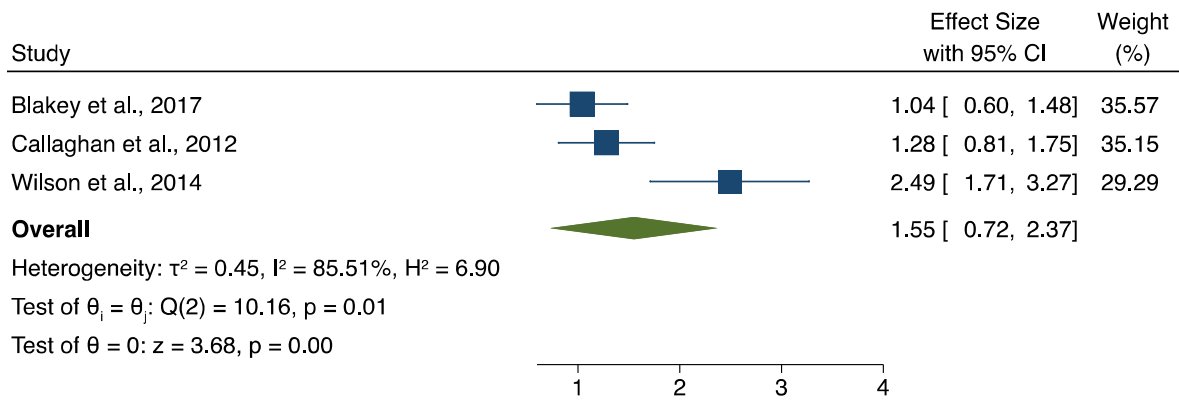
Random-effects REML model

Figure 2b. Forest plot of the main meta-analysis of the association between experiential avoidance and hoarding disorder. Note: Random effects model used; 95% CI = 95% Confidence Interval; ES = Standardized Mean Difference (SMD).



Random-effects REML model

Figure 2c. Forest plot of the main meta-analysis of the association between experiential avoidance and hair-pulling disorder. Note: Random effects model used; 95% CI = 95% Confidence Interval; ES = Standardized Mean Difference (SMD).



Random-effects REML model

Figure 2d. Forest plot of the main meta-analysis of the association between experiential avoidance and body dysmorphic disorder. Note: Random effects model used; 95% CI = 95% Confidence Interval; ES = Standardized Mean Difference (SMD).

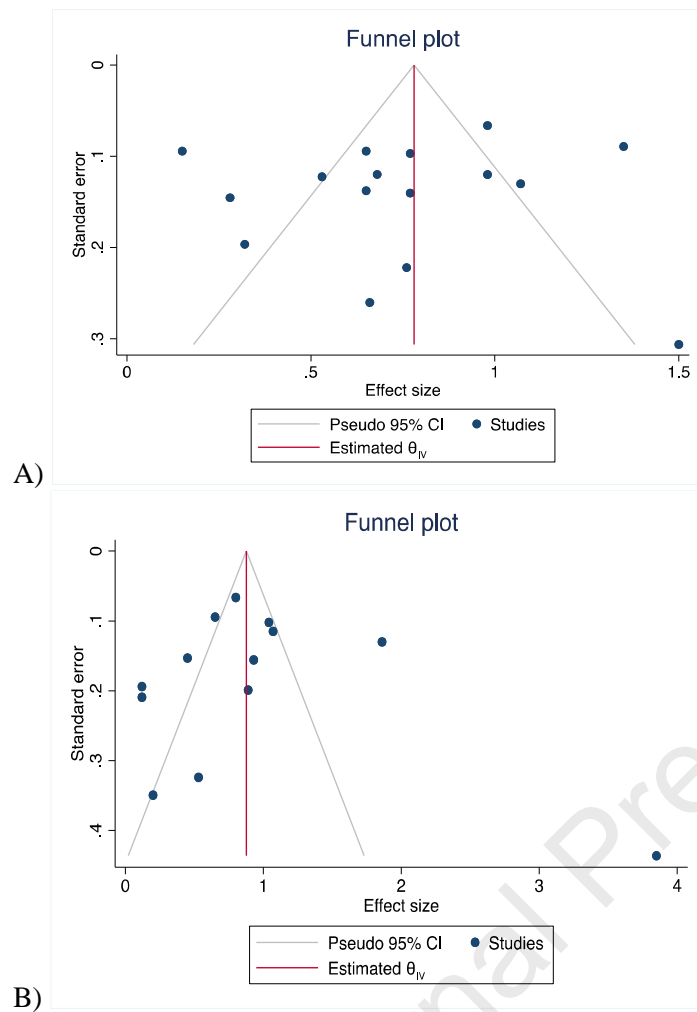


Figure 3. Publication bias funnel plot showing standard error by the SMD for the associations between A) OCD and experiential avoidance, and B) HD and experiential avoidance.

AUTHOR DISCLOSURE

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome. □ We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing, we confirm that we have followed the regulations of our institutions concerning intellectual property.

We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). He is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs. We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author and which has been configured to accept email from (ioannis.angelakis@southwales.ac.uk).

Yours sincerely,
Dr. Ioannis Angelakis