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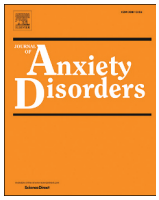

Review

Emetophobia (fear of vomiting): A meta-analysis

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ABSTRACT

Emetophobia refers to a specific fear of vomiting. There are only few original research studies on this condition and no study that has meta-analytically synthesized findings to describe the characteristics of persons with emetophobia. To this end, we extracted data from 31 reports and—as we examined different dependent variables—each meta-analysis was based on five to 21 samples. The pooled mean age of persons with emetophobia was 29 years but was reduced to 21–27 years when adjusting for publication bias. The pooled mean age of disorder onset was 10 years. The pooled proportion of females was 91 %. The pooled proportions of reporting fear of vomiting oneself, fear of seeing others vomit, or both, were 47 %, 11 %, and 39 %. The most common comorbid mental disorders were social anxiety disorder, depression, and generalized anxiety disorder. The pooled point prevalence of emetophobia was 5 %. Higher emetophobic symptomatology moderately related to higher disgust propensity and higher anxiety, and weakly related to higher depressive symptomatology. This meta-analysis is the first to quantify that most adults with emetophobia are in early adulthood but the disorder started in childhood, almost all are women, the primary locus of fear is vomiting oneself, the most common comorbid mental disorders are other anxiety and affective disorders, and higher emetophobic symptomatology relates to a more general tendency to be easily disgusted and to be anxious. Studies based on representative samples to obtain reliable estimates on the prevalence of emetophobia are needed.

1. Introduction

Emetophobia refers to a specific fear of vomiting (Boschen, 2007). It is classified as a specific phobia in current diagnostic systems (American Psychiatric Association, 2013; World Health Organization, 2022) but it is a little-known and underresearched disorder (Vandereycken, 2011). While the earliest descriptions of this condition can be traced back to the middle of the 20th century (Allen & Broster, 1945; Sutton et al., 1958), even the most recent literature seems to be dominated by case studies (e.g., Begum, 2023; Charis, 2024; Eckert et al., 2024; Köksal et al., 2022; Orme et al., 2022; Papagianni & Kotera, 2022). Although emetophobia is classified as a specific phobia, preliminary findings indicate that it may substantially differ from other specific phobias in presentation and need for treatment, which is why it is important to investigate it as a distinct diagnostic entity (Meule, 2025b; Veale et al., 2025).

One systematic review has summarized findings from the few original research that exist (Keyes et al., 2018). Based on a handful of studies, the authors concluded that persons with emetophobia have a younger age of onset and are more likely to be female than persons with other phobias. They also noted that the most common locus of fear is vomiting oneself and that the most common comorbid mental disorders are generalized anxiety disorder, depression, panic disorder, and social phobia. Furthermore, they highlighted a point prevalence of fear of vomiting as 1.8 % for men and 7 % for women (based on one study; van Hout & Bouman, 2012) and disgust—in addition to nausea, intrusive imagery of vomiting, and internal locus of control—as key feature of emetophobia.

A significant gap in the literature is that no study has yet meta-analytically summarized findings about key characteristics of persons with emetophobia and correlates of self-reported emetophobic symptomatology. Our reading of the literature suggested that there might be a sufficient number of studies available (at least five) to meta-analyze the following variables in samples of persons with emetophobia: mean age, mean age of disorder onset, percentage of females, percentage of locus of fear (fear of vomiting oneself, fear of seeing others vomit, or both), and percentage of specific comorbid mental disorders. In unselected samples, we aimed to meta-analyze the point prevalence of emetophobia. In both emetophobia-specific and unselected samples, we aimed to meta-analyze the correlations between emetophobic symptomatology and disgust propensity, anxiety, and depression as these are the constructs

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that have most frequently been assessed based on respective questionnaires.

Based on earlier reports, which are comprehensively summarized in the systematic review by Keyes et al. (2018), we derived the following hypotheses, which were preregistered before data collection was started (cf. https://osf.io/tgdez). We hypothesized that the pooled effects across studies would indicate that—on average—persons with emetophobia are young adults (between 20 and 30 years old) and age of onset lies in childhood (between eight and 12 years of age). We also hypothesized that persons with emetophobia are primarily female (between 70 % and 90 %). We further hypothesized that the most frequent locus of fear would be fear of vomiting oneself, followed by fear of vomiting both oneself and seeing others vomit, and the least frequent locus of fear of vomiting would be fear of seeing others vomit. Regarding comorbid mental disorders, we expected that the most frequent comorbid mental disorders would be depression and generalized anxiety disorder. We further expected that point prevalence of emetophobia would be between 1 % and 10 % in unselected samples. Finally, we hypothesized that higher emetophobic symptomatology would relate to higher disgust propensity, anxiety, and depression with small effect sizes ($r = .1$–$.3$).

2. Methods

2.1. Literature search and study selection

We conducted a literature search on November 18 2024 with Google Scholar (https://scholar.google.com) using the following keywords and Boolean operators: allintitle: emetophobia OR "vomit phobia" OR "phobia of vomiting" OR "fear of vomiting". No restrictions such as year of publication or document type were used. We only used Google Scholar for this search as it has been shown that selective databases such as Web of Science™ have deficiencies in coverage while Google Scholar has a broader coverage and usually covers all documents that are included in the selective databases (Martín-Martín, Orduna-Malea, & Delgado López-Cózar, 2018; Martín-Martín, Orduna-Malea & Thelwall, & Delgado López-Cózar, 2018). Search results were imported into *rayyan* (https://www.rayyan.ai), which was used for removing duplicates and screening. Titles and abstracts were screened by two independent reviewers and mismatches were resolved by discussion. References of all relevant articles were screened to backtrace further articles that might fulfill inclusion criteria. Studies were included if they investigated persons with emetophobia and reported at least one of the dependent variables (mean age, age of disorder onset, percentage of females, percentage of locus of fear, percentage of comorbid mental disorders, correlations with disgust propensity, anxiety, or depression) or if they investigated other samples and reported at least one of the dependent variables (point prevalence of emetophobia, correlations with disgust propensity, anxiety, or depression).

2.2. Data extraction

We extracted the following information: year of publication, country, in which the study was conducted, measure used to assess emetophobic symptomatology, sample size, type of sample, type of emetophobia diagnosis (diagnosed vs. self-identified vs. questionnaire cut-off scores), percentage of females, mean age, mean age of disorder onset, percentage of locus of fear (fear of vomiting oneself, fear of seeing others vomit, or both), percentage of each comorbid mental disorder, correlation coefficients for the relationships between self-reported emetophobic symptomatology and self-reported symptoms of disgust propensity, anxiety, and depression, and type of questionnaire used for measuring disgust propensity, anxiety, and depression. If studies assessed but did not report this information, we contacted the authors twice within four weeks. If no response was received after four weeks, the study was excluded for the given analysis for which information was missing.

2.3. Data analyses

All analyses were conducted with R version 4.4.3 in RStudio version 2024.12.1 and JASP version 0.19.3. The data and code with which all results can be reproduced can be accessed at https://osf.io/m6h45.

Meta-analyses were performed with the *meta* package version 8.0-2 for each dependent variable when there were at least five studies available. Specifically, means (age, age of onset) were pooled with the *metamean* function, which uses the generic inverse variance pooling method. Proportions (percentage of females, locus of fear, comorbid mental disorders, point prevalence) were pooled with the *metaprop* function, which logit-transforms proportions and pools them with a generalized mixed-effects model. Correlation coefficients (disgust propensity, anxiety, depression) were pooled with the *metacor* function, which uses the generic inverse variance pooling method and performs Fisher's *z*-transformation before pooling. Heterogeneity was evaluated with τ^2, I^2 and prediction intervals. As we expected between-study heterogeneity, we applied random-effects models. As we expected to analyze only a small number of studies, we used restricted maximum likelihood as estimator for calculating the heterogeneity variance τ^2. We also used Knapp–Hartung adjustments to calculate the confidence interval around the pooled effect.

The *dmetar* package version 0.1.0 was used for detecting outliers and influential studies. Specifically, the *find.outliers* function detects outliers and then re-runs the original model after removing the outliers. Amongst others, the *InfluenceAnalysis* function uses the leave-one-out method, that is, re-runs the original model after removing one of the studies each.

Meta-regressions were performed for examining moderators with the *meta* package's *metareg* function. For continuous predictors, we conducted meta-regressions when there were data of at least ten studies available. For categorical predictors, we conducted meta-regressions when there were data of at least five studies available for each category. Because of the limited number of studies, only the following variables could be used: year of publication, mean age, percent female, and type of emetophobia diagnosis (diagnosed vs. self-identified). However, which predictor variable was used (and if a meta-regression was run in the first place) differed for each meta-analysis because of the limited number of studies.

In the preregistration document (https://osf.io/tgdez), we stated to examine funnel plots and perform Egger's test to evaluate asymmetry in the funnel plot. However, these methods only help to detect potential publication bias but do not adjust for it. Thus, we decided not to report these methods here but instead chose to report other methods that provide adjusted estimates (readers who are interested in seeing the funnel plots can run the code provided at https://osf.io/m6h45). As there are different approaches to adjust for publication bias (each having different advantages and disadvantages) it is generally recommended to examine more than one of these methods (Harrer et al., 2022). Thus, we examined the bias-corrected effect sizes using the *meta* package's *trimfill* function for applying Duval & Tweedie's trim-and-fill method and further used the *limitmeta* function and *copas* function from the *metasens* package version 1.5-2 for applying the limit meta-analysis method and Copas selection models. We additionally computed bias-corrected estimates with the Precision-Effect Test–Precision-Effect Estimate with Standard Error (PET–PEESE) and the Weighted Average of the Adequately Powered effect size using Weighted Least Squares (WAAP–WLS). However, as there is currently no straightforward implementation of these methods in R packages, we used JASP version 0.19.3, with which they can be computed more conveniently. For a detailed description of all these methods to adjust for publication bias, we would like to refer readers to the article by Bartoš et al. (2022) and the book by Harrer et al. (2022).

3. Results

3.1. Overview of studies

The literature search yielded 100 hits, of which 31 reports were included in the meta-analyses (Fig. 1).[1] An overview of studies can be found in Table 1. Of note is that some reports were based on the same sample. For example, the same sample was used in the thesis by Petell (2019) and in the article by Petell et al. (2022). However, both reports were used in the current meta-analyses as Petell (2019) reported a correlation coefficient for the relationship between emetophobic symptomatology and disgust propensity, which was not reported by Petell et al. (2022) who in turn reported a correlation coefficient for the relationship between emetophobic symptomatology and anxiety. Similarly, the articles by Boschen et al. (2013), Veale et al. (2012), Veale, Ellison, et al. (2013), and Veale, Murphy, et al. (2013) all reported on the same sample, which is why we excluded the reports by Veale et al. (2012) and Veale, Ellison, et al. (2013) but retained both the article by Boschen et al. (2013) and the article by Veale, Murphy, et al. (2013) as they reported different information relevant to the current meta-analyses. Great care was taken to ensure that no duplicate samples were used in each meta-analysis.

We would also like to highlight that we only used reports with unselected samples for the meta-analysis on point prevalence. That is, while there were quite a few studies that reported how many participants exceeded the cut-off score of a questionnaire on emetophobia, some of them explicitly noted that while they recruited an Internet convenience sample, they also explicitly recruited participants from emetophobia-related websites (e.g., Hennemann et al., 2025; Uziel et al., 2024). We also excluded other samples for the meta-analysis on point prevalence such as the sample of outpatients with mental disorders investigated by Hennemann et al. (2025) as we deemed such samples as overestimating the prevalence of emetophobia.

A final issue that we would like to highlight considering the information provided in Table 1 is that contemporary research differentiates between disgust propensity and disgust sensitivity. Disgust propensity refers to how easily or frequently a person experiences disgust. Disgust sensitivity refers to how negatively a person reacts to the feeling of disgust itself. One widely used measure is the Disgust Scale, which has been described as a measure of disgust sensitivity by the developers of the scale (Haidt et al., 1994) but it actually measures what nowadays would be labelled disgust propensity (Meule, 2025a). As only few studies included a measure of disgust sensitivity, we only examined disgust propensity in the current meta-analyses.

3.2. Mean age

Based on 18 samples, the pooled estimate of mean age of persons with emetophobia was 29.4 years (95 % CI [26.3, 32.5], Fig. 2). Between-study heterogeneity was substantial ($\tau^2 = 33.4$, 95 % CI [18.1, 88.7]; $I^2 = 98.5$ %, 95 % CI [98.2, 98.8]; prediction interval [16.8, 41.9]). Yet, removing four outliers yielded a similar estimate of 29.3 years (95 % CI [27.3, 31.3] as did the leave-one-out analysis, for which estimates ranged between 29.0 and 29.9 years.

Year of publication moderated the effect such that mean age was younger in studies that were published in more recent years (estimate = − 0.44, $SE = 0.20$, $p = .039$). As the study by Yoneda et al. (2024) was the only study in this analysis that defined persons with emetophobia based on the cut-off score of the Specific Phobia of Vomiting Inventory (SPOVI), we excluded this study to test whether diagnosed vs. self-identified emetophobia moderated mean age, which it did not (estimate = − 10.3, $SE = 6.02$, $p = .108$). Percent female also did not moderate mean age (estimate = 0.21, $SE = 0.11$, $p = .092$).

The trim-and-fill analysis added eight studies, yielding an adjusted estimate of 24.2 years (95 % CI [20.1, 28.4]). The limit meta-analysis yielded an adjusted estimate of 27.4 years (95 % CI [24.2, 30.7]). The Copas selection model analysis was unable to produce an adjusted estimate, which may be due to severe publication bias. PET–PEESE indicated the presence of publication bias ($p = .016$) and adjusted estimates were 21.3 years (95 % CI [18.7, 24.0]) for the PET model and 23.5 years (95 % CI [21.4, 25.6]) for the PEESE model. The WAAP–WLS analysis indicating that all studies were adequately powered, yielding an adjusted estimate of 24.0 years (95 % CI [21.9, 26.1]).

3.3. Age of disorder onset

Based on 12 samples, the pooled estimate of mean age of onset was 10.2 years (95 % CI [7.92, 12.5], Fig. 3). Between-study heterogeneity was substantial ($\tau^2 = 11.3$, 95 % CI [4.92, 35.3]; $I^2 = 92.0$ %, 95 % CI [87.9, 94.7]; prediction interval [2.46, 17.9]). Yet, removing four outliers yielded a similar estimate of 9.96 years (95 % CI [8.31, 11.6] as did the leave-one-out analysis, for which estimates ranged between 9.62 and 10.7 years.

Year of publication did not moderate the effect (estimate = 0.01, $SE = 0.19$, $p = .947$). Mean age (estimate = − 0.02, $SE = 0.29$, $p = .961$) and percent female (estimate = 0.10, $SE = 0.27$, $p = .722$) also did not moderate age of onset based on 10 studies.

The trim-and-fill analysis did not add studies and, thus, did not provide an adjusted estimate. The limit meta-analysis yielded an adjusted estimate of 10.0 years (95 % CI [7.46, 12.6]). The Copas selection model analysis yielded an adjusted estimate of 10.2 years (95 % CI [8.25, 12.1]). PET–PEESE did not indicate the presence of publication bias ($p = .805$) and adjusted estimates were 9.54 years (95 % CI [6.26, 12.8]) for the PET model and 9.80 years (95 % CI [8.01, 11.6]) for the PEESE model. The WAAP–WLS analysis indicating that all studies were adequately powered, yielding an adjusted estimate of 9.92 years (95 % CI [8.46, 11.4]).

3.4. Percentage of females

Based on 21 samples, the pooled estimate of percent female was 0.91 (95 % CI [0.87, 0.94], Fig. 4). Between-study heterogeneity was substantial ($\tau^2 = 0.70$; $I^2 = 82.2$ %, 95 % CI [73.9, 87.9]; prediction interval [0.63, 0.98]). Yet, removing two outliers yielded a similar estimate of 0.91 (95 % CI [0.88, 0.94] as did the leave-one-out analysis, for which estimates ranged between 0.90 and 0.92.

Year of publication did not moderate the effect (estimate = − 0.05, $SE = 0.03$, $p = .156$). As the studies by Petell, 2019 and Yoneda et al. (2024) were the only studies in this analysis that defined persons with emetophobia based on the cut-off score of the SPOVI, we excluded them to test whether diagnosed vs. self-identified emetophobia moderated the percentage of females, which it did not (estimate = 0.16, $SE = 0.35$, $p = .664$). Mean age also did not moderate the percentage of females (estimate = 0.07, $SE = 0.03$, $p = .050$).

The trim-and-fill analysis added seven studies, yielding an adjusted estimate of 0.86 (95 % CI [0.79, 0.90]). The limit meta-analysis yielded an adjusted estimate of 0.88 (95 % CI [0.81, 0.93]). The Copas selection model analysis yielded an adjusted estimate of 0.90 (95 % CI [0.86, 0.93]). PET–PEESE did not indicated the presence of publication bias ($p = .681$) and adjusted estimates were 0.88 (95 % CI [0.72, 0.95]) for the PET model and 0.89 (95 % CI [0.82, 0.93]) for the PEESE model. The WAAP–WLS analysis indicating that 17 studies were adequately powered, yielding adjusted estimates of 0.90 (95 % CI [0.85, 0.93]) for the WLS model and 0.89 (95 % CI [0.84, 0.93]) for the WAAP model.

[1] For reference, conducting a similar search in Web of Science™ on the same day only yielded 47 hits and included all records identified by the Google Scholar search except two additional case reports, which were, thus, not relevant for the current meta-analyses.

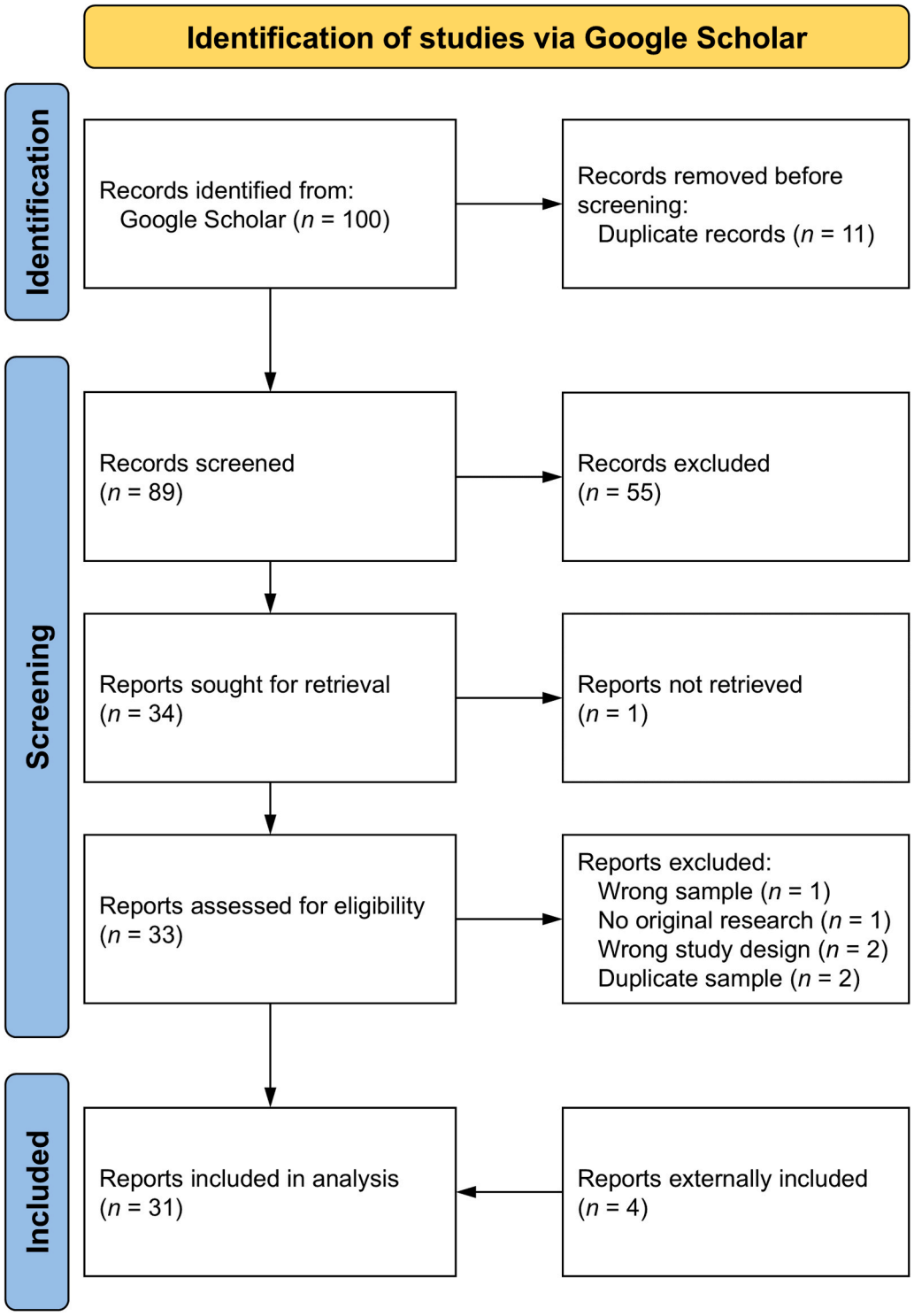

Fig. 1. Flow diagram based on the preferred reporting items for systematic reviews and meta-analyses (https://www.prisma-statement.org).

3.5. Locus of fear

Based on six samples, the pooled estimate of fear of vomiting oneself was 0.47 (95 % CI [0.38, 0.57], Fig. 5A), the pooled estimate of fear of seeing others vomit was 0.11 (95 % CI [0.08, 0.15], Fig. 5B), and the pooled estimate of fearing both was 0.39 (95 % CI [0.27, 0.54], Fig. 5C). Between-study heterogeneity ranged from low to substantial (Table 2). No outliers were detected and the leave-one-out analysis' adjusted estimates were comparable to the unadjusted estimates (Table 2). As there were only six samples included, no meta-regressions were run.

Adjusting for publication bias produced mixed findings, which may reflect the small number of samples. Adjusted estimates for the trim-and-fill analysis, limit meta-analysis method, and PET–PEESE suggested that the percentage of persons fearing both vomiting oneself and seeing others vomit was actually larger than fear of vomiting oneself (Table 2). The Copas selection model analysis could not compute an adjusted estimate for fear of both, the PET–PEESE's test of publication bias was not significant, and WAAP–WLS either deemed all or none of the studies adequately powered (Table 2).

Table 1
Overview of reports included in the meta-analyses.

Study	Country	Sample	Diagnosis	Questionnaires*	Study design
Ahlen et al. (2015)	Sweden	Persons with emetophobia	Diagnosed	BAI, EmetQ–13, MADRS–S	Treatment study with outpatient cognitive-behavioral group therapy
Becker et al. (2007)	Germany	Women	Diagnosed	—	Epidemiological study with structured clinical interview
Bohne et al. (2006)	Germany	Persons with emetophobia	Self-identified	—	Cross-sectional self-report study
Boschen et al. (2013)	UK	Persons with and without emetophobia	Diagnosed	DS–R, GAD–7, PHQ–9, SPOVI	Quasi-experimental study with persons with emetophobia and a matched control sample
Davidsdottir et al. (2025)	Iceland	Persons with emetophobia	Diagnosed	—	Treatment study with the Bergen 4-day treatment
Davidson et al. (2008)	International	Persons with emetophobia, persons with other phobias, and persons without phobias	Self-identified	—	Cross-sectional self-report study
Hennemann et al. (2025)	Germany	Convenience sample and persons with mental disorders	SPOVI cut-off score	BSI, BDI–II, GAD–2, PHQ–2, SPOVI	Cross-sectional self-report study
Höller et al. (2013)	Germany	Persons with emetophobia	Diagnosed	—	Cross-sectional self-report study
Jónsson (2022)	Iceland	University students	EmetQ–13 cut-off score	EmetQ–13, DPSS–R	Laboratory study
Kelly and Allen (2014)	UK	Persons with emetophobia and persons with other mental disorders	Self-identified	—	Treatment study with 'The Thrive Programme'
Lipsitz et al. (2001)	USA	Persons with emetophobia	Self-identified	—	Cross-sectional self-report study
Maack et al. (2018)	USA	University students	SPOVI cut-off score	DASS–21, SPOVI	Cross-sectional self-report study
Meule et al. (2025)	Germany	Persons with emetophobia and persons with other specific phobias	Diagnosed	—	Treatment study with inpatient treatment
Pearson (2010)	International	Persons with emetophobia	Self-identified	DPSS–R, self-created emetophobia measure, SHAI	Cross-sectional self-report study
Petell (2019)	USA	University students	SPOVI cut-off score	DS–R, SPOVI	Cross-sectional self-report study
Petell et al. (2022)	USA	University students	SPOVI cut-off score	DASS–21, SPOVI	Cross-sectional self-report study
Petell and Bilsky (2023)	International	Persons with emetophobia	Self-identified	DASS–21, SPOVI	Cross-sectional self-report study
Price et al. (2012)	UK	Persons with emetophobia	Diagnosed	DS–R, SPOVI	Cross-sectional interview study
Riddle-Walker et al. (2016)	USA	Persons with emetophobia	Diagnosed	—	Treatment study with outpatient cognitive behavior therapy
Sykes et al. (2016)	International	Persons with emetophobia	Diagnosed	—	Cross-sectional interview study
Uziel et al. (2024)	Israel	Convenience sample	SPOVI cut-off score	DAS, SPOVI	Cross-sectional self-report study
van Hout and Bouman (2012)	Netherlands	Convenience sample and persons with emetophobia	Self-identified	—	Cross-sectional self-report study
van Overveld et al. (2008)	Netherlands	Persons with and without emetophobia	Self-identified	DPSS–R, EQ	Cross-sectional self-report study
Veale and Lambrou (2006)	UK	Persons with emetophobia, persons with panic disorder, and persons without anxiety disorders	Self-identified	—	Cross-sectional self-report study
Veale, Murphy, et al. (2013)	UK	Persons with and without emetophobia	Diagnosed	—	Quasi-experimental study with persons with emetophobia and a matched control sample
Veale et al. (2015)	UK	Persons with emetophobia	Diagnosed	—	Cross-sectional interview study
Verwoerd et al. (2016)	Netherlands	Convenience sample	EQ cut-off score	DPSS–R, EQ	Cross-sectional self-report study
Wu et al. (2015)	USA	University students	SPOVI cut-off score	DASS–21, SPOVI	Cross-sectional self-report study
Wu et al. (2017)	El Salvador	Parents reporting on their child's symptoms	SPOVI cut-off score	HAI, SPOVI	Cross-sectional parent-report study
Yoneda et al. (2024)	Japan	University students	SPOVI cut-off score	DS–R, GAD–7, PHQ–9, SPOVI	Cross-sectional self-report study
Zhao (2014)	USA	University students	—	DASS–21, DS–R, SPOVI	

Notes. Further information about the studies' characteristics such as sample size, mean age, and percentage of females can be found in the figures. BAI = Beck Anxiety Inventory, BDI–II = Beck Depression Inventory–II, BSI = Brief Symptom Inventory (anxiety subscale), DAS = Dental Anxiety Scale, DASS–21 = Depression Anxiety Stress Scales–21, DPSS–R = Disgust Propensity and Sensitivity Scale–Revised, DS–R = Disgust Scale–Revised, EQ = Emetophobia Questionnaire, EmetQ–13 = Emetophobia Questionnaire–13, GAD–2 = Generalized Anxiety Disorder–2, GAD–7 = Generalized Anxiety Disorder–7, HAI = Health Anxiety Inventory, MADRS–S = Montgomery–Åsberg Depression Rating Scale–Self-Assessment, PHQ–2 = Patient Health Questionnaire–2, PHQ–9 = Patient Health Questionnaire–9, SHAI = Short Health Anxiety Inventory, SPOVI = Specific Phobia of Vomiting Inventory.

* Only questionnaire measures that were used in the current meta-analyses to examine relationships of emetophobic symptomatology with disgust propensity, anxiety, and depression are listed.

3.6. Comorbid mental disorders

Based on 11 samples, the pooled estimate of social anxiety disorder was 0.16 (95 % CI [0.07, 0.32], Fig. 6A). Based on 12 samples, the pooled estimate of depression was 0.15 (95 % CI [0.09, 0.23], Fig. 6B). Based on six samples, the pooled estimate of generalized anxiety disorder was 0.15 (95 % CI [0.05, 0.36], Fig. 6C). Based on 10 samples, the pooled estimate of obsessive–compulsive disorder was 0.12 (95 % CI

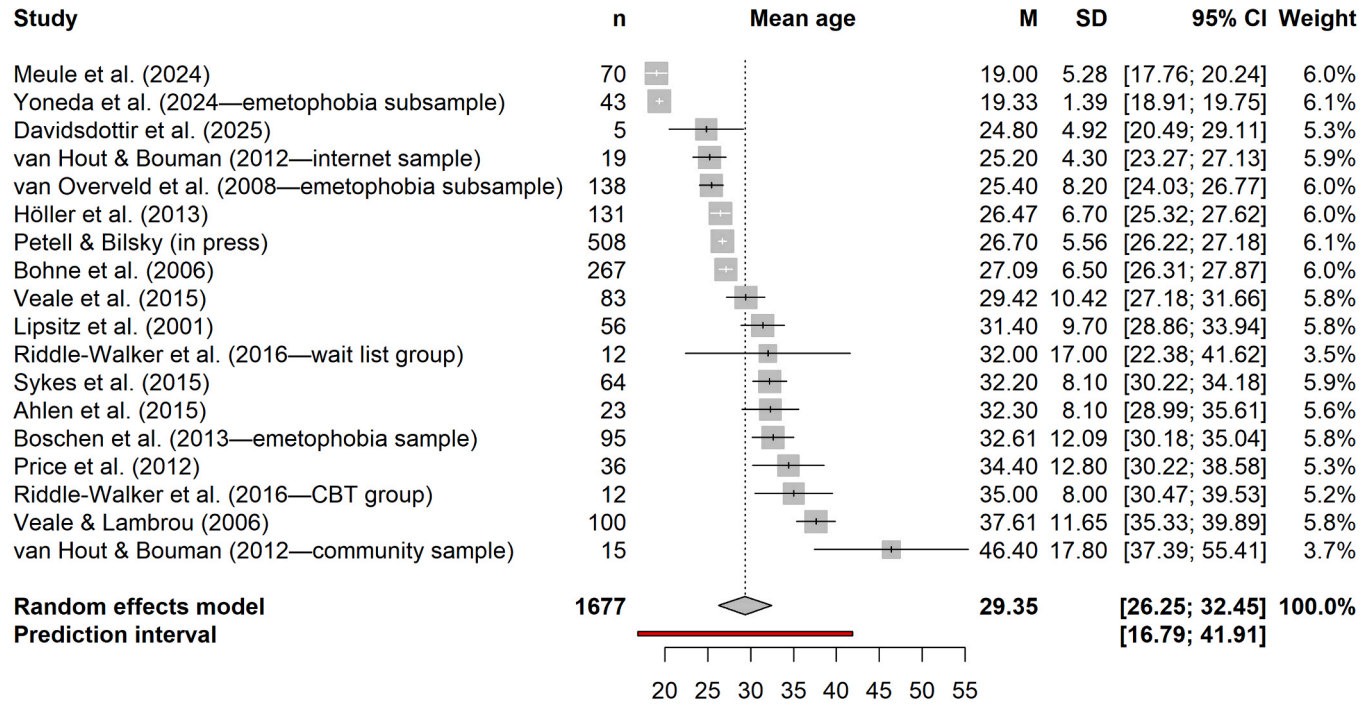

Fig. 2. Forest plot for the meta-analysis on mean age of persons with emetophobia. The vertical lines in the grey squares indicate the point estimate of the effect size for each study and size of the squares is proportional to the study's weight. The horizontal black lines represent the 95 % confidence intervals of the point estimate of the effect size for each study (the lines are displayed in white if they do not exceed the squares). The center of the grey diamond indicates the pooled effect estimate and the width of the diamond represents its 95 % confidence interval. The red line represents the 95 % prediction interval, which reflects the expected range of effects in future similar studies.

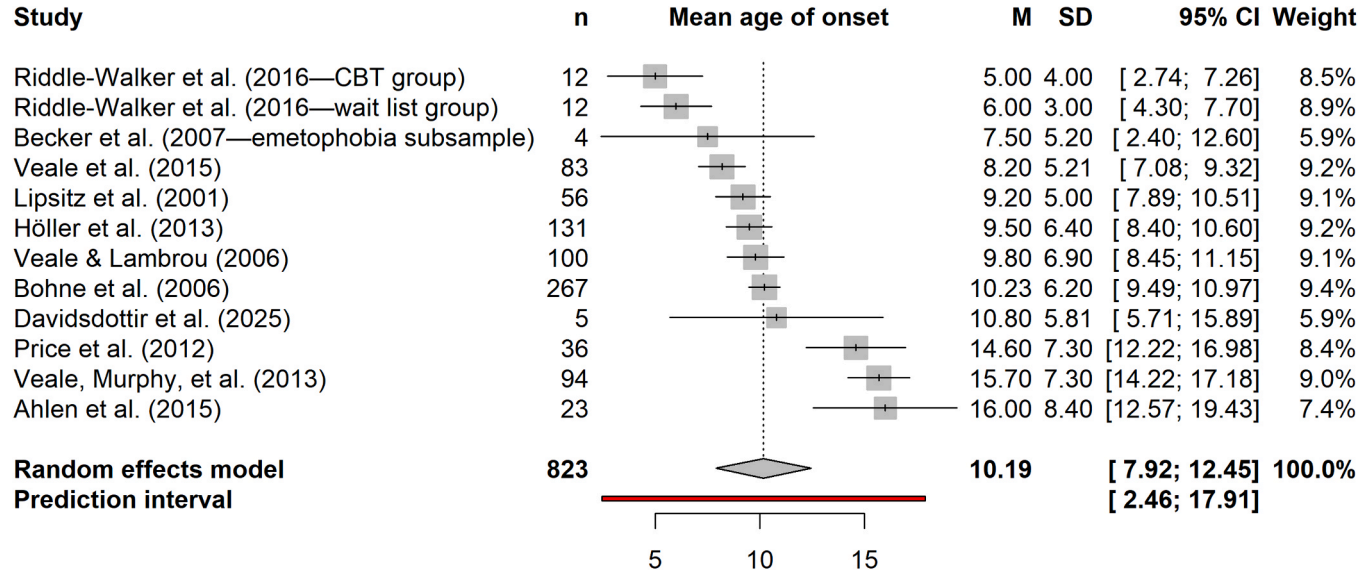

Fig. 3. Forest plot for the meta-analysis on mean age of disorder onset in persons with emetophobia. The vertical lines in the grey squares indicate the point estimate of the effect size for each study and size of the squares is proportional to the study's weight. The horizontal black lines represent the 95 % confidence intervals of the point estimate of the effect size for each study. The center of the grey diamond indicates the pooled effect estimate and the width of the diamond represents its 95 % confidence interval. The red line represents the 95 % prediction interval, which reflects the expected range of effects in future similar studies.

[0.08, 0.18], Fig. 6D). Based on eight samples, the pooled estimate of panic disorder was 0.11 (95 % CI [0.04, 0.28], Fig. 6E). Based on six samples, the pooled estimate of illness anxiety disorder was 0.09 (95 % CI [0.03, 0.24], Fig. 6F). Based on eight samples, the pooled estimate of agoraphobia was 0.08 (95 % CI [0.01, 0.33], Fig. 6G). Based on five samples, the pooled estimate of eating disorders was 0.06 (95 % CI [0.02, 0.16], Fig. 6H). Between-study heterogeneity ranged from low to substantial (Table 3). The number of outliers ranged from zero to two but the adjusted estimates as well as the leave-one-out analysis' adjusted estimates were largely comparable to the unadjusted estimates (Table 3).

A sufficiently large number of samples (i.e., 10) to run meta-regressions only was available for social anxiety disorder, depression, and obsessive–compulsive disorder. Yet, neither year of publication,

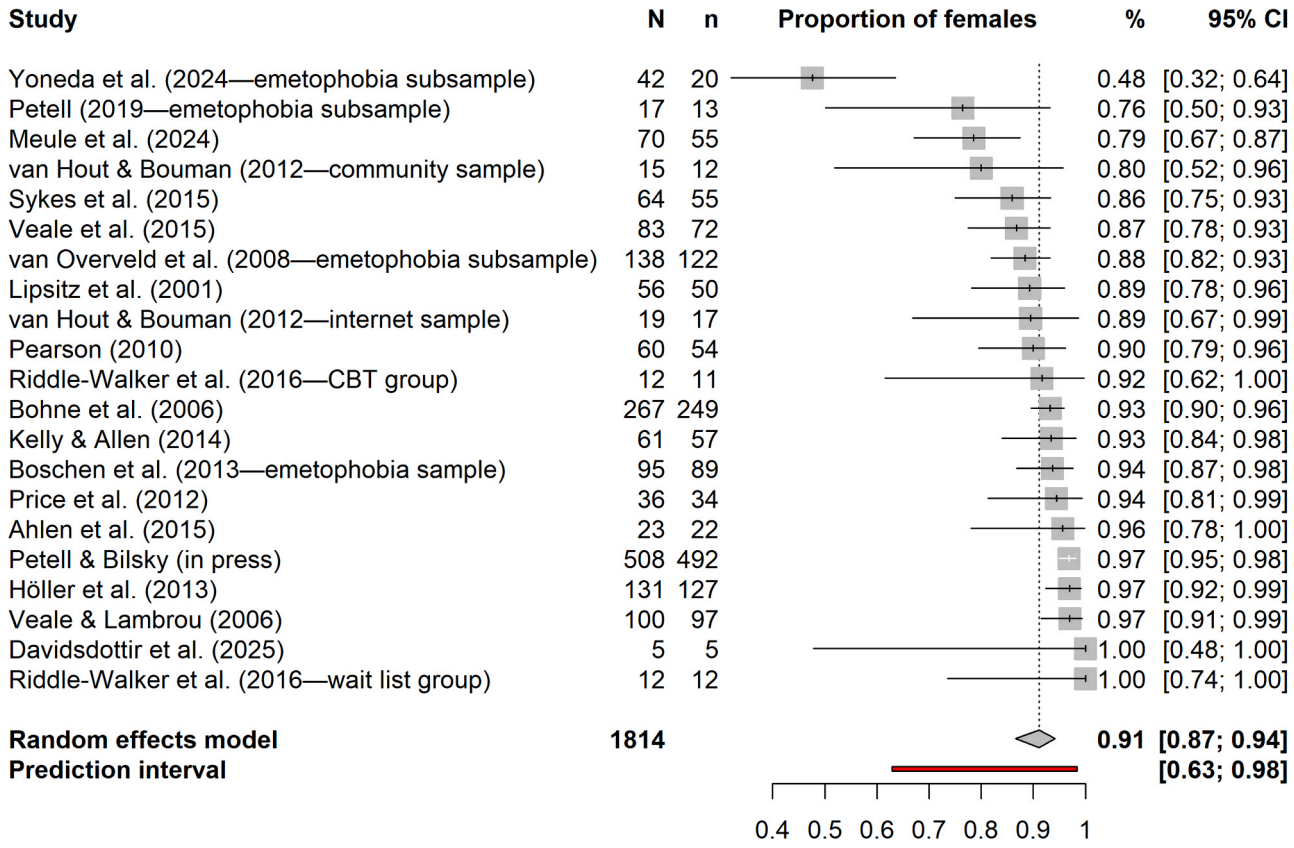

Fig. 4. Forest plot for the meta-analysis on proportion of females in persons with emetophobia. The vertical lines in the grey squares indicate the point estimate of the effect size for each study and size of the squares is proportional to the study's weight. The horizontal black lines represent the 95 % confidence intervals of the point estimate of the effect size for each study (the lines are displayed in white if they do not exceed the squares). The center of the grey diamond indicates the pooled effect estimate and the width of the diamond represents its 95 % confidence interval. The red line represents the 95 % prediction interval, which reflects the expected range of effects in future similar studies.

mean age, or percent female moderated the proportions of social anxiety disorder, depression, and obsessive–compulsive disorder (all *ps* > .051).

Examining publication bias produced mixed results (Table 3). Specifically, while the PET–PEESE's test of publication bias was only significant for social anxiety disorder, adjusted estimates across the different methods partially differed substantially from the unadjusted estimates, except for depression. Furthermore, the number of studies added by the trim-and-fill analysis was low and the number of adequately powered studies was high only for depression and eating disorders. Thus, it appears that publication bias was particularly present for anxiety disorders and obsessive–compulsive disorder.

3.7. Point prevalence

Based on seven samples, the pooled estimate of point prevalence was 0.05 (95 % CI [0.01, 0.18], Fig. 7). Between-study heterogeneity was substantial (τ^2 = 2.13; I^2 = 94.1 %, 95 % CI [90.2, 96.4]; prediction interval [0.001, 0.72]). Removing one outlier changed the estimate to 0.09 (95 % CI [0.06, 0.15] and estimates for the leave-one-out analysis ranged between 0.04 and 0.09. As there were only seven samples included, no meta-regressions were run.

The trim-and-fill analysis added two studies, yielding an adjusted estimate of 0.10 (95 % CI [0.02, 0.38]). The limit meta-analysis yielded an adjusted estimate of 0.16 (95 % CI [0.05, 0.43]). The Copas selection model analysis was unable to produce an adjusted estimate, which may be due to severe publication bias. Yet, PET–PEESE did not indicated the presence of publication bias (p = .309) and adjusted estimates were 0.15 (95 % CI [0.05, 0.34]) for the PET model and 0.12 (95 % CI [0.07, 0.19]) for the PEESE model. The WAAP–WLS analysis indicating that all studies were adequately powered, yielding an adjusted estimate of 0.09 (95 % CI [0.06, 0.14]).

3.8. Correlations with disgust propensity, anxiety, and depression

Based on 10 samples, the pooled estimate for disgust propensity was 0.39 (95 % CI [0.21, 0.55], Fig. 8A). Based on 13 samples, the pooled estimate for anxiety was 0.37 (95 % CI [0.27, 0.46], Fig. 8B). Based on 10 samples, the pooled estimate for depression was 0.25 (95 % CI [0.16, 0.34], Fig. 8C). Between-study heterogeneity ranged from moderate to substantial (Table 4). Only one outlier was detected for disgust propensity and anxiety, estimates after the exclusion of which were comparable to the unadjusted estimates. No outlier was detected for depression. Adjusted estimates for the influential analysis were also comparable to the unadjusted estimates (Table 4).

Year of publication and mean age did not moderate any effects (all *ps* > .165). Percent female did not moderate the effect for disgust propensity (estimate = 0.01, *SE* = 0.01, p = .509). However, percent female moderated the effect for anxiety (estimate = 0.01, *SE* = 0.003, p = .020) and depression (estimate = 0.01, *SE* = 0.002, p = .022) such that the correlations of emetophobic symptomatology with anxiety and depression were larger in samples with a higher percentage of females.

There were no indications for publication bias for the correlations with anxiety and depression as the trim-and-fill analysis only added one study for anxiety and none for depression, the PET–PEESE's test of publication bias was not significant, and all adjusted estimates were comparable to the unadjusted estimates (Table 4). While the PET–PEESE's test of publication bias was also not significant for the correlation with disgust propensity, there was still some indication for publication

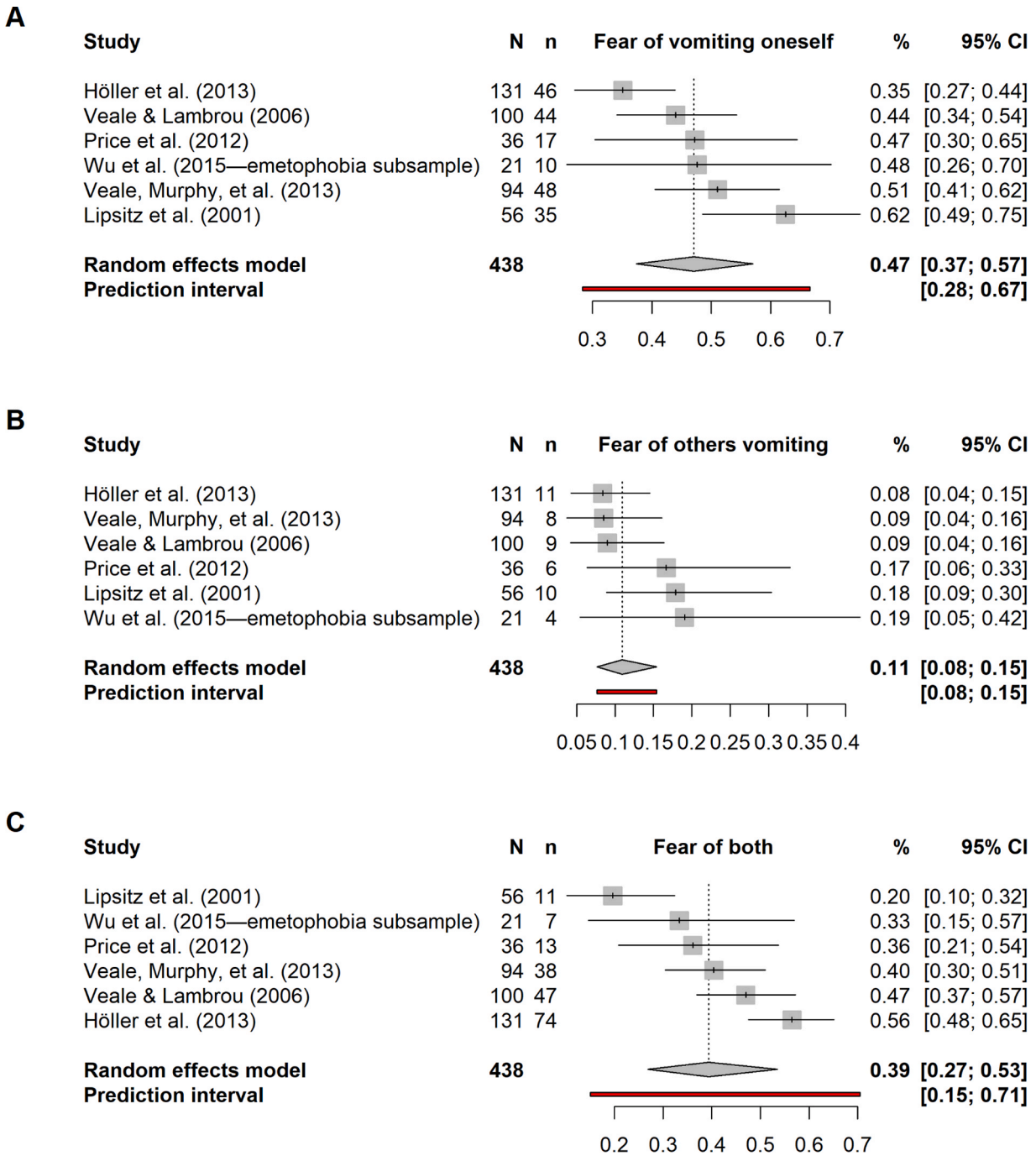

Fig. 5. Forest plots for the meta-analyses on locus of fear, that is, the proportions of persons with emetophobia reporting to (A) fear vomiting themselves, (B) fear seeing others vomit, and (C) fear both vomiting themselves and seeing others vomit. The vertical lines in the grey squares indicate the point estimate of the effect size for each study and size of the squares is proportional to the study's weight. The horizontal black lines represent the 95 % confidence intervals of the point estimate of the effect size for each study. The center of the grey diamond indicates the pooled effect estimate and the width of the diamond represents its 95 % confidence interval. The red line represents the 95 % prediction interval, which reflects the expected range of effects in future similar studies.

bias as the trim-and-fill analysis added five studies and some of the adjusted estimates differed quite substantially from the unadjusted estimates (Table 4).

4. Discussion

4.1. Mean age

In line with hypotheses, persons with emetophobia were—on average—in early adulthood, that is, between 20 and 30 years old. The pooled estimate of 29 years was reduced to 21–27 years when adjusting for publication bias. Moreover, persons with emetophobia tended to be younger in more recently published studies. We can only speculate that this might suggest that emetophobia becomes more known and, thus, persons with emetophobia earlier become aware of the condition, leading to earlier involvement in treatment and study participation. Nevertheless, most published studies investigated adults and while some studies included adolescents as well (e.g., Meule et al., 2025), there was only one study that investigated parents reporting on their children (Wu et al., 2017) and no study in which children participated directly. Thus,

Table 2
Estimates for between-study heterogeneity, outliers, influential studies, and publication bias of the meta-analyses on locus of fear.

$k = 6$	Fear of vomiting oneself	Fear of seeing others vomit	Fear of both
Between-study heterogeneity			
τ^2	0.08	0	0.21
I^2 [95 % CI]	62.2 % [7.9 %, 84.5 %]	27.5 % [0.0 %, 70.0 %]	78.1 % [51.7 %, 90.1 %]
Prediction interval	[0.28, 0.67]	[0.08, 0.15]	[0.15, 0.71]
Outlier analysis			
k studies removed	0	0	0
Adjusted estimate [95 % CI]	—	—	—
Leave-one-out analysis			
Adjusted estimate (lowest, highest)	0.44, 0.50	0.10, 0.12	0.36, 0.45
Trim-and-fill analysis			
k studies added	3	2	3
Adjusted estimate [95 % CI]	0.41 [0.31, 0.51]	0.10 [0.06, 0.15]	0.49 [0.34, 0.64]
Limit meta-analysis			
Adjusted estimate [95 % CI]	0.42 [0.28, 0.57]	0.05 [0.01, 0.16]	0.53 [0.34, 0.70]
Copas selection model analysis			
Adjusted estimate [95 % CI]	0.47 [0.40, 0.55]	0.12 [0.09, 0.15]	—
PET–PEESE			
Test of publication bias	$p = .367$	$p = .201$	$p = .078$
Adjusted estimate [95 % CI] (PET model)	0.32 [0.13, 0.60]	0.03 [0.01, 0.17]	0.70 [0.48, 0.86]
Adjusted estimate [95 % CI] (PEESE model)	0.41 [0.28, 0.55]	0.07 [0.03, 0.14]	0.55 [0.41, 0.68]
WAAP–WLS			
k studies adequately powered	0	6	0
Adjusted estimate [95 % CI] (WLS model)	0.46 [0.38, 0.54]	0.12 [0.08, 0.16]	0.44 [0.34, 0.55]
Adjusted estimate [95 % CI] (WAAP model)	—	0.12 [0.08, 0.16]	—

Notes. The confidence interval for τ^2 cannot be estimated for proportions. The limit meta-analysis method cannot handle data from generalized linear mixed models, which is why the adjusted estimates are based on the inverse variance method. The Copas selection model analysis could not compute the adjusted estimate for fear of both.

in line with results from the publication bias analyses, the current findings likely overestimate the true mean age of persons with emetophobia. For example, one study in inpatients even suggested that persons with emetophobia are younger than persons with other specific phobias (Meule et al., 2025), which requires replication in other samples in future studies.

4.2. Age of disorder onset

Another finding in line with hypotheses was that age of disorder onset lies in childhood between eight and 12 years of age. The pooled estimate was 10 years, with no indication for publication bias. This resonates well with another meta-analysis that estimated the mean age of onset of specific phobias in general to be 11 years of age (de Lijster et al., 2017). In light of the findings about mean age outlined above, this suggests that many persons with emetophobia do not seek or do not receive proper treatment until adulthood. Moreover, while there are several case reports about children and adolescents with emetophobia (e.g., Dosanjh et al., 2017; Faye et al., 2013; Fix et al., 2016; Graziano et al., 2010; Whitton et al., 2006; Williams et al., 2011), it seems that systematic studies on emetophobia in children are non-existent. This highlights the importance of increasing awareness about this condition in parents, teachers, and therapists to increase the probability that is recognized early and treated properly to prevent becoming an enduring condition.

4.3. Percentage of females

We expected that between 70 % and 90 % of persons with emetophobia would be female and the pooled estimate even was 91 %. Publication bias-adjusted estimates similarly yielded proportions of approximately 90 %. While anxiety disorders are more common in females than males, the ratio of females to males of 9:1 seems to be much larger than those reported for other anxiety disorders, including other specific phobias (Bekker & van Mens-Verhulst, 2007).

4.4. Locus of fear

Regarding locus of fear, we expected that the most frequent one would be fear of vomiting oneself, followed by fear of vomiting both oneself and seeing others vomit, and the least frequent locus of fear of vomiting would be fear of seeing others vomit. While this was confirmed in the basic meta-analyses, adjusting for publication bias partially indicated fearing both as the most common locus of fear. The analyses also indicated that there is a need for more adequately powered studies in order to derive more precise estimates. However, a robust finding was that exclusively fearing seeing others vomit is relatively rarely reported by persons with emetophobia (approximately by 10 %).

4.5. Comorbid mental disorders

Regarding comorbid mental disorders, we expected that the most frequent comorbid mental disorders would be depression and generalized anxiety disorder. While this was confirmed, social anxiety disorder was also one of the three most common comorbid mental disorders. Except for depression, analyses indicated the need for more adequately powered studies and estimates adjusted for publication bias partially differed substantially from the unadjusted estimates, particularly for other anxiety disorders. Although emetophobia can often be misdiagnosed as an eating disorder when the fear of vomiting results in restricted food intake (Russ & Christie, 2023; Veale et al., 2012), prevalence of comorbid eating disorders was relatively low. That is, once a person has been correctly diagnosed with emetophobia, it is quite uncommon that this person additionally meets the diagnostic criteria for an eating disorder. This may partially be due to the fact that—while emetophobia may be misclassified as anorexia nervosa or avoidant/restrictive food intake disorder—behaviors involved in other eating disorders are incompatible with emetophobic fears (e.g., self-induced vomiting such as in persons with bulimia nervosa or feeling nauseous after binge eating such as in persons with binge eating disorder).

Caution should be exercised when interpreting the absolute numbers of the pooled effects. Specifically, some studies that were included in these analyses used structured clinical interviews but others used self-report questionnaires. For example, the Psychiatric Diagnostic Screening Questionnaire was used in the study by van Hout and Bouman (2012) and this study produced the highest comorbidity rates for almost all analyses, in which it was included (Fig. 6) and was also identified as outlier in some of the analyses. Thus, it may be that rates of comorbid mental disorders tended to be overestimated by studies that did not employ a structured clinical interview.

4.6. Point prevalence

We expected that point prevalence of emetophobia would be between 1 % and 10 % in unselected samples, which was confirmed with a pooled estimate of 5 %. When excluding the study by Becker et al. (2007), the pooled estimate was 9 % and adjusting for publication bias partially yielded even higher prevalence rates. However, the study by

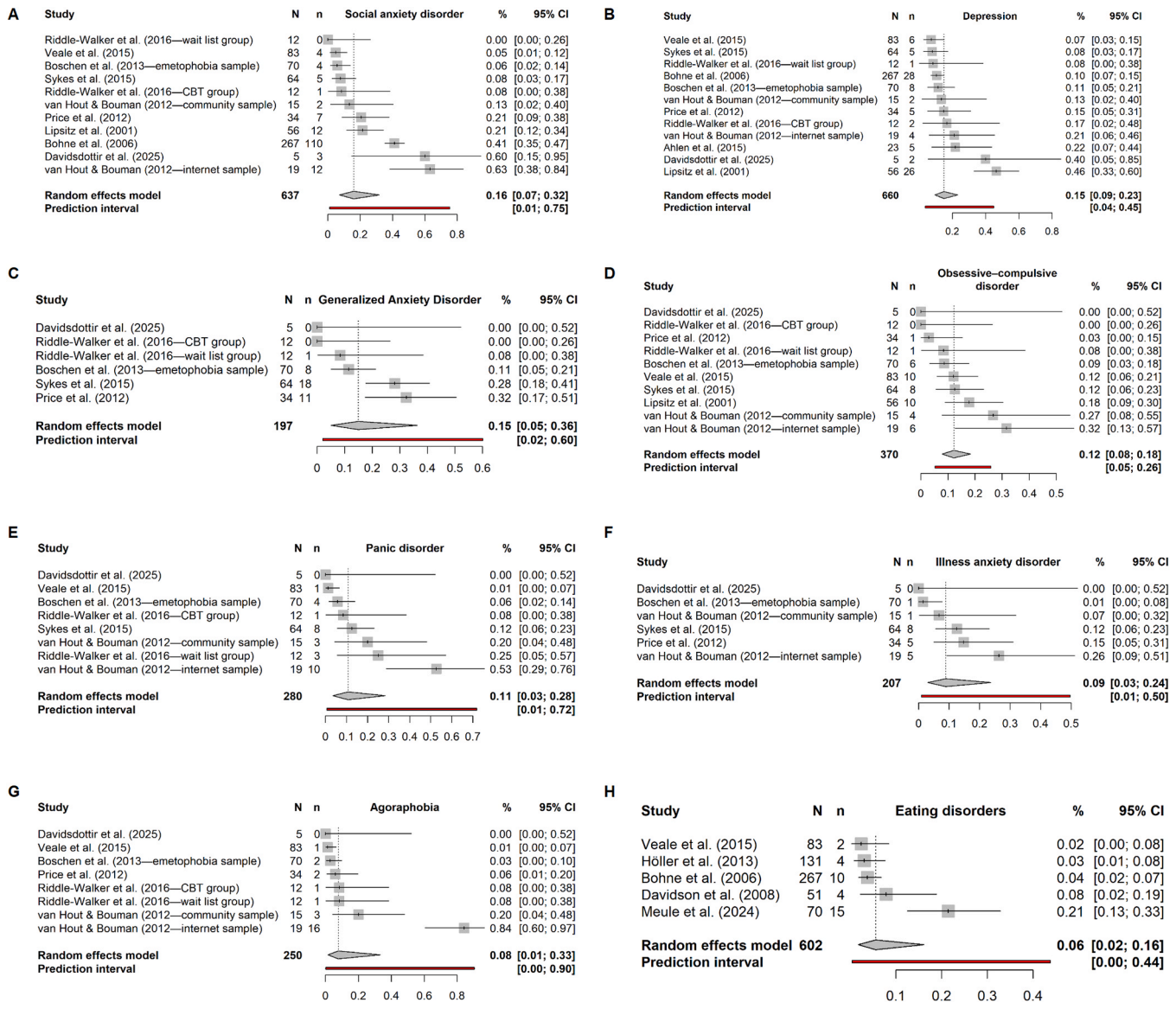

Fig. 6. Forest plots for the meta-analyses on comorbid mental disorders, that is, the proportions of persons with emetophobia having comorbid (A) social anxiety disorder, (B) depression, (C) generalized anxiety disorder, (D) obsessive–compulsive disorder, (E) panic disorder, (F) illness anxiety disorder, (G) agoraphobia, and (H) eating disorders. The vertical lines in the grey squares indicate the point estimate of the effect size for each study and size of the squares is proportional to the study's weight. The horizontal black lines represent the 95 % confidence intervals of the point estimate of the effect size for each study. The center of the grey diamond indicates the pooled effect estimate and the width of the diamond represents its 95 % confidence interval. The red line represents the 95 % prediction interval, which reflects the expected range of effects in future similar studies.

Becker et al. (2007) was the only one based on a sample representative of German women and using a structured clinical interview, yielding a point prevalence of 0.15 %. All other studies included in this analysis used the cut-off score of the SPOVI, except the study by van Hout and Bouman (2012), which used affirmative responses to the question "At present are you afraid to vomit (e.g. vomit yourself or see other people vomit)?" Thus, these studies likely overestimate the point prevalence of emetophobia. Moreover, the prevalence reported by Yoneda et al. (2024) based on the Japanese version of the SPOVI was exceptionally high (21 %), indicating either selection bias when recruiting participants or substantial cultural differences in the measurement of emetophobic symptomatology.

While the findings by Becker et al. (2007) are limited to a sample of women in Germany, we would speculate that this study still provides the most precise estimate of the prevalence of emetophobia. The SPOVI is a psychometrically sound measure and the suggested cut-off score by Veale, Ellison, et al. (2013) discriminated between persons with and without emetophobia with high sensitivity (i.e., the probability of a positive test result given the presence of emetophobia) and high specificity (i.e., the probability of a negative test result given the absence of emetophobia). However, even when a test has high sensitivity and specificity, it can still have a low positive predictive value (i.e., the probability of the presence of emetophobia given a positive test result; Molinaro, 2015). No study has yet reported the positive predictive value of the SPOVI's cut-off score but if it is low, this would mean that there are quite a few persons who score above 10 but still do not have emetophobia, which would then lead to an overestimation of the prevalence of emetophobia in epidemiological studies. Yet, although we explicitly excluded studies from the analysis in which selection bias was very likely and which, therefore, could have led to an overestimation of prevalence, we cannot confidently rule out the possibility that the studies included in the analysis were also subject to selection bias.

Table 3
Estimates for between-study heterogeneity, outliers, influential studies, and publication bias of the meta-analyses on comorbid mental disorders.

k = 5–12	Social anxiety disorder	Depression	Generalized anxiety disorder	Obsessive–compulsive disorder	Panic disorder	Illness anxiety disorder	Agoraphobia	Eating disorders
Between-study heterogeneity								
τ^2	1.39	0.43	0.49	0.12	1.42	0.61	3.43	0.68
I^2 [95 % CI]	87.0 % [78.6 %, 92.1 %]	77.9 % [61.8 %, 87.2 %]	43.7 % [0.0 %, 77.7 %]	25.6 % [0.0 %, 64.1 %]	75.9 % [51.8 %, 88.0 %]	42.9 % [0.0 %, 77.4 %]	84.7 % [71.6 %, 91.7 %]	86.1 % [69.5 %, 93.6 %]
Prediction interval	[0.01, 0.75]	[0.04, 0.45]	[0.02, 0.60]	[0.05, 0.26]	[0.01, 0.72]	[0.01, 0.50]	[0.001, 0.91]	[0.01, 0.44]
Outlier analysis								
k studies removed	2	1	0	0	1	0	1	0
Adjusted estimate [95 % CI]	0.11 [0.06, 0.20]	0.11 [0.09, 0.15]	—	—	0.08 [0.03, 0.19]	—	0.05 [0.02, 0.12]	—
Leave-one-out analysis								
Adjusted estimate (lowest, highest)	0.13, 0.18	0.11, 0.16	0.11, 0.19	0.11, 0.13	0.08, 0.15	0.07, 0.14	0.05, 0.11	0.04, 0.07
Trim-and-fill analysis								
k studies added	4	1	3	2	3	3	3	2
Adjusted estimate [95 % CI]	0.34 [0.15, 0.59]	0.17 [0.11, 0.25]	0.23 [0.13, 0.38]	0.15 [0.10, 0.22]	0.23 [0.09, 0.49]	0.16 [0.07, 0.34]	0.29 [0.06, 0.70]	0.09 [0.03, 0.24]
Limit meta-analysis								
Adjusted estimate [95 % CI]	0.23 [0.10, 0.46]	0.16 [0.08, 0.29]	0.26 [0.14, 0.44]	0.18 [0.11, 0.29]	0.23 [0.07, 0.54]	0.26 [0.10, 0.53]	0.26 [0.03, 0.83]	0.14 [0.03, 0.43]
Copas selection model analysis								
Adjusted estimate [95 % CI]	0.18 [0.10, 0.31]	0.16 [0.11, 0.23]	0.21 [0.13, 0.34]	0.14 [0.10, 0.19]	0.13 [0.06, 0.27]	0.13 [0.09, 0.20]	0.11 [0.03, 0.30]	0.06 [0.03, 0.13]
PET–PEESE								
Test of publication bias	p = .045	p = .974	p = .180	p = .362	p = .414	p = .259	p = .255	p = .325
Adjusted estimate [95 % CI] (PET model)	0.47 [0.30, 0.64]	0.16 [0.06, 0.37]	0.35 [0.17, 0.57]	0.20 [0.09, 0.37]	0.33 [0.05, 0.83]	0.26 [0.08, 0.59]	0.84 [0.02, 0.99]	0.31 [0.02, 0.89]
Adjusted estimate [95 % CI] (PEESE model)	0.36 [0.24, 0.50]	0.16 [0.09, 0.27]	0.25 [0.16, 0.38]	0.16 [0.11, 0.23]	0.22 [0.08, 0.49]	0.17 [0.09, 0.32]	0.38 [0.04, 0.91]	0.15 [0.03, 0.45]
WAAP–WLS								
k studies adequately powered	1	8	3	6	3	3	0	5
Adjusted estimate [95 % CI] (WLS model)	0.31 [0.21, 0.44]	0.16 [0.10, 0.24]	0.22 [0.14, 0.32]	0.14 [0.10, 0.19]	0.16 [0.08, 0.31]	0.13 [0.08, 0.22]	0.15 [0.04, 0.43]	0.08 [0.03, 0.18]
Adjusted estimate [95 % CI] (WAAP model)	—	0.16 [0.09, 0.26]	0.24 [0.13, 0.39]	0.15 [0.11, 0.22]	0.18 [0.04, 0.51]	0.16 [0.10, 0.24]	—	0.08 [0.03, 0.18]

Notes. The confidence interval for τ^2 cannot be estimated for proportions. The limit meta-analysis method cannot handle data from generalized linear mixed models, which is why the adjusted estimates are based on the inverse variance method.

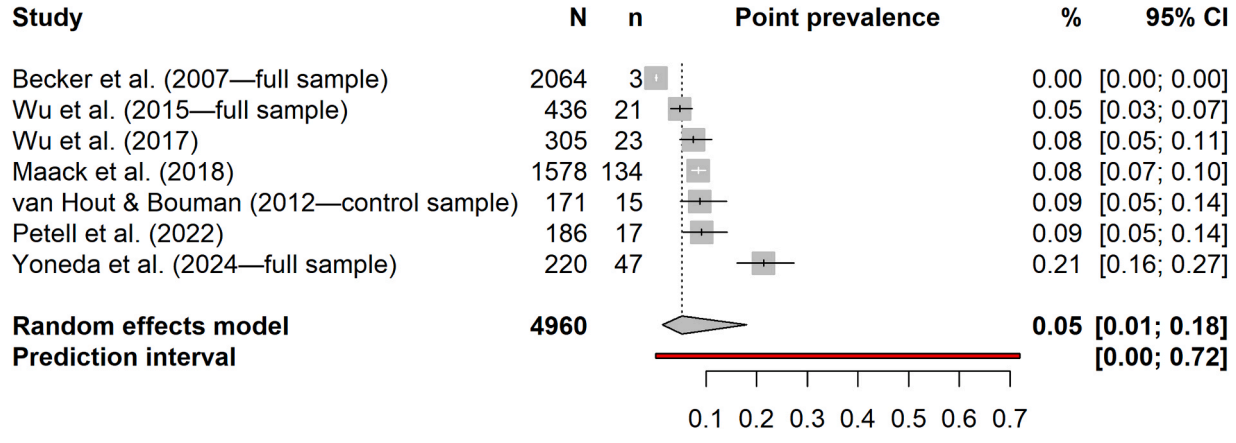

Fig. 7. Forest plot for the meta-analysis on the point prevalence of emetophobia in unselected samples. The vertical lines in the grey squares indicate the point estimate of the effect size for each study and size of the squares is proportional to the study's weight. The horizontal black lines represent the 95 % confidence intervals of the point estimate of the effect size for each study (the lines are displayed in white if they do not exceed the squares). The center of the grey diamond indicates the pooled effect estimate and the width of the diamond represents its 95 % confidence interval. The red line represents the 95 % prediction interval, which reflects the expected range of effects in future similar studies.

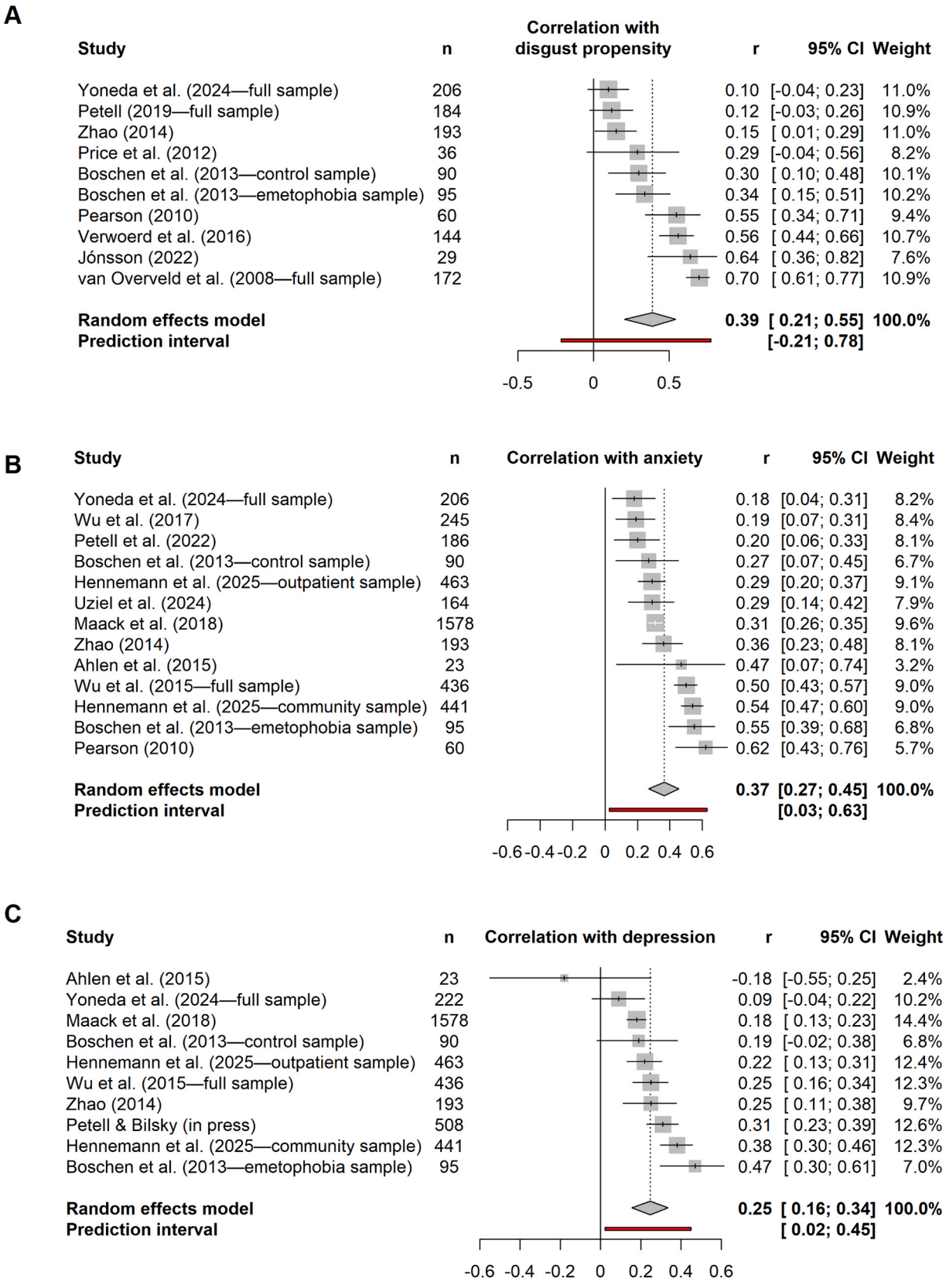

Fig. 8. Forest plots for the meta-analyses on the relationships of emetophobic symptomatology and (A) disgust propensity, (B) anxiety, and (C) depressive symptoms. The vertical lines in the grey squares indicate the point estimate of the effect size for each study and size of the squares is proportional to the study's weight. The horizontal black lines represent the 95 % confidence intervals of the point estimate of the effect size for each study (the lines are displayed in white if they do not exceed the squares). The center of the grey diamond indicates the pooled effect estimate and the width of the diamond represents its 95 % confidence interval. The red line represents the 95 % prediction interval, which reflects the expected range of effects in future similar studies.

Table 4
Estimates for between-study heterogeneity, outliers, influential studies, and publication bias of the meta-analyses on correlations with disgust propensity, anxiety, and depression.

$k = 10–13$	Disgust propensity	Anxiety	Depression
Between-study heterogeneity			
τ^2 [95 % CI]	0.07 [0.03, 0.25]	0.02 [0.01, 0.08]	0.01 [0.003, 0.09]
I^2 [95 % CI]	90.5 % [84.7 %, 94.1 %]	84.8 % [75.5 %, 90.5 %]	74.6 % [52.6 %, 86.4 %]
Prediction interval	[− 0.22, 0.78]	[0.03, 0.63]	[0.02, 0.45]
Outlier analysis			
k studies removed	1	1	0
Adjusted estimate [95 % CI]	0.34 [0.16, 0.49]	0.34 [0.25, 0.44]	—
Leave-one-out analysis			
Adjusted estimate (lowest, highest)	0.35, 0.45	0.36, 0.40	0.23, 0.27
Trim-and-fill analysis			
k studies added	5	1	0
Adjusted estimate [95 % CI]	0.17 [− 0.08, 0.39]	0.35 [0.24, 0.44]	—
Limit meta-analysis			
Adjusted estimate [95 % CI]	0.29 [0.01, 0.53]	0.33 [0.20, 0.44]	0.28 [0.19, 0.37]
Copas selection model analysis			
Adjusted estimate [95 % CI]	0.41 [0.24, 0.58]	0.38 [0.29, 0.47]	0.25 [0.19, 0.32]
PET–PEESE			
Test of publication bias	$p = .432$	$p = .646$	$p = .745$
Adjusted estimate [95 % CI] (PET model)	0.11 [− 0.45, 0.56]	0.31 [0.16, 0.43]	0.21 [0.08, 0.33]
Adjusted estimate [95 % CI] (PEESE model)	0.26 [− 0.03, 0.48]	0.33 [0.24, 0.40]	0.24 [0.17, 0.30]
WAAP–WLS			
k studies adequately powered	7	11	7
Adjusted estimate [95 % CI] (WLS model)	0.35 [0.18, 0.50]	0.35 [0.28, 0.42]	0.24 [0.18, 0.29]
Adjusted estimate [95 % CI] (WAAP model)	0.33 [0.12, 0.52]	0.35 [0.27, 0.42]	0.23 [0.17, 0.29]

4.7. Correlations with disgust propensity, anxiety, and depression

We hypothesized that higher emetophobic symptomatology would relate to higher disgust propensity, anxiety, and depression with small effect sizes. This was partially confirmed as higher emetophobic symptomatology moderately related to higher disgust propensity and anxiety and weakly related to higher depression scores. Relationships with anxiety and depression were larger in samples with a higher percentage of females. These findings dovetail results mentioned above, indicating other anxiety disorders and depression as the most common comorbid mental disorders in persons with emetophobia. Thus, it seems that persons with emetophobia do not only fear vomiting specifically but tend to be anxious more generally. Moreover, results also show that persons with emetophobia seem to have a general tendency to be easily disgusted, which appears to contribute to the development and maintenance of emetophobic symptomatology (Verwoerd et al., 2016).

4.8. Limitations and future directions

Interpretation of the current findings is limited by the small number of available studies results of which were partially influenced by publication bias. Of note, although emetophobia usually begins in childhood, there are virtually no studies in children. The observed early onset and predominance in women highlight the need for longitudinal studies that explore risk factors and trajectories beginning in childhood and adolescence. Understanding how emetophobia emerges and evolves over time could be critical for early identification and intervention.

To gain more precise estimates of the prevalence of emetophobia as well as comorbidity rates, more studies with representative samples using structured clinical interviews are urgently needed. Moreover, the substantial comorbidity with anxiety and affective disorders, along with the consistent associations with disgust propensity and generalized anxiety, suggests that transdiagnostic processes—such as intolerance of uncertainty or emotion regulation difficulties—may be particularly relevant to the maintenance of emetophobia. Future research should investigate these mechanisms more directly, ideally using experimental or longitudinal designs.

Finally, while these meta-analyses examined key characteristics that describe person with emetophobia, it was not feasible to meta-analyze effectiveness of different treatment approaches as there is only a handful of treatment-related studies yet (Ahlen et al., 2015; Davidsdottir et al., 2025; Keyes et al., 2020; Meule et al., 2025; Riddle-Walker et al., 2016; Kelly & Allen, 2014). Thus, well-powered randomized controlled trials or experimental single-session designs to investigate the effectiveness of current treatments for emetophobia in general and to dismantle effectiveness of specific treatment elements would be desirable future avenues.

4.9. Conclusion

This meta-analysis is the first to quantify that most adults with emetophobia are in early adulthood but the disorder started in childhood, almost all are women, the primary locus of fear is vomiting oneself, the most common comorbid mental disorders are other anxiety and affective disorders, and higher emetophobic symptomatology relates to a more general tendency to be easily disgusted and to be anxious. Studies based on representative samples to obtain reliable estimates on the prevalence of emetophobia are needed.

CRediT authorship contribution statement

Adrian Meule: Writing – original draft, Visualization, Validation, Supervision, Formal analysis, Conceptualization. **Leonie Seufert:** Writing – review & editing, Methodology, Investigation, Formal analysis, Data curation. **David R. Kolar:** Writing – review & editing, Supervision, Resources.

Ethics approval statement

This study did not involve testing human subjects.

Funding statement

No funding was received for this study.

Declaration of Competing Interest

All authors declare that they do not have any conflicts of interest.

Data availability

The preregistration as well as the data and code with which all results can be reproduced can be accessed at https://osf.io/m6h45.

References

Ahlen, J., Edberg, E., Di Schiena, M., & Bergström, J. (2015). Cognitive behavioural group therapy for emetophobia: An open study in a psychiatric setting. *Clinical Psychologist, 19*(2), 96–104. https://doi.org/10.1111/cp.12040

Allen, C., & Broster, L. R. (1945). Paranoid psychosis successfully treated by adrenalectomy. *British Medical Journal, 1*(4402), 696–698. https://doi.org/10.1136/bmj.1.4402.696

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association.

Bartoš, F., Maier, M., Quintana, D. S., & Wagenmakers, E.-J. (2022). Adjusting for publication bias in JASP and R: Selection models, PET-PEESE, and robust bayesian meta-analysis. *Advances in Methods and Practices in Psychological Science, 5*(3), 1–19. https://doi.org/10.1177/25152459221109259

Becker, E. S., Rinck, M., Türke, V., Kause, P., Goodwin, R., Neumer, S., & Margraf, J. (2007). Epidemiology of specific phobia subtypes: Findings from the Dresden Mental Health Study. *European Psychiatry, 22*(2), 69–74. https://doi.org/10.1016/j.eurpsy.2006.09.006

Begum, M. (2023). EMDR therapy in specific phobia of vomiting (SPOV). *Journal of EMDR Practice and Research, 17*(4), Article EMDR.17.14.239. https://doi.org/10.1891/EMDR-2023-0010

Bekker, M. H. J., & van Mens-Verhulst, J. (2007). Anxiety disorders: Sex differences in prevalence, degree, and background, but gender-neutral treatment. *Gender Medicine, 4*(. B), S178–S193. https://doi.org/10.1016/S1550-8579(07)80057-X

Bohne, A., Nigbur, K., & Gerlach, A. L. (2006). *Emetophobia – Pathological fear of vomiting: An Internet-based study*. Poster presented at the 40th Annual Convention of the Association for Behavioral and Cognitive Therapies, Chicago, IL.

Boschen, M. J. (2007). Reconceptualizing emetophobia: A cognitive–behavioral formulation and research agenda. *Journal of Anxiety Disorders, 21*(3), 407–419. https://doi.org/10.1016/j.janxdis.2006.06.007

Boschen, M. J., Veale, D., Ellison, N., & Reddell, T. (2013). The emetophobia questionnaire (EmetQ-13): Psychometric validation of a measure of specific phobia of vomiting (emetophobia). *Journal of Anxiety Disorders, 27*(7), 670–677. https://doi.org/10.1016/j.janxdis.2013.08.004

Charis, C. (2024). Case study of a 33-year-old patient with a panic disorder, an emetophobia (ICD-10 F 41.0/F 40.2) and a moderate depression on the basis of a recurrent depressive disorder (ICD-10 F 33.1) from psychodynamic point of view. In C. Charis, & G. Panayiotoutou (Eds.), *Anxiety disorders and related conditions* (pp. 127–139). Springer. https://doi.org/10.1007/978-3-031-56798-8.

Davidsdottir, S. D., Hjartarson, K. H., Ludvigsdottir, S. J., Gunnarsson, Á., Vidar, S., Kvale, G., Hansen, B., Hagen, K., & Öst, L.-G. (2025). The Bergen 4-day treatment for specific phobia of vomiting: a case series. *Behavioural and Cognitive Psychotherapy*. https://doi.org/10.1017/S135246582400050X

Davidson, A. L., Boyle, C., & Lauchlan, F. (2008). Scared to lose control? General and health locus of control in females with a phobia of vomiting. *Journal of Clinical Psychology, 64*(1), 30–39. https://doi.org/10.1002/jclp.20431

de Lijster, J. M., Dierckx, B., Utens, E. M. W. J., Verhulst, F. C., Zieldorff, C., Dieleman, G. C., & Legerstee, J. S. (2017). The age of onset of anxiety disorders: A meta-analysis. *Canadian Journal of Psychiatry, 62*(4), 237–246. https://doi.org/10.1177/0706743716640757

Dosanjh, S., Fleisher, W., & Sam, D. (2017). I think I'm going to be sick: An eight-year-old boy with emetophobia and secondary food restriction. *Journal of the Canadian Academy of Child and Adolescent Psychiatry, 26*(2), 104–109.

Eckert, A. P., Wallner, L., & Hofstädter, A. C.-S. (2024). Emetophobie: Die spezifische Phobie des Erbrechens – ein Case Report. *Fortschritte der Neurologie – Psychiatrie, 92*(4), 135–138. https://doi.org/10.1055/a-2248-5229

Faye, A. D., Gawande, S., Tadke, R., Kirpekar, V. C., & Bhave, S. H. (2013). Emetophobia: A fear of vomiting. *Indian Journal of Psychiatry, 55*(4), 390–392. https://doi.org/10.4103/0019-5545.120556

Fix, R. L., Proctor, K. B., & Gray, W. N. (2016). Treating emetophobia and panic symptoms in an adolescent female: A case study. *Clinical Case Studies, 15*(4), 326–338. https://doi.org/10.1177/1534650116642576

Graziano, P. A., Callueng, C. M., & Geffken, G. R. (2010). Cognitive-behavioral treatment of an 11-year-old male presenting with emetophobia: A case study. *Clinical Case Studies, 9*(6), 411–425. https://doi.org/10.1177/1534650110384436

Haidt, J., McCauley, C., & Rozin, P. (1994). Individual differences in sensitivity to disgust: A scale sampling seven domains of disgust elicitors. *Personality and Individual Differences, 16*, 701–713. https://doi.org/10.1016/0191-8869(94)90212-7

Harrer, M., Cuijpers, P., Furukawa, T. A., & Ebert, D. D. (2022). *Doing meta-analysis with R: A hands-on guide*. CRC Press. https://doi.org/10.1201/9781003107347

Hennemann, S., Weirich, A., Bräscher, A.-K., Meule, A., & Witthöft, M. (2025). German version of the Specific Phobia of Vomiting Inventory (SPOVI): Psychometric properties and correlates in a clinical and non-clinical sample. *BMC Psychiatry, 25*, 305. https://doi.org/10.1186/s12888-025-06744-0

Höller, Y., Van Overveld, M., Jutglar, H., & Trinka, E. (2013). Nausea in specific phobia of vomiting. *Behavioral Sciences, 3*(3), 445–458. https://doi.org/10.3390/bs3030445

Jónsson, S. B. (2022). *Examining the roles of fear and disgust in emetophobia (Bachelor's thesis)*. Reykjavik, Iceland: Reykjavik University. ⟨http://hdl.handle.net/1946/42325⟩.

Kelly, R. C., & Allen, C. E. L. (2014). *Exploring the efficacy of 'The Thrive Programme' with emetophobic clients: results of a preliminary survey*. ⟨https://www.thriveprogramme.org⟩.

Keyes, A., Deale, A., Foster, C., & Veale, D. (2020). Time intensive cognitive behavioural therapy for a specific phobia of vomiting: A single case experimental design. *Journal of Behavior Therapy and Experimental Psychiatry, 66*, Article 101523. https://doi.org/10.1016/j.jbtep.2019.101523

Keyes, A., Gilpin, H. R., & Veale, D. (2018). Phenomenology, epidemiology, co-morbidity and treatment of a specific phobia of vomiting: A systematic review of an understudied disorder. *Clinical Psychology Review, 60*, 15–31. https://doi.org/10.1016/j.cpr.2017.12.002

Köksal, M., Koçak, G., Öztürk, Y., & Tufan, A. E. (2022). A case of emetophobia responding to mirtazapine and propranolol treatment. *Journal of Neurogastroenterology and Motility, 28*(4), 709–710. https://doi.org/10.5056/jnm22133

Lipsitz, J. D., Fyer, A. J., Paterniti, A., & Klein, D. F. (2001). Emetophobia: Preliminary results of an internet survey. *Depression and Anxiety, 14*(2), 149–152. https://doi.org/10.1002/da.1058

Maack, D. J., Ebesutani, C., & Smitherman, T. A. (2018). Psychometric investigation of the specific phobia of vomiting inventory: A new factor model. *International Journal of Methods in Psychiatric Research, 27*(1), Article e1574. https://doi.org/10.1002/mpr.1574

Martín-Martín, A., Orduna-Malea, E., & Delgado López-Cózar, E. (2018). Coverage of highly-cited documents in Google Scholar, Web of Science, and Scopus: A multidisciplinary comparison. *Scientometrics, 116*(3), 2175–2188. https://doi.org/10.1007/s11192-018-2820-9

Martín-Martín, A., Orduna-Malea, E., Thelwall, M., & Delgado López-Cózar, E. (2018). Google Scholar, Web of Science, and Scopus: A systematic comparison of citations in 252 subject categories. *Journal of Informetrics, 12*(4), 1160–1177. https://doi.org/10.1016/j.joi.2018.09.002

Meule, A. (2025a). Disgust. In J. A. Schermer (Ed.), *Elgar encyclopaedia of personality and individual differences*. Edward Elgar Publishing Ltd.

Meule, A. (2025b). Emetophobia appears to be the most common specific phobia that requires treatment. *BJPsych Open*. https://doi.org/10.31234/osf.io/xu2g5_v1

Meule, A., Zisler, E. M., Metzner, M. S., Voderholzer, U., & Kolar, D. R. (2025). Characteristics of and treatment outcome in inpatients with emetophobia and other specific phobias. *Journal of Psychiatric Research, 189*, 285–290. https://doi.org/10.1016/j.jpsychires.2025.06.028

Molinaro, A. M. (2015). Diagnostic tests: How to estimate the positive predictive value. *Neuro-Oncology Practice, 2*(4), 162–166. https://doi.org/10.1093/nop/npv030

Orme, K., Challacombe, F. L., & Roxborough, A. (2022). Specific fear of vomiting (SPOV) in early parenthood: Assessment and treatment considerations with two illustrative cases. *The Cognitive Behaviour Therapist, 15*, Article e12. https://doi.org/10.1017/S1754470X22000101

Papagianni, V., & Kotera, Y. (2022). The beneficial effects of a single hypnotherapy session using parts negotiation for specific phobias. *International Journal of Spa and Wellness, 5*(2), 167–184. https://doi.org/10.1080/24721735.2022.2049103

Pearson, M. R. (2010). *Characteristics, correlates, and experiences of emetophobia: An exploratory study (Master's thesis)*. Toronto, Canada: Ryerson University. https://doi.org/10.32920/ryerson.14644821.v1

Petell, J. A. (2019). *Behavioral similarities and differences among symptoms of emetophobia, disordered eating, and disgust (Master's thesis)*. MS, USA: Oxford, University of Mississippi. https://egrove.olemiss.edu/etd/1937.

Petell, J. A., & Bilsky, S. A. (2023). An examination of the association between emotion regulation and emetophobia symptoms. *Psychological Reports*. https://doi.org/10.1177/00332941231213855 (in press).

Petell, J. A., Wickenhauser, M. E., & Maack, D. J. (2022). Afraid to vomit? The relationship between temperamental fear, emetophobia symptoms, and the impact of sex. *Graduate Student Journal of Psychology, 19*, 87–97. https://doi.org/10.52214/gsjp.v19i.10049

Price, K., Veale, D., & Brewin, C. R. (2012). Intrusive imagery in people with a specific phobia of vomiting. *Journal of Behavior Therapy and Experimental Psychiatry, 43*(1), 672–678. https://doi.org/10.1016/j.jbtep.2011.09.007

Riddle-Walker, L., Veale, D., Chapman, C., Ogle, F., Rosko, D., Najmi, S., Walker, L. M., Maceachern, P., & Hicks, T. (2016). Cognitive behaviour therapy for specific phobia of vomiting (emetophobia): A pilot randomized controlled trial. *Journal of Anxiety Disorders, 43*, 14–22. https://doi.org/10.1016/j.janxdis.2016.07.005

Russ, D., & Christie, A. S. (2023). *Emetophobia – Understanding and treating fear of vomiting in children and adults*. Jessica Kingsley Publishers.

Sutton, H. A., Falstein, E. I., & Judas, I. (1958). Emotional reactions to medical procedures and illness in a hospital child psychiatry unit. *American Journal of Orthopsychiatry, 28*(1), 180–187. https://doi.org/10.1111/j.1939-0025.1958.tb03735.x

Sykes, M., Boschen, M. J., & Conlon, E. G. (2016). Comorbidity in emetophobia (specific phobia of vomiting). *Clinical Psychology & Psychotherapy, 23*(4), 363–367. https://doi.org/10.1002/cpp.1964

Uziel, N., Gilon, E., Bar, I., Edri, N., & Eli, I. (2024). Excessive gag reflex, dental anxiety, and phobia of vomiting in dental care. *International Dental Journal*. https://doi.org/10.1016/j.identj.2023.12.002

van Hout, W. J. P. J., & Bouman, T. K. (2012). Clinical features, prevalence and psychiatric complaints in subjects with fear of vomiting. *Clinical Psychology & Psychotherapy, 19*(6), 531–539. https://doi.org/10.1002/cpp.761

van Overveld, M., de Jong, P. J., Peters, M. L., van Hout, W. J. P. J., & Bouman, T. K. (2008). An internet-based study on the relation between disgust sensitivity and emetophobia. *Journal of Anxiety Disorders, 22*(3), 524–531. https://doi.org/10.1016/j.janxdis.2007.04.001

Vandereycken, W. (2011). Media hype, diagnostic fad or genuine disorder? Professionals' opinions about night eating syndrome, orthorexia, muscle dysmorphia, and emetophobia. *Eating Disorders, 19*, 145–155. https://doi.org/10.1080/10640266.2011.551634

Veale, D., Beeson, C., & Papageorgiou, A. (2025). Frequency of and sex distribution in specific phobia subtypes in a treatment-seeking sample. *BJPsych Open*.

Veale, D., Costa, A., Murphy, P., & Ellison, N. (2012). Abnormal eating behaviour in people with a specific phobia of vomiting (emetophobia). *European Eating Disorders Review, 20*(5), 414–418. https://doi.org/10.1002/erv.1159

Veale, D., Ellison, N., Boschen, M. J., Costa, A., Whelan, C., Muccio, F., & Henry, K. (2013). Development of an inventory to measure specific phobia of vomiting

(emetophobia). *Cognitive Therapy and Research, 37*(3), 595–604. https://doi.org/10.1007/s10608-012-9495-y

Veale, D., Hennig, C., & Gledhill, L. (2015). Is a specific phobia of vomiting part of the obsessive compulsive and related disorders? *Journal of Obsessive-Compulsive and Related Disorders, 7*, 1–6. https://doi.org/10.1016/j.jocrd.2015.08.002

Veale, D., & Lambrou, C. (2006). The psychopathology of vomit phobia. *Behavioural and Cognitive Psychotherapy, 34*(2), 139–150. https://doi.org/10.1017/S1352465805002754

Veale, D., Murphy, P., Ellison, N., Kanakam, N., & Costa, A. (2013). Autobiographical memories of vomiting in people with a specific phobia of vomiting (emetophobia). *Journal of Behavior Therapy and Experimental Psychiatry, 44*(1), 14–20. https://doi.org/10.1016/j.jbtep.2012.06.002

Verwoerd, J., van Hout, W. J. P. J., & de Jong, P. J. (2016). Disgust- and anxiety-based emotional reasoning in non-clinical fear of vomiting. *Journal of Behavior Therapy and Experimental Psychiatry, 50*, 83–89. https://doi.org/10.1016/j.jbtep.2015.05.009

Whitton, S. W., Luiselli, J. K., & Donaldson, D. L. (2006). Cognitive-behavioral treatment of generalized anxiety disorder and vomiting phobia in an elementary-age child. *Clinical Case Studies, 5*(6), 477–487. https://doi.org/10.1177/1534650105284476

Williams, K. E., Field, D. G., Riegel, K., & Paul, C. (2011). Brief, intensive behavioral treatment of food refusal secondary to emetophobia. *Clinical Case Studies, 10*(4), 304–311. https://doi.org/10.1177/1534650111417144

World Health Organization. (2022). *International classification of diseases* (11th ed.). World Health Organization ⟨https://icd.who.int/browse11⟩.

Wu, M. S., Rudy, B. M., Arnold, E. B., & Storch, E. A. (2015). Phenomenology, clinical correlates, and impairment in emetophobia. *Journal of Cognitive Psychotherapy, 29*(4), 356–368. https://doi.org/10.1891/0889-8391.29.4.356

Wu, M. S., Selles, R. R., Novoa, J. C., Zepeda, R., Guttfreund, D., McBride, N. M., & Storch, E. A. (2017). Examination of the phenomenology and clinical correlates of emetophobia in a sample of Salvadorian youths. *Child Psychiatry Human Development, 48*(3), 509–516. https://doi.org/10.1007/s10578-016-0677-9

Yoneda, K., Iwano, S., & Sugiura, Y. (2024). Factor structure, reliability, and validity of the Japanese version of the Specific Phobia of Vomiting Inventory. *Japanese Journal of Personality Psychology, 33*(1), 32–41. https://doi.org/10.2132/personality.33.1.5

Zhao, M. (2014). *Toward a conceptualization of emetophobia: Examining intolerance of uncertainty as a unique predictor of symptoms (Master's thesis)*. Oxford, MS: University of Mississippi. ⟨https://egrove.olemiss.edu/etd/814⟩.