





BMJ Open Short-term functions and long-term consequences of checking behavior as a transdiagnostic phenomenon: protocol for a systematic review

Maj-Britt Vivell ,¹ Vanessa Opladen ,² Silja Vocks ,² Andrea S Hartmann ¹

To cite: Vivell M-B, Opladen V, Vocks S, *et al*. Short-term functions and long-term consequences of checking behavior as a transdiagnostic phenomenon: protocol for a systematic review. *BMJ Open* 2022;**12**:e056732. doi:10.1136/bmjopen-2021-056732

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2021-056732>).

Received 24 August 2021
Accepted 31 March 2022



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Institute of Psychology, Department of Experimental Clinical Psychology, University of Konstanz, Konstanz, Germany

²Institute of Psychology, Department of Clinical Psychology and Psychotherapy, Osnabrück University, Osnabrück, Germany

Correspondence to

Maj-Britt Vivell;
maj-britt.vivell@uni-konstanz.de

ABSTRACT

Introduction Checking behaviour (CB) occurs in various mental health problems. Cognitive-behavioural models for these mental disorders share similar theoretical assumptions. Thus, they postulate a negative reinforcing effect of CB by reducing negative affect (ie, anxiety) and a maintenance of the pathology due to a lack of reality testing of concerns. This paper details methods for a systematic review that will be conducted to synthesise empirical evidence testing these theoretical assumptions across obsessive-compulsive, generalised anxiety, eating, body dysmorphic and illness anxiety disorder. The results are expected to foster our understanding of the mechanisms of action underlying CB, which is of high clinical relevance. Depending on whether or not the findings confirm the model assumptions regarding CB, the focus of treatments would need to be intensified or modified.

Methods and analysis We will search PsycINFO, PubMed, PSYINDEX and Scopus for studies investigating the emotional state in which CB is being used as well as the immediate and longer-term effects of CB on cognitive and emotional measures in clinical and analogue samples. The selection process, data extraction and quality assessment of included studies will be performed by two independent reviewers. In the case of inconsistencies, a third reviewer will be involved. Study results will be reported in a narrative synthesis.

Ethics and dissemination Ethics approval will not be required as this is a protocol for systematic review. The results are mainly disseminated through peer-reviewed publications. **PROSPERO registration number** CRD42021238835.

INTRODUCTION

Rationale

Safety behaviour represents a core feature of various mental disorders^{1 2} and is defined as ‘actions taken to prevent, avoid or escape a feared outcome’.³ In the narrower sense, this includes behaviours such as taking sedatives, not going to certain places without another person or always carrying a bottle of water. Furthermore, it comprises avoidance behaviours and checking behaviour (CB), which manifests in different ways depending on the respective disorder. The earliest descriptions of the latter

Strengths and limitations of this study

- The protocol is written following the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols guidelines.
- As the review includes non-randomised studies that are likely to produce evidence of low certainty, risk of bias and the strength of evidence collected from each study will be assessed using the Grading of Recommendations Assessment, Development and Evaluation system.
- The heterogeneity and the expected small number of studies represent a limitation of this systematic review.

can be found regarding obsessive-compulsive disorders (OCD).^{4 5}

In OCD, CB is the most common compulsion⁶ and manifests, for example, as controlling the absence of potential sources of danger in one’s surroundings (eg, stove turned off to prevent fire, windows or doors locked to prevent burglary) or repetitive requests for reassurance from others.^{7 8} Closely related to this, CB in generalised anxiety disorder (GAD) is also described,^{9–11} but mainly in terms of interpersonal checking (ie, seeking reassurance from others, eg, before making decisions, when engaging in activities or asking a loved one if he or she is upset).^{8 12} While in OCD and GAD, checking primarily refers to objects, environment, relationships and achievement, in other disorders, the main focus of CB is one’s own body. Disorders with body-related CB include eating disorders (EDs),¹³ body dysmorphic disorder (BDD)¹⁴ and illness anxiety disorder (IAD).¹⁵ In EDs, that is, anorexia nervosa, bulimia nervosa and binge-eating disorder, CB expresses itself as inspecting one’s own body in terms of its weight or shape, and manifests in behaviours such as repeated weighing, measuring the circumference of body parts,

inspecting one's body or individual body parts in the mirror, seeking reassurance about one's appearance and comparing it to others.^{13 16} CB in BDD is described as inspecting one's perceived defect by looking at it in the mirror or other reflective surfaces (eg, shop windows, car mirrors) in a ritualistic way, taking photos, comparing it with other people (in real life, media, photos of oneself in the past), checking its size or contour by touching it with one's fingers, and asking others for reassurance (eg, whether the perceived flaw has become worse or is adequately camouflaged).¹⁷⁻¹⁹ Whereas, checking in EDs and BDD refers to figure, weight or appearance, checking in IAD focuses on health. It manifests as repeatedly inspecting one's body for signs of illness (eg, breast self-examination, lymph node palpation) or seeking reassurance from others about health and signs of a severe illness (eg, family, friends, healthcare physicians or alternative sources such as medical textbooks).^{15 20}

Although CB refers to different domains (eg, weight, illness, safety of the environment) in all five disorders, cognitive-behavioural theories regarding the mechanism of action of checking are very alike.^{7 21-24} Three central theoretical postulates are formulated in each case. First, it is proposed that CB is used primarily in order to gain relief from unpleasant emotional states.^{22 25} Relatedly, the second theoretical postulate states that CB is thought to have a negative affect-reducing function in the short term.¹⁷ For example in OCD, it is postulated by Rachman⁷ that people repeatedly check for safety in situations where they feel unsure about the absence of harm in order to gain relief from their indisposition, uncertainty and anxiety.⁷ In EDs, it is hypothesised that body checking reduces negative affect which is triggered, for example, by dysfunctional body-related information processing.²² For BDD, it is postulated that there is distress caused by physical appearance, which becomes very strong, for example, in social situations. CB, according to the theory, serves to reduce these unpleasant emotions (eg, fear, disgust, anger, shame) caused by appearance.²³ By providing immediate short-term relief from unpleasant feelings, the third theoretical assumption is based on a learning theory mechanism.²³ It is postulated that CB as a behaviour is negatively reinforced (ie, produces the absence of a negative consequence), therefore increasing the likelihood that it will be performed more frequently in the future,²² as patients experience CB to be helpful and necessary in the short run. In contrast, theories postulate that repeated use of CB reinforces anxiety and psychopathology in the long term turning into a self-perpetuating mechanism.²⁴ For example, it is discussed that CB can foster distorted perception and evaluation of one's body in EDs.^{16 22} For BDD, it is postulated that CB increases selective attention in the long term and may intensify the dysfunctional beliefs about the supposed flaw(s), thus contributing to the maintenance of the disorder.^{17 19}

In sum, although CB looks phenomenologically different depending on the respective disorder, aetiological models across disorders outline checking as an important behaviour, which provides immediate relief from negative states in the

short term, therefore reinforcing itself and leading to a self-perpetuating mechanism, and hence contributing to the maintenance of the pathology in the long term. Although the mechanism of action of CB has been postulated in numerous models of different disorders, empirical support for these assumptions is lacking. To date, several empirical studies have investigated the proposed mechanisms in each disorder, but a systematic overview of studies is yet to be undertaken. A systematic overview, however, is urgently needed, given that current cognitive-behavioural treatments for these disorders are based on the afore-mentioned theories and include ritual prevention (ie, not using CB to learn that situations can be handled without this safety behaviour) as one therapeutic technique aimed at reducing CB and consequently related disorder-specific symptoms. Usually, this is addressed in the context of exposure therapy (ie, confronting patients with fearful or even avoided situations without the use of safety behaviours, eg, in OCD, leaving the house without checking the stove and windows). Depending on whether or not the empirical evidence supports the proposed emotion regulating mechanism of checking in the cognitive-behavioural models, the focus of these interventions would need to be intensified or altered, respectively. For example, one might assume that CB does not or not only serve to reduce negative affect but also to gain certainty.²⁶ Therefore, it might be worthwhile to address the excessive need for certainty more directly, for example, through cognitive interventions questioning the pursuit of certainty²⁷ or promoting the willingness to experience fear and uncertainty.²⁸ Furthermore, a better understanding of the mechanisms of action underlying CB may also have implications for the prevention of mental disorders (eg, if the proposed long-term negative effect of CB on psychopathology can be supported by empirical evidence, prevention programmes addressing the reduction of checking in healthy individuals or at-risk groups could be developed).

Objectives

As such, our systematic review intends to synthesise existing evidence for the three postulates regarding CB across the mental disorders OCD, GAD, EDs, BDD and IAD. The current study protocol outlines the methods of our investigation and is based on the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) checklist (online additional file 1). The following research questions will be addressed: (1) Which (emotional) states are people in when engaging in CB? (2) What effect does CB have on emotional, cognitive and disorder-specific outcomes in the short term (ie, directly following CB)? (3) What effect does CB have on emotional, cognitive and disorder-specific outcomes in the long term (ie, after a repeated number of checking episodes)?

METHODS

Our review has been registered with PROSPERO. The planned data selection process runs from January to May 2022.

Table 1 Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Types of studies	All study designs and settings, original empirical papers and dissertations	Therapeutically guided checking*
Participants	Clinical and nonclinical samples	
Type of checking	Disorder-specific checking	Checking not typical for the diagnosis
Outcomes of interest	Global and disorder-specific emotional (eg, anxiety) or cognitive (eg, worry) measures	
Language	English, German, French or Italian	

*If our search yields studies investigating the effect of checking behaviour (CB) in an experimental design, it may be necessary to distinguish CB from exposure as a treatment modality. Therefore, we will exclude studies investigating CB with an instruction to check for therapeutic purposes (eg, in therapeutically guided mirror exposures).

Inclusion and exclusion criteria

The inclusion and exclusion criteria are shown in [table 1](#).

Information sources

The following electronic databases will be searched: PsycINFO, PubMed, PSYINDEX and Scopus. Furthermore, we will screen the bibliographies of relevant articles for additional studies. Additionally, research registries (ClinicalTrials.gov, PROSPERO and the International Clinical Trials Registry Platform of the WHO) will be searched for eligible unpublished studies. The search process will be presented in a PRISMA flow diagram (online additional file 2). It shows whether an article stems from the electronic databases or from further literature research.

Search strategy

During the design of the search strategy, library staff were on hand to advise us. To generate search terms, we screened reviews and primary studies as well as the respective keywords (using the “Thesaurus of Psychological Index Terms” and “Medical Subject Headings”). The search terms available for selection were presented to and discussed by a group of experienced clinical researchers. Finally, relevant keywords and, if necessary due to lack of indexing, free text words were selected for each disorder. Since CBs have not yet been keyworded, their search was limited to free text words. To reduce irrelevant hits, only studies that included checking terms in the title or abstract were searched. To be implemented in the scientific databases, the disorder-related search terms were combined using the Boolean operator “AND” with the free text words for Checking. The only filter set is that the search should be limited to studies with human participants. The full search strategy for one database is displayed as additional file (online additional file 3). This will be adapted for each database according to the respective guidelines.

Study records

Selection process

In a first step, two independent reviewers will screen the titles and abstracts yielded by the search after removal of duplicates. We will then obtain the full text for potentially eligible studies. If the full text is not available, for example, through institutional membership, we will contact the authors to request access. By screening the full text in a second step, the two reviewers will assess for inclusion in

the review based on the criteria outlined before. We will note the reason for exclusion of any study and present the selection process in the PRISMA flow diagram (online additional file 2). In the case of discrepancies between the two reviewers in either step, a third reviewer will be consulted. None of the reviewers will be blind to the journal titles or to the study authors or institutions.

Data extraction

For all included studies, data will be extracted by two independent raters using a data collection form developed for this review (online additional file 4). Both reviewers will pilot this in advance with five studies and make adjustments prior to the extraction of data if necessary. We plan to extract the following information and data from each study: (1) basic characteristics of the study: authors, title, publication year, country; (2) sample: sample size, average age, gender, type of sample (clinical vs analogue), diagnosis and criteria for diagnosis (clinical samples) or type of symptoms in analogue samples, comorbidities; (3) setting (eg, online survey, laboratory experiment); (4) type of CB investigated; (5) assessment time points; (6) instruments for the assessment of outcomes and type of outcomes investigated; and (7) study results with regard to the research questions.

Data synthesis

Selected studies will first be assigned according to the disorder or psychopathology they investigated. Within these five groups, studies will additionally be categorised according to which research question they address. Due to the expected low number of eligible studies, we will carry out a narrative synthesis and compile a table outlining characteristics and findings of every study.

Risk of bias

We will assess the risk of bias within randomised trials using the Cochrane Collaboration tool for assessing risk of bias²⁹ and within non-randomised studies with the Risk Of Bias In Non-randomized Studies of Interventions tool.³⁰ The strength of evidence collected from each study in the review will be assessed using the Grading of Recommendations Assessment, Development and Evaluation system.³¹ The evaluation process will be conducted by two

independent reviewers. If necessary, a third reviewer will resolve disagreements.

Patients and public involvement

Patients and the public will not be directly involved in the design, interpretation or dissemination of the results.

Ethics and dissemination

This systematic review will be based on previously published data, so there will be no requirement for ethical approval. The results of the review will be submitted for publication in a peer-reviewed psychological journal. In addition, the results will be disseminated in various media such as symposia, congresses and seminars.

Acknowledgements We want to thank Dr Jost Hindersmann (subject librarian), Wibke Meyer zu Westerhausen and Carin Tholen-Wandel (information specialists) for their advice during the design of the search strategy. We are also thankful to Sarah Mannion de Hernandez for language editing services as well as Antonia Lucht and Lotta Flechsig for the support in the management of literature.

Contributors SV and ASH developed the primary idea for the review, and this was refined with the help of M-BV and VO. All authors contributed to the development of the protocol document. All authors read and agreed the final version of the manuscript. M-BV is the guarantor of the review.

Funding This work was supported by the German Research Foundation (Deutsche Forschungsgemeinschaft) to ASH (HA 8589/5-1) and SV (VO1750/5-1).

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Maj-Britt Vivell <http://orcid.org/0000-0002-9503-5112>

Vanessa Opladen <http://orcid.org/0000-0002-9916-2469>

Silja Vocks <http://orcid.org/0000-0001-8498-9466>

Andrea S Hartmann <http://orcid.org/0000-0002-6251-3763>

REFERENCES

- Helbig-Lang S, Petermann F. Tolerate or eliminate? A systematic review on the effects of safety behavior across anxiety disorders. *Clin Psychol Sci Pract* 2010;17:218–33.
- Goetz AR, Davine TP, Siwec SG, et al. The functional value of preventive and restorative safety behaviors: a systematic review of the literature. *Clin Psychol Rev* 2016;44:112–24.
- Deacon BJ, Sy JT, Lickel JJ, et al. Does the judicious use of safety behaviors improve the efficacy and acceptability of exposure therapy for claustrophobic fear? *J Behav Ther Exp Psychiatry* 2010;41:71–80.
- Carr AT. Compulsive neurosis: a review of the literature. *Psychol Bull* 1974;81:311–8.
- Hodgson RJ, Rachman S. Obsessional-compulsive complaints. *Behav Res Ther* 1977;15:389–95.
- Ruscio AM, Stein DJ, Chiu WT, et al. The epidemiology of obsessive-compulsive disorder in the National comorbidity survey replication. *Mol Psychiatry* 2010;15:53–63.
- Rachman S. A cognitive theory of compulsive checking. *Behav Res Ther* 2002;40:625–39.
- Coleman SL, Pietrefesa AS, Pietrefesa AS, et al. Content and correlates of checking related to symptoms of obsessive compulsive disorder and generalized anxiety disorder. *J Anxiety Disord* 2011;25:293–301.
- Townsend MH, Weissbecker KA, Barbee JG, et al. Compulsive behavior in generalized anxiety disorder and obsessive-compulsive disorder. *J Nerv Ment Dis* 1999;187:697–9.
- Schut AJ, Castonguay LG, Borkovec TD. Compulsive checking behaviors in generalized anxiety disorder. *J Clin Psychol* 2001;57:705–15.
- Mahoney AEJ, Hobbs MJ, Newby JM, et al. Maladaptive behaviours associated with generalized anxiety disorder: an item response theory analysis. *Behav Cogn Psychother* 2018;46:479–96.
- Beesdo-Baum K, Jenjahn E, Höfler M, et al. Avoidance, safety behavior, and reassurance seeking in generalized anxiety disorder. *Depress Anxiety* 2012;29:948–57.
- Rosen JC. Cognitive-behavioral body image therapy. In: Garner DM, Garfinkel PE, eds. *Handbook of treatment for eating disorders*. 2nd ed. New York: The Guilford Press, 1997: 188–201.
- Oakes A, Collison J, Milne-home J. Repetitive, safe, and automatic: the experience of Appearance-Related behaviours in body dysmorphic disorder. *Aust Psychol* 2017;52:433–41.
- Taylor S, Asmundson GJG. *Treating health anxiety: a cognitive-behavioral approach*. New York: The Guilford Press, 2004.
- Fairburn CG, Shafran R, Cooper Z. A cognitive behavioural theory of anorexia nervosa. *Behav Res Ther* 1999;37:1–13.
- Rosen JC, Reiter J, Orosan P. Cognitive-behavioral body image therapy for body dysmorphic disorder. *J Consult Clin Psychol* 1995;63:263–9.
- Phillips KA, Menard W, Fay C, et al. Demographic characteristics, phenomenology, comorbidity, and family history in 200 individuals with body dysmorphic disorder. *Psychosomatics* 2005;46:317–25.
- Veale D, Neziroglu FA. *Body dysmorphic disorder: a treatment manual*. Chichester, Malden: Wiley-Blackwell, 2010.
- Bleichhardt G, Weck F. *Kognitive Verhaltenstherapie bei Hypochondrie und Krankheitsangst*. 3rd ed. Berlin: Springer, 2015.
- Wells A. A metacognitive model and therapy for generalized anxiety disorder. *Clin Psychol Psychother* 1999;6:86–95.
- Williamson DA, White MA, York-Crowe E, et al. Cognitive-behavioral theories of eating disorders. *Behav Modif* 2004;28:711–38.
- Veale D, Gournay K, Dryden W, et al. Body dysmorphic disorder: a cognitive behavioural model and pilot randomised controlled trial. *Behav Res Ther* 1996;34:717–29.
- Warwick HM, Salkovskis PM. Hypochondriasis. *Behav Res Ther* 1990;28:105–17.
- Salkovskis PM. Understanding and treating obsessive-compulsive disorder. *Behav Res Ther* 1999;37(Suppl 1):S29–52.
- Hartmann AS, Cordes M, Hirschfeld G, et al. Affect and worry during a checking episode: a comparison of individuals with symptoms of obsessive-compulsive disorder, anorexia nervosa, Bulimia nervosa, body dysmorphic disorder, illness anxiety disorder, and panic disorder. *Psychiatry Res* 2019;272:349–58.
- Grayson JB. OCD and intolerance of uncertainty: treatment issues. *J Cogn Psychother* 2010;24:3–15.
- Twohig MP, Levin ME. Acceptance and commitment therapy as a treatment for anxiety and depression: a review. *Psychiatr Clin North Am* 2017;40:751–70.
- Higgins JPT, Altman DG, Gøtzsche PC, et al. The Cochrane collaboration's tool for assessing risk of bias in randomised trials. *BMJ* 2011;343:d5928.
- Sterne JA, Hernán MA, Reeves BC, et al. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *BMJ* 2016;355:i4919.
- Guyatt GH, Oxman AD, Vist GE, et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* 2008;336:924–6.