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SCOPING REVIEW

SUBJECTIVE ASSESSMENT OF RDOC-RELATED CONSTRUCTS IN ADDICTION AND COMPULSIVE DISORDERS: A SCOPING REVIEW

Ana Paula Ribeiro, Julia E. Mühlbauer, Marcelo Piquet-Pessôa, Juliana B. de-Salles-Andrade, Carina Félix-da-Silva, Leonardo F. Fontenelle

Abstract

Objective: Obsessive-compulsive and related disorders (OCRDs) and disorders due to addictive behavior (DABs) are prevalent conditions that share common neurobiological and behavioral characteristics. This scoping review aims to identify and map the range of subjective assessment tools (e.g., interviews and self-report instruments) for assessing Research Domain Criteria (RDoC) and related constructs underlying DABs and OCRDs, such as impaired response inhibition, habit formation, and compulsivity.

Method: A scoping review was performed following the PRISMA Extension for Scoping Reviews (PRISMA ScR). The search was conducted in Medline, Web of Science, PsycINFO, and EMBASE databases. No constraints of data or document type were adopted.

Results: The search yielded 615 instruments, of which 79 were deemed transdiagnostic and capable of assessing at least one of the target constructs. Noteworthy tools included are the Cambridge-Chicago Compulsivity Trait Scale, the Self-report Habit Index, the Reward Probability Index, the Threat-Related Reassurance-Seeking Scale, and the recent Positive Valence Systems Scale.

Conclusions: Despite the growing body of literature on OCRDs and DABs as new diagnostic chapters and the number of tools with the potential to assess their transdiagnostic constructs clinically, most instruments were designed to capture dimensions or psychopathology not directly (or primarily) related to OCRDs, DABs and the concepts of impaired response inhibition, habit formation, and compulsivity in the context of these conditions. Further studies exploring the correlation between subjective assessments, corresponding behavior paradigms, and neuroimaging data would be of great value in the translation of RDoC constructs and domains into clinical settings.

Key words: impulsivity, compulsivity, transdiagnostic, phenotype, questionnaire, self-report, review

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1. Introduction

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the 11th revision of the International Classification of Diseases, obsessive-compulsive and related disorders (OCRDs) comprise a group of conditions that share repetitive thoughts and/or behaviors, key diagnostic validators, and underlying etiology. They include obsessive-compulsive disorder (OCD), body dysmorphic disorder, hoarding disorder, trichotillomania (hair-pulling disorder), and excoriation (skin picking) disorder in the DSM-5. In parallel, disorders due to addictive behaviors (DABs), including alcohol and other substance use disorders and behavioral addictions, are characterized by an inability to inhibit or delay deleterious behaviors, which can progress to a compulsive stage. While it is estimated that more than 15% of the general population exhibits at least one OCRD (Grant et al., 2020; Grant & Chamberlain, 2020; Hollander et al., 2016; Postlethwaite et al., 2019; Ruscio et al., 2010), the global impact of DABs is profound and far-reaching (Calado & Griffiths, 2016; Castaldelli-Maia & Bhugra, 2022; Meng et al., 2022; Stevens et al., 2021). Alongside their public health magnitude, those conditions share several conceptual similarities and risk factors, indicating potential transdiagnostic mechanisms

(Gillan et al., 2017; Figee et al., 2016). In recent times, an emerging consensus among experts supports the proposition that there exists a group of common neuropsychological functions (and underlying neural processes) predisposing to and maintaining addictive or compulsive behaviors (R. S. C. Lee et al., 2019; van den Heuvel et al., 2016; Yücel et al., 2021). Through the implementation of a transdiagnostic approach guided by the RDoC matrix (Insel et al., 2010), experts argued that systems governing habit, inhibitory control, and compulsivity are essential constructs for both OCRDs and DABs, while performance monitoring is especially important to the former and reward and action selection to the latter group (Fontenelle et al., 2020; Yücel et al., 2019; Yücel et al., 2021).

Despite the growing body of research adopting RDoC-related methods and constructs, its self-report unit of analysis has been less explored and domains underlying both DABs and OCRDs are still frequently evaluated with neuropsychological tests and behavioral paradigms. Using behavioral tasks in DAB and OCRD research certainly has benefits, as people with these conditions often lack self-awareness and insight. Yet, it also has disadvantages. They are impractical in a clinical setting – a comprehensive assessment battery of existing laboratory paradigms for addiction or OCRDs may take several hours – and usually require specific training for their application. Additionally, capturing the underlying mechanisms of such constructs in real-world activities, thus translating laboratory-studied paradigms into a more ecological environment, remains a challenge (de Wit et al., 2018). Subjective assessments, like self-reports and questionnaires, on the other hand, are faster to administer, can be undertaken with or without supervision, and may offer important complementary information to objective laboratory tasks.

They are able to provide additional phenomenological data (and not just a single outcome measure), as they also include information on "unobserved" behaviors (Cyders & Coskunpinar, 2011). Moreover, studies have shown that questionnaires or self-report measures could be more strongly related to psychopathology than to performance in neurocognitive tests. For instance, considering evidence of impulsive traits in OCD (Abramovitch & McKay, 2016; Grassi et al., 2018), a recent evaluation of this trait in an OCD sample revealed that OCD patients exhibited significantly heightened impulsivity in self-reported measures (that is, they described themselves as impulsive), while related objective neurocognitive tests did not show abnormalities in comparison to the control group (Frydman et al., 2020). Accordingly, it has also been suggested that theories that are explanatory and predictive of human behavior in experimental contexts may lack relevance for naturalistic human behavior (Eisenberg et al., 2019).

In this sense, a better knowledge of subjective, language-based tools that scrutinize underlying psychological traits in DABs and OCRDs in real-world settings is critical. However, the most frequently utilized instruments with this intent focus on characterizing symptoms (versus mechanisms) – guided by a descriptive approach (e.g., DSM-5 criteria) – rather than transdiagnostic constructs. Recently, the important work of Hook et al. (2021) provided a comprehensive review of self-report tools used in the assessment of impulsivity and compulsivity across various psychiatric disorders, also exploring the concept of trans-diagnostic measurements. Yet, Hook et al. 's. review did not refer to tools directly related to RDoC constructs. This scoping review aims to identify and map the range of subjective assessment tools thought to tap RDoC constructs regarded as essential for understanding the pathophysiology of DABs and OCRDs from a transdiagnostic perspective and according to an expert consensus, including response inhibition, habit, reward, action selection, and performance monitoring (Fontenelle et al., 2020; Yücel et al., 2019).

The use of the RDoC framework aims to increase the knowledge of the biological constructs of psychopathology and possibly select tools informed by recent neuroscience research. Accordingly, our ultimate objective was to provide a range of subjective assessments suitable for research and clinical use that, together with other measures, can effectively predict outcomes across DABs and OCRDs and benefit the diagnosis, treatment, and prevention of those psychiatric disorders (Williams et al., 2023). These assessments could pin down subjective aspects and assist clinicians and researchers in identifying patients with a relevant subjective burden. Furthermore, it could enable online research and large-scale panel studies with community samples. This synthesis provides a comprehensive overview that, while acknowledging the differences between self-reports and neuropsychological tests, highlights the value of integrating both types of measures in research and clinical contexts.

2. Materials and methods

In order to provide an overview of existing assessments and describe their properties, this scoping review was performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses, Extension for Scoping Reviews (PRISMA-ScR; Tricco et al., 2018) guidelines. The flow diagram depicted in **figure 1.1** illustrates the study identification and selection process. The flowchart for selecting scales from those documents is depicted in **figure 1.2.**

The protocol of the present review was registered at the Open Science Framework (OSF; DOI 10.17605/OSF.IO/UJ7G5) and published (Ribeiro et al., 2022).

2.1. Search Strategy and Information Sources

Appropriate keywords were identified by exploring the literature on the topic and then combined to form the search strings. The search was conducted in July 2023 using Medline, PsycINFO, Web of Science and EMABSE databases, with the following keywords: (response inhibition or habit* or compuls* or reward or action selection or performance monitoring) and (self-report or questionnaire or psychometric or scale or measurement tool* or interview* or index or instrument) and (valid* or reliab*). In addition to the online databases, forward and backward searches were conducted by screening the reference lists of included studies and the scale's original references. This step adopted no constraint of date, language, or document type to cover the literature as much as possible. During the selection phase, however, only studies in English, Spanish, Portuguese, French, or German were considered for feasibility reasons. **Supplementary material 1** contains the full search strategy used for all databases.

2.2. Study and Instruments Selection

Duplicate titles across databases were removed with

a reference manager (Endnote®) and Rayyan (https://www.rayyan.ai), and complemented by a manual search. Those that clearly did not meet the inclusion criteria (titles related to scientific areas not related to psychiatry, psychology, neurology, and neuropsychology) were also excluded by the first author (APR) in a pre-screening phase. Two researchers independently screened titles and abstracts, selecting for the next step only studies related to the topic (OCRDs and/or DABs) that mentioned self-reports, scales, or questionnaires for evaluating any aspect in the spectrum of those conditions. The remaining studies were selected for full-text reading and extraction of the assessment tools mentioned in each study. Complementarily, we also cross-checked the references of the papers screened to search for scales of interest and identify other records eligible for the goals of the study.

Exclusion criteria at the full-text reading stage referred to the characteristics of the contributions, including the language of publication, the availability of the original full-text article, and the use or development of questionnaires of interest in the articles found. Retrieved records were excluded if: (1) the article was not written in English, Spanish, Portuguese, French, or German; (2) after multiple efforts, we were unable to retrieve the full-text manuscript online or after contacting the first author; and (3) the study did not mention any scales or instruments.

After the studies were selected, the instruments mentioned were extracted and reviewed carefully by the first author (APR) to remove duplicates. APR and LFF analyzed the preliminary list of assessment tools independently to select instruments possibly related to the constructs. Discrepancies were solved through discussion between both authors until a consensus was reached. Only tools that met the inclusion criteria and had sufficient validation details (at least one measure of internal consistency and/or reliability) were selected for data extraction.

Assessment tools were excluded if: (1) the main outcome evaluated by the instrument was not related to any of the constructs of interest; (2) the main purpose of the instrument was simply to assess personality or character more broadly; (3) the instrument was designed to evaluate one specific mental disorder (i.e., it was not transdiagnostic); (4) the scales or questionnaires of potential interest mentioned in the text were not sufficiently described in the main text or supplement of the article; (5) we were unable to retrieve the full instrument; or (6) sufficient validation details were not provided.

2.3. Evaluation of instruments

The first author (APR) collected the necessary information from the selected instruments in tabular summary form. To provide insights into the characteristics and quality of these tools, the original publication of each instrument was assessed. Additional information was found in validation studies and relevant literature when available. Apart from the title and its original reference, publication date, and country, the psychometric properties of each instrument were registered. Other versions of the same instrument were listed when available. Translations into other languages and the number of citations of the original reference in Google Scholar were also mentioned as they both can be considered an inference of the popularity of the instrument. Additionally, original reports mentioning included instruments were retrieved using the Google Scholar citation tracker in order to analyze the samples in which they were previously implemented as an investigation method (e.g., nonclinical samples or clinical samples and the most prevalent disorders investigated with the instrument) **(table 2).**

2.4. Semantic link between instruments and RDoC-related constructs

During this stage, the first author (APR) and the senior author (LFF) conducted a qualitative item analysis, as defined by Cohen and Swerdlik (2005), to explore the semantic correspondence between instruments and their associated constructs. This analysis aimed to elicit their perspectives on the suitability or unsuitability of test items for measuring constructs. The process of assigning a specific outcome assessed by an instrument to a construct of interest initially relied on the original description of the instrument provided by its authors. For instance, instruments explicitly designed by their authors to assess habit, such as the "Self-report Habit Index," were categorized within the habit section.

Subsequently, these instruments and their items were assessed vis-à-vis the definitions of the constructs delineated in the RDoC framework or intermediate "semantic domains" extrapolated from the scales. Themes across questionnaires and the definitions of RDoC constructs were juxtaposed to discern both commonalities and disparities. For instance, in the case of compulsivity, our analysis was grounded in the Cambridge-Chicago Compulsivity Trait Scale (Chamberlain & Grant, 2018), alongside prevalent definitions of compulsivity in the extant literature (Luigjes et al., 2019).

In the case of items/scales behind a paywall [i.e., Barkley Deficits in Executive Functioning Scale (Barkley, 2011), Behavior Rating Inventory of Executive Function (BRIEF; Gioia et al., 2000), Comprehensive Executive Function Inventory (Naglieri & Goldstein, 2013)], the assignment of the scale to a specific construct was informed by the relevant literature on that particular instrument. Detailed information regarding the definition of each construct of interest, its corresponding subjective semantic domain, and examples of scale items utilized in the decision-making process are provided in **table 1.**

In line with scoping review guidelines, a risk of bias assessment of the included studies was not carried out (Tricco et al., 2018). Likewise, no formal quality assessment of the instruments was performed as this was out of the scope of this review. However, internal consistency, test-retest correlation coefficients, and scale length were parameters considered when listing recommended measures for future studies (see **table 4** in the Discussion section). As a relevant number of instruments were related to more than one construct of interest, an overview of constructs related to each instrument was outlined in **table 3.**

3. Results

3.1. Study and Instruments Selection

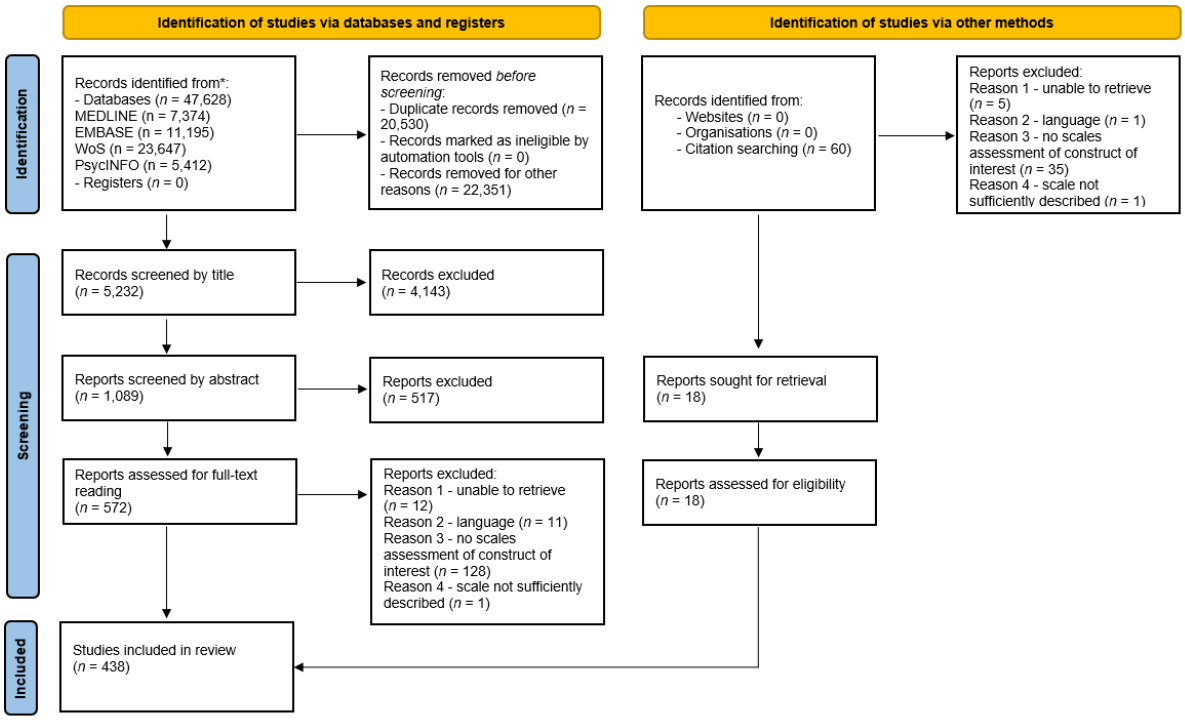
The search yielded 7,374 studies in MEDLINE, 11,195 in EMBASE, 23,647 in Web of Science, and 5,412 in PsycINFO. Removing duplicates resulted in 27,098 articles, of which 5,232 were considered eligible for screening after a pre-screening phase conducted by the first author (APR) – according to the general subject of each article (studies not related

Table 1. *Definition of constructs of interest, its correspondent subjective semantic domain and examples of a scale items that assess each construct*

Constructs of interest	***Definition***	***Corresponding Semantic Domains***	***Example of a scale item that assess the construct***
Habit	*Sequential, repetitive, motor behaviors or cognitive processes elicited by external or internal triggers that, once initiated, can go to completion without continuous effortful oversight (Gardner, 2015). DABs and OCRDs are related to an increased tendency to form habits.*	*1) Frequency of engagement; 2) Automaticity of performance; 3) Difficulty in resisting doing it.*	*"Behavior X is something… I do frequently; I do automatically; I do without having to consciously remember" (SRHI; Verplanken & Orbell 2003).*
Compulsivity	*Additional construct to the RDoC matrix. Corresponds to repetitive or automatic behavior associated with an experience of being 'forced' or 'compelled' to act despite negative consequences (Luigjes et al., 2019).*	*1) Persistence, rigidity and inflexibility; 2) Desire of control, fear of loosing control, avoidance of situations that are hard to control; 3) Feeling of being compelled to act, feeling of being stuck in a habit; 4) Need for completion or perfection and desire for high standards; 5) Indecisiveness.*	*"I hate leaving a task unfinished" (CHI-T; Chamberlain & Grant 2018).*
Response Inhibition	*A sub-construct of the cognitive control system, that corresponds to the ability to suppress unrelated or inappropriate stimuli/responses (Hampshire et al., 2010). DABs and OCRDs are related to deficits of Response Inhibition.*	*1) Experience of losing control; 2) Inability to suppress unrelated or inappropriate stimuli/ responses, inability to control ones' behavior (self-control).*	*"I do things without thinking" (BIS-11; Patton et al., 1995)*
Performance monitoring	*A sub-construct of the cognitive control system, that corresponds to a set of cognitive and affective functions that maintains task performance in the context of specific goals, evaluating behavioral progress, adjusting behavior as needed, and adapting to changing contingencies (Ullsperger et al., 2014). OCRDs are related to deficits in Performance Monitoring.*	*1) Apprehension or fear of unpredictable; 2) Perfectionism. 3) Fear of making mistakes 4) Need for reassurance*	*"When actions change rapidly, I am always seriously afraid to make mistakes" (Conflict Monitoring Questionnaire; Leue 2021), and "Even when I do something very carefully, I often feel that it is not quite right" (Frost et al., 1990).*
Reward	*Processes by which the probability and benefits of a prospective outcome are computed by reference to external information, social context (e.g., group input), and/or prior experience (Reward Valuation; Harmon-jones et al. 2020); or a type of reinforcement learning by which organisms acquire information about stimuli, actions, and contexts that predict positive outcomes, and by which behavior is modified when a novel reward occurs, or outcomes are better than expected (Reward Learning; Dayan & Balleine 2002). DABs are related to deficits in reward processing.*	*1) Need for reward. 2) Impatience or need for immediate rewards; 3) Sensation seeking; 4) Delay discounting.*	*"I often give up on things that I cannot have immediately" (Quick delay questionnaire; Clare, Helps, and Sonuga-Barke 2010), and "When I am successful at something, I continue doing it" (Reward Response Scale; Van den Berg et al., 2010).*
Action selection preference-based decision-making	*Processes whereby an individual engages a plan for spatial and temporal components of possible purposeful movements, which match internal and external constraints to achieve a goal. It involves an evaluation of costs/benefits and occurs in the context of multiple potential choices available for decision-making (Scherbaum et al., 2010). DABs are related to deficits in action selection.*	*The ability to pursue more positive/constructive things over less relevant ones.*	*"I made time to pursue my hobbies even when it was inconvenient" (PVSS; Khazanov, Ruscio, and Forbes 2020).*

to the fields of psychiatry, psychology, neurology, and neuropsychology were excluded by title). Titles and abstracts were screened against eligibility criteria, resulting in 572 studies for full-text reading. Of those, 152 were excluded for being written in other languages (n = 11), not able to retrieve (n = 12), had no scales assessment of construct of interest (n = 128), and had assessments not sufficiently described (*n* = 1). Searching citation lists of included studies yielded 18 additional titles **(figure 1.1).**

Figure 1.1. *PRISMA flow chart. Studies selection*



Of the 438 articles selected, 615 unique instruments were identified (i.e., after deduplication). Of those, 528 were excluded for measuring other constructs than the ones of interest (n = 449), measuring related constructs but in the context of broader personality or character evaluation (n = 47), being disorder-specific or not applicable in a transdiagnostic sample (n = 33), being unavailable online or through attempts to contact authors by email (n = 2), or not having sufficient validation details in the original paper or related literature (n = 5). Thus, 79 unique instruments were finally included in the review **(figure 1.2).** A general description of those is presented in **table 2.** Cohen's kappa coefficient for the stage of selection instruments indicated substantial agreement between raters on inclusion vs exclusion of a specific tool ($\kappa = 0{,}68$, $p < 0.005$).

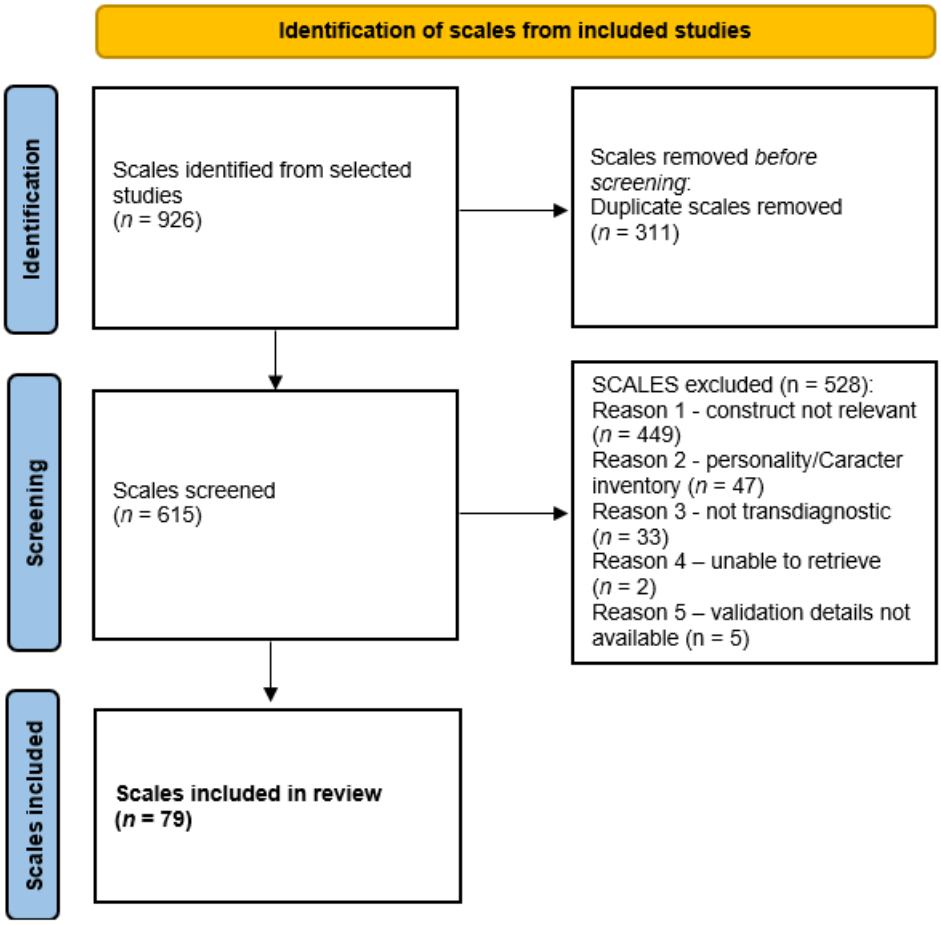
3.2. Questionnaires characteristics

Most instruments measured more than one construct, including (not exclusively): reward (n = 31; 38%), compulsivity (n = 22; 28%); response inhibition (n = 20; 25%); performance monitoring (n = 12; 15%); habit (n = 8; 10%); and action selection (n = 1; 1%). Most were formulated in North America (*n* = 47), followed by Europe (*n* = 27), Australia (*n* = 2), and South America (n = 2); and in the years between 1950-1970 (*n* = 3%), 1971-1990 (*n* = 11, 14%), 1991-2010 (*n* = 32, 39%), and after 2010 (*n* = 33, 42%). An overview of constructs related to each instrument is outlined in **table 3.** The vast majority of the instruments were designed in a Likert format and were initially validated in samples of healthy subjects recruited by convenience (e.g., undergraduate students) in North America (United States and Canada). Validation studies mostly provide internal consistency according to the Cronbach α coefficient and stability measures based on test-retest schedules with intervals that vary from days to several months.

3.2.1 Compulsivity

A total of 22 instruments were considered to capture the concept of *compulsivity*. Of those, only the Cambridge-Chicago Compulsivity Trait Scale (CHI-T; Chamberlain & Grant, 2018) was explicitly designed for the transdiagnostic measurement of compulsivity. Other instruments found were designed to measure psychological aspects related to compulsive behaviors, like (1) *Cognitive flexibility/rigidity*: including the Rigidity Attitudes Regarding Personal Habit Scale (Meresko et al., 1954), the Cognitive Flexibility Scale (Martin & Rubin, 1995), the Cognitive Flexibility Inventory (Dennis & Vander Wal, 2010), the Desire Thinking Questionnaire (Caselli & Spada, 2011), and the Perseverative Thinking Questionnaire-15 (Ehring et al., 2011); (2) *Self-control and desire for control*: including the Habitual Self-Control Questionnaire (Schroder et al., 2013), the Self-Control Scale (Tangney et al., 2004), the Desirability for Control Scale (Burger & Cooper, 1979), the Need for Structure Scale (Neuberg & Newsom, 1993), the Thought Control Questionnaire (Wells et al., 1994), the White Bear Suppression Inventory (Wegner & Zanakos, 1994), and the Beliefs About Losing Control Inventory (Radomsky & Gagné, 2019); (3) *Perfectionism*: such as the Frost Multidimensional Perfectionism Scale (Frost et al., 1990), the Hewitt-Flett Multidimensional Perfectionism Scale (Hewitt et al., 1991), the Almost Perfect Scale-Revised (Slaney

Figure 1.2. *PRISMA flow chart. Scales selection*



et al., 2001), and the Persistence, Perfectionism and Perseveration Questionnaire (Serpell et al., 2009); (4) *Intolerance of uncertainty, indecisiveness and doubt*, such as the Intolerance of Uncertainty Scale (Freeston et al., 1994), the Indecisiveness Scale (Frost & Shows, 1993), and the Doubt Questionnaire (Marton et al., 2019); and (5) *Dysfunctional planning,* which can be assessed by the Style of Planning Action (STOP) Questionnaire (O'Connor et al., 2015), the Habitual Tendencies Questionnaire (Ramakrishnan et al., 2022), and the Persistence Scale (Styk et al., 2023).

3.2.2 Habit

A total of 8 instruments were considered to capture the concept of *habit*. Five questionnaires evaluate habit exclusively: (1) the Self-report Habit Index (Verplanken & Orbell, 2003), developed as a direct measure of habit strength and aimed not to rely on estimates of behavioral frequency, but on the history of repetition, automaticity (lack of control and awareness, efficiency), and the relationship of the target behavior with self-identity; (2) the Creature of Habit (Ersche et al., 2017), which measures individual differences in habitual responding in everyday life situations, with items subdivided into automaticity and routine subscales; (3) the Daily Habit Scale (Georgiev et al., 2022), which measures the frequency (from monthly to several times a day) and the automaticity ("I do automatically/without thinking") of a list of common daily habits, such as drinking coffee, brushing teeth, eating fast-food, etc; (4) the SAM2 Habitual Behavior Instrument (Dutriaux et al., 2023), which has 80 common behaviors (from 10 domains of human activity) whose habitualness is established by the regularity of performance in situations where doing so is possible; (5) the Routinization Scale (Reich & Zautra, 1991), a forced choice self-report that assess resistance to change, rejection attempts to alter patterns of daily living, and experience of distress at events that require change; (6) The Habit, Reward, and Fear Scale (Piquet-pessôa et al., 2019), which was partially inspired by the SRHI to measure three possible motivations of addictive and compulsive behaviors, including habit; (7) the Habitual Tendencies Questionnaire (Ramakrishnan et al., 2022), which explores the relationship between habit and compulsivity, with items illustrating both facets of behavior; and (8) The Volitional Components Inventory, which assesses habitual tendencies together with other dimensions of reduced volitional competence (Kuhl & Fuhrmann, 2009).

Table 2.1. *Summary of instruments – Compulsivity*

Scale Name (Original reference)	Year Country	Item example	Constructs	Nº items	Response format	Internal consistency	Test-retest reliability	Usual samples	Nº citations*	Availability	Other versions
Beliefs About Losing Control Inventory (Radomsky & Gagné, 2019)	2020 Canada	"I don't even like thinking about losing control".	Compulsivity	21	4-point Likert	Cronbach's α = .94.	r = .68 (~ 33 days)	Explored in OCD and social anxiety subjects.	11	Free	Turkish translation available.
Cambridge-Chicago Compulsivity Trait Scale (CHI-T) (Chamberlain & Grant, 2018)	2018 UK	"Need for control".	Compulsivity	15	4-point Likert	Cronbach's α = .80	NR	Explored in both addiction and OCRDs.	45	Free	NA
Cognitive Flexibility Inventory (Dennis & Vander Wal, 2010)	2010 USA	"I consider all the available facts and information when attributing causes to behavior".	Compulsivity	20	7-point Likert	Cronbach's α > .84 - .91	r = .81 (7 weeks)	Largely explored in OCD, but also in addictions, eating and anxiety disorders.	1084	Free	Translations available.
Cognitive Flexibility Scale (Martin & Rubin, 1995)	1995 USA	''I am willing to listen and consider alternatives for handling a problem''	Compulsivity	12	6-point Likert	Cronbach's α = .76 - .77	r = .83 (One week)	Specially explored in anxiety disorders, but also in OCD, addiction and eating disorders	1087	Free	Translations available.
Desirability for Control Scale (Burger & Cooper, 1979)	1979 USA	"I enjoy having control over my own destiny".	Compulsivity	20	7-point	Cronbach's α = .80	r = .75 (6 weeks)	Explored both in addictions and OCRDs samples.	1356	Free	Translations available.
Desire Thinking Questionnaire (Caselli & Spada, 2011)	2011 Italy	"My mind is focused on repeating what I desire till I manage to satisfy it".	Compulsivity	10	4-point Likert	Cronbach's α = .83	r = .59 (8 weeks)	Samples of behavior addictions only.	102	Free	Translations available
Habitual Self-Control Questionnaire (Schroder et al., 2013)	2013 USA	"It would be easy for me to adopt a new habit such as doing exercise every day"	Compulsivity	14	5-point Likert	Cronbach's α = .81	r = .83 (One month)	Explored in OCD and addictive samples, but mainly in nonclinical samples.	37	Free	Translations available.

Table 2.1. *Continued*

Indecisiveness Scale (Frost & Shows, 1993)	1993 USA	"I have a hard time planning my free time".	Compulsivity	15	5-point Likert	Cronbach's α = .90	NR	Specially explored in OCRDs, ADs and MDD patients.	618	Free	Translations available.
Need for Structure Scale (Neuberg & Newsom, 1993)	1993 USA	"I enjoy having a clear and structured mode of life".	Compulsivity	12	6-point Likert	Cronbach's α = .77	r = .76 - .84 (12 weeks)	Mostly explored in nonclinical samples.	1510	Free	Translations available.
Perseverative Thinking Questionnaire (Ehring et al., 2011)	2011 Germany	"Thoughts come to my mind without me wanting them to".	Compulsivity	15	5-point Likert	Cronbach's α = 94 - .95	r = .69 (4 weeks)	Mainly explored in mood disorders, anxiety disorders, and OCD samples.	874	Free	Child version (Bijttebier et al., 2015) and translations available.
Persistence Scale (Styk et al., 2023)	2023 Poland	"I feel internally that I need to finish what I have started".	Compulsivity	20	7-point Likert	Cronbach's α = .97 (Polish version) and .62 - .79 (English version).	NR	Explored in a nonclinical sample only.	0	Free	Polish (original) and English versions available.
Rigidity Attitudes regarding Personal Habits (RAPH) Scale (Meresko et al., 1954)	1954 USA	"I dislike doing anything just on the spur of the moment".	Compulsivity	20	6-point Likert	Odd-even reliability coefficient = .78.	NR	Explored in nonclinical samples only.	80	Free	NA
Style of Planning Action (STOP) Questionnaire (O'Connor et al., 2015)	2015 Canada	"Do you adequately plan your own leisure?".	Compulsivity	21	10-point Likert	Cronbach's α = .77	ICC = .77 (2 months)	Explored only in OCRDs.	8	Free	NA
Thought Control Questionnaire (Wells et al., 1994)	1994 UK	"I think pleasant thoughts instead".	Compulsivity	36	4-point Likert	Cronbach's α = .64 - .79	r = .83 (6 weeks)	Predominantly explored in OCD but also studied in DABs samples.	932	Free	Translations available.
White Bear Suppression Inventory (Wegner & Zanakos, 1994)	1994 USA	"Sometimes I wonder why I have the thoughts I do".	Compulsivity	15	5-point Likert	Cronbach's α = .87 - .89	r = .69 - .92 (3 weeks – 3 months)	Largely explored in both DABs and OCRDs samples.	2067	Free	Translations available.

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Table 2.2 *Summary of instruments – Habit*

Scale Name (Original reference)	Year Country	Item example	Constructs	Nº items	Response format	Internal consistency	Test-retest reliability	Usual samples	Nº citations*	Availability	Other versions
Creature of Habit (Ersche et al., 2017)	2017 UK	"I park my car always in the same place"	Habit	27	5-point	Cronbach's α =.86 - .89	NR	Specially explored in samples with addictive behaviors and disordered eating, but also in OCRDs.	131	Free	Translations available.
Daily Habit Scale (Georgiev et al., 2022)	2022 Slovenia	"Waking up early is something that..." I do not do at all or I do "several times a day/ daily/ weekly/ monthly".	Habit	38	4-point	Cronbach's α =.73	NR	Nonclinical samples only.	1	Free	NA
Routinization Scale (Reich & Zautra, 1991)	1991 USA	"I do pretty much the same things every day".	Habit	20	True/False	Cronbach's α = .74	r = .74 (7 months)	Nonclinical samples.	82	Free	NA
SAM2 Habitual Behavior Instrument (Dutriaux et al., 2023)	2023 France/UK	List of activities, with positive and negative valence ("Eat healthy snacks" *vs* "Eat fast food").	Habit	80	Continuous, 0 to 100 scale	Cronbach's α = .74 - .95	NR	Samples of individuals with AUDs or OCRDs (trichitilomania).	12	Free	NA
Self-report Habit Index (Verplanken & Orbell, 2003)	2003 Norway	"*Behavior X* is something… I do frequently; I do automatically; I do without having to consciously remember".	Habit	12	7-point Likert	Cronbach's α = .89 - .92	r = .91 (one week)	Largely explored in DABs, as well as in other compulsive behaviors and eating disorders.	2238	Free	Translations available.

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Table 2.3. *Summary of instruments – Response Inhibition*

Scale Name (Original reference)	Year Country	Item example	Constructs	Nº items	Response format	Internal consistency	Test-retest reliability	Usual samples	Nº citations*	Availability	Other versions
Barkley Deficits in Executive Functioning Scale (Barkley, 2011)	2011 USA	"I like to do things without considering the consequences for doing them".	Response Inhibition	89	NR	Cronbach's α > 0.91	NR	Mainly explored in ADHD samples.	370	Purchase only	Short-version, other-report, children and adolescents versions and translations available.
Barratt Impulsiveness Scale (BIS-11) (Patton et al., 1995)	1995 USA	"I do things without thinking".	Response Inhibition	30	4-point Likert	Cronbach's α =.79	NR	Largely explored in addiction and OCRDs, although more in the former.	1005	Free	BIS-15 (Spinella, 2007), BIS-R-21 (Potenza et al., 2013). Abbreviated Impulsiveness Scale (ABIS; Coutlee et al., 2014). Translations available.
Behavior rating inventory of executive function (BRIEF) (Gioia et al., 2000)	2000 USA	NA	Response Inhibition	86	NR	Cronbach's α = .80 - .98	r = .82 - .88 (2-3.5 weeks)	Explored in both addiction and OCRDs samples.	3405	Purchase only	Adult version (Roth et al., 2005), BRIEF-2 (Gioia et al., 2015), parental, teacher and self-report forms, and translations available.
Behavioral Inhibition Questionnaire (Bishop et al., 2003)	2003 Australia	"Is happy to perform in front of others"	Response Inhibition	30 (parent version) 28 (teacher version)	7-point Likert	Cronbach's α > .80	r = .49 to .78 (12 months)	Explored mainly in anxiety and OCD samples	307	Free	Translations available.
Dickman's Impulsivity Inventory (Dickman, 1990)	1990 USA	"I will often say whatever comes into my head without thinking first".	Response Inhibition	63	True/False	Cronbach's α = .83 - .86	NR	Largely explored in both addiction and OCRDs.	1908	Free	Short version (DII-short; Claes et al., 2000) and translations available.
Eysenck's Impulsivity Scale (Eysenck et al. 1985)	1985 UK	"Do you like planning things carefully well ahead of time?".	Response Inhibition	35 (impulsivity and venturesomeness)	Yes/No	Cronbach's α = .84 (reviewed in Webster & Jackson 1997)	NR	Mainly explored in addictive and impulsive disorder samples.	1573	Free	Translations available.

Table 2.3. *Continued*

Impulsive Behavior Scale (UPPS) (Whiteside & Lynam, 2001)	2001 USA	"When I am in great mood, I tend to get into situations that could cause me problems"	Response Inhibition	46	4-point Likert	Cronbach's α = .76 -87	NR	Largely explored in samples of DABs, but also in OCRDs.	4991	Free	UPPS-P (Cyders, 2013), short version (Cyders et al., 2014) and translations available.
Kendall and Wilcox's Self-Control Rating Scale (Kendall & Wilcox, 1979)	1979 USA	"Does the child interrupt inappropriately in conversations with peers, or wait his or her turn to speak?".	Response Inhibition	33	7-point Likert	Cronbach's α = .98	r = .84 (3-4 weeks)	Mainly samples of children with ICDs.	861	Free	Self-report version (Rorhbeck et al., 1991) and translations available.
Multidimensional Self-Control Scale (Nilsen et al., 2020)	2020 Norway	"I am easily disturbed by my impulses".	Response Inhibition	29	5-point Likert	Cronbach's α = .72 - 82	NR	Nonclinical samples only.	29	Free	Short version (Nilsen et al., 2020) and English version available.
NAS-50 Self-Control Scale (Nęcka et al., 2016)	2016 Poland	"Sometimes I do things impulsively before thinking them over".	Response Inhibition	50	5-point Likert	Cronbach's α = .81 - .88	ICC = .94	Nonclinical samples only.	22	Free	Self and other-reports versions available (Nęcka et al., 2016).
Positive Urgency Measure (Cyders & Smith, 2007)	2007 USA	"When I am very happy, I can't seem to stop myself from doing things that can have bad consequences".	Response Inhibition	14	4-point Likert	Cronbach's α = .94	NR	Largely explored in samples of addictive and OCRDs, although more in the former.	1313	Free	Translations available.
Reuter and Montag's revised Reinforcement Sensitivity Theory Questionnaire (Reuter et al., 2015)	2015 Germany	"Most of the time I have a thirst for action".	Response Inhibition	31	4-point Likert	Cronbach's α = .74 - .77 (rBAS subscale)	NR	Nonclinical samples.	115	Free	English and German versions available.
Three-Factor Impulsivity index (Madole et al., 2021)	2011 USA	"When I am really excited, I tend not to think of the consequences of my actions".	Response Inhibition	54	5-point Likert	Cronbach's α = .80 - .87	NR	Explored mainly in DABs and ICDs samples.	163	Free	Translations available.
Volitional Components Inventory (Kuhl & Fuhrmann, 2009)	1998 Germany	"Having no difficulties with spontaneous decisions".	Response Inhibition	190	4-point Likert	Cronbach's α = .70 - .95	NR	Explored mainly in nonclinical samples.	835	Contact author	Short form (Forstmeier & Rüddel, 2008) translations available.

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Table 2.4. *Summary of instruments – Reward*

Scale Name (Original reference)	Year Country	Item example	Constructs	Nº items	Response format	Internal consistency	Test-retest reliability	Usual samples	Nº citations*	Availability	Other versions
Anticipatory and Consummatory Interpersonal Pleasure Scale (Gooding & Pflum, 2014)	2014 USA	"A good meal always tastes better when you eat it in the company of someone you feel close to".	Reward	17	6-point Likert	Cronbach's α = .86	r = .78 (5-8 weeks)	Largely explored in depression and schizophrenia samples.	172	Free	Translations available.
Appetitive Motivation Scale (C. J. Jackson & Smillie, 2004)	2004 Australia	"I like to be rewarded for what I do".	Reward	20	True/False	Cronbach's α = .74	NR	Specially explored in addiction and eating behaviors samples.	88	Free	NA
Arnett Inventory of Sensation Seeking (Arnett, 1994)	1994 USA	"I like to travel to strange places".	Reward	20	4-point Likert	Cronbach's α = .70	NR	Specially explored in addiction.	1337	Free	Translations available.
Delay discounting questionnaire (Kirby et al., 1999)	1999 USA	"Would you prefer $55 today or $75 in 61 days?"	Reward	27	Yes/No	NR	r = .77 (5 weeks) (Kirby, 2009)	Mainly explored in addiction samples, with few studies in OCD and body-focused compulsive disorders.	2581	Free	Translations available.
Delaying Gratification Inventory (Hoerger et al., 2011)	2011 USA	"I am capable of working hard to get ahead in life".	Reward	35	5-point	Cronbach's α = .77 - >.90	r = .87 - .90 (2 months)	Specially explored in substance abuse and eating disorders samples.	185	Free	Translations available.
Environmental Reward Observation Scale (Armento & Hopko, 2007)	2007 USA	"A lot of activities in my life are pleasurable".	Reward	10	4-point Likert	Cronbach's α = .85	r = .85 (7-10 days)	Specially explored in depressive and addictive samples.	219	Free	EROS-R (Vilca et al., 2022) and translations available.
Fawcett-Clark Pleasure Scale (Fawcett et al., 1983)	1983 USA	"You sit watching a beautiful sunset in an isolated, untouched part of the world".	Reward	36	5-point	Cronbach's α = .94 - .96	NR	Mainly explored in samples of depression.	439	Free	Translations available.

Table 2.4. *Continued*

Frustrative Nonreward Responsiveness Scale (Wright et al., 2009)	2009 UK	"When circumstances prevent me from achieving an important goal, I find it hard to keep trying".	Reward	5	4-point	Cronbach's α = .71 - .73	ICC = .75	Explored mainly in samples of subjects with mood disorders.	23	Free	NA
Generalized Reward and Punishment Expectancy Scale (GRAPES) (Ball & Zuckerman, 1990)	1990 USA	"I usually find my work or study exciting or challenging"	Reward	30	True/False	Cronbach's α = .60 - .63	NR	Explored mainly in nonclinical samples.	204	Free	NA
Physical Anhedonia Scale (L. J. Chapman et al., 1976)	1976 USA	"I have always loved having my back massaged".	Reward	51	True/False	Cronbach's α = .66 - .82	NR	Mainly explored in squizophrenia and depression samples.	1972	Free	Revised Scale (J. P. Chapman et al., 1995) and translations available.
Pleasant Activities List (Roozen et al., 2008)	2008 Netherlands	List of activities, such as "watching TV", "listening to the radio", etc.	Reward	139	5-point Likert	Cronbach's α = .67 - .96	NR	Explored mostly in subjects with SUDs and impulse-control disorders.	40	Free	Dutch (original) and English versions available.
Pleasant Events Schedule (Macphillamy & Lewinsohn, 1982)	1982 USA	List of activities, events or experiences, such as "Going to a rock concert", "Being at the beach", etc.	Reward	320	3-point Likert for frequency, enjoyment and obtained pleasure scales.	Cronbach's α = .89 - .93 (Whisman et al., 2014).	r = .69 - .88	Explored in subjects with depression (mainly), SUDs and elderly (dementia).	460	Free	NA
Quick delay questionnaire (Clare et al., 2010)	2010 UK	"I often give up on things that I cannot have immediately".	Reward	10	5-point Likert	Cronbach's α = .68 - .77	r = .80 - .81 (One week)	Predominantly explored in samples of ADHD patients and other impulsive disorders.	57	Free	NA
Reinforcement Survey Schedule (Cautela & Kastenbaum, 1967)	1967 USA	List of objects, activities and situations that may give joy or other pleasurable feelings. E.g., "Being praised by the boss for having completed a job well done".	Reward	36	5-point Likert	NR	r = .40 - .91 (5 weeks) (Thorndike & Kleinknecht, 1974)	Nonclinical and AUDs samples.	357	Free	Translations available.

Table 2.4. *Continued*

Reward and punishment responsivity and motivation questionnaire (Jonker & Timmerman, 2022)	2022 Netherlands	"Winning makes me enthusiastic".	Reward	18	5-point Likert	ω = .76 - .87	NR	Nonclinical samples only.	2	Free	NA
Reward Deficiency Syndrome Questionnaire (Kótyuk et al., 2022)	2022 Hungary	"I can never get enough sex".	Reward	29	5-point Likert	Cronbach's α = 89 - .91	NR	Explored mainly in samples of SUDs.	18	Free	English and Hungarian (original) versions available.
Reward Probability Index (Carvalho et al., 2011)	2011 USA	"I have many interests that bring me pleasure".	Reward	20	4-point Likert	Cronbach's α = .90	r = .69 (2 weeks)	Explored mainly in individuals with MDD or DABs.	118	Free	Translations available.
Reward Response Scale (Van den Berg et al., 2010)	2010 USA	"When I am successful at something, I continue doing it".	Reward	8	4-point Likert	Cronbach's α = .80	r = .88 (5 weeks)	Explored mainly in individuals with MDD or DABs.	82	Free	NA
Rewarding Events Inventory (Hughes et al., 2017)	2017 USA	List of common rewarding activities, like "Give a party or get-together".	Reward	58	5-point in each item (enjoying, wanting or frequency)	Cronbach's α = .73	r > .83 (3-7 days)	Explored mainly in individuals with tobacco addiction.	6	Free	NA
Sensitivity to Punishment and Sensitivity to Reward Questionnaire (Torrubia et al., 2001)	2001 Spain	"Do you often refrain from doing something because you are afraid of it being illegal?".	Reward	24	Yes/No	Cronbach's α = .75 - .78	r = .87 (3 months)	Largely explored in both addiction and OCRDs.	1532	Free	Translations available.
Snaith-Hamilton Pleasure Scale (Snaith et al., 1995)	1995 UK	"I would enjoy a warm bath or refreshing shower".	Reward	14	4-point Likert	.857 (Kuder-Richardson formula)	NR	Explored mainly in samples of MDD.	1452	Free	Translations available.
Social Anhedonia Scale (L. J. Chapman et al., 1976)	1976 USA	"Getting together with old friends has been one of my greatest pleasures".	Reward	56	True/False	Cronbach's α = .82 - .85	NR	Explored mainly in samples of squizophrenia and MDD.	1972	Free	Revised version (Eckblad et al., 1982) and translations available.

Table 2.4. *Continued*

Social Reward Questionnaire (Foulkes et al., 2014)	2014 UK	"I enjoy achieving recognition from others"	Reward	23	5-point Likert	Cronbach's α = .77 - .87	r = .80 (10-14 days)	Specially explored in studies about autism and in samples of adolescents and young adults.	83	Free	Translations available.
Temporal Experience of Pleasure Scale (TEPS) –anticipatory pleasure scale and consummatory pleasure scale (Gard et al., 2006)	2006 USA	"I appreciate the beauty of a fresh snowfall".	Reward	18	6-point Likert	Cronbach's α = .79	r = .81 (5-7 weeks)	Largely explored in samples of ADs, MDD, schizophrenia, DABs, and OCRDs.	938	Free	Translations available.
Value-Driven Attention Questionnaire (Anderson et al., 2020)	2020 USA	"When I see an attractive person, I have a hard time taking my eyes off of them".	Reward	16	4-point Likert	Cronbach's α = .76	r = .69 (4 weeks)	Studied in AUDs samples.	12	Free	NA

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Table 2.5. *Summary of instruments – Performance Monitoring*

Scale Name (Original reference)	Year Country	Item example	Constructs	Nº items	Response format	Internal consistency	Test-retest reliability	Usual samples	Nº citations*	Availability	Other versions
Attitudes Toward Self Scale (Carver et al., 1988)	1988 USA	"If I fail at something, I think about that particular failure for a long time afterward".	Performance Monitoring	18	5-point Likert	Cronbach's α = .65 - .82	r = .59 - .66. (6 weeks)	Specially explored in depression and nonclinical samples.	172	Free	Translations available.
Child Error Sensitivity Index (Meyer & James, 2022)	2018 USA	"If I make a mistake, I always want to fix it".	Performance Monitoring	9	3-point Likert	Cronbach's α > .80 (Meyer & James, 2022)	r = .63 (2 years) (Meyer & James, 2022)	Nonclinical samples.	26	Free	NA
Conflict Monitoring Questionnaire (Leue & Beauducel, 2021)	2021 Germany	"When actions change rapidly, I am always seriously afraid to make mistakes".	Performance Monitoring	60	6-point Likert	Cronbach's α =.72 - .89	NR	Nonclinical samples.	2	Free	NA

Table 2.5. *Continued*

Doubt Questionnaire (Marton et al., 2019)	2019 USA	"I need to reassure myself that something I did was actually Completed".	Performance Monitoring	18	5-point Likert	Cronbach's α = .91	r = .86	Mainly explored in OCD samples.	23	Free	NA
Not Just Right Experience-Sensitivity scale (Melli et al., 2020)	2020 Italy	"If I had to live for a long time with a sense of not being 'right', I believe that I would not be able to throw myself into things that I like to do".	Performance Monitoring	8	5-point Likert	Cronbach's α = .84 -.91	NR	Nonclinical sample only.	1	Free	English and Italian (original) versions available.
Threat-Related Reassurance Seeking Scale (Cougle et al., 2012)	2011 USA	"Do you find yourself often asking others whether everything will be alright?".	Performance Monitoring	8	7-point Likert	Cronbach's α = .92	r = .84 (one month)	Explored mainly in ADs and OCD samples.	131	Free	NA

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Table 2.6. *Summary of instruments – Miscellaneous*

Scale Name (Original reference)	Year Country	Item example	Constructs	Nº items	Response format	Internal consistency	Test-retest reliability	Usual samples	Nº citations*	Availability	Other versions
Almost Perfect Scale-Revised (Slaney et al., 2001)	2001 USA	"My best just never seems to be good enough for me".	Compulsivity, Performance Monitoring	23	7-point Likert	Cronbach's α = .82 - .92.	NR	Largely explored in OCD samples.	1615	Free	Short-form (Rice et al., 2014) and translations available.
Behavioral Inhibition and Behavioral Activation Scale (BIS/BAS) (Carver & White, 1994)	1994 USA	"When I get something I want, I feel excited and energized".	Response Inhibition, Reward	13	4-point Likert	Cronbach's α = .87 (Cyders et al., 2007)	r = .59 - .69 (2 months)	Largely explored in addiction and OCRDs, although more in the former.	9111	Free	Translations available.

Table 2.6. *Continued*

Comprehensive Executive Function Inventory (Naglieri & Goldstein, 2013)	2013 USA	NA	Response Inhibition, Performance Monitoring	100,for each form (Parent, Teacher, and Self-Report)	6-point Likert	Cronbach's α =.97 - .99	r = .74 - .91 (7-30 days)	Explored mainly in samples of children with ADHD and nonclinical samples.	176	Purchase only.	Translations available.
Frost Multidimensional Perfectionism Scale (Frost et al., 1990)	1990 USA	"Even when I do something very carefully, I often feel that it is not quite right"	Compulsivity, Performance Monitoring	47	5-point	Cronbach's α = .77 - .93	r = .60 - .69 (3 months)	Broadly explored in behaviors prone to addiction and OCRDs, as well as in affective disorders.	6576	Free	Brief version and (Burgess et al., 2016) translations available.
Habit, Reward and Fear Scale (Piquet-pessôa et al., 2019)	2019 Brazil	"*Behavior X* is something I do without having to consciously remember".	Reward, Habit	18	7-point Likert	Cronbach's α = .72 - .81	NR	Explored in samples of OCD and AUDs.	17	Free	Translation to Chinese available.
Habitual Tendencies Questionnaire (Ramakrishnan et al., 2022)	2021 UK	"I mentally fixate on certain issues and cannot move on"	Compulsivity, Habit	11	7-point Likert	Cronbach's α = .76 -87	NR	Only OCD samples.	8	Free	NA
Hewitt-Flett Multidimensional Perfectionism Scale (Hewitt et al., 1991)	1991 Canada	"One of my goals is to be perfect in everything I do)".	Compulsivity, Performance Monitoring	45	7-point Likert	Cronbach's α = .74 - .88	r = .60 - 69	Mainly explored in samples of MDD, ADs, OCD and EDs.	832	Free	Translations available.
Intolerance of Uncertainty Scale (Freeston et al., 1994)	1994 Canada	"When I'm uncertain, I can't move forward".	Compulsivity, Performance Monitoring	27	5-point Likert	Cronbach's α = .91	r = .74 (5 weeks)	Mainly OCRDs and ADs samples.	2266	Free	Short version (Carleton et al., 2007) and translations available.

Table 2.6. *Continued*

Persistence, Perfectionism and Perseveration Questionnaire (Serpell et al., 2009)	2009 UK	"If I try to solve a problem or puzzle, I do not stop until I find an answer".	Compulsivity, Performance Monitoring	22	5-point Likert	Cronbach's α = .63 - .76	r = .73 - .89. (2 weeks)	Explored in nonclinical samples and eating disorders samples.	68	Free	Polish version available.
Positive Valence Systems Scale (Khazanov et al., 2020)	2020 USA	"I made time to pursue my hobbies even when it was inconvenient"	Reward, Action Selection	45	9-point Likert	Cronbach's α = .95	r = .83	Explored mainly in MDD samples.	33	Free	Short version available (Khazanov et al., 2020).
Self-Control Scale (Tangney et al., 2004)	2004 USA	"I never allow myself to loose control".	Compulsivity, Response Inhibition, Habit	36	5-point Likert	Cronbach's α = .89	r = .89 (3 weeks)	Largely explored in both DABs and OCRDs, as well as in nonclinical samples.	8497	Free	Brief version (Tangney et al., 2004) and translations available.
State Impulsivity Scale (Iribarren et al., 2011)	2011 Spain	"I generally fall into temptations that make it hard for me to fulfill a commitment".	Response Inhibition, Reward	20	4-point Likert	Cronbach's α = .88	r = .77 (one week)	Explored mainly in DABs and violent or agressive behaviors.	18	Free	English and Spanish (original) versions available.
Urgency, Sensation Seeking and Impulsivity Questionnaire (CUBI-18) (Squillace Louhau & Picón-Janeiro, 2019)	2019 Argentina	"I have problems to control my impulses".	Response Inhibition, Reward	18	5-point Likert	ω = .74 to .84	NR	Investigated only in nonclinical samples.	6	Free	Spanish version (original).
Zuckerman Sensation Seeking Scale (Zuckerman et al., 1964)	1964 USA	"I like wild "uninhibited" parties".	Response Inhibition, Reward	40	Yes/No	Cronbach's α = .83 - .86	NR	Largely explored in DABs and OCRDs, although more in the former.	1785	Free	SSS Form V (Zuckerman, 1994), brief version (Hoyle et al., 2002) and translations available.

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Table 3. *Constructs per each instrument*

Scale Name	Compulsivity	Habit	Response Inhibition	Reward	Performance Monitoring	Action Selection
Almost Perfect Scale-Revised	✓				✓	
Anticipatory and Consummatory Interpersonal Pleasure Scale				✓		
Appetitive Motivation Scale				✓		
Arnett Inventory of Sensation Seeking				✓		
Attitudes Toward Self Scale					✓	
Barkley Deficits in Executive Functioning Scale			✓			
Barratt Impulsiveness Scale (BIS-11)			✓			
Behavior rating inventory of executive function (BRIEF)			✓			
Behavioral Inhibition and Behavioral Activation Scale (BIS/BAS)			✓	✓		
Behavioral Inhibition Questionnaire			✓			
Beliefs About Losing Control Inventory	✓					
Cambridge-Chicago Compulsivity Trait Scale (CHI-T)	✓					
Child Error Sensitivity Index					✓	
Cognitive Flexibility Inventory	✓					
Cognitive Flexibility Scale	✓		✓		✓	
Comprehensive Executive Function Inventory (CEFI)			✓		✓	
Conflict Monitoring Questionnaire					✓	
Creature of Habit		✓				
Daily Habit Scale		✓				
Delay discounting questionnaire				✓		
Delaying Gratification Inventory				✓		
Desirability for Control Scale	✓					
Desire Thinking Questionnaire	✓					
Dickman's Impulsivity Inventory			✓			
Doubt Questionnaire	✓				✓	
Environmental Reward Observation Scale (EROS)				✓		
Eysenck's Impulsivity Scale			✓			
Fawcett-Clark Pleasure Scale				✓		
Frost Multidimensional Perfectionism Scale	✓				✓	
Frustrative Nonreward Responsiveness Scale				✓		
Generalized Reward and Punishment Expectancy Scale (GRAPES)				✓		
Habit, Reward and Fear Scale		✓		✓		
Habitual Self-Control Questionnaire	✓					
Habitual Tendencies Questionnaire	✓	✓				
Hewitt-Flett Multidimensional Perfectionism Scale	✓				✓	
Impulsive Behavior Scale (UPPS)			✓			
Indecisiveness Scale	✓					
Intolerance of Uncertainty	✓				✓	
Kendall and Wilcox's Self-Control Rating Scale			✓			
Multidimensional Self-Control Scale			✓			
NAS-50 Self-Control Scale			✓			
Need for Structure Scale	✓					
Not Just Right Experience -Sensitivity Scale					✓	

Table 3. *Continued*

Perseverative Thinking Questionnaire-15	✓					
Persistence Scale	✓					
Persistence, Perfectionism and Perseveration Questionnaire	✓				✓	
Physical Anhedonia Scale				✓		
Pleasant Activities List				✓		
Pleasant Events Schedule				✓		
Positive Urgency Measure			✓			
Positive Valence Systems Scale				✓		✓
Quick delay questionnaire				✓		
Rigidity Attitudes regarding Personal Habits (RAPH) Scale	✓					
Reinforcement Survey Schedule				✓		
Reuter and Montag's revised Reinforcement Sensitivity Theory Questionnaire			✓			
Reward and punishment responsivity and motivation questionnaire				✓		
Reward Deficiency Syndrome Questionnaire				✓		
Reward Probability Index				✓		
Reward Response Scale				✓		
Rewarding Events Inventory				✓		
Routinization Scale		✓				
SAM2 Habitual Behavior Instrument		✓				
Self-Control Scale	✓	✓	✓	✓	✓	
Sensitivity to Punishment and Sensitivity to Reward Questionnaire				✓		
Snaith-Hamilton Pleasure Scale (SHAPS)				✓		
Social Anhedonia Scale				✓		
Social Reward Questionnaire				✓		
Self-report Habit Index		✓				
State Impulsivity Scale			✓			
Style of Planning Action (STOP) Questionnaire	✓					
Temporal Experience of Pleasure Scale (TEPS)				✓		
Thought Control Questionnaire	✓					
Threat-Related Reassurance Seeking Scale					✓	
Three-Factor Impulsivity index			✓			
Urgency, Sensation Seeking and Impulsivity Questionnaire (CUBI-18)			✓	✓		
Value-Driven Attention Questionnaire				✓		
Volitional Components Inventory			✓			
White Bear Suppression Inventory	✓					
Zuckerman Sensation Seeking Scale			✓	✓		

3.2.3 Reward

A total of 31 instruments were considered to capture the concept of *reward*. The Reward Response Scale (Van den Berg et al., 2010) and the Reward and Punishment Responsivity and Motivation Questionnaire (Jonker & Timmerman, 2022) were designed to assess *reward responsiveness* ("When I am successful at something, I continue doing it", "Winning makes me enthusiastic"), while the Reward Probability Index (Carvalho et al., 2011) and the Environmental Reward Observation Scale (Armento & Hopko, 2007) evaluate the *ability to enjoy* and to find satisfaction in life ("I have many interests that bring me pleasure", "There are many activities that I find satisfying"). On the other hand, the Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS; Gooding & Pflum, 2014), the Fawcett-Clark Pleasure Scale (Fawcett et al., 1983), the Pleasant Activities List (Roozen et al., 2008), the Pleasant Events Schedule (Macphillamy & Lewinsohn, 1982), the Physical and Social Anhedonia Scales (L. J. Chapman et al., 1976), and the Snaith-Hamilton Pleasure Scale (SHAPS; Snaith et al., 1995) evaluate the inability to enjoy or experience pleasure in general (i.e., anhedonia).

The Reward Deficiency Syndrome Questionnaire (Kótyuk et al., 2022) measures Reward Deficiency with four subscales (lack of sexual satisfaction, activity, social concerns, and risk-seeking behavior), covering satisfaction, fulfillment, pleasure, activity in general, and regarding special, "unusual" behaviors, such as extreme sexual activity or sports ("I like to live dangerously, I can never get enough sex, I cannot stand inactivity"). The Rewarding Events Inventory (Hughes et al., 2017) considers a list of possible rewarding activities and rates how much a person would enjoy and want such activities and how often the one performed those in the last week. Similarly, the Reinforcement Survey Schedule (Cautela & Kastenbaum, 1967) lists objects, activities, and situations that may give joy or other pleasurable feelings, rating the extent of pleasure in a 5-point Likert scale format.

There are also instruments that focus on the anticipatory components of reward. The Temporal Experience of Pleasure Scale (TEPS; Gard et al., 2006) has both an anticipatory scale related to reward responsiveness and imagery and a consummatory pleasure scale related to openness to different experiences and appreciation of positive stimuli. Among the most common instruments to assess reward, we found measures of delay discounting, including the Delay Discounting Questionnaire (Kirby & Maraković, 1995), the Quick Delay Questionnaire (Clare et al., 2010), and the Delaying Gratification Inventory (Hoerger et al., 2011), and three measures of sensation seeking: the Zuckerman Sensation Seeking Scale (Ball & Zuckerman, 1990), the Arnett Inventory of Sensation Seeking (Arnett, 1994), the Urgency, Sensation Seeking and Impulsivity Questionnaire (Squillace Louhau & Picón-Janeiro, 2019). In contrast, The Value-Driven Attention Questionnaire (Anderson et al., 2020) intends to measure attention-to-reward, an attentional bias related to the degree to which reward influences the attention system specifically ("When I see an attractive person, I have a hard time taking my eyes off of them"). The Social Reward Questionnaire (Foulkes et al., 2014) also brings a more specific concept of reward, which is related to the ability to feel rewarded by social stimuli ("I enjoy achieving recognition from others").

The Positive Valence Systems Scale (Khazanov et al., 2020) and the Habit, Reward and Fear Scale (Piquet-pessôa et al., 2019) are recent instruments that evaluate reward together with other constructs and were designed with a transdiagnostic perspective. Similarly, measures of Impulsivity derived from Gray's neuropsychological systems, with items designed to capture reward responsiveness among other non-reward factors, include the Behavioral Inhibition and Behavioral Activation Scale (BIS/BAS; Carver & White, 1994), the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (Torrubia et al., 2001), the Appetitive Motivation Scale ("I like to be rewarded for what I do"; C. J. Jackson & Smillie, 2004), and the State Impulsivity Scale (Iribarren et al., 2011). The Generalized Reward and Punishment Expectancy Scale (GRAPES; Ball and Zuckerman, 1990) evaluates individual's expectations regarding reinforcement from various life events, with Reward Expectancy (an optimistic attitude and expectations of success and life satisfaction: "I usually find my work or study exciting or challenging") and Punishment Expectancy (pessimistic attitude and distrust: "It is likely that most of us will have a serious car accident at some point in our lives") as two independent factors. Finally, the Frustrative Nonreward Responsiveness Scale (Wright et al., 2009) is a 5-item subscale to be used with the BIS/BAS scales (Carver & White, 1994) and measures lowered approach motivation following nonreward ("When circumstances prevent me from achieving an important goal, I find it hard to keep trying").

3.2.4 Response Inhibition

A total of 20 instruments were considered to capture the concept of *response inhibition*. Most of them were designed for measuring impulsivity more broadly – Eysenck's Impulsivity Scale (S. B. G. Eysenck & H. J. Eysenck, 1977), Dickman's Impulsivity Inventory (Dickman, 1990), Impulsive Behavior Scale (UPPS; Whiteside & Lynam, 2001), Behavioral Inhibition and Behavioral Activation Scale (BIS/BAS; Carver & White, 1994), Reuter and Montag's revised Reinforcement Sensitivity Theory Questionnaire (Reuter et al., 2015), Barratt Impulsiveness Scale (Patton et al., 1995), State Impulsivity Scale (Iribarren et al., 2011), Three-Factor Impulsivity index (Madole et al., 2021) – or more restricted to subtypes of impulsivity – Positive Urgency Measure (Cyders & Smith, 2007), Urgency, Sensation Seeking and Impulsivity Questionnaire (CUBI-18; Squillace Louhau & Picón-Janeiro 2019), Zuckerman Sensation Seeking Scale (Zuckerman et al., 1964).

We also included here executive functions inventories: the Behavior Rating Inventory of Executive Function (Gioia et al., 2000), which has an 'inhibit scale' designed to measure inhibitory control and the ability to stop one's own behavior, the Barkley Deficits in Executive Functioning Scale (Barkley, 2011), and the Comprehensive Executive Function Inventory (Naglieri & Goldstein, 2013); and four measures of self-control: the Kendall and Wilcox's Self-Control Rating Scale (Kendall & Wilcox, 1979), the Self-Control Scale (Tangney et al., 2004), already mentioned in the Compulsivity section above, the Multidimensional Self-Control Scale (Nilsen et al., 2020), the NAS-50 Self-Control Scale (Nęcka et al., 2016), and the Volitional Components Inventory (Kuhl & Fuhrmann, 2009) – which is based in theoretically separable specific volitional subcomponents, self-control and self-regulation. Two measures of response inhibition in children – Behavioral Inhibition Questionnaire (Bishop et al., 2003) and Kendall and Wilcox's Self-Control Rating Scale (Kendall & Wilcox, 1979) – were

also found, although both are instruments for hetero-application (by teachers and parents).

3.2.5 Performance Monitoring

A total of 12 instruments were considered to capture the concept of *Performance Monitoring*. Among them, the Child Error Sensitivity Index (Meyer & James, 2022) is a self-report tool designed to measure error sensitivity, the Conflict Monitoring Questionnaire (CMQ) (Leue & Beauducel, 2021) is designed to measure the detection of conflicts in information processing ("When actions change rapidly, I am always seriously afraid to make mistakes"), the Not Just Right Experience (NJRE)-Sensitivity Scale (Melli et al., 2020) is a self-report tool that measures intolerance of NJRE feelings and a tendency to overestimate its negative consequences and repercussions for one's life, and the Threat-Related Reassurance Seeking Scale (Cougle et al., 2012) evaluates reassurance-seeking behavior related to general and evaluative threat.

We also included here measures of perfectionism – the Frost Multidimensional Perfectionism Scale (Frost et al., 1990), the Hewitt-Flett Multidimensional Perfectionism Scale (Hewitt et al., 1991), the Almost Perfect Scale-Revised (Slaney et al., 2001), and the Persistence, Perfectionism, and Perseveration Questionnaire (Serpell et al., 2009). Similarly, the Attitudes Toward Self Scale (Carver et al., 1988) has sub-scales measuring tendencies toward holding high standards, being self-critical, and generalizing. The Intolerance of Uncertainty Scale (Freeston et al., 1994), which assesses emotional, cognitive, and behavioral reactions to ambiguous situations, implications of being uncertain, and attempts to control the future, the Doubt Questionnaire (Marton et al., 2019) ("I need to reassure myself that something I did was actually Completed"), and the Comprehensive Executive Function Inventory (Naglieri & Goldstein, 2013), with items for self-monitoring, can also be used to assess the domain of performance-monitoring.

3.2.6 Action Selection

Only one instrument was considered to capture the concept of *action selection:* the Positive Valence Systems Scale (Khazanov et al., 2020), with 6-item action selection subscale (e.g., "I made time to pursue my hobbies even when it was inconvenient").

4. Discussion

To the best of our knowledge, this is the first attempt at reviewing and synthesizing the scope of scientific literature regarding the available instruments linking RDoC-related constructs to clinical rating scales of relevance to OCRDs and DABs. Importantly, we noted that some items of high clinical importance to OCRDs and DABs, such as compulsivity and response inhibition, were frequently evaluated by instruments originally designed to assess dimensions unrelated to these main constructs, thus underlying the minor attention that has been paid to these concepts in the literature thus far. At the same time, the fact that some relevant scales (e.g., Intolerance of Uncertainty Scale) may be used to assess multiple constructs (e.g., Performance Monitoring vs. Compulsivity) not only suggest that that same behavioral manifestation can relate to multiple brain systems, but also that further work should aim to disentangle the concepts underlying these constructs and new scales should be more precise in relation to the RDoC constructs they can possibly measure. Despite the number of instruments identified in our study (n = 79), this lack of specificity suggests that research on the subjective features of OCRDs and DABs according to the RDoC is still at its infancy. There is, for example, a pressing need for instruments (either interviews or self-report tools) that evaluate the constructs argued to cut across OCRDs and DABS. We will now attempt to approach the discussion of the constructs and their corresponding instruments in a point-by-point fashion.

In terms of compulsivity, the CHI-T (Chamberlain & Grant, 2018) is a scale recently designed for the transdiagnostic measurement of compulsivity. The CHI-T is a 15-item scale that covers broad aspects of compulsivity, including the need for completion or perfection, being stuck in a habit, reward-seeking, desire for high standards, and avoidance of situations that are hard to control. Scores on the CHI-T showed convergent validity against clinical instruments measuring different compulsive symptoms, including gambling, OCD, substance use disorder (Chamberlain & Grant, 2018), and body-focused repetitive behaviors (Grant & Chamberlain, 2022), and it was recently validated in an immense population-based sample (Tiego et al., 2022).

Considering the construct of compulsivity, it's also important to examine past investigations on the concepts *of self-control, desire for control, and thought control*. Emerging from the cognitive-behavioral account of OCD (S. F. Taylor et al., 2007), these aspects are relevant to the dysfunctional beliefs associated with the emergence and maintenance of OCD symptoms, and may be present in other OCRDs or DABs as well. Self-control is the capacity to exert control over one's behavior and is necessary for directing personal behavior toward achieving goals (Tangney et al., 2004). A lack of self-control has been posited as a process that may impact the development or maintenance of various forms of psychopathology. The Self-Control Scale (Tangney et al., 2004), with items like "People would say that I have iron self-discipline", "Sometimes I can't stop myself from doing something, even if I know it is wrong", "I sometimes drink or use drugs to excess", is one of the most popular instruments to measure this psychological aspect and it has been used to investigate self-control in a myriad of conditions.

Researchers agree on the key role of self-control in the development and treatment of addictive behaviors. The inability to stop engaging in addictive behavior despite a willingness to do so (Koob & Volkow, 2016; Hammond et al., 2014) and the decreased ability to regulate thoughts and emotions contribute to risk-taking behaviors (Tang et al., 2015). Other behaviors prone to become compulsions, such as buying (Frost et al., 2013), hoarding (Timpano et al., 2013), and eating (Luo et al., 2022), were also correlated with lower self-control scores. Closely related, the Desirability for Control Scale (Burger & Cooper, 1979), also very popular, accesses individual differences in the level of motivation to exert personal control over one's life, a concept related to compulsivity and perhaps more linked to OCD than to other OCRDs or DABs (Fieulaine & Martinez, 2010). It is suggested that discrepancies between an individual's desired level of control and their perceived level of control could contribute to OCD symptoms, and exacerbate the tendency for individuals with OCD to engage in magical ideation and superstitious rituals (Moulding et al., 2008). Some research on desire for control and risk-taking behavior in individuals with gambling disorder has been carried

out using the Desirability for Control Scale (Burger & Schnerring, 1982; Trimpop et al., 1999). This topic, however, has been less explored in recent years.

The concepts of *cognitive flexibility* and *rigidity* (Dennis & Vander Wal, 2010; Martin & Rubin, 1995), exemplified by instruments such as Rigidity Attitudes regarding Personal Habits (RAPH) Scale (Meresko et al., 1954), Cognitive Flexibility Scale (Martin & Rubin, 1995) and Cognitive Flexibility Inventory (Dennis & Vander Wal, 2010), also deserve attention due to their overlap with compulsivity. Flexibility and rigidity are constructs on the same dimension, with rigidity being at the extreme end point of the flexibility continuum. According to Kashdan (2010), *flexibility* is defined as the ability to disengage from a particular cognitive/behavioral pattern of response if it is no longer effective for the specific situation. *Rigidity*, on the other hand, can be defined as "the tendency to develop and perseverate in a particular cognitive or behavioral pattern (…) when this pattern is no longer effective" (Morris & Mansell, 2018). This definition undoubtedly overlaps with observational aspects of compulsivity, e.g., persistent, inappropriate, and without adaptive function (Luigjes et al., 2019). Indeed, several studies support the relationship between compulsive behavior and cognitive (in)flexibility (or rigidity), either in self-reported (Dingemans et al., 2022) and in "objective" laboratory tasks (Albertella et al., 2020; Chamberlain et al., 2021; Van Timmeren et al., 2018), although it's uncertain if self-report and neurocognitive assessments of "cognitive flexibility" target similar underlying constructs (Howlett et al., 2023).

In addition, there are various measures that assess specific dysfunctional beliefs or appraisals, such as the Thought Control Questionnaire (Wells et al., 1994), and the White Bear Suppression Inventory (Wegner & Zanakos, 1994), and others that evaluate the tendency to a more "cognitive compulsivity", such as the Desire Thinking Questionnaire (Caselli & Spada, 2011), the Perseverative Thinking Questionnaire-15 (Ehring et al., 2011) and the Beliefs About Losing Control Inventory (Radomsky & Gagné, 2019).

Concerning self-report measures of habit, the Self-report Habit Index (SRHI; Verplanken & Orbell, 2003) was found to be the most popular instrument. The SRHI showed good reliability and validity on the assessment of habitual marijuana, alcohol, cigarette, and e-cigarette use in adult users (Morean et al., 2018) and correlated positively with clinical severity (Ray et al., 2020). Studies exploring habit strength in OCD patients also showed significant correlations with duration of illness, severity of OCD, and comorbidity with impulse control disorders (Ferreira et al., 2017). Accordingly, The Habit, Reward, and Fear Scale, which includes six items from the SRHI, was used to investigate habit in a sample of patients with AUDs and showed that this measure was significantly associated with the severity of alcohol dependence across different domains (including loss of behavioral control, obsessive-compulsive drinking, and perceptual and psychophysical withdrawal) (Piquet-pessôa et al., 2019). An alternative instrument, the self-reported Creature of Habit Scale (COHS) has been proposed to differentiate two distinct features of habits – routine behaviors and automatic responses – and it is argued to mitigate the low focus on the context given by the SRHI (Sniehotta & Presseau, 2012). Considered to be habit dimensions, routines and automaticity were both linked to compulsive behavior (Ersche et al., 2019). Despite the behavioral and neural support for the dysfunctional goal-directed control model of OCRDs and DABs (Gillan et al., 2017; Lüscher et al., 2020; Renteria et al., 2018; Vaghi et al., 2017), there is an ongoing debate regarding the most appropriate way to measure and define habitual behavior. Recent studies have failed to show a correlation between subjective habitual tendencies and objective levels of automaticity in clinical samples. For instance, in a study using the COHS, Wyckmans et al. (2020) showed that the propensity to rely more on routines was associated with lower levels of alcohol abuse and nicotine use, suggesting that some degree of routine might act as a protective factor against substance use. In contrast, a high automaticity score was associated with an increased risk of harmful alcohol use in the same study. Piercy et al. (2023) investigated the possible roles of habits and impaired goal/habit arbitration as explanations of compulsive OCD symptoms and showed that despite greater subjective habitual tendencies – measured with the Creature of Habit questionnaire (Ersche et al., 2017) – subjects with OCD reached the same level of "objective" automaticity as healthy controls.

The conscious inhibition of responses that are not adequate to meet the demands of the current context – Response Inhibition – is evaluated in a series of questionnaires yielded in this review, most of which were designed to measure impulsivity more broadly. In this sense, the BIS/BAS (Carver & White, 1994), the UPPS (Whiteside & Lynam, 2001), and the BIS-11 (Patton et al., 1995) were found to be the most commonly used. However, given the multidimensionality of impulsivity, the question as to which aspects of impulsivity map on the behavioral and neural correlates of response inhibition have to be treated carefully. Some studies with healthy subjects have failed to correlate BIS-11 scores with behavioral measures of response inhibition, like the Go/No-Go task (Dück, 2023; Sánchez-kuhn et al., 2017) and stop-signal task (SSRT; Wilbertz et al., 2014). In contrast, studies evaluating samples with the UPPS showed that the subdomain *Negative Urgency* explained inter-individual variability in SSRT scores (Roxburgh et al., 2022; Allen et al., 2021) and was negatively correlated to right inferior frontal gyrus/anterior insula activation in 'Stop > Go' trials — a key region for response inhibition (Tops & Boksem, 2011; Wilbertz et al., 2014). Also, a recent investigation on the self-report BIS/BAS scale showed a positive correlation of this measure with behavioral tasks of response inhibition (Cyders, 2020).

Studies with clinical samples showed mixed findings on the correlation between SSRT and BIS-11. Ahn et al. (2016) studied a sample of cocaine-dependent individuals (CDIs) and failed to observe significant group differences on the SSRT, although CDIs scored higher than healthy controls on the motor, non-planning, and attentional subscales of the BIS-11. Khemiri et col. (2020), on the other hand, showed that patients with AUDs scored significantly higher on the BIS total score, including the attention, motor and non-planning subscales, and exhibited a significantly higher SSRT then did healthy controls. Similar correlations was also found among OCD subjects (Lynn et al., 2012) and in individuals with a high risk of behaviors prone to addiction, like internet gaming disorder (Wang et al., 2022). Therefore, current literature supports the notion that, while trait-like and laboratory measures of response inhibition may assess non-overlapping and distinct aspects of response control (Caswell et al., 2015; Friedman et al., 2020; MacKillop et al., 2016; Vassileva et al., 2014), some self-reports could be more closely related to neurobehavioral tasks than others. This topic deserves further investigation.

In our search, the construct of reward was the most

prevalent among the transdiagnostic questionnaires, and thirty instruments were found to include at least one measure of this construct. Widely used as a measure of impulsiveness, *delay discounting* is one element that underlies decision-making, and can be defined as the depreciation of the value of a reward related to the time that it takes to be released. Behavioral economic theories of discounting were extensively applied to the study of addictive behaviors (Amlung et al., 2017; Weinsztok et al., 2021) and also recently explored in OCRDs as well (Flasbeck et al., 2022; Levy et al., 2019; Murphy and Flessner, 2017; Weinsztok et al., 2021). In our search., the Delay Discounting (Kirby & Maraković, 1995) was the most common instrument used to measure this concept related to reward.

Largely applied as measures of reward, we also found instruments derived from Gray's reinforcement sensitivity theory (Bijttebier et al., 2009). This theory describes two distinct neurobiological systems that underlie motivation and behavioral responding: the Behavioral Activation System (BAS), related to approach behavior in response to reward, and the Behavioral Inhibition System (BIS), related to inhibition in response to punishment. In our search, measures of BIS and BAS included the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (Torrubia et al., 2001) and the already mentioned BIS/BAS (Carver & White, 1994). Both instruments have been extensively applied to investigate sensitivity to reward and to punishment in both OCRDs and DABs, showing positive correlations between these sub-constructs and the vulnerability to pathological behaviors (Loxton, 2017; Lyvers et al., 2016; Slikboer et al., 2018) and response to treatment (Mestre-bach et al., 2016).

Also, important measures of reward were the instruments designed to target *anhedonia*, the decrease in the sensitivity to a reward. Prominently, we found the TEPS (Gard et al., 2006), which measures different aspects of reward processing: reward "wanting", referring to the motivated approach of and feelings of desire for reward, with a putative basis in mesolimbic dopaminergic functioning, and reward "liking", referring to feelings of enjoyment or satisfaction upon reward consummation, with a putative basis in forebrain opioid circuitry (Berridge et al., 2009). Interestingly, the TEPS, together with the SHAPS (Snaith et al., 1995) and the Chapman Social and Physical Anhedonia Scales (L. J. Chapman et al., 1976) are popular measures of reward, although almost exclusively explored in samples of subjects with mood disorders and schizophrenia. On the other hand, *sensation seeking*, i.e. the preference for intense rewards, is measured predominantly by self-reports such as the Zuckerman Sensation Seeking Scale (Zuckerman et al., 1964) and Arnett Inventory of Sensation Seeking (Arnett, 1994), which are almost exclusively explored in samples of subjects with DABs.

Although delay discounting, reinforcement sensitivity, anhedonia, and sensation seeking have been subjectively explored for long time, only recently instruments have been designed to measure reward in a more specific and detailed fashion. In this sense, the Reward Probability Index (Carvalho et al., 2011), the Reward Response Scale (Van den Berg et al., 2010), and the Positive Valence Systems Scale (Khazanov et al., 2020) are noteworthy – with the latter being the only one conceptualized to target one of the RDoC domains. The Reward Deficiency Syndrome Questionnaire (Kótyuk et al., 2022) and the Value-Driven Attention Questionnaire (Anderson et al., 2020) are also promising scales with good psychometric properties, although, to date, they have only been explored in samples of DABs.

Regarding Performance Monitoring, the careful evaluation of the instruments yielded in the review revealed twelve potential scales, with the Frost Multidimensional Perfectionism Scale (Frost et al., 1990) and the Intolerance of Uncertainty Scale (Birrell et al., 2011) being the most popular. However, those instruments were designed to assess marginal constructs related to performance monitoring: perfectionism and intolerance of uncertainty (IU). Perfectionism is an important subcomponent of the OCD phenotype. Increasing degrees of perfectionism have been associated with increased severity of OCD, and specific elements of perfectionism clearly distinguish OCD patients from healthy control subjects (J. C. Lee et al., 2009). Perfectionism has also been shown to play a role in other disorders along the compulsive spectrum, such as eating disorders (Davies et al., 2009; Slof-Op't Landt et al., 2016). There is growing consensus indicating that personality traits, such as anxious apprehension and perfectionism, are associated with increased neural indices of performance monitoring – including the processing of errors (Moser et al., 2013; Perrone-McGovern et al., 2017; Stahl et al., 2015).

At the same time, IU, the dispositional tendency not to tolerate ambiguous or uncertain events (Freeston et al., 1994), is closely tied to obsessions of control and the importance of thoughts, as well as compulsions of ordering and checking (Calleo et al., 2010; S. Taylor et al., 2010). In a study of dysfunctional beliefs and OCD symptoms, IU predicted ordering compulsions (i.e., putting items in certain orders or arrangements) above and beyond other beliefs of inflated personal responsibility and the overestimation of threat, as well as over importance of thoughts and the need to control thoughts (Reuther et al., 2013). Previous research regarding the relationships between neural indices of performance monitoring and intolerance of uncertainty have been performed in non-clinical samples (F. Jackson et al., 2016; Ruchensky et al., 2020; Sandre & Weinberg, 2019; Saunders & Inzlicht, 2020), although with inconclusive results.

As for reward, only more recently instruments were designed to target performance monitoring *per se,* such as the Child Error Sensitivity Index (Meyer & James, 2022), designed to measure error sensitivity in children, and the Conflict Monitoring Questionnaire (CMQ) (Leue & Beauducel, 2021), conceptualized to measure the detection of conflicts in information processing. Both scales, to date, have been explored mainly in nonclinical samples.

Finally, only one instrument was considered to capture the concept of *action selection:* The Positive Valence Systems Scale, 45-item version (PVSS-45). In this scale, choosing to pursue a reward among other possible courses of action is measured in six items (e.g., "I made time to pursue my hobbies *even when* it was inconvenient"), with Confirmatory Factor Analysis for the items measured in two studies and varying from .37 to .72. As mentioned above, the PVSS-45, and its short version, are valuable instruments for the assessment of reward, albeit so far only explored in the context of depressive disorders.

Limitations

The findings of this review should be interpreted in the context of several limitations. Firstly, during the assignment of instruments to specific constructs, inter-rater reliability scores were not obtained. Nevertheless, the first author (APR) and the senior expert (LFF)

interacted actively in this critical step, clarifying key concepts and reducing discrepancies. This approach minimized divergences and allowed the elucidation of the specific nature of occasional disagreements, something that wouldn't be possible through pure reliance on inter-rater reliability scores. Secondly, there is some arbitrariness in the decisions to match scales to specific constructs of interests. This is compounded by the fact that RDoC constructs are necessarily overlapping. For instance, compulsivity is recognized as a multi-dimensional construct, with perfectionism and reward drive as its subdimensions. Therefore, the intricacy between instruments for the measurement of compulsivity and reward is evident. In this sense, the scoping approach was preferred over a systematic approach, as providing a more rigid framework could sound artificial. While systematic reviews adhere to strict protocols and focus on synthesizing quantifiable data, a scoping review accommodates the inherent heterogeneity in the literature by including a diverse range of study types and methodologies. This flexibility was essential for identifying and mapping the range of subjective assessment tools in use for DABs and OCRDs. Finally, concerning the results of this scoping review, some tools have not been fully validated in populations with addiction or OCRDs. Some of the included instruments have also not been adapted to and validated in different cultural contexts, and still some others were explored exclusively in samples of specific psychiatric disorders (e.g. either OCD or alcohol use disorder) or just in nonclinical samples. Further studies will be needed to validate these measures in transdiagnostic DABs' and OCRDs' samples.

Conclusions, implications, and future directions

This study set out to review the available psychometric tools developed to assess important constructs under addictive and compulsive disorders. Despite the growing body of literature on OCRDs and DABs, only a few instruments designed for evaluating their underlying mechanisms were published in the past years, and only one was specifically designed according to the RDoC domains and constructs. Furthermore, the extent to which these instruments accurately capture these constructs and *how well the most commonly used rating scales in OCRDs and SUDs serve the purpose of measuring RDoC constructs and the response to interventions based on the RDoC framework* remain open questions. Further studies exploring the correlation between subjective assessments, corresponding behavior paradigms, and neuroimaging data would be of great value in the translation of RDoC constructs and domains into clinical settings. Based on an assessment of the instruments' aims (i.e. whether the questionnaire were specifically designed to measure the construct of interest from a transdiagnostic point of view), quality of the psychometric data on specificity and validity, length of administration, and popularity (number of citations), we suggest that future studies investigating the transdiagnostic aspects of OCRDs and DABs may consider including instruments listed in **table 4.**

Author statement

A.P.R was responsible for the conception and design of the study, the collection, analysis, and interpretation of data, and the preparation of the manuscript. L.F.F was responsible for the conception and design of the study, the analysis and interpretation of data, and critical revision of the manuscript for important intellectual content. J.E.M., M.P.P., J.B.S.A., and C.F.S, and were involved in the acquisition of data, analysis, and interpretation of data. All authors approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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Table 4. *Recommmended instruments*

Constructs	Recommended instruments
Compulsivity	Cambridge-Chicago Compulsivity Trait Scale (CHI-T)
Habit	Self-report habit index (SRHI) Routinization Scale Creature of Habit
Response Inhibition	Behavior Inhibition Questionnaire Volitional Components Inventory
Reward	Reward Probability Index Sensitivity to Reward Questionnaire Temporal Experience of Pleasure Scale (TEPS)
Performance Monitoring	Threat-Related Reassurance Seeking Scale Child Error Sensitivity Index

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