Therapist-delivered and self-help interventions for gambling problems: A review of contents

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Background and aims: To date, no systematic approach to identifying the content and characteristics of psychological interventions used to reduce gambling or problem gambling has been developed. This study aimed to develop a reliable classification system capable of identifying intervention characteristics that could, potentially, account for greater or lesser effectiveness. *Methods:* Intervention descriptions were content analyzed to identify common and differentiating characteristics. A coder manual was developed and applied by three independent coders to identify the presence or absence of defined characteristics in 46 psychological and self-help gambling interventions. *Results:* The final classification taxonomy, entitled Gambling Intervention System of CharacTerization (GIST), included 35 categories of intervention characteristics. These were assigned to four groups: (a) types of change techniques (18 categories; e.g., cognitive restructuring and relapse prevention), (b) participant and study characteristics (6 categories; e.g., recruitment strategy and remuneration policy), and (c) characteristics of the delivery and conduct of interventions (11 categories; e.g., modality of delivery and therapist involvement), and (d) evaluation characteristics (e.g., type of control group). Interrater reliability of identification of defined characteristics was high ($\kappa = 0.80$–1.00). *Discussion:* This research provides a tool that allows systematic identification of intervention characteristics, thereby enabling consideration, not only of whether interventions are effective or not, but also of which domain-relevant characteristics account for greater or lesser effectiveness. The taxonomy also facilitates standardized description of intervention content in a field in which many diverse interventions have been evaluated. *Conclusion:* Application of this coding tool has the potential to accelerate the development of more efficient and effective therapist-delivered and self-directed interventions to reduce gambling problems.

Keywords: reporting guidelines, change techniques, self-help, treatment, taxonomy, personalized feedback

INTRODUCTION

Systematic reviews have reported that face-to-face psychological interventions are effective in treating problem gambling (Thomas et al., 2011). Evidence supports the utility of cognitive-behavioral therapies, motivational interviewing (MI), behavioral therapies, cognitive therapies, and brief or minimal approaches (Cowlishaw et al., 2012; Fong, 2005; Toneatto & Ladouceur, 2003; Viets & Miller, 1997). Emerging evidence also suggests an expanded delivery mode beyond face-to-face that includes self-help interventions (Hawker, Merkouris, Rodda, & Dowling, 2018) and Internet interventions (Gainsbury & Blaszczynski, 2011), which are effective in treating gambling problems. Even though there is a growing body of evidence on the effectiveness of intervention approaches (and their mode of delivery), less is known of the characteristics and active ingredients of interventions that differentiate effective and ineffective interventions designed to reduce problem gambling. Consensus guidelines for evaluating gambling interventions (or treatments) recommend reporting three outcome types, namely, reductions in frequency or intensity of gambling behavior, reductions in problems caused by gambling, and mechanisms or processes of change (Walker et al., 2006). These

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guidelines distinguish between theoretically specified mechanisms of change and non-specific process variables, such as therapeutic rapport. Walker et al. highlighted the potential benefit of non-specific effects and emphasized that change mechanisms for both specific and non-specific effects were unclear. Unfortunately, this lack of clarity remains.

Characterizing intervention content is a prerequisite to distinguishing between specific and non-specific effects. A Cochrane review examining the efficacy of face-to-face psychological interventions for problem gambling (Cowlishaw et al., 2012) categorized the content of reviewed studies. These included cognitive-behavioral (e.g., cognitive restructuring, coping skills training, and relapse prevention) and MI techniques (e.g., exploration of positive and negative consequences of gambling, motivational enhancement therapy, and personalized feedback about gambling). While providing useful guidance, such categorizations may group together interventions that differ in detail. For example, descriptions of change techniques employed in this Cochrane review included "personalized feedback," "psychoeducation," "MI," and "cognitive correction." Other content was described more precisely, for example, "financial limit setting" and "activity scheduling of leisure activities." This review highlighted discrepancies in the reporting of gambling interventions in terms of consistency in the labels and descriptions of interventions components. Without consistency in reporting intervention content, it is difficult to compare interventions or identify their active ingredients.

More generally, considerable research effort has been devoted to developing frameworks that can be used to analyze and describe the content of behavior change interventions. For example, following Albarracín et al.'s (2005) application of 10 theory-based technique categories to differentiate between more or less effective condom-promoting interventions, Abraham and Michie (2008) defined 26 categories describing frequently used, theory-based, change-technique types. This work has been developed and applied to a range of health-related behavior change challenges (Abraham & Michie, 2008; Albarracín et al., 2005; Conn, Valentine, & Cooper, 2002; Hardeman, Griffin, Johnston, Kinmonth, & Wareham, 2000; Kok et al., 2015; Merkouris, Thomas, Browning, & Dowling, 2016; Michie, Abraham, Whittington, McAteer, & Gupta, 2009; Michie, Hyder, Walia, & West, 2011; Michie et al., 2013; van Beurden, Greaves, Smith, & Abraham, 2016). For example, taxonomies developed for addictive behaviors include smoking cessation (43 change techniques identified) (Michie, Hyder, et al., 2011) and alcohol reduction (42 change techniques identified) (Michie et al., 2012). Both of these taxonomies grouped change techniques into four categories including increasing motivation (e.g., providing information on the consequences of smoking), maximizing self-regulation (e.g., facilitate goal setting), supporting adjunctive activities (e.g., information on medication), and general aspects of the therapeutic exchange (e.g., development of rapport). Once developed, taxonomies of intervention characteristics can be applied to intervention descriptions to identify characteristics and change-technique types associated with larger effect sizes.

For example, application of Michie, Hyder, et al.'s (2011) alcohol taxonomy identified that "prompting self-recording" was associated with larger effect sizes in 18 RCT's examining techniques to reduce excessive alcohol consumption. However, no taxonomy of characteristics that apply specifically to gambling interventions has been developed.

Knowing the specific components of interventions is important, including those associated with the participant characteristics and the intervention delivery. Consolidated Standards of Reporting Trials (CONSORT; Moher, Schulz, Altman, & Consort Group, 2001; Schulz, Altman, & Moher, 2010) provides a standard outline for reporting randomized trials and most of these reporting requirements related to the content of interventions include participant eligibility, the setting for data collection, and the nature of the intervention. Similarly, the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) checklist (Des Jarlais, Lyles, & Crepaz, 2004) emphasizes the description of the methods employed, including the nature of the intervention (i.e., the quantity and duration meaning how many sessions or episodes or events were intended and over what period of time) and its theoretical basis. Recently, frameworks have been developed to guide categorization of this wider range of intervention characteristics. For example, Borek, Abraham, Smith, Greaves, and Tarrant (2015) recommend a classification of intervention design (e.g., setting, number of sessions, length, frequency, and duration of sessions), intervention content (e.g., topics covered and participant materials), participant characteristics (e.g., methods for allocation and group size), and facilitator characteristics (e.g., professional background and style of delivery). This is especially relevant to gambling disorder (GD) as research indicates participant characteristics (e.g., recruitment, remuneration, and eligibility criteria) and delivery characteristics (e.g., modality of delivery and therapeutic involvement) influence effectiveness (Davidson et al., 2003; Merkouris et al., 2016).

This study aims to develop a classification system that could identify intervention characteristics that would differentiate effective and ineffective interventions for specified populations. Classification systems have been developed using a variety of methods and materials. Some are explicitly based on change mechanisms specified by theory while others are not. Intervention descriptions can be sourced from publications identified in systematic reviews, intervention protocols, or published intervention manuals (Michie, Ashford, et al., 2011). This study aimed to develop a bespoke classification system ideal for gambling researchers to enable greater specification of differences between existing interventions that are more or less effective. In particular, we aimed to develop a system that could identify patterns of similarity and difference across gambling interventions that account for differential effectiveness. Following methods used previously (e.g., Borek et al., 2015), we sought to develop categories that were data driven. Categories were derived from, and represent, the current problem gambling research base. The benefit of this approach is that the classification system can accurately classify and describe the current state (and ingredients) of interventions for problem gambling. Such classification would facilitate detailed characteristic-specific synthesis of evaluation data

(e.g., in meta-analyses) and generate evidence-based guidance on intervention development, moving away from trial and error evaluations that may foster reinvention of ineffective approaches.

The aims of this study were to (a) develop a classification system that represented the content and characteristics of problem gambling interventions, (b) determine the reliability of the classification system when applied to a selection of gambling studies, and (c) describe the frequency of categories present (and those that are absent) when applied to a selection of gambling studies. The classification system is informed by preexisting categories of change techniques (e.g., Abraham & Michie, 2008) and categories of other intervention characteristics (i.e., Borek et al., 2015), but was primarily data driven. That is, the categories were derived from the contents of intervention descriptions in the gambling literature. Intervention descriptions were sourced from systematic reviews of interventions delivered in various modes (i.e., face-to-face, telephone, online, and self-directed) and settings (i.e., clinical, community, and university).

METHODS

Identification of studies

Several systematic reviews examining the efficacy of psychological interventions for problem gambling were used to identify studies for inclusion in the development and examination of the classification system. Studies were identified from the following sources: (a) a systematic search from a Cochrane systematic review examining the efficacy of face-to-face, therapist-delivered psychological interventions for problem gambling (Cowlishaw et al., 2012); (b) a systematic search from a systematic review examining the efficacy of self-directed interventions for alcohol, drug, and problem gambling (Hawker et al., 2018); and (c) a gray literature search, whereby the first 10 pages (100 citations) from a Google search using the terms gambling, intervention, and treatment. We also searched targeted gambling websites and research repositories and consulted with gambling intervention experts. The systematic search from the Cochrane review was updated to include studies published between January 1980 and April 2016. We also identified and included studies that were excluded from the Cochrane review, because they were delivered by telephone or Internet.

We sought to develop a classification system based on a search that was broadly comprehensive and represented the characteristics of contemporary gambling interventions. The studies were included in the development of the classification system if they were: (a) published in English; (b) published between January 1980 and April 2016; (c) evaluated the effectiveness of a psychological intervention for the treatment of gambling problems using a randomized controlled trial (RCT), randomized trial, quasi-randomized trial, or cross-over RCT study design; and (d) included an outcome measure of gambling symptom severity, gambling frequency, or gambling expenditure. Descriptions of interventions in these published studies were used to develop the classification system.

Development of classification system

We adopted a data-driven approach to comprehensively capture the content of intervention descriptions. We initially selected a random sample of six of the included studies that reported high and low effect sizes across the two main delivery modes (i.e., therapist-delivered and self-help). Two researchers (SR and SM) independently identified a set of characteristics that captured the characteristics of interventions. Initial resulting categories were carefully considered for conceptual distinctiveness and redundancy and a list of categories was developed and labeled to match their conceptual content. We then reapplied these categories to the same six studies and adjusted the definitions and labels through discussion (SR, SM, ND, and CA). This process generated four broad sets of categories: (a) types of change technique used in interventions (e.g., cognitive restructuring), (b) participant and study characteristics (e.g., recruitment), (c) characteristics of the delivery and conduct of the intervention (e.g., modality of delivery), and (d) evaluation characteristics (e.g., type of control group).

The classification system was piloted with a further 10 studies. During piloting, item labels were refined and expanded. Labels were informed by previously defined categories from cross-behavior taxonomies (Abraham et al., 2015; Borek et al., 2015; Michie et al., 2012) as well as definitions as outlined by the task force working on a Common Language for Psychotherapy (www.commonlanguagepsy chotherapy.org). Additional categories identified during pilot coding were also discussed and, where appropriate, added to the list. Where there was disagreement in coding, SR and SM refined the label descriptions and coding instructions, making these as succinct as possible. Coding challenge and disagreements that could not be resolved were discussed with the wider research group and consequently categories were removed from the classification system, merged with other categories, redefined, or relabeled. To account for the varied description of change techniques, we entered the exact description (copy and paste) of the content of interventions into the coding spreadsheet under the appropriate category definition. We then used this data to inform the categories of change techniques descriptions and labels. For example, social support ranged from disclosing to others, sourcing support to attend treatment, getting involved in social activities, and talking to people in a similar situation in online forums. A final set of category definitions and labels was agreed through discussion across the research team. We also grouped categories of change techniques by their associated theory. Associated theories were identified by matching the change-technique type with similar change techniques in previous studies (Abraham & Michie, 2008; Kok et al., 2015; Michie & Prestwich, 2010), as well as a review of behavior change theories frequently used in addictions research (Webb, Sniehotta, & Michie, 2010). The classification system referred to as the Gambling Intervention System of CharacTerization (GIST-1) is presented in Tables 1–4.

Application of the GIST-1

The GIST-1 includes four types of coding categories. Part 1 describes types of change technique used in interventions (e.g., cognitive restructuring); Part 2, participant and study

Table 1. Gambling Intervention System of CharacTerization (GIST-1) technique types

Technique	Associated theory	Description
Behavior substitution	RPT, TTM, and CBT	This item involved substitution of gambling for non-problematic behaviors (e.g., pleasant activities, hobbies, social activities, and physical exercise) with the purpose of spending time doing other things, developing a sense of achievement or accomplishment, or as a purposeful distraction away from gambling.
Cognitive restructuring	CBT	Encouragement to identify dysfunctional sets of thoughts and beliefs related to gambling (e.g., misunderstanding of randomness, independence of events, chance, and illusion of control). Through Socratic questioning and behavioral experiments, the validity of thoughts and beliefs were challenged and more adaptive alternatives generated.
Decisional balance	TRA, TPB, TTM, SCT, IMB, and HBM	Elaborated form of the pros and cons of behavior change (e.g., benefits of not gambling, benefits of gambling, costs of gambling, and costs of not gambling). It also included imagining positive outcomes of change, or identifying how gambling fits with life goals and values. This sometimes involved the use of a decisional balance sheet.
Feedback on assessment	CT, HBM, and SDT	Feedback was often a summary of data collected (e.g., gambling severity, time or money spent, or other areas targeted for change, such as cognitions) against a standard (e.g., cut off score for problem gambling).
Financial regulation	SRT	Financial regulation related to information, instruction, guidance or support in reorganizing finances, budgeting, or banking systems so as to more effectively manage finances.
Goal setting	TRA, TPB, SCT, and IMB	Goal setting included setting a goal to limit, reduce or quit one or more gambling behaviors during treatment or deciding on the types, frequency, and amount of money that can be spent on gambling. This item does not include goals set prior to the treatment (e.g., quit and abstain) or goals that have not been facilitated, discussed, or guided.
Exposure	CC and OC	Systematic, gradual, and controlled exposure to gambling situations (i.e., gambling venue) and cues (e.g., gambling venue with cash) with the purpose of extinguishing urges via repeated exposure.
Imaginal desensitization	CC and OC	Progressive application of relaxation approaches when intentionally exposed to a gambling related stimuli, image, or visualization.
Information gathering	IMB	Information gathering involved conducting an assessment or asking strategic questions with the purpose of understanding the nature of the problem, so that solutions could be generated (also referred to as Socratic questioning). The focus was on problem development (first experience), past or current gambling behaviors, motivations, or reasons for gambling, help seeking and change attempts, and other problems associated or caused by gambling (e.g., comorbid mental health issues).
Information provision	IMB, TTM, and SCT	Information was provided about problem gambling (including negative consequence and potential harms) and risk factors for problem gambling. Information also included the psychology of addiction and how gambling works (odds, randomness, and chance).
Motivational enhancement	IMB, TTM, SDT, and HBM	Focus was on increasing change talk and strengthening commitment to change through exploring and resolving ambivalence. This included decreasing defensiveness, increasing problem awareness, and supporting self-efficacy.
Problem solving	SRT and IMB	Problem solving aimed to help people view and manage gambling-related stressors more effectively through the identification, generation, and implementation of solutions. The focus of problem solving included removal of barriers to change, management of gambling-related problems (e.g., develop other methods of coping instead of managing anxiety with gambling), and better managing general problems (e.g., financial, relationship, legal, family, employment, and social).
Relapse prevention (RP)	RPT	RP focused on identifying the return of previous behaviors and the development of plans to deal with triggers or high-risk situations (e.g., places, people, thoughts, times of day, and emotions). This item also included understanding the relationship between lapse and relapse and developing coping plans.
Self-monitoring	CT and SRT	Self-monitoring included keeping a record, diary, or other means of recording thoughts or behaviors over a specific period. It may or may not be specifically related to gambling cognitions or behaviors.
Social comparison	TRA, TPB, and IMB	Social comparison involved a planned comparison of gambling behaviors (e.g., frequency, expenditure, and time spent gambling) with another social group (e.g., population or some meaningful comparison, such as age, gender, or geographic location).
Social skills training	IMB	This included assertiveness, communication, and interpersonal skills to carry out context-specific behaviors, such as refusal skills (i.e., being able to say "no" to situations where gambling is encouraged).

Table 1. (Continued)

Technique	Associated theory	Description
Plan social support	SST, TTM, and SDT	Prompting social support involved seeking practical and emotional support or help from another person (such as family or friends or others in a similar situation such as online groups or forums). Support also involved disclosing gambling to others or discussing plans or goals for change. It also included enacting social change by socializing with family and friends or others who were non-gamblers.
Stimulus control	TTM and SRT	Described as actions taken to modify the environment thereby reducing access to gambling. Frequent focus was on limiting or restricting access to money (e.g., cash control and no access to cash) or venues (self-exclusion). Stimulus control also included avoiding social cues, such as people or places that trigger thoughts or actions about gambling.

Note. RPT: relapse prevention theory; TTM: transtheoretial model; CBT: cognitive behavioral therapy; SCT: social cognitive theory; TRA: theory of reasoned action; TPB: theory of planned behavior; IMB: information-motivation-behavioral skills model; CT: control theory; HBM: health belief model; SRT: self-regulation theory; CC: classical conditioning; OC: operant conditioning; SDT: self-determination theory; SST: social support theory.

Table 2. GIST-1 participant and recruitment characteristics

Sample type	Community	Participants recruited from the community.
	Clinical	Participants recruited from a service or treatment agency with the purpose of accessing a treatment for gambling problems.
	University	Participants who have been recruited directly from university or college campuses.
Remuneration	Remuneration for screening	Payment of any form for completion of a screen prior to the intervention commencing (voucher, extra credit, and cash).
	Remunerated for baseline	Payment of any form for completion of a baseline assessment (voucher, extra credit, cash, and gift card).
	Remunerated for follow-up	Payment of any form for completion of an assessment at one or all follow-up evaluation time points; payment may be made at each time point or at the final time point.
	Total available remuneration	Total payment available to participants across all time points (screening, baseline, and follow-up).
Eligibility criteria	Gambling disorder	Participation in the study is contingent on screening positive for a gambling problem or gambling disorder (GD) or based on a validated measure.
	Gambled in past year	Participation in the study is contingent on having gambled at least once in the last 12 months.
	Age restriction	Aged 18 years or older is a requirement of participation in the study.
	No suicidal ideation	Suicidal ideation, previous suicidal attempts, or at current risk exclude the person from participating in the study.
	No acute mental distress	Current or past psychotic symptoms, schizophrenia, bipolar disorder, mania, or other acute mental distress prevents participation in the study.
	No current intervention	Current intervention (psychological or pharmacological) for gambling excludes participation in the study.
	Preferred gambling type	Specific type of gambling is a requirement for participation in the study. Types of gambling might be electronic gaming machines (slots and fruit machines), wagering, sports betting, poker, etc.
	Collateral person	Collateral person to assist with locating the participant at follow-up or for data verification is required for participation in the study.
Screening modality	Face-to-face screen	A research assistant, clinician, or other person administered a screen to a person by reading the questions and eliciting a response in a face-to-face setting.
	Telephone screen	A research assistant, clinician, or other person administers a screen to a person by reading the question and eliciting a response by telephone.
	Self-directed screen	The screening tool is delivered via a preprepared program, workbook, or resources via a wireless or Internet-enabled device (e.g., computer, tablet, phone, SMS, video, and smartphone applications) or paper-based resource.
Baseline modality	Face-to-face delivery	A research assistant, clinician, or other person administered a baseline assessment to a person by reading the questions and eliciting a response in a face-to-face setting.
	Telephone delivery	A research assistant, clinician, or other person administers a baseline assessment to a person by reading the question and eliciting a response by telephone.
	Self-directed delivery	The baseline assessment is delivered via a preprepared package via a wireless or Internet-enabled device (e.g., computer, tablet, phone, SMS, video, and smartphone applications) or paper-based resources.
	Length of assessment	The total number of individual questions asked as part of the baseline assessment.

Note. GIST-1: Gambling Intervention System of CharacTerization.

Table 3. GIST-1 intervention delivery mode

Therapeutic contact	Planned intensity	Total number of sessions available to participants and/or duration of time spent on completing the program (therapist-delivered or self-directed).
	Actual intensity	Total number of sessions completed by participants and/or actual duration of time spent on completing the program (therapist-delivered or self-directed).
	Minimal contact	Total therapeutic interaction is less than 30 min in duration.
	Single session	Total therapeutic interaction is contained in a single session but longer than 30 min duration.
	Short contact	Total therapeutic interaction is between two and four sessions.
	Medium contact	Total therapeutic interaction is between five and eight sessions.
	Long contact	Total therapeutic interaction is more than nine sessions.
	Individual	Participants undertake treatment in an individual format rather than in a group format.
	Group	Participants undertake treatment in a group format rather than in an individual format.
Goal	Intervention goal	Intervention goal is determined at screening, assessment, or at the commencement of the intervention. Goal includes abstinence or reduction in gambling time or money.
	Type of goal	List any treatment goal options including reduction, abstinence, or moderation.
	Imposed goal	Were participants able to select their own treatment goal?
Professional oversight	Self-directed support	Support is supportive, encouraging, or facilitative. It does not involve the delivery of support or intervention/therapeutic content; rather, it involves support for content delivered by a self-directed program or workbook.
	Advice and information	Advice and information involves providing information on change options (e.g., self-exclusion or information on gambling). It may include support for a self-directed program, if it is advice only on how to use the program.
	Therapeutic response	There is a therapeutic response provided and this may include CBT, motivational interviewing, etc.
Therapist approach	CBT	Intervention specifically states that the intervention involves cognitive and behavior therapy.
	MI	Intervention specifically states that the intervention involves motivational interviewing or motivational enhancement.
	CT	Intervention specifically states that the intervention involves cognitive therapy techniques but not BT.
	BT	Intervention specifically states that the intervention involves behavior therapy techniques but not CT.
	Non-directive	Intervention specifically states that the intervention involves non-directive supportive therapy.
Interaction modality	Face-to-face	A clinician or other person administered the intervention to a person in a face-to-face setting.
	Telephone	A clinician or other person administered the intervention to a person by telephone.
	Internet	A clinician or other person administered the intervention to a person by Internet. This could be via video conferencing, chat, e-mail, online forums, or online message boards.
Qualifications	Registered professional	The clinician is registered or eligible for registration to work as a psychologist, psychiatrist, social worker, or psychiatric nurse.
	Intern or student	A clinician that is undertaking higher-level study in psychology, social work or other related discipline.
	Counselor or volunteer	No requirement for professional registration or higher degree training to deliver the intervention.
Supervision	Supervision provided	Oversight, mentoring, or advice to the person delivering the intervention is provided by someone who may or may not be part of the research team.
	Training provided	Training provided to clinicians to deliver the program refers to any sort of instruction, skill building, information, or training provided prior to commencing service delivery.
Manual	Treatment manual	An intervention manual or protocol document that outlines, guides, or provides information for the delivery of the content of the intervention.
	Integrity check	An integrity or fidelity check that the therapist delivers the treatment as intended by review of tapes, recordings, or direct observation that is informed by a validated tool or a checklist developed for the study.
Self-directed	Internet	The intervention is delivered via the Internet or computer-mediated communication.
	Paper-based	The intervention is a paper-based resource such as a workbook, printout, or pamphlets.
	Check materials received	Verification that the participant has received and understood the intervention (i.e., read and received personalized feedback).
Self-directed approach	CBT	Intervention specifically states that the intervention involves cognitive and behavior techniques.
	MI	Intervention specifically states that the intervention involves motivational interviewing or motivational enhancement techniques.
	CT	Intervention specifically states that the intervention involves cognitive techniques but not BT.
	BT	Intervention specifically states that the intervention involves behavior techniques but not CT.
	Non-directive	Intervention specifically states that the intervention involves non-directive supportive techniques.
	Normative feedback	Feedback on assessment provided that includes a comparison with another relevant population.

Note. GIST-1: Gambling Intervention System of CharacTerization; CBT: cognitive behavioral therapy; BT: behavior therapy; CT: control theory; MI: motivational interviewing.

Table 4. GIST-1 evaluation characteristics

Nature of evaluation	No intervention control group	No intervention control group includes a wait list or assessment only control. There is no passive or active intervention.
	Active control group	Active control group are interventions that are not part of the controlled study (e.g., treatment as usual or referral to gamblers anonymous).
	Intervention comparison group	Intervention comparison group is when two or more interventions that have been developed for evaluation are compared.
Process evaluation	Process-targeted	Specific processes (or mediators) targeted by the intervention.
	Measurement	A description of how the process was tested including the name, the measure/s, and process.

Note. GIST-1: Gambling Intervention System of CharacTerization.

characteristics (e.g., recruitment); Part 3, characteristics of the delivery and conduct of the intervention (e.g., modality of delivery); and Part 4, evaluation characteristics. The GIST-1 manual includes information on the background and application of the system, coding instructions and labels, and definitions of categories in four parts (see Supplementary Material).

Three research assistants without experience of using the GIST-1 were trained to apply it to the included studies. Training involved an introduction to the GIST-1 (i.e., overview of what it is and what it is attempting to do and guided review through each of the items), guided group coding of each of the parts of the system, and then individual coding of two interventions while in the presence of the group. Immediate feedback was provided to the group on accuracy of coding, and coding errors discussed and corrected. Each coder then independently coded three further studies, and accuracy was again assessed. Post-piloting, there was a further refinement phase and the researchers made amendments to the GIST-1 where systematic errors were identified. This included improving item labels (e.g., adding more examples in the item labels and clarifying ambiguity) and removing items that were consistently poorly identified between coders and coding sessions. Once finalized, two research assistants coded the entirety of the data in a Microsoft Excel spreadsheet. The average time for coding each study was approximately 30 min. To ensure accuracy of coding, each paper was double-coded (by SR or SM). SM then reviewed the spreadsheets and highlighted coding that was not consistent for later calculation of interrater reliability.

RESULTS

Characteristics of included studies

The PRISMA flow diagrams of the search results are displayed in Figures 1 (therapist-delivered) and 2 (self-directed). The first systematic search from a Cochrane systematic review identified 44 studies as potentially eligible for this review. Of these, seven studies were excluded because of treatment type (i.e., pharmacological interventions, not a treatment outcome study), study design (i.e., not an RCT), no published or relevant outcome data were reported, and gambling was not the index condition. The remaining 35 studies (published in 37 articles) were included. The systematic search from a systematic review examining self-directed interventions across addictions identified

312 studies, which were assessed for eligibility. This included 303 studies, which were excluded on the basis that the index condition was not gambling (due to the original scope being alcohol, drugs, and gambling). The remaining studies were excluded due to the evaluation of a prevention program, study design (i.e., not an RCT), treatment type, and sample type (family members instead of gamblers). Therefore, nine studies (published in nine articles) involving self-directed interventions were included from this search. The gray literature search identified 100 citations and full-text studies (in four reports) were assessed and included in this review.

Overall, 46 studies (in 49 articles) were identified for inclusion (see Supplementary Material for the characteristics of these 46 studies used to develop the GIST-1). The sample sizes ranged from 12 to 1,122 ($M = 133.0$, $SD = 176.6$, Median $= 88.0$). The average age of participants ranged from 19 to 68 years ($M = 40.6$, $SD = 9.5$, Median $= 43.4$) and the proportion of males ranged from 0% to 100% ($M = 63.3\%$, $SD = 21.5$, Median $= 59.8$). The majority of the studies were conducted in Canada ($\kappa = 13$, 28.3%), followed by the USA ($\kappa = 12$, 26.1%) and Australia ($\kappa = 11$, 23.9%). The majority of the study samples were recruited from the community ($\kappa = 22$, 47.8%), followed by clinical services ($\kappa = 13$, 28.3%) and universities ($\kappa = 5$, 10.9%). Some studies recruited participants from both community and clinical services ($\kappa = 5$, 10.9%). The majority of the included studies examined therapist-delivered ($\kappa = 30$, 65.2%) interventions, followed by self-directed interventions ($\kappa = 16$, 34.8%).

Reliability of GIST-1

The GIST-1 included 18 categories of change techniques used in interventions, 6 categories of participant and study characteristics, and 11 categories of characteristics of the delivery and conduct of the intervention. Reliability of the categories comprising the GIST-1 was tested by two coders applying it to each of the 46 studies (among SR, SM, SF, BK, and KS). We calculated both Cohen's (1968) κ and Gwet's (2002, 2012) AC1, which resulted in 76 sets of reliability tests (see Supplementary Material for the percentage agreement and number of correctly identified items). Across all categories comprising the GIST-1, excellent levels of agreement were observed regarding the presence or absence of defined techniques and characteristics. All AC1 scores were above 0.70, indicating good interrater reliability for all 76 tests. All κ values were between 0.80 and 1.00, indicating near-perfect agreement.

Frequency of GIST-1 items in the gambling literature

Across the 46 included studies, 88 interventions were identified and examined for the presence of categories defined within GIST-1. When applying the GIST-1 to included studies, 8 out of 83 categories were found to have too few instances to undertake statistical analyses reliably. This included intervention goal (type of goal), whether the goal was imposed or freely chosen, specific process (or mediator) targeted, how the specific process was measured and planned, and actual frequency and duration of interventions.

Of the 88 interventions, the content of 60 was delivered only by a therapist or professional and involved no self-directed materials (68%), 21 interventions were self-directed only (24%), and 6 involved content delivered by a therapist and also via self-directed materials (7%). The type of oversight for one intervention was not stated.

All 18 categories of change-technique types were identified in at least one intervention description. The frequency of identified technique categories is presented in Table 5. The number of technique-type categories identified across all types of interventions ranged from 0 to 10 ($M = 4.4$, $SD = 2.8$, Median $= 4.0$), with relapse prevention (60%) and cognitive restructuring techniques (52%) being most frequently utilized. The number of technique-type categories reported in therapist-delivered interventions also ranged from 0 to 10, with an average of 4.21 ($SD = 2.9$, Median $= 4.0$) techniques. The most commonly reported technique types in therapist-delivered interventions were also relapse prevention (57%) and cognitive restructuring (45%). The number of technique types reported in self-directed interventions ranged from 1 to 10 ($M = 5.7$, $SD = 3.0$, Median $= 5.0$). Interestingly, the most frequently reported technique in self-directed interventions was behavioral substitution (71%). This was followed closely by relapse prevention (67%), cognitive restructuring (67%), and stimulus control (63%).

The least commonly reported change-technique types across all interventions were social skills training (8%) and social comparison/social norms (9%). This was similar to the therapist-delivered interventions, in which social comparison/social norms was reported in just two interventions and social skills training was the least utilized (10%). On the contrary, for self-directed interventions, the least frequently reported technique types were problem solving (4%), social skills training (5%), imaginal desensitization (5%), and exposure therapy (0.0%).

Identification of mechanisms of change was infrequently included in the study reports. We had intended to identify specific processes targeted by interventions; however, only seven studies associated their research with a specific theory and of these studies, there was limited evidence of theory testing. Across the 18 categories of change techniques, we identified 14 theories or models that are associated with the identified change techniques. Of these, both the transtheoretical model and information-motivation-behavioral skills model were associated with six and seven categories of change techniques, respectively. Theories least associated with identified change techniques were social support theories and self-determination theory.

Across the 46 studies, six categories of participant and study characteristics with 23 subitems were defined in

GIST-1. The frequency of categories of participant and study characteristics present in the included studies is shown in Table 5. The most frequent source of recruitment for all included studies was the community (59%), followed by clinical settings (52%). Almost 30% of participants were remunerated with an average of $74 (converted to US$) (Median: $65; range: $30–$150). The most frequently reported eligibility criteria were the presence of a gambling problem or GD (78%), followed by no acute mental distress (47%), being over 18 years (44%), and no other current gambling treatment (40%). The most frequently reported screening mode was telephone (55%), but telephone was reported less frequently for baseline assessment (30%). Assessment was most frequently administered face-to-face (62%). Screening and assessment modalities were not reported for 27% and 20% of studies, respectively. The average number of assessment questions was 81.1 ($SD = 62.7$), with a median split of 74 (range: 6–301). Across the 46 included studies, the most frequent comparison group reported was a no intervention control group (65%), followed by an intervention comparison group (37%).

About 10 categories of delivery and conduct characteristics were defined and used to categorize the 88 intervention descriptions. The most frequent intensity of therapist contact was medium term (5–8 sessions) (30%), followed by long-term contact (more than 9 sessions) (24%). Over two thirds reported an individual format (85%). Almost two thirds of studies included an intervention goal that was established pretrial (66%), before the intervention or during the intervention.

There were 72 interventions that included professional oversight (81%), with the vast majority offering a therapeutic response (86%). When there was a therapeutic response, cognitive behavioral therapy (CBT) (36%) and MI (31%) were the most frequently reported. Most interventions were delivered face-to-face (86%). Therapists usually had professional registration (67%), with 27% of interventions delivered by students or interns. One third of studies did not report information relating to supervision or training; but when it was reported, most therapists received some training (68%) or supervision (82%). Two thirds of interventions involved an intervention manual and just over half of evaluation studies stated that intervention fidelity checks were undertaken (54%).

The most frequent mode for delivering self-directed interventions was via paper-based workbooks, resources, or handouts (74%) and to a lesser extent, via the Internet (26%). Integrity checks (i.e., that the intervention was received as intended, such as that it could be read and understood) were reported in just five interventions. Self-directed interventions most frequently applied cognitive-behavioral strategies (59%). Seven self-directed interventions reported the use of normative feedback (26%).

DISCUSSION

This is the first study to systematically identify and describe the components of psychological interventions for problem gambling. The present research developed a classification
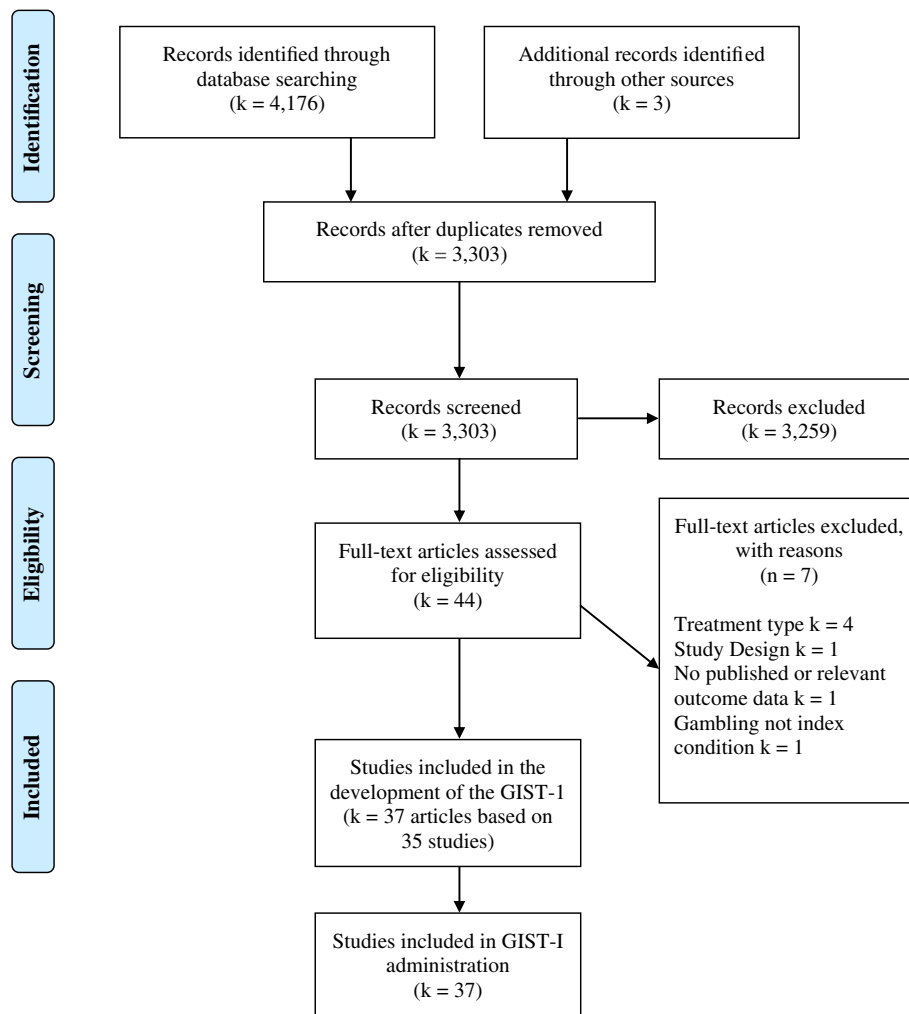
Figure 1. Flow diagram of included studies (therapist-delivered)

system, referred to as the GIST-1, consisting of the following four broad categories: (a) types of change technique used in interventions (e.g., cognitive restructuring), (b) participant and study characteristics (e.g., recruitment), (c) characteristics of the delivery and conduct of the intervention (e.g., modality of delivery), and (e) evaluation characteristics (e.g., type of control group). Within the four broad categories, there were 18 different groupings of categories of similar meaning (e.g., sample type) and these contained 62 different technique types (e.g., community, clinical, or university sampling). The GIST-1 was applied to 88 intervention descriptions provided by 46 studies examining the effectiveness of therapist-delivered and self-directed psychological interventions for the treatment of problem gambling. The classification system reliably detected the presence of 18 categories of change-technique types, 6 categories of participant and study characteristics, and 11 categories of characteristics of the delivery and conduct of the intervention. This work demonstrates the feasibility of a common language for all psychological interventions for problem gambling regardless of mode of delivery or degree of therapist involvement. It provides a model for consistency in reporting of gambling interventions and it also identifies areas where current reporting is inconsistent or absent.

Furthermore, by identifying what currently happens in psychological interventions for problem gambling, gaps have been identified and potential new types of interventions can be pursued.

The categories of change-technique types identified in this study overlapped with those identified previously in analyses of frequently employed techniques to change behavior, in general (Abraham & Michie, 2008), and a subsequent refined list of categories especially relevant to alcohol-use reduction (Michie et al., 2012). These include self-monitoring, relapse prevention, social comparison, goal setting, motivational enhancement, and social support. Applying our classification system to 88 intervention descriptions, we found that relapse prevention was used in 60% of interventions, cognitive restructuring in 52%, and behavioral substitution in 44%. Behavioral substitution (where other activities are substituted for the problematic behavior) was previously included in a taxonomy for alcohol-use reduction (Michie et al., 2012) but not in a taxonomy-identifying categories of change techniques used to promote smoking cessation (Michie, Hyder, et al., 2011). This is perhaps because gambling, like alcohol use, involves planning time, for example, in relation to acquisition of money for gambling, the gambling act, and recovery from
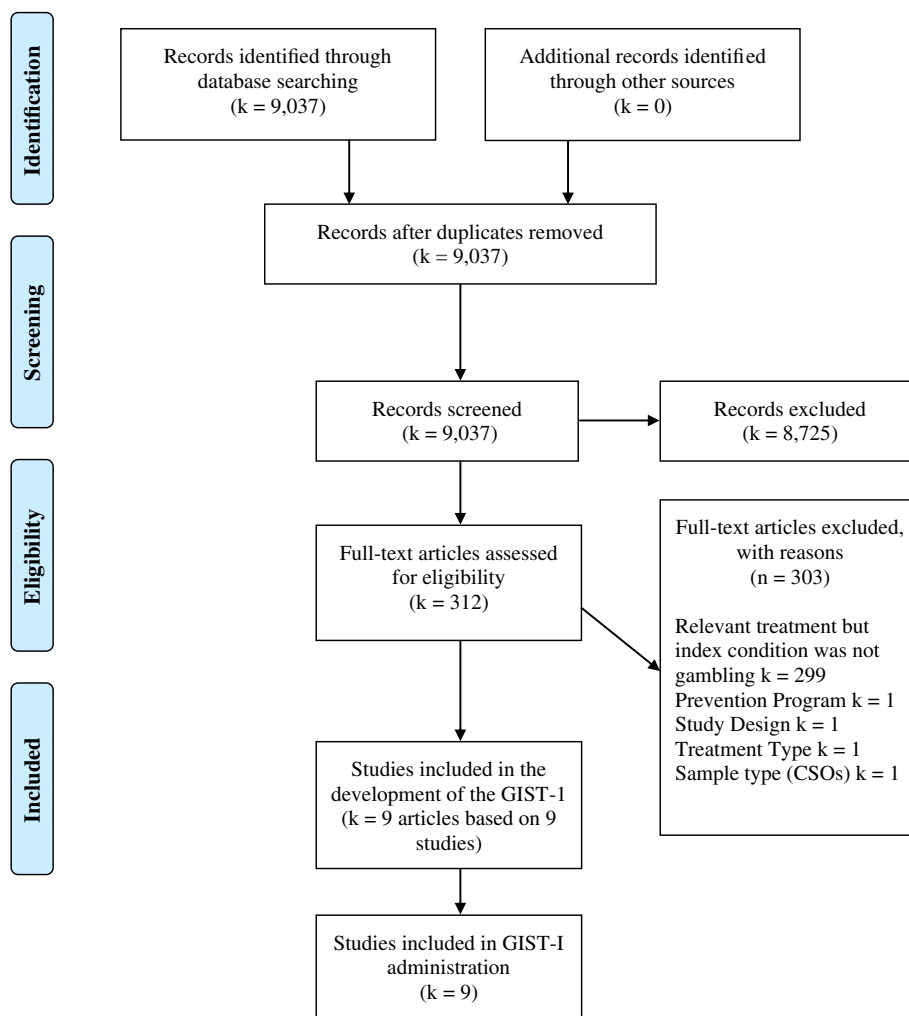
Figure 2. Flow diagram of included studies (self-directed)

that act (Rodda & Lubman, 2012). Other category lists have included stimulus control (Conn et al., 2002; Michie et al., 2012). The focus of this technique is on reducing accessibility to the problematic behavior. On the contrary, stimulus control for gambling, alongside financial regulation (not reported in any other category list), was focused on financial issues and cash control (i.e., not having ready cash for gambling). Interestingly, self-exclusion, which is arguably the most promoted and effective means of controlling access to gambling venues (Gainsbury, 2014), was included in just two of the interventions in the included studies. Few therapist-delivered or self-directed gambling interventions included self-monitoring. When included, self-monitoring involved maintaining a record or other means of recording thoughts or behaviors across a specific period. Such self-monitoring predominantly focused on monitoring thoughts about gambling when attempting to change and focused less on supporting ongoing change or real-time monitoring of spending or gambling.

Many of the participant and study intervention characteristics identified are consistent with other checklists, such as CONSORT and TREND (e.g., participant eligibility, setting, and duration of intervention) (Des Jarlais et al., 2004; Moher et al., 2001). Other categories, such as

therapist's qualifications, training, and therapeutic approach, are also consistent with recent checklists for intervention reporting (Borek et al., 2015). In contrast to other classification checklists, the GIST-1 focuses on additional categories of participant and study characteristics. This includes remuneration (nearly 30% of studies remunerated participants on at least one occasion), eligibility (eight criteria were identified), and screening and assessment mode (screening was more frequent by phone, but assessment was more frequent in person). We also included intervention characteristics in the GIST-1 related to the delivery of the intervention. We identified three different ways of offering professional oversight (i.e., advice and information, self-directed support, and psychotherapeutic response), and five different therapist approaches (i.e., CBT, behavior therapy, control theory, MI, and non-directive).

In reporting of the frequency of the GIST-1 categories in the problem gambling literature, 8 (out of 83) categories were omitted because they were infrequently reported in the literature. Several categories specifying the intensity of the intervention (planned and actual duration and frequency and number of sessions) were also infrequently reported (cf. Borek et al., 2015). Furthermore, two categories relevant to the use of logic models in designing interventions,

Table 5. Frequency of GIST-1 categories across included studies and by intervention type

Technique	Characteristic	Present in all studies	Therapist-delivered interventions only	Self-directed interventions only	Therapist- and self-directed interventions
Types of change technique used in interventions					
Technique types	Relapse prevention	53 (60.2)	34 (56.7)	14 (66.7)	5 (83.3)
	Cognitive restructuring	46 (52.3)	27 (45.0)	14 (66.7)	5 (83.3)
	Behavioral substitution	39 (44.3)	19 (32.8)	15 (71.4)	5 (83.5)
	Stimulus control	33 (37.5)	16 (26.7)	12 (57.1)	5 (83.3)
	Motivational enhancement	25 (28.4)	16 (26.7)	3 (14.3)	6 (100)
	Prompting goal setting	25 (28.4)	14 (23.3)	6 (28.6)	5 (83.3)
	Information provision	23 (26.1)	17 (28.3)	6 (28.6)	–
	Feedback on assessment	22 (25.0)	11 (18.3)	10 (47.6)	1 (17)
	Information gathering	19 (21.6)	6 (10.0)	8 (38.1)	5 (83.5)
	Decisional balance	16 (18.2)	8 (13.3)	5 (23.8)	3 (50)
	Social support	14 (15.9)	6 (10.0)	3 (14.3)	5 (83.5)
	Problem solving	13 (14.8)	12 (19.4)	1 (3.7)	–
	Self-monitoring	13 (14.8)	9 (15.0)	4 (19.0)	–
	Imaginal desensitization	11 (12.5)	10 (16.7)	1 (4.8)	–
	Exposure therapy	9 (10.2)	9 (15.0)	–	–
	Financial regulation	9 (10.2)	3 (5.0)	2 (9.5)	4 (66.7)
	Social comparison	7 (8.0)	2 (3.3)	5 (23.8)	–
	Social skills training	7 (8.0)	6 (10.0)	1 (4.8)	–
Participant and study characteristics					
Sample type[a]	Community setting	27/46 (58.7)	31/60 (51.7)	15/21 (71.4)	4/6 (66.7)
	Clinical setting	24/46 (52.2)	40/60 (66.7)	3/21 (14.3)	2/6 (33.3)
	University setting	11/46 (23.9)	13/60 (21.7)	7/21 (33.3)	–
Remuneration	Completion of screen	3/46 (6.5)	2/60 (3.3)	1/21 (4.8)	1/6 (16.9)
	Completion of baseline	8/46 (17.4)	10/60 (16.7)	4/21 (19.0)	1/6 (16.7)
	≥1 post-intervention follow-up	13/46 (28.3)	19/60 (31.7)	7/21 (33.3)	–
Eligibility	Presence of gambling problem or GD	35/45 (77.8)	42/59 (71.2)	17/21 (81.0)	3/6 (50.0)
	Gambled less than once in last 12 months	12/45 (26.7)	13/59 (22.0)	6/21 (28.6)	3/6 (50.0)
	Aged ≥18	20/45 (44.4)	19/59 (32.2)	15/21 (71.2)	5/6 (83.3)
	No suicidal ideation	16/45 (35.6)	28/59 (47.5)	4/21 (19.0)	2/6 (33.3)
	No acute mental distress	21/45 (46.7)	37/59 (62.7)	4/21 (19.0)	2/6 (33.3)
	No gambling intervention currently	18/45 (40.0)	23/59 (39.0)	9/21 (42.9)	4/6 (66.7)
	Preferred gambling type	6/45 (13.3)	11/59 (18.6)	2/21 (9.5)	–
	Collateral person required	10/45 (22.2)	13/60 (21.7)	5/21 (23.8)	6 (100.0)
Screening mode[b]	Face-to-face screen	14/33 (42.2)	56/59 (94.9)	0/5 (0.0)	6/6 (100.0)
	Telephone screen	18/33 (54.6)	25/47 (53.2)	8/16 (50.0)	6/6 (100.0)
	Self-directed screen	6/33 (18.2)	2/47 (4.3)	8/16 (50.0)	–
Assessment mode[b]	Face-to-face delivery	23/37 (62.2)	41/50 (82.0)	4/19 (21.0)	1/5 (20.0)
	Telephone delivery	11/37 (29.7)	11/39 (28.2)	11/19 (57.9)	5/6 (83.3)
	Self-directed delivery	6/37 (16.2)	0/50 (0.0)	9/19 (47.4)	–
Characteristics of the delivery and conduct of the intervention					
Therapeutic contact	Minimal contact	4/86 (4.7)	2/58 (3.4)	–	–
	Single session	11/86 (12.8)	6/58 (11.3)	–	4/6 (66.6)
	Short contact	8/86 (9.3)	6/58 (11.3)	–	2/6 (33.3)
	Medium contact	26/86 (30.2)	23/58 (39.6)	–	–
	Long contact	21/86 (24.4)	21/58 (36.2)	–	–
	Individual delivery	73/86 (84.9)	45/60 (75.0)	21/21 (100.0)	6/6 (100.0)
	Group delivery	15/86 (17.4)	15/60 (25.0)	0/21	0/6
Goal	Intervention goal	58/88 (65.9)	43/60 (71.7)	–	5/6 (83.3)
Therapist approach	CBT	22/62 (35.5)	22/56 (39.8)	–	0/6
	MI	19/62 (30.6)	13/56 (23.2)	–	6/6 (100.0)
	CT	6/62 (9.7)	6/56 (10.7)	–	0/6
	BT	16/62 (25.8)	16/56 (28.6)	–	0/6
	Non-directive	4/62 (6.5)	4/56 (7.1)	–	0/6

(Continued)

Table 5. (Continued)

Technique	Characteristic	Present in all studies	Therapist-delivered interventions only	Self-directed interventions only	Therapist- and self-directed interventions
Therapist modality	Face-to-face	60/70 (85.7)	58/60 (96.6)	–	1/6 (16.6)
	Telephone	8/70 (11.4)	2/60 (3.3)	–	5/6 (83.3)
	Internet	3/70 (4.3)	0/60 (0.0)	–	0/6
Qualifications	Registered professional	47/70 (67.1)	44/59 (74.6)	–	1/4 (25.0)
	Intern or student	19/70 (27.1)	16/59 (27.1)	–	1/4 (25.0)
	Counselor or volunteer	5/70 (7.1)	3/59 (5.1)	–	2/4 (50.0)
Supervision	Supervision provided	34/50 (68.0)	27/42 (46.5)	–	5/6 (83.3)
	Training provided	41/50 (82.0)	36/51 (70.6)	–	5/6 (83.3)
Manual	Treatment manual	46/69 (66.7)	42/60 (70.0)	–	4/6 (66.6)
	Integrity check	37/69 (53.6)	32/60 (53.3)	–	5/6 (83.3)
Self-directed modality	Internet	7/27 (25.9)	–	7/21 (33.3)	0/6
	Paper and pencil	20/27 (74.1)	–	14/21 (66.7)	6/6 (100.0)
	Integrity check	5/27 (18.5)	–	4/17 (19.0)	1/6 (16.7)
Self-directed approach	Cognitive-behavioral	16/27 (59.3)	–	10/21 (47.6)	6/6 (100.0)
	MI	2/27 (7.4)	–	2/19 (9.5)	0/6
	CT	0/27 (0.0)	–	0/21	0/6
	BT	1/27 (3.7)	–	0/21	0/6
	Non-directive	1/27 (3.7)	–	1/21	0/6
	Normative feedback	7/27 (25.9)	–	7/14 (33.3)	0/6
Evaluation characteristics					
Nature of evaluation	"No intervention" control group	30/46 (65.2)	31/60 (51.7)	16/21 (76.2)	4/6 (66.7)
	Active control group	7/46 (15.2)	8/60 (13.3)	1/21 (4.8)	2/6 (33.3)
	Intervention comparison group	17/46 (37.0)	38/60 (63.3)	4/21 (19.0)	–

Note. GD: gambling disorder; GIST-1: Gambling Intervention System of CharacTerization; CBT: cognitive behavioral therapy; BT: behavior therapy; CT: control theory; MI: motivational interviewing.
[a]Studies may have recruited samples from multiple settings. [b]Studies conducted screening and assessment via multiple modalities.

namely, "a specific process (or mediator) was targeted" and "measurement of process" were infrequently reported. It is surprising and of concern that so few studies described the underlying logic model identifying targeted change processes. To address this issue, we attempted to identify relevant theories that could be associated with each of the listed categories of change techniques. This is the first study to link categories of change techniques for problem gambling with specific theories or models. This is important, because it is difficult for the field to move forward without examining the mechanisms of change (or why interventions work). Future meta-analytic studies can use these findings to examine the mechanisms (and useful theories) underpinning effectiveness.

This is the first study to comprehensively develop a reliable classification system of the content and characteristics of gambling interventions. Several limitations of such classification should be considered. In developing the GIST-1, we found the labels used to describe interventions did not always represent the techniques included in the intervention. For example, inclusion of "cognitive restructuring" might be reported, but the detail suggested that only information was provided with no attempt to correct cognitions. Thus, change techniques may be mislabeled in the research literature. Moreover, the same type of technique may be differently described in two intervention reports.

We acknowledge that a more comprehensive classification system may have been developed, if we had had access to all intervention manuals and consequently our categories may warrant further refinement in future applications. Future studies could apply the GIST-1 to manuals to determine the degree of consistency between manuals and associated publications as well as to identify missing categories of techniques that may appear in manuals but not articles (Abraham & Michie, 2008). In addition, although multiple RCTs claimed to examine just one category of change techniques (e.g., cognitive restructuring), they frequently included other categories, such as social skills training, relapse prevention, or social support. The application of the GIST-1 to the 46 included studies indicated large gaps in the gambling literature. For instance, there is currently limited research on the use of third wave therapies (e.g., acceptance and commitment therapy), just in time interventions or cognitive-neurological interventions. Furthermore, application of the GIST-1 indicated most interventions involved face-to-face delivery, even though there is substantial evidence in other fields that self-directed interventions are effective (Barak, Hen, Boniel-Nissim, & Shapira, 2008). As intervention types are developed, and different modes of delivery are tested, the GIST-1 will need to be updated, so that it continues to reflect the current state of gambling interventions.

This study can assist researchers, policy makers, and treatment providers in identifying and describing the components of interventions, but further work is needed to identify categories of technique types and delivery

characteristics that are associated with good outcomes (e.g., reductions in gambling severity, frequency, or expenditure). Despite considerable progress of intervention research for problem gambling, further work is required to move from evaluating the efficacy of interventions ("does it work?") to answering questions about "why" and "how" treatments work. The answers to these questions are priorities for the next generation of interventions, not only for problem gambling, but also for the field of psychological interventions more generally (Longabaugh et al., 2005). Without the ability to accurately describe the content of interventions in a standardized fashion, we are unable to answer these questions. Knowing what works will allow for the development of more efficient and effective psychological and self-help interventions for problem gambling.

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