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Abstract

Mental disorders are prevalent and can lead to significant impairment. Some progress has been made toward establishing treatments; however, effect sizes are small to moderate, gains may not persist, and many patients derive no benefit. Our goal is to highlight the potential for empirically supported psychosocial treatments to be improved by incorporating insights from cognitive psychology and research on education. Our central question is: If it were possible to improve memory for the content of sessions of psychosocial treatments, would outcome substantially improve? We leverage insights from scientific knowledge on learning and memory to derive strategies for transdiagnostic and transtreatment cognitive support interventions. These strategies can be applied within and between sessions and to interventions delivered via computer, the Internet, and text message. Additional novel pathways to improving memory include improving sleep, engaging in exercise, and using imagery. Given that memory processes change across the lifespan, services to children and older adults may benefit from different types and amounts of cognitive support.

Keywords

memory, learning, psychosocial treatments, cognitive behavior therapy, sleep

A number of surprises have emerged from research on mental illness. The prevalence of mental illness is very high, affecting 30% of the American population during any 12-month period (Kessler, Berglund, et al., 2005; Kessler, Demler, et al., 2005). The disability and functional impairments associated with mental illness are serious and wide-ranging. The economic impact on the individual and society is substantial (Kessler et al., 2008). Hence, research to improve treatment is a high priority. The director of the National Institutes of Mental Health, Dr. Thomas Insel (2009), has highlighted the somewhat discouraging results from several large pharmacotherapy trials. He also observed that "while psychosocial interventions have received much less marketing attention than pharmacological treatments, the results are arguably more encouraging" (Insel, 2009, p. 129). Indeed, progress in establishing evidence-based psychosocial treatments for many mental illnesses has been excellent (Chambless & Ollendick, 2001; Silverman & Hinshaw, 2008). However, much work remains. The effect sizes of most available treatments are small to moderate, gains may not persist, and there is a proportion of patients who derive little or no benefit. Even under optimal conditions, treatment failure is too common (Lambert, 2004; Nathan & Gorman, 2007). Our goal is to highlight the potential for empirically supported treatments to be improved by incorporating insights from cognitive psychology and educational research. Our central questions are as follows: If it were possible to improve memory for content of sessions of psychosocial treatments, would outcome substantially improve? And, if so, how could such memory improvements be made?

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Table 1. Examples of Specific Types of Memory Impairment in Depression, Bipolar Disorder, and Schizophrenia

Type of impairment	Depression	Bipolar disorder	Schizophrenia
Declarative memory	Hertel (1998); Hertel and Rude (1991)[a]	Torres et al. (2007)[b]	Aleman et al. (1999)[b]; Cirillo and Seidman (2003)[c]
Nondeclarative memory	N/A	Cognitive function is relatively spared: van Gorp et al. (1999)[a]	Cognitive function is relatively spared: Boyer et al. (2007)[c]; W. Perry et al. (2000)[a]
Working memory	Gotlib and Joormann (2010)[c]	Torres et al. (2007)[b]	Lee and Park (2005)[b]
Prospective memory	N/A	N/A	Henry et al. (2007)[a]

Note: Declarative memory is composed of episodic memory (memory for events) and semantic memory (memory for facts); nondeclarative memory is composed of procedural, implicit, and nonassociative memory as well as conditioning. Prospective memory = memory for future intentions; N/A = To the best of our knowledge, this aspect of memory has not yet been studied.
[a]Single experiment. [b]Meta-analysis. [c]Thorough selective review.

Memory Problems and Mental Illness

Memory deficits are commonly observed across mental illnesses, including major depression (Behnken et al., 2010; Campbell & MacQueen, 2004; Hertel & Hardin, 1990; MacQueen et al., 2003; Marvel & Paradiso, 2004; Taconnat et al., 2010; Videbech & Ravnkilde, 2004), bipolar disorder (L. Clark, Sarna, & Goodwin, 2005; Martinez-Aran et al., 2005; Martino, Igoa, Marengo, Scarpola, & Strejilevich, 2011; Robinson et al., 2006), schizophrenia (Altshuler et al., 2004; Holthausen et al., 2003; Varga, Magnusson, Flekkoy, David, & Opjordsmoen, 2007), posttraumatic stress disorder (Bremner, Vermetten, Nadeem, & Meena, 2004; Isaac, Cushway, & Jones, 2006; Jelinek et al., 2006), as well as the other anxiety disorders (Airaksinen, Larsson, & Forsell, 2005).

These deficits have been attributed to poor organizational skills (Behnken et al., 2010), hippocampal atrophy due to stress steroids (Campbell & MacQueen, 2004; MacQueen et al., 2003; Videbech & Ravnkilde, 2004), disruptions that include compromised connectivity between the prefrontal cortex and hippocampus (Marvel & Paradiso, 2004; Mayberg, 2002), executive functioning disruption (Fossati, Ergis, & Allilaire, 2002), poor ability to self-initiate (Hertel & Hardin, 1990; Taconnat et al., 2010), and the impact of negative emotion, such as depression and anxiety, which narrows and biases attention and occupies cognitive capacity (Easterbrook, 1959; Leighl, Gattellari, Butow, Brown, & Tattersall, 2001; Schraa & Dirks, 1982).

Although a systematic review of the specific memory deficits experienced by patients diagnosed with a mental illness is beyond the scope of the present article, we include Table 1 to illustrate specific examples of the pervasive deficits across memory domains for patients with depression, bipolar disorder, and schizophrenia. These three disorders were selected because they present the biggest treatment challenges that currently face the field in terms of both prevalence and severity (Insel, 2008).

Memory for Professional Advice Is Poor

Therapeutic outcome may be profoundly adversely affected by memory impairment. There is robust evidence across two decades documenting that patients have very poor memory for diagnostic and treatment information. This phenomenon has been observed across many patient groups: Accurate memory recall by cancer patients ranges from 23% to 33% (Bober, Hoke, Duda, & Tung, 2007; Jansen et al., 2008) and by patients with osteoporosis from 31% to 63% (Pickney & Arnason, 2005); patients with chronic pain and those with high cholesterol recall 30% (Lewkovich & Haneline, 2005) and 38% (Croyle et al., 2006), respectively, of diagnostic and treatment information. Recall is particularly poor for health behavior change advice (Flocke & Stange, 2004). It should not be surprising that poor memory for the content of a doctor's visit has severe adverse effects on treatment adherence (Kravitz et al., 1993; Pickney & Arnason, 2005; Tosteson et al., 2003).

Various explanations for these findings have been offered. First, at the most basic level, even when memory functioning is optimal, it is an imperfect system, with fallibility possible at the stage of initial encoding (formation), storage (consolidation), or later recollection (retrieval) (Schacter, 2001). Second, the experience of negative emotion, which occurs during diagnosis and treatment, is associated with attentional biasing and narrowing, which affects what is encoded (Easterbrook, 1959; Leighl et al., 2001; Schraa & Dirks, 1982). Indeed, Phelps (2004) highlighted the finding that when we are emotionally aroused we are more likely to remember

"gist" rather than details—and it is such details that are likely to be important for treatment. Similarly, but in an applied situation, Buckman (1992) noted that when a physician delivers upsetting or anxiety-provoking material, many patients have difficulty registering any subsequent information. Third, based on schema theory, it has been proposed that recall for a diagnosis may be forgotten or misremembered if the person generally views him- or herself as healthy because the news of the diagnosis is inconsistent with the patient's self-schema (Croyle et al., 2006). Finally, as we review below, even in the absence of memory deficits, there is good reason to believe that the odds are stacked against people learning, generalizing, and transferring knowledge.

There has been less research on memory for the content of therapy sessions. The few studies that have been conducted indicate that memory for the content of therapy sessions is also poor. Chambers (1991) reported that insomnia patients forget one third of the instructions given during therapy, and for some types of recommendations, recall is as low as 13%. Also, in a study of memory for genetic counseling, two thirds of the patients did not remember the recommendations, and a quarter remembered recommendations that were not made (Bober et al., 2007).

The findings just reviewed are of considerable concern because persistent cognitive deficits are associated with poorer social functioning (Martinez-Aran et al., 2004) and poorer therapeutic outcome as well as increased risk of relapse (Majer et al., 2004). Studies on patients with bipolar disorder (Martinez-Aran et al., 2004) and substance use disorder (McCrady & Smith, 1986) also provide clear evidence that cognitive impairment is associated with poorer clinical course and poorer treatment outcome. Moreover, two studies provide evidence that memory impairment is related to the efficacy of cognitive behavior therapy (CBT), which is a group of treatment approaches that emphasize that emotions, behaviors, and cognitions are highly interrelated such that a change in one will result in a change in others, with positive effects for reducing symptoms and distress. In one study, Aharanovich, Nunes, and Hasin (2003) administered the MicroCog computerized battery to 18 nondepressed cocaine-dependent patients prior to a 15-week CBT intervention. Better cognitive performance prior to treatment predicted treatment completion and abstinence. In another study, researchers demonstrated that memory difficulties distinguished those patients whose posttraumatic stress disorder (PTSD) did and did not improve following CBT (Wild & Gur, 2008).

Memory Impairment Is Modifiable

What is interesting is that memory encoding and retention can be markedly improved through carefully devised cognitive training techniques (Bäckman & Forsell, 1994; Elgamal, McKinnon, & Ramakrishnan, 2007; Naismith, Redoblado-Hodge, Lewis, Scott, & Hickie, 2010; Taconnat et al., 2010). These findings arise from a well-established literature, spanning a range of conditions characterized by memory impairment, that clearly documents that memory impairment is modifiable, via cognitive support. *Cognitive support* involves the manipulation of the external context with the goal of supporting the mental operations required at the encoding and retrieval stages of forming an episodic memory. Various forms of cognitive support improve memory in older people and individuals with poor frontal lobe function (Bunce, 2003), in patients with Alzheimer's disease and vascular dementia (Almkvist, Fratiglioni, Agüero-Torres, Viitanen, & Bäckman, 2010), and in patients with depression (Bäckman & Forsell, 1994; Taconnat et al., 2010).

Aim

Together this evidence raises a novel line of investigation—namely, if it were possible to improve memory for the content of therapy sessions, would outcome substantially improve? This proposal has potential for major public health implications because memory-enhancing strategies that are safe (no side effects), simple (easy to disseminate), powerful, and inexpensive could be readily included as a standard feature in psychosocial treatments for a broad range of mental illnesses. Indeed, it might be possible to devise strategies that are applicable across disorders (transdiagnostic) and across treatments (transtreatment).

A great deal of research on memory and learning in cognitive psychology and education research has tried to understand how memory and learning work and can be improved, but these literatures do not tend to consider clinical settings. We begin by defining concepts that are key to this article. Next, we highlight relevant theory from a review of the cognitive psychology and education research literatures. We then describe specific cognitive support strategies and tools therapists could use to improve memory for the contents of therapy sessions. Finally, we consider additional novel pathways to improving memory.

At the outset, we need to define three terms that are used ubiquitously across this article. We use the term *therapy point* to refer to (a) statements that trigger the patients' awareness of new concepts and cognitions or (b) statements that prompt the patient to apply new skills or behaviors. In other words, a therapy point refers to a main idea, principle, or experience that the therapist wants the patient to remember or implement as part of the treatment. *Learning* refers to "the process by which changes in behavior arise as a result of experiences interacting with the world," and *memory* refers to "the record

of past experiences acquired through learning" (Gluck, Mercado, & Myers, 2007, p. 2).

Overarching Principles

The section that follows briefly outlines five theories that form the theoretical foundation for the selection of specific cognitive support strategies and tools designed to aid learning and memory in psychosocial treatments.

Encoding. How does a therapist assist with the process of making sure that information from a therapy session gets encoded and stored in short-term memory (STM), which involves retention of small amounts of material for a few seconds? Then how does a therapist assist with the process of maximizing the possibility that information from STM moves into long-term memory (LTM)?

These questions can be informed by the *multicomponent theory of memory* (A. Baddeley, 2012; A. D. Baddeley & Hitch, 1974). Two of the components store information in STM. The phonological loop is the verbal STM store that holds sequences of acoustic or speech-based items. It is limited in capacity, and the items are registered as memory traces that decay in a few seconds. The traces can be refreshed by subvocal rehearsal (saying the item to yourself). The visuospatial sketchpad is similar to the phonological loop except the focus is visual or spatial information (e.g., imagery). The third component, the central executive, is an attention controller rather than a memory system. Attending to an item helps in the process of forming a memory of it. Finally, the episodic buffer provides temporary storage between the first two components and LTM. As material enters LTM, the capacity of working memory—the temporary stores and processor—is freed up. The episodic buffer can hold four chunks of information.

In sum, the multidimensional theory of memory (A. Baddeley, 2012; A. D. Baddeley & Hitch, 1974) describes the process of encoding—moving material from STM to LTM. And it provides several specific strategies and tools that therapists can use to ensure that therapy points are encoded.

Deepening Processing. Craik and Lockhart (1972) proposed the *levels of processing theory*. This theory asserts that items that are deeply or elaborately processed will be better remembered. For example, words that get shallow visual processing (Is the following word in upper- or lowercase? TABLE) are less well remembered relative to words that get phonological processing (Does the following word rhyme with dog? LOG), which are less well remembered relative to words that get semantic processing (Does the word *field* fit into the following sentence? The horse lived in a ____). In the context of treatment, therapists should be concerned with facilitating deeper processing of therapy points.

Reducing Interference. Interference occurs when two memories overlap with each other in content. Previous memories can interfere with subsequent similar memories, and the opposite can take place as well. *Proactive interference* occurs when old information interrupts new learning. There are empirical demonstrations showing that medical information that confirms previous beliefs is remembered better than information that disconfirms those beliefs (Rice & Okun, 1994). Pettigrew and Donovan (2009) have highlighted the application of this theory to mental health among older adults; for example, beliefs formed during childhood can create challenges for learning new material as an adult. Cognitive therapy approaches include strategies to reduce this kind of interference (A. T. Beck, 1976; J. Beck, 1995).

Retroactive interference occurs when recently acquired information (new learning) interrupts old learning. For example, consider an adolescent with social anxiety disorder who begins to learn and believe, during a therapy session, that he is worthwhile. Then he goes to school and gets bullied and called a "geek." If the new learning (being bullied and called a geek) adversely affects the learning from the therapy session, retroactive interference has occurred. Hence, a challenge for a therapist is to develop strategies and tools to address proactive and retroactive interference.

Stages of Skill Acquisition. Fitts and Posner (1967) proposed three stages of acquiring a new skill or new knowledge: (a) During the cognitive stage, performance requires an ability to recall, or refer to, specific domains of knowledge; (b) during the associative stage, the learner begins to use stereotyped actions when performing the skill and relies less on actively recalling memories of rules; and (c) during the autonomous stage, the skills or subcomponents have become motor programs. They have become automatic and the learner has become an expert. An application of Fitts and Posner's theory to the delivery of interventions suggests that a therapist needs to find strategies and tools that facilitate their patient's move through the stages of skill acquisition associated with therapy points.

Transfer of Learning. In addressing treatment failures, even if the lessons that are part of a psychosocial treatment are imparted perfectly, a key question is whether patients are able to apply the lessons to their everyday lives and successfully generalize to the future situations they encounter. This is the transfer-of-learning problem.

Thorndike (1932) proposed that successful transfer of learning to novel situations depends on the number of elements in the novel situation that are identical to those in the situation in which the skills were encoded. People are often able to encode, recall, and recognize information, but there are multiple empirical demonstrations that people largely fail to apply the material that was learned to similar situations that differ only in surface features, a problem that has been recognized across the cognitive science literature (for reviews, see Leberman, McDonald, & Doyle, 2012; Mestre, 2005).

In the context of psychosocial treatments, transfer of learning is a potentially serious challenge. Given the empirical demonstrations that transfer is worse when the encoding and testing circumstances differ, a challenge facing therapists is to develop strategies and tools to increase the similarity between the encoding that takes place in the therapy session and the patient's real world.

Cognitive Support Strategies

In this section, we propose eight specific strategies that could be useful to therapists in an attempt to increase cognitive support for memory of the contents of therapy. The strategies were derived from an iterative process of (a) carefully reviewing the cognitive psychology and education literatures, (b) coding therapy tapes for cognitive support strategies that therapists currently use, and (c) applying the following four criteria to guide the selection of these strategies:

1. Identifiable: The strategy must be precisely defined and operationalizable.
2. Distinct: The strategy must not overlap or be redundant with other categories, though there may be instances in which a therapist uses multiple strategies at the same time.
3. Effective: Evidence in the cognitive psychology or education literatures must indicate that this strategy will improve memory.
4. Actionable: Therapists can realistically use this strategy within the context of a therapy session.

Descriptions of the eight strategies follow.

Attention Recruitment. Recruiting and engaging attention is a critical bedrock for learning, and theories of memory include attention as a core process. Indeed, Baddeley and Hitch (1974; see also, Baddeley, 2012) emphasized that the central executive is an attentionally limited system. Thus, divided attention impairs later recall and recognition when a secondary task is performed during encoding but has relatively little effect when performed during retrieval (Craik, Govoni, Naveh-Benjamin, & Anderson, 1996). Thus, therapists should reduce the division of attention during encoding and should develop ways to recruit and scaffold attention onto the encoding of the therapy points.

Two other empirical findings are relevant here. First, and perhaps paradoxically, under some circumstances, directing attention away from sources of distraction might be achieved by increasing task demands. For example, Krames and MacDonald (1985) delivered a dual-processing task under varying degrees of cognitive load. Nondepressed participants recalled more words from the beginning of lists under low load than under high load, but the reverse was true for the depressed participants, who showed a "distraction effect" under low loads and recalled at higher levels as the load increased. Perhaps rumination, a core cognitive process in depression that consumes cognitive capacity, may be overridden by attention-demanding tasks (Krames & MacDonald, 1985).

Second, motivation is important for attention. The intrinsic motivation literature provides ample evidence that a learner must be motivated to optimally learn (Cordova & Lepper, 1996; Ferguson, 2009; Kinzie, Sullivan, & Berdel, 1992). Moreover, when participants are manipulated via incentives and deadlines, they are less intrinsically motivated and less likely to learn (Deci, Koestner, & Ryan, 1999). Perhaps the motivational techniques that therapists often use, such as motivational interviewing (Miller & Rollnick, 2002), may improve outcome via attention recruitment, which, in turn, results in improved learning.

Categorization. There is ample evidence that categorizing critical information improves recall (Hunt & McDaniel, 1993; Ley, Bradshaw, Eaves, & Walker, 1973). Indeed, the episodic buffer within Baddeley's model (Baddeley, 2012; Baddeley & Hitch, 1974) explains how strategies that promote organization are likely to help. The episodic buffer is limited in capacity—it can hold only four chunks of information in a multidimensional code. Hence, binding information into meaningful chunks will increase memory capacity. As applied to the delivery of psychosocial treatments, therapists might help their patients better learn and remember by using tools that help categorize multiple therapy points based on common themes or principles.

Evaluation. Education research demonstrates that generating and evaluating explanations enhances learning across a wide variety of settings (Graesser, Langston, & Baggett, 1997; Siegler, 2002), proving more effective than spending twice as much time studying (Chi, de Leeuw, Chiu, & LaVancher, 1994). Potential examples of evaluation include weighing advantages and disadvantages and comparing one idea or response with an alternative or

existing idea or response. There are multiple reasons why promoting evaluation may be so effective.

There is evidence that tools that promote evaluation promote deeper processing (Craik & Lockhart, 1972) as well as conceptual understanding (Murphy & Medin, 1985). Indeed, evidence suggests that memory improves if participants generate explanations of the key relationships and the causal connections between them. This might involve unpacking the meaning of an unhelpful belief or behavior or discussing the meaning of new perspectives gained (Lombrozo, 2006).

A potentially powerful tool that therapists could use to promote evaluation is encouraging the patient to compare a range of different responses to situations. For example, assertion training distinguishes between passive, assertive, and aggressive responses to a given situation and evaluates the pros and cons of each. Similarly, parent training delineates a spectrum of parent responses from permissive to authoritative to authoritarian and then considers the pros and cons of each. In assertion training, the underlying principles that are sometimes in conflict *are respect own wishes* versus *respect wishes of other*. In parent training, the principles that are sometimes in conflict are *warmth* versus *structure*. In either case, it seems to help the patient or parent learn the principles if they specify explicit behaviors that fall into each category and evaluate them. Indeed, it is clear from the cognitive psychology literature that comparisons are very helpful for clarifying the key principles and pros and cons of a therapy point and/or a particular belief or behavior (Gentner, Loewenstein, & Thompson, 2003). Evaluation might also involve the therapist working with the patient to discuss the pros and cons of using a particular strategy.

Application. Although individuals are often capable of encoding, recalling, and recognizing information, multiple empirical demonstrations have showed that people fail to apply learned material to a similar situation that differs only in surface features (Gick & Holyoak, 1983; Lockhart, Lamon, & Gick, 1988). Indeed, one of the most striking findings in cognitive science and education is how difficult it is for people to take abstract principles they learn in one situation and apply them to novel but relevant situations (Bransford & Schwartz, 1999; Mestre, 2005).

Hence, the goal of application is to explicitly link abstract principles to specific cases so as to guide people to see the specific situations in which they will have to apply knowledge. Indeed, comparing multiple specific examples of a broader principle also results in far greater use of knowledge than increasing learning time or improving motivation (Gentner et al., 2003). One important aspect of application is to provide a specific, concrete, detailed episodic or autobiographical context for therapy points by tying them to particular past, future, or hypothetical experiences in a patient's life. In so doing, the material to be remembered is linked to other material in memory, both within the set of items being learned and beyond, and this enables associations to be established between the session content, homework, and real life.

Specific types of application include problem-directed learning or presenting therapy points in terms of how patients can help solve specific problems they encounter in their everyday lives (Hmelo-Silver, 2004) and the use of problem solving to evoke past knowledge (Benjamin & Ross, 2010). For example, a therapist may ask their patients about instances in which they have overcome their doubts or mastered their fears (like learning to ride a bike or how to drive on ice) and examine how they did it as a prelude to tackling a problem in the here and now that seems difficult or scary. Also, example-based learning improves learning by having people link key facts and principles to particular situations and problems they have experienced or are likely to experience in their lives (Kolodner, 1997). For example, if a therapist wishes to link a patient's abstract core belief, such as that he or she is "incompetent" or "unlovable," to a specific instance in the here and now, a therapist is likely to do two things in the same session: (a) Ask the patient to identify the earliest time he or she can first remember thinking this belief about him- or herself (to see whether the patient would come to the same conclusion from an adult perspective), and (b) work out a way to test the validity of the belief in a different context than the one in which it was first developed.

Several psychosocial treatments emphasize the value of moving therapy out of the therapy room and into the real world. In CBT for social anxiety disorder, the therapy hour can be profitably spent out in social situations, running "experiments" or engaging in exposures to feared social situations. This very direct application presumably results in greater transfer of learning. For example, behavioral activation is an evidence-based treatment for depression in which avoidant behavior is reduced and activation–engagement strategies are increased so as to increase positive reinforcement from the environment (Dimidjian et al., 2006; Jacobson, Martell, & Dimidjian, 2001). Behavioral activation emphasizes practice across different contexts, aims to link desired alternative behavior to concrete warning signs and stressors, and also assists the client to devise contingency plans. These are all examples of application.

Repetition. There is clear and robust evidence that repetition helps automatize new knowledge (Guttentag, 1984), and there is evidence that distributed or spaced repetition is far more effective in the learning process than massed learning (Rohrer & Pashler, 2007). In the context of therapy, repetition of therapy points could

involve the therapist restating, rephrasing, summarizing, or revisiting therapy points. Audiotaping sessions and asking patients to review the session in advance of the next session is another example of the use of repetition in therapy (Shepherd, Salkovskis, & Morris, 2009).

Practice Remembering. Multiple theories and lines of evidence highlight the importance of facilitating the patient's regenerating, restating, rephrasing, and/or revisiting information previously discussed in therapy. Psychologists have recognized this for more than 100 years. Indeed, Ballard (1913) demonstrated that the amount and rate of recall increases with retrieval practice. There are many demonstrations that the simple procedure of repeatedly retrieving some newly learned fact boosts subsequent recall performance (Karpicke & Roediger, 2007). Moreover, as for repetition, learning improves if practice remembering is spread out in time rather than massed together (Hintzman, 1974; Kornell & Bjork, 2008). It is even more effective for learning if the retrieval practice requires the participants to retrieve information they have already encoded and apply it to novel problems and contexts (Roediger & Karpicke, 2006; Roediger, Putnam, & Smith, 2011).

The benefits of practice remembering arise from a number of sources. First, repeated successful retrievals can reinforce the appropriate cues for retrieval operations (Karpicke & Blunt, 2011). Second, each conscious retrieval allows for another chance to encode (Bjork, 1975), so an act of retrieval is likely to be more effective as a second encoding in that it involves deeper semantic processing operations. Third, practice remembering involves active generation. An important finding in the cognitive psychology literature is that people learn better if they actively generate information in response to stimuli they are learning compared with if they are simply passively told the information (Slamecka & Graf, 1978). Hence, therapists should seek to facilitate the patient's active generation of new therapy points.

It is interesting to note that the extensive benefits of repeating information also arise from attempting to answer quizzes, questions, or tests (Pashler et al., 2007). These effects have been demonstrated in a range of contexts from standard laboratory tasks to multimonth classroom schedules (McDaniel, Roediger, & McDermott, 2007). Testing one's memory is even more effective for long-term learning than deep and elaborative educational strategies like constructing concept maps of key ideas (Karpicke & Blunt, 2011; Roediger & Karpicke, 2006).

It is important to note that multiple attempts to retrieve information in the contexts in which the information will be needed may be the most effective way to improve the match between cues at encoding and cues at test, especially when therapy points can be applied in so many different contexts that it is hard to determine how specific cues should elicit the application of different strategies (Rohrer, 2009). Hence, in the context of a therapy session, it may be important to visit relevant contexts during session time (e.g., scene of a car accident) and then to give the patient practice in remembering the therapy points (e.g., identifying safety cues).

Practice remembering may also harness the demonstrated benefits of collaborative remembering (Hirst & Echterhoff, 2012). Collaborative remembering refers to the strong tendency people have to talk with others about past experiences. The positive effects on memory formation from collaborative remembering are much stronger for the speaker than for the listener. Therefore, therapists can use Socratic questions to facilitate practice remembering and to ensure that the patient is in the speaker role as much as possible.

Taken together, it is helpful to have the therapist restate or summarize the main points (repetition) and better still to ask the patient to do so in his or her own words. This is why, in CBT, therapists are encouraged to ask the patient to summarize the point of each item on the agenda on an ongoing basis throughout the session and to provide a capsule summary of the main points that were covered and how they relate to the homework at the end of each session.

Cue-Based Reminders. Thorndike (1932) proposed that successful transfer of learning to novel situations depends on the number of elements in the novel situation that are identical to those in the situation in which the skills were encoded. More specifically, transfer of learning is reduced when the learning and transfer contexts differ in knowledge domain, physical context (learning environment), temporal context (long delay between learning and context), functional context (different purpose of learned behavior), social context (one individual-based learning situation and one social-based learning situation), and modality (visual presentation in one situation and auditory presentation in another; for review, see Barnett & Ceci, 2002). Hence, the challenge facing therapists is to develop strategies and tools to increase the similarity between the encoding that takes place in the therapy session and the site of retrieval—the patient's real world.

Cue-based reminders may be one good solution to this problem of transfer of learning. This cluster of strategies would typically involve the therapist initiating discussions with the patient about options for setting up reminders to help remember a therapy point in specific situations. The goal is to help the patient identify specific cues that can serve as reminders for a thought or action and to facilitate transfer of learning. For example, in interpersonal and social rhythms therapy for bipolar disorder (Frank, 2005), which includes training in regularizing social and sleep rhythms, cue-based reminders such

as automatic alarms delivered via cell phone or Post-it notes stuck to the bathroom mirror are helpful for remembering to maintain regularity in activities such as bed and wake times. The premise of this intervention is that regularizing daily social and biological rhythms will optimize sleep, stabilize the circadian rhythm, and improve mood.

There are many other examples of cue-based reminders that are used without a firm understanding of the principles behind them. For example, a patient may be taught phrases like "opposite action," which is a reminder that when experiencing a high emotional state that does not match the situation, it is helpful to engage in an action that is opposite to the urge of the moment. This is a concept used within dialectical behavior therapy, which is a treatment focused on teaching skills for emotion regulation, distress tolerance, acceptance, and mindfulness (Linehan et al., 2006). Such cue-based reminders may be effective because the process of recovering a target memory is then based on more cues or associative connections that can access the target and bring it into awareness (Kolodner, 1997).

Mnemonics are another example of a cue-based reminder. Ericsson and Polson (1988) highlighted that encoding can be improved by creating a mnemonic based on content that is meaningful. Practicing the mnemonic encourages quicker encoding and retrieval. Hence, the use of mnemonics helps the patient develop methods for remembering key therapy points. Of course, there are many other examples of cue-based reminders, including setting up automatic and environmentally based reminders such as e-mail or text messages (Bauer, Okon, Meermann, & Kordy, 2012) to help remember each homework item.

Cognitive psychologists have developed "implementation intentions" (Gollwitzer, 1999), a procedure that could be used as a cue-based reminder, albeit a mental cue-based reminder. Implementation intentions are simple, quick techniques that take advantage of mental imagery and pre-deciding how to implement one's goals. The general format of an implementation intention is that after identifying a goal, participants are asked to say out loud or to themselves their commitment to seizing their goal. The recommendation is to use a form such as the following: "If/When I encounter this situation _____ I intend to _____ at this time _____ in this_____ place." Participants are then asked to write down their commitment and to visualize it as vividly as possible. Then participants repeat this process a few times. The results are quite strong. In a meta-analysis of published findings from 94 tests, implementation intentions had a positive effect of medium-to-large magnitude on goal attainment (Gollwitzer & Sheeran, 2006). It is thought that the mental representation established with this procedure becomes "highly activated and thus more easily accessible" (Gollwitzer, 1999, p. 495). This approach has already been incorporated into one recent therapy development, rumination-focused treatment for depression (Watkins et al., 2011). As this treatment is a multicomponent treatment, it is not yet known whether implementation intentions specifically improve outcomes.

Praising Recall. Classic experiments in the behaviorist tradition have clearly demonstrated that providing positive consequences for a behavior increases the probability of that behavior. Perhaps reinforcements, such as praise for successfully recalling information discussed in therapy or implementing a therapy point, might reinforce the use of retrieval practice and thereby promote better learning.

Practical Implications

If it were possible to improve memory for the content of psychosocial treatment sessions by infusing the eight cognitive support strategies listed above within psychosocial treatments, would outcome substantially improve? If so, this would have the potential for major public health implications because memory-enhancing strategies that are safe (no side effects), simple (easy to disseminate), powerful, and inexpensive could be readily included as a standard feature in psychosocial treatments for a broad range of mental illness. Future research will be needed to check whether the memory-enhancing strategies proposed reach this potential. Another topic for future research is whether these strategies will increase cost or burden in terms of therapist training and whether extra time for therapy sessions would be needed. It will also be important to gauge patients' experiences receiving the memory-enhancing strategies.

In this section, we highlight the range of contexts in which cognitive support could be, or is being, applied.

Within a Treatment Session. Table 2 presents examples of specific cognitive support strategies that can be used within a treatment session. Our supplemental table presents a dialogue between a therapist and patient to demonstrate the use of cognitive support within a therapy session (for additional details, see the Supplemental Material available online). The goal of Table 2 and the supplemental table is to demonstrate the potential for inserting cognitive support strategies, derived from the cognitive psychology and education research literatures, beyond what is already included in a typical therapy session. In the supplemental table, notice that typical therapy does yield some cognitive support strategies.

Handouts. Many psychosocial treatments include handouts in an attempt to support learning. What might be gleaned from the empirical literature on visual learning

Table 2. Examples of Cognitive Support Within a Therapy Session

Cognitive support	Cognitive support strategy
"Can you think of any situations in the past week in which you tried to apply the concepts and skills from last session? Which ones did you apply? What was the situation? What helped you remember?" If not: "Thinking back now, can you imagine applying the concepts and skills to something that happened last week?" Praise successful application	Practice remembering; application; praising recall
"How often did you think back to therapy or remember a concept or skill in the context of your everyday life in this past week?"; "What could we do to try to help you think about what we cover in therapy between sessions?"; or "One thing that we could try is to do [X] whenever you see [Y]," in which X is the desired behavior and Y is the cue or reminder.	Cue-based reminders
Incorporate props, activities, and media that require patient to use as many senses as possible. Use videos, pictures, songs, poems, handouts, role-playing, games, food (e.g., a raisin to explain mindfulness), colored markers, scented markers, pipe cleaners, or wiki sticks, or draw on the board together. If applicable, suggest that the patient brings home one of these "souvenirs" to remind him or her of a therapy point.	Attention recruitment; cue-based reminders
Group or organize concepts or skills into themes (e.g., create a list of helpful or unhelpful ways of managing rumination). "Out of all these ways [e.g., to manage rumination], what are the ones you are most likely to use? Least likely?" Praise when the patient recalls therapy points while categorizing them.	Categorization; practice remembering; praising recall
Ask patient to describe a new perspective that a concept or skill provides and compare it with a preexisting or alternate perspective.	Evaluation
Ask the patient to teach you the skill or concept (e.g., "If you were the therapist, how would you explain this to me?"). Encourage the patient to come up with examples of the newly learned therapy points in action. Praise the patient for remembering concepts and/or applying the new therapy points after teaching.	Attention recruitment; practice remembering; application; praising recall
Visualize using new skills or learning in a real-world situation (e.g., implementation intention). Include as many real-world cues as possible (e.g., induce a sad mood).	Application; attention recruitment
Implementation intentions: "When you encounter [X] situation, imagine yourself doing [X] to achieve your goal. Now, write down your commitment, and say it out loud a few times." Praise implementations	Attention recruitment; evaluation; application; repetition; practice remembering; praising recall
End of session: "Based on this session, what things might you do differently this coming week? What situations might you respond differently to?"; "How will you apply the skill(s) from today?"; "Why is this new way better?"; "What trigger will help you remember to do that?" Praise for accurate recall and/or application of new skills or strategies	Practice remembering; evaluation; application; cue-based reminders; praising recall
Between-session intervention: Record the patient's own voice reviewing the therapy skills for today. Link to learning in prior sessions. E-mail the audio to the client to replay each day.	Repetition; attention recruitment

and on optimizing visual materials for learning and retention that would maximize patients' ability to remember the content of handouts? *Organizability* is a critical concept. Clark, Mayer, and colleagues (R. E. Clark & Feldon, 2005; Mayer, 2002) have described several general principles for text and visual presentations to maximize organizability—namely, that they be concentrated (most important ideas are highlighted in the illustrations and in the text), concise (extraneous descriptions should be minimized), correspondent (illustrations and text that refer to similar materials should be presented near each other), concrete (material should be presented to allow for easy visualization), coherent (presentations should have a clear structure), comprehensible (presentations

are familiar and can be readily applied to relevant past experience), and codable (key terms are used consistently) (Otto, 2003).

Between Sessions. Between-session homework, a key part of existing CBT interventions, presents further opportunities for cognitive support, particularly application and repetition. Phone coaching, which is part of dialectical behavior therapy, is another example of a between-session therapy that can be used to promote memory. Also, the growth in use of technology provides an opportunity to send reminders to patients via text messages, phone calls, and e-mails. Early studies have indicated that the use of text messages between sessions is enjoyable for patients (R. C. W. Perry et al., 2012) and has positive effects across a range of domains and treatment types (Sirriyeh, Lawton, & Ward, 2010; Whittaker et al., 2012). In the context of a between-session intervention to aid memory, at least two paths could be taken. One is to send text messages to remind the patient of their goals for the week. This would qualify as *repetition*. The second is to send text messages to remind the patient to recall their goals for the week. This would qualify as *practice remembering*. The cognitive psychology literature reviewed earlier suggests that practice remembering should result in superior learning relative to repetition (Roediger et al., 2011), but this awaits empirical evaluation.

Internet Delivery. Psychosocial treatments are being adapted for delivery over the Internet as a cost-effective option, with medium to large effect sizes (Andersson, 2009; Spek et al., 2007; Titov et al., 2010). It would be interesting to test whether cognitive support strategies, integrated within and/or between the online sessions, would improve outcome. In fact, Internet delivery of therapy may provide a unique opportunity to test the potential of cognitive support interventions because the delivery of specific therapy points and inclusion of cognitive support strategies can be readily experimentally manipulated.

Computer-Delivered Treatments. Another potentially relevant group of computerized treatments aim to modify cognitive biases. Repetition, in the form of the multiple training trials administered, might be considered a form of cognitive support that is critical to the success of these interventions. For example, among individuals diagnosed with generalized anxiety disorder, an eight-session computer-delivered training effectively modified the cognitive bias toward threat that is characteristic of this patient group and reduced symptom outcome measures (Amir, Beard, Cobb, & Bomyea, 2009). The training involved 240 trials that comprised various combinations of probe type (E or F) and word type (neutral or threat). On seeing the probe, participants were asked to identify whether the probe is an E or F via a response typed into the keyboard in front of them. For the *attention modification* group, there was contingency between the location of the probe and the neutral word on 66% of the trials. In other words, attention was being trained away from the threat word and toward the neutral word. For the *attention control* group, there was no contingency. In other words, the probe appeared with equal frequency in the position of the threat and neutral word. Over multiple trials, the process of training attention away from threat, relative to the control condition in which the probe appeared with equal frequency in the position of the threat and neutral word, was thought to be responsible for the improvement in symptom outcome observed. A similar pattern of findings has been found among patients who met diagnostic criteria for depression (Joormann, LeMoult, Hertel, & Gotlib, 2009). Although much research remains, particularly to broaden the range of outcome measures beyond symptom measures and include follow-up periods (MacLeod, Koster, & Fox, 2009), these initial results—involving cognitive support in the form of repetition—are quite encouraging.

A Special Note on Imagery. Psychology has had a long interest in the powerful effects of mental imagery on memory (Kosslyn, 1980), and the use of imagery is indicated as part of the visuospatial sketchpad and as part of Baddeley's multicomponent theory of memory (Baddeley, 2012; Baddeley & Hitch, 1974). Visual perception and visual imagery share common neural substrates (Ishai, Haxby, & Ungerleider, 2002), such as the frontal–parietal control regions and occipital–temporal sensory regions (Slotnick, Thompson, & Kosslyn, 2012). Such findings raise the possibility that imagining a scene may form a memory as strong as participating in the scene. Treatment development advances have incorporated imagery within psychosocial treatments (e.g., Borkovec, Lyonfields, Wiser, & Deihl, 1993; Hackmann, Clark, & McManus, 2000; Lang, 1977; Pearson, Deeprose, Wallace-Hadrill, Heyes, & Holmes, 2012). However, imagery could also be used in the service of improving memory for the contents of therapy sessions. One example of the use of imagery has already been described (implementations as cue-based reminders). We suggest that other simple imagery exercises could be developed and used to promote memory across the eight cognitive support categories described.

Novel Methods for Improving Memory for Therapy

Perhaps other novel pathways for improving memory for the contents of therapy sessions will emerge. Three examples are offered below.

Sleep. Sleep disturbance is a common problem across psychiatric disorders (Benca, Obermeyer, Thisted, & Gillin,

1992; Harvey, 2008). Sleep disturbance is a possible mechanism contributing to mental illness and a possible contributor to the cognitive deficits experienced by patients. This raises the possibility of a novel method for improving memory for therapy sessions—namely, improving sleep the nights prior to and following therapy. This possibility does not seem so far-fetched as it may first sound in light of recent evidence on the relationship between sleep and memory.

There are at least two stages of memory for which sleep has been demonstrated to be important, and both hold relevance in the context of memory for therapy sessions. The first is sleep before learning, which prepares the brain for initial learning. The second is sleep after learning, which facilitates long-term memory consolidation and information integration.

Evidence to date has described a critical role for sleep before learning in preparing key neural structures for efficient next-day memory encoding. For example, Yoo, Hu, Gujar, Jolesz, and Walker (2007) showed that sleep loss impairs hippocampal-encoding activity, resulting in a decreased ability for new episodic learning. Moreover, the extent of disruption to encoding appears to be further governed by alterations in prefrontal encoding dynamics. The impact of sleep deprivation on memory formation is especially pronounced for emotional material (Walker & Stickgold, 2006), and this is highly relevant to encoding the contents of a therapy session. Specifically, sleep-deprived participants exhibit a 40% reduction in the ability to form new memories under conditions of sleep deprivation. The magnitude of encoding impairment differed between the sleep and sleep-deprived groups when the data were separated into the three affective categories (negative, positive, or neutral). For participants who had slept, both positive and negative stimuli were associated with superior retention levels relative to the neutral condition. However, for the sleep-deprived group, there was severe disruption of encoding and hence later retention for neutral and especially positive emotional memory, but negative emotional memory persisted. In contrast to the impairment of memory encoding following sleep loss, recent findings have characterized the proactive benefit of sleep on memory encoding. Specifically, a daytime nap restores the normal pattern of deterioration in learning capacity that develops across the day (Mander, Santhanam, Saletin, & Walker, 2011).

In addition to the role of sleep before learning, sleep obtained after learning plays a critical role in the consolidation of episodic (fact-based) declarative memories. Sleep deprivation after learning prevents the consolidation of new memories (both emotional and nonemotional). Also, experimentally enhancing the quality of sleep, specifically slow-wave sleep (Stages 3 and 4), causally enhances consolidation and hence long-term retention of (nonemotional) memories (Diekelmann & Born, 2010; Payne et al., 2009; Stickgold & Walker, 2005). Beyond simply strengthening individual fact-based memories, sleep after learning also appears to help integrate newly learned information. As a consequence, sleep after learning has been shown to promote the cross-linking and association of individual memories together, to facilitate the development of generalized knowledge from related pieces of learned information, and even to trigger creative insights on problem-solving tasks. More specifically, and as reviewed by Stickgold and Walker (2013), sleep (a) enhances cognitive flexibility in problem solving (Wagner, Gais, Haider, Verleger, & Born, 2004; Walker, Liston, Hobson, & Stickgold, 2002), (b) assists in the integration of new learned information (Walker & Stickgold, 2010), and (c) is critical for promoting memory associations (Ellenbogen, Hu, Payne, Titone, & Walker, 2007).

Together this evidence raises an interesting additional strategy for improving memory for therapy sessions. Perhaps improving sleep the night prior to a therapy session will improve the initial learning of information provided by the session. Also, improving sleep the night after a therapy session may improve consolidation of the acquired information and additionally help develop generalized knowledge and understanding of what this information means. These are powerful and simple evidence-based treatments for improving sleep (e.g., Morin et al., 2006). Core principals include going to bed and waking up about the same time every day, getting up out of bed if sleep onset does not occur within 15–20 min so that bed is associated with sleep, and minimizing bright light the hour before bed.

Exercise. As another example of a potential novel pathway for improving memory for therapy, human and animal studies have showed that exercise improves memory performance, particularly among older adults (e.g., Colcombe & Kramer, 2003). The mechanisms by which exercise may improve memory includes plasticity-related growth factors such as brain-derived neurotrophic factor (Berchtold, Castello, & Cotman, 2010).

Pharmacotherapy. Over the past decade, investigators have used D-cycloserine (DCS) to improve memory for the core learning processes of CBT (Davis, Barad, Otto, & Southwick, 2006; Hofmann, 2007). DCS is a partial agonist of the glutaminergic N-methyl-D-aspartate (NMDA) receptor in the amygdala and enhances learning and memory. In contrast, inhibitors of the NMDA receptor block learning (Falls, Miserendino, & Davis, 1992). DCS has been used to augment learning and memory during the exposure portion of CBT for anxiety disorders. Exposure to the feared stimuli is a core component of CBT for anxiety disorders. For example, an exposure task for a

patient with social anxiety disorder might be to strike up a conversation with the barista at the local coffee shop. There are some mixed findings (e.g., Storch et al., 2010), certain details are yet to be worked out (administration before versus with versus after an exposure session), and the results are stronger for social anxiety disorder, specific phobia, and panic disorder relative to obsessive-compulsive disorder (Hofmann, Smits, Asnaani, Gutner, & Otto, 2011; Norberg, Krystal, & Tolin, 2008). Nonetheless, this line of research represents as interesting potential role for memory-enhancing pharmacological approaches.

Summary and Future Questions

We have argued that it may be possible to improve the outcome in psychosocial treatments by improving memory for the content of therapy sessions. The promise of this hypothesis includes compelling data documenting that memory impairment is modifiable and data from cognitive psychology and education that provide specific strategies for improving memory. We emphasize that the goal of the proposed approach is to improve treatment outcome by improving memory for treatment information. We do not expect that applying cognitive support strategies in therapy will generalize to memory improvement for other information. In this final section, we explore future directions for this approach.

Future research is needed to establish how much cognitive support is already used across various psychosocial treatments. For example, there are many examples of cognitive support dispersed throughout Judy Beck's books (Beck, 1995, 2011), which are considered bibles for cognitive therapists. We also need to know how much cognitive support tends to be used by experienced versus intermediate versus novice therapists. These would be important first steps toward determining whether it will be possible to improve outcomes across therapies with a transdiagnostic and transtreatment cognitive support intervention. The details of whether this approach would be differentially effective across radically different psychosocial therapies and whether it would need to be adapted for different therapies remains to be established. Also, we presume that more intensive involvement of the therapist and repeated sessions in psychotherapy have different implications for recall relative to less frequent or one-off consultations, although this remains to be established. A useful further step would be to move toward an empirically derived taxonomy of cognitive support methods that could be used to code and enhance existing interventions, paralleling work in health psychology (Abraham & Michie, 2008; Michie et al., 2011). The path toward resolving these questions relies on a valid and reliable measure of cognitive support becoming available, a process that is in progress.

Memory and learning processes change across the lifespan. The application of cognitive support methods may be particularly beneficial when administering psychosocial treatments to children (Ofen, 2012; Zelazo & Carlson, 2012) and older adults (Hedden & Gabrieli, 2004; Yeoman, Scutt, & Faragher, 2012). Every aspect of memory shows improvement throughout childhood, including the amount of information held in memory and the length of time it can be held: The recollections from the past are richer and more complete (episodic memory), recall is better, and there is less forgetting and greater use of mnemonic techniques (Ghetti & Bunge, 2012; Ornstein & Haden, 2001). Therefore, the younger the child, the greater the need for cognitive support. Although older adults tend to have only slight decrements in implicit memory, short-term memory span, and recognition memory, they tend to experience substantial problems in free or cued recall, recollection of the original context in which an event occurred (source memory), remembering to carry out an action at a future time (prospective memory), and working memory (Grady & Craik, 2000). It is interesting, as reviewed earlier, that cognitive support appears to ameliorate the memory changes associated with older adulthood as well as diseases that impair memory that tend to occur in older adulthood (e.g., vascular dementia, Alzheimer's disease). Future research is needed to determine the impact of cognitive support on the memory of children. Taken together, the nature of memory problems will be different for patients of different ages and with different kinds of memory competencies. Hence, a potentially profitable direction for future research would be to determine whether clinicians need to choose memory-enhancing strategies that target the specific impairments of an individual patient.

In a similar vein, we emphasize that there are many challenges to memory functioning optimally within a treatment session among individuals diagnosed with a mental illness. Although a systematic review of the specific memory deficits experienced by patients diagnosed with a mental illness is beyond the scope of the present article, we offer three themes from the scientific literature. First, there are well-documented biases in memory across various psychiatric disorders (e.g., Harvey, Watkins, Mansell, & Shafran, 2004). Most patient groups selectively remember disorder-congruent stimuli (explicitly and implicitly). For example, people with obsessive-compulsive disorder who fear contamination selectively remember contaminated objects (Ceschi, Van der Linden, Dunker, Perroud, & Broadart, 2003), and people with eating disorders selectively remember weight and shape-related words (Brooks, Prince, Stahl, Campbell, & Treasure, 2011). Most patient groups have a tendency to experience disorder-congruent recurrent memories. For example, people with depression experience recurrent pessimistic thoughts about family deaths and illness and

interpersonal events, and patients with posttraumatic stress disorder are more likely to reexperience memories of personal trauma (Ehlers et al., 2002; Reynolds & Brewin, 1999). Also, most patient groups have difficulty accessing their specific store of memories, which is necessary to operate in the world (Dalgleish, Spinks, Yiend, & Kuyken, 2001; McNally, Lasko, Macklin, & Pitman, 1995; Williams & Dritschel, 1988). Second, it is clear that many patients with a mental illness have a tendency to over-elaborate certain memories, in the form of worry and rumination (Joormann, Dkane, & Gotlib, 2006; Watkins, 2008). Third, in terms of basic memory functioning, Table 1 provides examples of pervasive, and some specific, deficits across memory domains for patients with depression, bipolar disorder, and schizophrenia. Future research is needed to determine how these memory biases and deficits impact treatment engagement and outcome and if there is a need to match specific memory deficits with specific cognitive support strategies.

It is notable that the memory deficits documented in patients who meet diagnostic criteria for schizophrenia either do not respond to treatment or show only a small improvement (e.g., for atypical antipsychotics; Cirillo & Seidman, 2003). Among patients diagnosed with bipolar disorder, there are no differences in treatment outcome between patients with good and poor outcomes on working memory tests (Ferrier, Stanton, Kelly, & Scott, 1999). Also, Goldberg and Roy Chengappa (2009) concluded that current pharmacotherapy approaches do not improve cognition in bipolar disorder. The picture is more promising in depression. Douglas and Porter (2009) reported that improved mood is associated with overall improved memory. Together, it appears that memory deficits may be more responsive to treatments for depression than bipolar disorder or schizophrenia. As such, if certain memory deficits resolve with successful treatment in some disorders, it will be important to tease apart the role of the cognitive support strategies on memory for therapy content versus improving memory functioning more broadly as a consequence of the treatment.

Clearly, there will be a range of potential covariates and confounds to be investigated, including the age of the patient, the type of memory deficit evident at the beginning of treatment, the malleability of the memory deficit, and the severity of the mental illness. Also, perhaps there are variables within the treatment process itself that may be important confounds to examine in future research. Determining the extent to which these separable, measureable, and distinguishable constructs contribute to treatment outcome will be important. For example, memory for therapy contents may be associated with homework compliance and therapeutic alliance. If so, the important question to be answered becomes: Is memory for therapy contents the key ingredient, apart from homework compliance and therapeutic alliance?

An interesting extension to the lines of thinking developed in this article is the application to therapists. If therapists enhance their own memory for session content, would that also improve outcome? One method for studying this hypothesis would be to randomly allocate therapists to listen to audiotaped sessions each week versus not listening to the tapes. Indeed, Shepherd et al. (2009) investigated therapist attitudes to reviewing audiotaped sessions. Most therapists expressed positive views, and a key advantage cited was that reviewing the tape would improve memory.

Although we have focused on memory for psychosocial interventions, the implications are likely to extend to the doctor–patient relationship more generally. Indeed, robust evidence across two decades has documented that patients have poor memory for diagnostic and treatment information delivered by their physicians (as reviewed early in this article). It is not surprising that poor memory for the content of a doctor's visit has severe adverse effects on treatment adherence (Kravitz et al., 1993; Pickney & Arnason, 2005; Tosteson et al., 2003). Hence, perhaps the cognitive support intervention will be useful in broader medical health contexts.

Finally, the development of "transdiagnostic" and "transtreatment" approaches has a number of advantages, including the reduction of the current heavy burden on clinicians who must learn multiple treatment protocols that often share many common theoretical underpinnings and interventions (Harvey, 2009; Harvey et al., 2004). This is a high priority given reports that most individuals with mental illness do not receive treatment, and for those who do, 32% receive alarmingly low standards of care (Wang et al., 2005). Developing transdiagnostic and transtreatment components is one valuable but currently underutilized approach to improving availability and dissemination of treatments.

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Supplemental Material

Additional supporting information may be found at http://pps.sagepub.com/content/by/supplemental-data

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