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Perceptions of Cognitive Behavioral Therapy, Aerobic Exercise, and Their Combination for Depression

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Although cognitive behavioral treatment and aerobic exercise are effective treatments for depression, their perception among potential clients is unclear. In the present study, nearly 600 participants from an online survey platform provided data on their own depressive symptoms and their impressions of the potential efficacy, credibility, expected improvement, and perceived difficulty of exercise, cognitive behavioral therapy (CBT), and a combined alternative. For additional impact ratings, participants also guessed the percentage of patients who would no longer qualify for a diagnosis of depression after each treatment, revealing that they significantly underestimated the impact of both exercise and CBT relative to meta-analytic estimates. Participants rated the combined treatment higher on all domains than CBT and higher than exercise on impact, expectancy, and difficulty. Further exploratory analyses revealed no consistent significant links between ratings and past exercise habits, mental disorder diagnosis, mental health treatment, or psychiatric medication use on some ratings. Individual differences in depression scores or body mass index (BMI) also did not significantly influence participant ratings on the various measures. The present study provides evidence that potential clients appear to believe combining exercise and CBT will be especially efficacious, but they view exercise as difficult. Past research demonstrates that these perceptions can affect outcomes, so these findings might inform current practice, mental health education, and public service announcements.

Public Significance Statement
This study provides evidence that individuals reporting at least some symptoms of depression view exercise as a more difficult, but potentially more helpful, intervention than cognitive behavioral therapy. They rate a combined treatment as even more helpful than either alone but underestimate the potential efficacy of all options compared to published evidence. Given established links between expected and actual effects of treatments, these results suggest that discussing perceptions of the difficulty and efficacy of treatment, including exercise, could create better outcomes.

Keywords: exercise, aerobic exercise, cognitive behavioral therapy, depression

Mental health professionals may often be unaware of how their depressed clients perceive the role of physical exercise in their treatment. Potential clients might view exercise as a welcome suggestion that could supplement standard approaches or serve as a substitute for therapy. Many might find the idea of exercise too difficult. Although some clients might benefit most from an idiographic intervention, general impressions of exercise, psychotherapy, and their combination could inform clinicians about the potential impact of recommending certain treatments.

Major depression, a mental health disorder characterized by depressed mood and loss of interest or pleasure in daily activities, affects millions (National Institutes of Mental Health, 2017). The estimated economic burden in the United States exceeds $200 billion annually (Greenberg et al., 2015). The disorder includes deficits related to sleep, energy, concentration, and mood, and has deleterious effects on comorbid problems like anxiety, substance use disorder, and posttraumatic stress disorder. Lifetime prevalence of major depressive disorder in the U.S. is approximately 20% (Hasin et al., 2018), and worldwide estimates exceed 300 million (World Health Organization, 2017). Associated outcomes include poor quality of life for affected individuals and their families, increased mortality, and considerable economic burden (World Health Organization, 2017). The need for inexpensive, effective treatment seems obvious.

Psychotherapy and physical exercise each can improve depression. Meta-analytic reviews and randomized controlled trials

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suggest that they can have comparable efficacy, too. Investigations support an array of forms of moderate-intensity, regular, frequent exercise, including aerobic activities and lifting weights. The impact of continued exercise also appears quite durable at follow-up time periods ranging from 4 months to an entire year (Craft & Perna, 2004). Pooled standardized mean differences for exercise likely range from approximately 0.4 to 1.4 (Babyak et al., 2000; Cooney et al., 2013; Craft & Landers, 1998; Daley, 2008; Danielsson et al., 2013; DiLorenzo et al., 1999; Doyne et al., 1987; Fremont & Craighead, 1987; Josefsson et al., 2014; Krogh et al., 2011; Rethorst et al., 2009; Rosenbaum et al., 2014; Schuch et al., 2016 Silveira et al., 2013; Stathopoulou et al., 2006). Potential clients generally view exercise as an acceptable suggestion for treating depression, (Schneider et al., 2016; Searle et al., 2011) though vegetative symptoms related to motivation and fatigue might inhibit compliance (Busch et al., 2016).

Perceptions of how physical exercise compares to psychotherapy in its effectiveness at reducing symptoms of depression, however, remain unclear, suggesting a need for more specific investigation. In addition to psychiatric medication, psychotherapy, including cognitive behavioral therapy (CBT), also has meaningful antidepressant effects. Meta-analytic results suggest that CBT creates better gains than care-as-usual conditions ($d = 0.47$–0.72; Cuijpers et al., 2019), and reviews reveal that those who participate in CBT significantly improve more than control groups. Effect sizes range from $d = 0.87$ to 1.02 (Cuijpers et al., 2019). Potential clients often find psychotherapy an acceptable suggestion, and many clients prefer it to medication (van Schaik et al., 2004).

Randomized controlled trials that compare exercise against psychotherapy suggest either comparable benefit or enhanced positive effects from exercise in some populations (e.g., Cooney et al., 2013; Greist et al., 1979; Rimer et al., 2012). Continued exercise long term might also have an advantage over CBT against relapse to a depressive episode (Blumenthal et al., 1999; Fremont & Craighead, 1987; Greist et al., 1979), but both approaches help. Other research suggests that combined treatment provides greater improvements in suicidal ideation and depression compared to CBT alone (Abdollahi et al., 2017), and positive effects on immunological measurements affected by major depression (Euteneuer et al., 2017). New meta-analytic results suggest that adding exercise to interventions that are strictly behavioral has a meaningful impact on improvements in depression even though adding exercise to cognitive-behavioral interventions offered no edge for depression treatments in adults with chronic disease (Bourbeau et al., 2020).

Nevertheless, perceptions about exercise, CBT, and a combination of the two remain underinvestigated. Few studies address the impressions these interventions make on dysphoric individuals. Each approach likely creates different expectations in the minds of those who might benefit. The rationales for their efficacy might range in both credibility (the sense that clients feel that the treatment would work) and difficulty (the amount of effort required for improvement). The present study compares patient perceptions of exercise as a treatment for depression to CBT and a combined alternative. Though combined treatments might not be more effective than either exercise or CBT alone, employing both treatments simultaneously might prove advantageous for preventing relapse and could have a unique appeal to potential clients (Blumenthal et al.,1999; Fremont & Craighead, 1987). Because several factors such as body mass index (BMI), motivation, fatigue, and mood all negatively influence perceptions of exercise, we hypothesized that participants would view this treatment option as generally more difficult than CBT, and that a combined treatment option would be perceived as even more difficult than CBT alone (Busch et al., 2016; Seime & Vickers, 2006; Vartanian & Novak, 2011). We also hypothesized that participants would view the combined treatment as more effective than either treatment alone, as previous work has suggested when clients combine two different therapies (Alang & McAlpine, 2020).

In addition, we explored perceptions of CBT alone or exercise alone and focused on a novel dependent measure. Few studies address client perceptions related to complete remission from the diagnostic category. That is, research rarely asks potential patients how many people would no longer qualify for a depression diagnosis at the end of treatment. Meta-analytic reviews suggest that this number is roughly 60% (Cuijpers et al., 2014), but impressions in the public could vary from this rate quite dramatically. Ideally, these data could reveal if one treatment or the combination might appear more impactful, credible, or difficult, potentially providing insights into ways to present these approaches to those who might benefit most. Finally, we assessed past exercise habits, mental disorder diagnosis, mental health treatment, and psychiatric medication use among participants. Perhaps, participants who exercised regularly in the past could view exercise as less difficult or more effective. Moreover, those with a history of mental health diagnosis, treatment, or medication use might have a range of impressions of therapy or its efficacy that differs from those who do not have these relevant experiences.

Method

Participants

We recruited participants using Amazon's Mechanical Turk, a popular online survey platform ($N = 1{,}130$). Our study was deemed exempt by the University at Albany's Institutional Review Board. The consent form included contact information for local and national resources providing mental health support. In an effort to focus on a sample with depressive symptoms, those who scored less than 4 on the initial Center for Epidemiologic Studies Depression Scale Revised (CESD-R-10) (described below) did not continue with further questions (Andresen et al., 1994). A comparable approach has helped previous work focus on identifying a sample currently experiencing symptoms of depression (Ophir & Mor, 2014). We also omitted data from those who failed multiple infrequency items (Meade & Craig, 2012), leaving a final sample of 579.

Body Mass

We surveyed height in inches and weight in pounds to calculate BMI as a potential predictor of exercise impressions (Vartanian & Novak, 2011).

Exercise Habits

We asked participants about past exercise habits with the following prompt: "Moderate intensity exercise is described as sports, physical activities, or exercise that cause moderate increases in breathing or heart rate. Was there ever a time when you engaged in

moderate-intensity exercise for at least 30 min at least 3 times per week?" See Table 2 for percentages.

Mental Disorder Diagnosis

We asked participants if they have ever been diagnosed with any psychiatric conditions. See Table 2 for percentages.

Mental Health Treatment

We also asked participants if they have ever received psychotherapy treatment. See Table 2 for percentages.

Psychiatric Medication Use

We surveyed psychiatric medication use among participants with the following prompt: "Did you ever take a psychiatric medication for anxiety, depression, or some other symptoms?" See Table 2 for percentages.

Depression Severity

The CESD-R-10 served as an index of depression (Andresen et al., 1994). This 10-item self-report measure, an adaptation of the original CES-D's items (Radloff, 1991), shows strong psychometric properties with internal consistencies (Cronbach's α) ranging from 0.89 to 0.91 in previous investigations (Björgvinsson et al., 2013; Haroz et al., 2014). The assessment includes eight items about depression symptom frequency and two about positive affectivity. Participants endorse all items on a scale from 0 (*Rarely or none of the time*) to 3 (*All of the time*). Items assessing positive affectivity are reverse scored and summed with the depression items to calculate a global depression score; total scores range from 0 to 30. Scores greater than 10 indicate probable depression. For the purposes of this study, only individuals who scored at least a 4 on the measure were able to complete the survey. This cutoff allowed for only users who experience at least occasional depression symptoms to respond. Individuals who scored less than a 4 were directed to the end of the study and thanked for their participation without compensation, as stated in the informed consent.

Stimuli

Participants read descriptions of treatments one at a time: an exercise intervention ("Exercise"), "CBT," and a combination ("Combination"). We assigned approximately half (49.1%) to read the exercise description first, based on birthdate (even or odd), in an effort to account for any order effects. The approach and descriptions parallel those used in previously published work (Beshai et al., 2019) and appear in the Appendix.

Impressions of Treatment

We used the Credibility/Expectancy Questionnaire (Devilly & Borkovec, 2000) and individual items related to potential impact and difficulty. The scale's internal consistency (Cronbach's α) ranged from 0.79 to 0.86 in its initial validation (Devilly & Borkovec, 2000). Participants indicated their rating on a sliding 0–100 scale ranging from *Not at all* to *Extremely* for questions related to how logical the therapy seems, how successful the treatment will be, how much improvement they think and feel will occur, and how difficult adherence might be.

The Credibility subscale was the average of three items (how logical, how successful, and how confident they would be recommending the treatment). Responses ranged from 0—*Not at all Logical/Successful/Confident* to 100—*Extremely Logical/Successful/Confident*. The midpoint was "Somewhat Logical/Successful/Confident."

The Expectancy subscale was the average of three other items (how much improvement they thought would occur with treatment, how much they *felt* the therapy would reduce symptoms, and how much improvement they *felt* would occur with the therapy). The points of the scale followed the same format.

The Difficulty item asked how difficult they thought adhering to the treatment might be (from 0 (*Not at all difficult*) to 100 (*Extremely difficult*)).

The Impact (Percentage Recovered) item asked participants to estimate the post treatment depression rate for those who completed the sessions (0%–100%): "Of all the people who complete this therapy, what percentage do you think are no longer depressed when they leave their last session."

Analytic Plan

We used standard one-way ANOVAs and paired comparisons to test primary hypotheses about perceptions of treatments. When assumptions were violated, we used Welch's one-way ANOVA and Games–Howell tests (Games & Howell, 1976), which correct to avoid error. We used a modified, step down Bonferroni procedure to balance power and Type I error (see Rom, 1990). This approach uses 0.05 for the smallest effect first, 0.025 for the second, etc. so each test must pass more stringent criteria than the previous one, improving power better than Bonferroni without inflating Type I errors (see Wilcox, 2009). Thus, the 19 main hypothesis tests (order and gender, correlation with age, four omnibus F tests, and 12 follow-up tests for primary hypotheses (CBT vs. Exercise, CBT vs. Combination, Exercise vs. Combination by 4 DVs)) listed as $p < .05$ below met these criteria.

Exploratory analyses (including links to BMI, CES-D scores, previous mental health diagnosis, mental health treatment, exercise, or psychiatric medication use) used a separate Rom's procedure, again starting at 0.05 and growing more stringent to qualify for significance.

Results

Demographics appear in Table 1. Height in inches ($M = 67$; $SD = 5.3$, $R = 41$) and weight in pounds ($M = 163$; $SD = 54$, $R = 433$) were transformed to compute BMI (Kg/meters^2; $M = 26$, $SD = 8$, $R = 69$). CES-D scores averaged 14.8 ($SD = 5.84$, $R = 4$–30).

Perceptions

The Credibility subscale ($M = 65$, $SD = 67$; Cronbach's $\alpha = 0.897$) and Expectancy subscale ($M = 60$, $SD = 22$; Cronbach's $\alpha = 0.939$) used the full range (0–100). Collapsed across all conditions, the Difficulty item ($M = 57$, $SD = 25$) and Impact ($M = 56.5$, $SD = 22$) also used the full range. Order of

Table 1
Demographics

Total	$N = 579$
Gender	
Female	305 (53%)
Male	274 (47%)
Age	
18–20	38 (6.7%)
21–29	229 (40.5%)
30–39	165 (29.0%)
40–49	80 (14.3%)
50–59	31 (5.4%)
60+	23 (4.1%)
Ethnicity	
White	298 (51%)
Hispanic or Latinx	51 (9%)
Asian	124 (21%)
African or Caribbean descent	37 (6%)
Native American or Alaska Native	22 (4%)
Other or mixed	52 (9%)
Education	
Some high school	6 (1%)
High school diploma or equivalent	50 (9%)
Some college	95 (16.5%)
Associate's degree	40 (7.0%)
Bachelor's degree	274 (47.5%)
Some graduate training	18 (3%)
Advanced degree	93 (32.2%)
Missing	1 (0.02%)

presentation of treatments, BMI, age, and gender had no significant effects, all p values $> .05$; no d exceeding 0.19 or correlation exceeding 0.20. A within-subjects Welch's one-way ANOVA revealed significant differences across the three conditions (Combined, Exercise, and CBT) for all measures; Credibility $F(1, 245) = 15.3$, $p < .05$, Expectancy $F(1, 153) = 25.1$, $p < .05$, Impact $F(1, 144) = 29.7$, $p < .05$, and Difficulty $F(1, 153) = 18.1$, $p < .05$. Average ratings for each condition are shown in Table 3. Games–Howell comparisons revealed significant differences across all three conditions for most measures. Combined treatment usually exceeded Exercise, which often exceeded CBT. Specifically, compared to Exercise, participants reported that the Combined treatment had higher Impact ($p < .05$), greater Expectancy of Improvement ($p < .05$), and more Difficulty ($p < .05$), but not more Credibility. Participants believed that combined treatment exceeded CBT on Impact, Credibility, Expectancy of Improvement, but also more Difficulty (all ps $< .05$). Compared to CBT, Exercise treatment appeared no higher on Impact ($p = .135$) but significantly greater on Credibility, Expectancy of Improvement, and Difficulty (all ps $< .05$) (see Table 4 for effect sizes).

Table 2
Percentages of Participants

Choice	Exercise	Diagnosis	Treatment	Medication use
Yes	88%	39%	40%	44%
No	12%	54%	56%	53%
Prefer not to say		7%	4%	3%

Note. Exercise: "Moderate intensity exercise is described as sports, physical activities, or exercise that cause moderate increases in breathing or heart rate. Was there ever a time when you engaged in moderate-intensity exercise for at least 30 min at least 3 times per week?" Diagnosis: "Have you ever been diagnoses with any psychiatric conditions?" Treatment: "Have you ever received psychotherapy treatment?" Medication use: "Did you ever take a psychiatric medication for anxiety, depression, or some other symptoms?"

Contrasts With Meta-Analytic Estimates of Impact

For perceptions of the percentage of patients who would recover, participants indicated that, on average, they thought 53%, 55%, and 62% of patients would no longer be depressed after CBT, exercise treatment, and combined treatment, respectively. Comparisons of these estimates to the 60% recovery rate suggested by meta-analytic results via the Modified Wald Test (Agresti & Coull, 1998) suggest that only the impression for the combined treatment was comparable (95% CI = 59.0%–66.9%). Participants rated CBT alone (95% CI = 48.8%–56.9%) and Exercise alone (95% CI = 50.8%–58.9%) significantly lower on the percentage of participants they thought would no longer qualify for a diagnosis of depression after treatment.

Exploratory Analyses

Previous mental health diagnosis, mental health treatment, exercise, and psychiatric medication use failed to link significantly to dependent measures.

Discussion

Physical exercise, as well as CBT, has empirical support as treatments for depression (Craft & Perna, 2004; Cuijpers et al., 2019). Few studies address perceptions of these treatments alone or in combination. Nearly 600 participants with depressive symptoms read descriptions of each therapy (and their combination) and reported impressions of each treatment's (a) impact on the percentage who would recover, (b) credibility, (c) expectations of efficacy, and (d) difficulty to complete. They also estimated the percentage of depressed clients who would not qualify for a depressive diagnosis after treatment. Participants understandably viewed the combined therapy as potentially better, but also more difficult, than either treatment alone. Participants also rated physical exercise (compared to CBT) as no higher in potential to completely alleviate depression, but significantly greater in credibility and expected efficacy, but also difficulty. These results suggest that many people with depressive symptoms know that either physical exercise or CBT could help; they view the combination as particularly salubrious. Nevertheless, they also see exercise as difficult.

Participants also indicated that, on average, they thought 53%, 55%, and 62% of patients would no longer be depressed after CBT, exercise treatment, and combined treatment, respectively. These averages represent pessimistic estimates for recovery relative to extant findings, which may warrant further investigation. Because research shows that expectations affect outcomes, these levels could decrease patient improvement. Realistic education on efficacy might improve impressions of different treatments (Curry et al., 2006, de Haan et al., 1997; Price et al., 2008). Informing patients might encourage them, potentially enhancing confidence in treatment. Managing this balance could have impact. In addition, these perceptions might affect client preferences, which influence outcomes. Generally, clients who receive treatment that aligns with their own

Table 3
Perceptions by Condition (Mean and [SD]) N = 579

Subscale	Exercise	CBT	Combined
Impact	55 (22.7)	52.6 (19.9)	61.8 (21.5)
Credibility	65.4 (19.5)	62.4 (18.2)	68.5 (19.4)
Expectancy	59.9 (22.5)	55.7 (21.5)	64.6 (21.1)
Difficulty	57.5 (25.9)	52.9 (24.4)	61.6 (24.5)

Note. Impact = % no longer depressed at treatment's end. CBT = Cognitive behavior therapy; Credibility = Subscale from credibility/expectancy questionnaire; Expectancy = subscale from credibility/expectancy questionnaire; Difficulty = how difficult.
See Table 4 for effect sizes and statistical significance.

predilections improve more (Chilvers et al., 2001; Clever et al., 2006; Crits-Christoph et al., 2017; Dwight-Johnson et al., 2001; Iacoviello et al., 2007; Kocher et al., 2002; Lin et al., 2005; Raue et al., 2009). Clinicians who respect these client preferences can incorporate them into patient-centered discussions, strengthening therapeutic alliance (Pinto et al., 2012). This approach is consistent with Motivational Interviewing, which has enhanced CBT for depression (Keeley et al., 2016).

Perceptions of difficulty suggest that addressing this topic might also improve outcomes. Participants found exercise a credible intervention but rated it as more difficult than CBT. Research reveals that pairing exercise with cognitive therapy as a form of Behavioral Activation is acceptable. Clients might benefit from education to overcome barriers to compliance (Schneider et al., 2016). Successive approximations, challenging cognitions about exercise, and natural positive reinforcers could help. Multidisciplinary teams employing mental health specialists, athletic trainers, and physicians might be especially efficacious at tailoring these interventions.

BMI was not a significant predictor of ratings, despite previous links to exercise avoidance (Vartanian & Novak, 2011). The previous work, however, focused on weight attitudes. Only those who displayed higher antifat attitudes and internalized societal standards of attractiveness avoided exercise in response to weight stigma. The failure to detect BMI as a significant predictor of treatment perceptions could stem from our relatively less specific measure. Nevertheless, the null result might suggest that clients of all sizes could still hold positive impressions of exercise. Despite major depression's link to diminished mood, energy, and motivation, self-reported depression symptoms (as measured by the CESD-R) did not predict treatment attitudes in the current sample. Although the range was restricted (4–30), this result offers hope about depression's link to expectations.

Table 4
Effect Size Differences (N = 579)

Groups	Impact	Credibility	Expectancy	Difficulty
COM > Exercise	0.31*	0.15	0.22*	0.16*
COM > CBT	0.44*	0.32*	0.42*	0.35*
Exercise > CBT	0.11	0.16*	0.18*	0.18*

Note. COM = Combined treatment; CBT = Cognitive behavior therapy.
* Corrected $p < .05$.

Limitations, Future Directions, and Implications

These data have limitations related to sampling and procedure. Replication is always essential. An enormous sample from multiple recruitment sources representing a greater range of diversity in participants, especially given established deviance among Amazon Mechanical Turk (MTURK) workers, would make a welcome addition to any replication (Chandler et al., 2020; Chandler & Paolacci, 2017; Moss & Litman, 2018; Robinson et al., 2020). Although sample size and attention checks provide confidence in the current data, high-powered replications that address perceptions in alternative ways in a range of participants would likely reveal more about attitudes related to CBT, exercise, and their combination. These approaches might vary depending upon focus. For example, improved assessment of treatment barriers, including physical or medical conditions that might decrease ability to exercise, treatment history, stigma related to therapy participation, concerns about financial costs, time commitments, and other relevant variables, could help explain some null findings here as well as account for more variance in perceptions. Established predictors of dropout in exercise interventions would be particularly relevant (Stubbs et al., 2016). A close look at impressions before and after reading therapy descriptions might illuminate why links to previous treatment did not appear. (Perhaps information in the descriptions equated groups.) A detailed assessment of treatment history successes and failure might explain the absence of links with previous therapy. In addition, personality correlates and other individual differences might prove illustrative.

Extensions to other treatments and other troubles that respond well to exercise might take advantage of the strengths of this paradigm as well. Some scholars recommend that all people with serious mental illnesses should increase their physical activity, partly given their risk of cardiovascular diseases (Vancampfort et al., 2015). The results of the present study could inform any potential shifts in care. The generally positive attitudes toward exercise are encouraging for research on low-intensity interventions in the stepped care approach for mental health treatment (Hermens et al., 2014), which advocates the use of low intensity interventions that are the "least restrictive" in personal cost and inconvenience (Bower & Gilbody, 2005). Given the positive attitudes toward exercise and its lack of significant cost, challenges to perceptions of difficulty seem worthwhile. Nevertheless, income and access to exercise do covary, and attitudes about exercise might vary in other cultures, suggesting the need for more work in these areas.

Although extensions to other mental health conditions seem an obvious move, those without a clinical diagnosis might benefit from these treatments as well. As recent trends in positive psychology document, viewing mental health along a continuum from flourishing to languishing has considerable heuristic value and could prevent both physical and psychological distress. Flourishing individuals are nearly three times less likely to have recently suffered a major depressive episode than moderately mentally healthy individuals (Heintzelman et al., 2020; Keyes, 2002). Given exercise's role in reducing depression and the covariation between depression and flourishing, future work might also examine expectations related to exercise's impact on optimal functioning. With all of these results in mind, clinicians might find that clients of all types might benefit from presenting multiple options and combinations for treatment as well as for prevention of related

symptoms. These results also suggest that improving our understanding of expectations about combining CBT with exercise has the potential to improve treatment and, by extension, prevent depression. Addressing attitudes about adding appropriate exercise to psychotherapy could likely help a range of clients.

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Appendix

Descriptions

Cognitive Behavior Therapy

Research reveals that Cognitive behavior therapy (CBT) reduces depression. CBT focuses on helping patients understand how thoughts and actions affect emotions. Treatment often begins with important information about what depression is, how it might work, and how therapy can help. In the "cognitive" part, clients learn to recognize unhelpful thoughts and challenge their validity, which can improve mood, increase energy, and lead to a better outlook on life. The therapist then helps clients identify their values so they can choose activities for the "behavior" part. Clients choose activities each day that can enhance feelings of accomplishment. The activities are often simple but important for day-to-day functioning (e.g., paying the electric bill) or inherently pleasurable (e.g., chatting with a friend or enjoying a movie). Clients often begin with smaller, easier tasks like bathing and cooking, and then work up to more elaborate goals like taking a class or being more assertive at work.

After a few weeks of improved mood, clients often plan for how to cope with symptoms should they reappear. The process includes homework exercises like tracking symptoms, thoughts, and actions. Those who complete more of these exercises tend to improve the most. Usually, 12–20 weekly, face-to-face sessions with a mental health professional create meaningful improvement.

Advantages of CBT

1. Scientific reviews reveal that most patients (55%–65%) with depression who undergo CBT see significant reductions in symptoms.
2. The skills related to identifying and challenging thoughts appear to have a positive impact on multiple facets of life.
3. The therapist can easily adapt each session to the needs of each client.
4. New activities not only improve mood but also help life satisfaction, relationships, and self-esteem.
5. Unlike antidepressant medications, CBT for depression has no physiological side effects.

Disadvantages of CBT

1. Approximately 15%–30% of patients will see no reduction in their symptoms.
2. Approximately 25% experience a return of symptoms within a year after completing CBT.
3. CBT requires considerable time and effort on the client's part to reduce depression.
4. The success of CBT for depression depends to a large degree on the delivery techniques and expertise of the therapist.
5. To date, there is little scientific consensus as to exactly why, how, or for whom CBT might work.

Exercise

Multiple experiments reveal that regular, moderate-intensity, aerobic exercise reduces depression. Depressed clients who exercise at least 3 times per week improve more than those who take a placebo, wait for treatment, or participate in informal groups that talk about feelings. Some of the best experiments compare brisk jogging for 30 min to 30 min of stretching or effortless walking. In 8–12 weeks, depression drops for clients regardless of age, socioeconomic status, or ethnicity. Programs that include supervision and training with an exercise professional, trainer, or coach seem to have the biggest impact.

Years of research confirm that exercise helps depression, but we are not exactly sure why. Regular activity increases "feel-good" chemicals that are often responsible for the "runner's high." Brisk exercise also increases brain-derived neurotrophic factor, a compound associated with better mood, attention, and memory. Stress

(*Appendix continues*)

hormones decrease in regular exercisers, and serotonin, a neurotransmitter targeted by many antidepressants, tends to increase. Long-term studies suggest that exercise not only improved mood but also cardiovascular health, quality of life, and self-esteem.

Advantages of Exercise

1. The release of "feel good" chemicals often leads to rapid relief that is just as effective as psychotherapy and antidepressants.
2. Exercise's impact can last longer than other treatment approaches, decreasing rates of relapse.
3. The treatment often takes on a life of its own, requiring less time from an exercise professional and little effort from mental health or medical personnel.
4. Exercise also improves sleep, weight management, memory, and more, potentially keeping depressive symptoms to a minimum in indirect ways.
5. Clients tend to adhere to the program well because they can pick favorite activities and work out with partners or groups if they like.

Disadvantages of Exercise

1. Of note, 15%–25% of patients do not see any reduction in their symptoms.
2. Because depression often includes reduced motivation and energy, some clients claim they have trouble getting started with the exercise program.
3. Depending on each client's health, weight, and physical fitness, an exercise program is not always appropriate.
4. The outcomes of the treatment rest almost entirely on patient effort.
5. Exercise programs rarely provide the same level of professional support associated with traditional medical or psychotherapy interventions.

Exercise and Psychotherapy

Exercise has been used in conjunction with CBT to help treat depression. Patients attended 3 weekly, supervised exercise sessions in addition to a typical schedule of weekly cognitive therapy.

The CBT focused on helping patients change their negative, unhelpful thoughts to more adaptive, positive ones. In addition, the therapist worked with the patient to become reacquainted with positive activities that may have been neglected or avoided during a depressive episode. This approach allowed the therapist and client to form a good therapeutic relationship while the impact of exercise on mood and motivation remained.

Alongside the exercise program, CBT was provided by a therapist on a weekly basis for 10 weeks. In this treatment, patients received both the immediate and long-term effects of exercise and learned better coping skills to help them recover from their depressive symptoms. CBT included the usual homework and discussions designed to teach the clients to maintain their gains, connect to their values, and behave in ways that are consistent with those values. These sessions also helped them learn to identify when their thoughts did not seem to serve them well, reflect reality, or create the kind of moods they wanted to experience.

Advantages of Exercise and Psychotherapy

1. Patients receive multiple treatments, connecting the patient with multiple sources of relief.
2. In addition to receiving immediate relief from exercise, patients learn coping skills that they can use if they experience depression again.
3. Exercise benefits might allow severely depressed patients to more actively participate in CBT.
4. The therapist patient relationship may provide support to encourage exercise compliance.
5. Patients who may not have responded to one treatment on its own might benefit from combined treatment.

Disadvantages of Exercise and Psychotherapy

1. Being that this treatment includes both activities, it may be more time intensive than other interventions.
2. Concurrent treatment might make it difficult to tell which aspect of treatment helped a patient most.
3. Some studies have found no additional benefit by combining these two treatments.
4. Exercise treatment might cause physical side effects such as injury.
5. Patients might not be motivated to engage in the cognitive behavioral intervention, especially if they experience immediate relief from exercise.

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