

Summary

The Effectiveness of Attention Training Technique as a Metacognitive Therapy Strategy: A Systematic Review

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According to the metacognitive model, psychopathologies are associated with the activation of a maladaptive thinking style in the individual and with transient negative thoughts and emotions becoming persistent. This condition is explained by the Cognitive Attentional Syndrome, in which self-focused repetitive cognitive processes such as threat monitoring, rumination, and worry predominate (Wells, 2011). Targeting this syndrome, the Attention Training Technique (ATT; Wells, 1990) is a metacognitive therapy method that aims to foster detached mindfulness of thoughts, reduce repetitive thinking cycles, and strengthen attentional control and cognitive flexibility (Wells, 2007, 2009). By allowing individuals to experience that attention is under their own control, ATT weakens metacognitive beliefs about uncontrollability and contributes to reducing the tendency toward self-focused attention, thereby supporting emotion regulation processes (Wells, 1990, 2009).

Applied as a transdiagnostic intervention, ATT is based on directing attention through auditory stimuli (Wells, 2009). The approximately 12-minute protocol consists of three components: selective attention, rapid attention switching, and divided attention. Sessions involve explaining the role of excessive self-focused attention in maintaining problems, presenting the theoretical foundations of ATT, conducting the exercise, providing feedback, and assigning homework (Wells, 2007, 2009). Participants are instructed to treat intrusive thoughts as “background noise” and the technique is supported through daily practice (Wells, 2000, 2009).

The effectiveness of ATT as a stand-alone intervention has been demonstrated in numerous studies. Findings indicate that ATT reduces self-focused attention, increases attentional control, and lowers anxiety levels, and in depressive samples it decreases repetitive thinking and symptom severity (Fergus et al., 2014; Papageorgiou & Wells, 2000). Neuroimaging studies show increased

neural flexibility in attentional orienting processes (Jahn et al., 2023; Kowalski et al., 2020). Two review studies (Fergus & Bardeen, 2016; Knowles et al., 2016) suggest that ATT may be effective for anxiety, depression, and some psychotic symptoms, while also highlighting sample-size limitations. In this context, ATT appears to be a low-cost, easily administered attentional manipulation technique with potential as a therapeutic tool, whereas the lack of a recent systematic review represents an important gap in the literature.

Method

Because ATT has been the focus of research for approximately the last three decades, no time restriction was applied in the literature search. Accordingly, studies published in PsycINFO, Scopus, Web of Science, and PubMed were systematically reviewed using the keyword “attention training technique.” From the publications identified, studies that were not ATT effectiveness trials, that included child or adolescent samples, that examined ATT outside a metacognitive therapy framework, or that were published in languages other than English were excluded. Effectiveness studies conducted with adult samples and examining ATT from a metacognitive therapy perspective were included in this review.

The most recent search of the databases was completed on 30 July 2025. In total, 225 records were identified through the specified databases, and after removing duplicates, 125 studies meeting the general criteria were retained. Title and abstract screening resulted in 46 studies being examined in detail. In line with the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guideline (Page et al., 2021), 30 studies that met the inclusion criteria were selected, and 3 further studies identified from other sources were added, resulting in a total of 33 included studies. In addition, for

randomized controlled trials, risk of bias was assessed using the Cochrane Risk of Bias 2 tool (RoB 2; Sterne et al., 2019). RoB 2 generates judgments of “low risk of bias,” “some concerns,” or “high risk of bias” based on responses to signaling questions across five domains: Domain 1 – Bias arising from the randomization process, Domain 2 – Bias due to deviations from intended interventions, Domain 3 – Bias due to missing outcome data, Domain 4 – Bias in measurement of the outcome, and Domain 5 – Bias in selection of the reported result. Following the RoB 2 guideline, the overall risk-of-bias judgment for each study was determined as high risk of bias if any domain was rated high; some concerns if at least one domain was rated as some concerns and none as high risk; and low risk of bias if all domains were rated low risk.

Results

Among the studies examined, the earliest was published in 1998 (Papageorgiou & Wells, 1998), and the remaining studies have been added to the literature over the last 18 years with increasing frequency. Although ATT was developed by Wells in 1990, the recent literature shows that the technique has been investigated more systematically and from multiple perspectives in recent years. This section presents information on sample sizes, diagnostic characteristics, gender distribution, diagnostic procedures, as well as the characteristics of treatment, control, and comparison groups, group allocation methods, measures used, frequency of assessments, session structures, study findings, and evaluations of risk of bias.

Sample characteristics: Participants in the reviewed studies ranged in age from 17 to 73 years, with the highest mean age reported in the study by Papageorgiou and Wells (1998). Twelve studies included student samples, ten included healthy adults, and ten included participants with psychiatric diagnoses. These diagnoses comprised paranoid schizophrenia (Levaux et al., 2011), mixed anxiety disorders (Snuggerud et al., in press), social phobia (Donald et al., 2014; McEvoy & Perini, 2009; Vogel et al., 2016), alcohol use disorder (Erdoğan-Yıldırım et al., 2025), schizoaffective disorder (Carter & Wells, 2018), major depressive disorder (Müller et al., 2025), hypochondriasis (Papageorgiou & Wells, 1998), and Tourette syndrome (Schaich et al., 2020). Studies conducted with patients with coronary heart disease (Dammen et al., 2022; Tunheim et al., 2025) demonstrate that ATT can also be applied in clinically heterogeneous populations. In some studies, diagnoses were based on DSM-III-R, DSM-IV, DSM-IV-TR, or DSM-5 criteria; in others, structured interview instruments were

used (e.g., MINI, SCID, DSM-IV anxiety disorders interview). Certain samples were defined around specific stressors (e.g., pain, traumatic life event, stressful life event). Sample sizes varied widely, from single-case studies to 218 participants. In most studies, women were overrepresented; some samples consisted solely of women (Carter & Wells, 2018; Levaux et al., 2011; Papageorgiou & Wells, 1998; Schaich et al., 2020), whereas others included only men (Dammen et al., 2022; Erdoğan-Yıldırım et al., 2025).

Control and comparison conditions: Although there are studies in which ATT was applied only as a case-based intervention (Carter & Wells, 2018), most research compares ATT with other interventions or control conditions. These include cognitive group therapy (Donald et al., 2014), cognitive-behavioral group therapy with integrated ATT (McEvoy & Perini, 2009), progressive muscle relaxation (Sharpe et al., 2010), filler tasks (Nassif & Wells, 2014; Callinan et al., 2015), passive listening conditions (Knowles & Wells, 2018), auditory materials without instructional content (Ferne et al., 2019; Heitland et al., 2020; Jahn et al., 2023), auditory material composed of neutral statements (Stewart et al., 2021), non-instructed versions of ATT (Müller et al., 2025), attention deployment tasks (Taraban et al., 2017), distraction and thought-shifting conditions (Fergus et al., 2014; Fergus & Wheless, 2018; McEvoy et al., 2017), mindfulness-based self-compassion (Haukaas et al., 2018), and wait-list control groups (Moritz et al., 2011; Myhr et al., 2019; Snuggerud et al., in press). Designs comparing short and long versions of ATT were also identified (Baumeister et al., 2024).

Group allocation: A substantial proportion of the studies were randomized controlled trials, with 26 studies reporting random allocation to conditions; however, the specific procedures used for randomization were often not described in detail. Case studies, qualitative research, and nonrandomized designs were also present (e.g., Dammen et al., 2022; Papageorgiou & Wells, 1998; Tunheim et al., 2025).

Measures. Symptom measures were used alongside instruments assessing cognitive and metacognitive processes (e.g., Meta-Worry Questionnaire, Toronto Mindfulness Scale, MCQ-30). Some studies used the single-item Self-Focused Attention Scale. In addition to self-report measures of attentional processes, performance-based tasks such as the Stroop test, Dichotic Listening Task, and emotional dot-probe task were used. EEG (Knowles & Wells, 2018; Usui et al., 2022) and fMRI assessments (Jahn et al., 2023; Kowalski et al., 2020; Müller et al., 2025) were also employed.

Frequency of assessments: In most studies, effe-

ctiveness was evaluated using pre- and post-treatment assessments, while some included measurements after each session. Follow-up assessments were reported in only ten studies, conducted between one and six months after treatment. One study (Schaich et al., 2020) implemented follow-ups at 18 and 30 weeks.

Structure and characteristics of sessions: Interventions were mostly delivered individually; six studies used a group format. The number of sessions ranged from a single session to 17 sessions (Carter & Wells, 2018). In some studies, ATT was applied as an auditory manipulation task with sequential applications or “doses” (Barth, 2019; Heitland et al., 2020).

Results of the studies: Owing to the large number of measures used, findings are broad in scope: some studies reported significant changes on all measures, whereas others found effects on only certain variables. In some research, ATT did not yield the expected effects or failed to outperform comparison conditions. Among the ten studies conducted with clinically diagnosed participants, nine demonstrated that ATT was effective. Reported effects included reductions in the frequency of hallucinations and tics (Tourette syndrome and schizophrenia samples), decreases in anxiety and depressive symptoms, reductions in positive symptoms, lower levels of self-focused attention, diminished fear of negative evaluation, and marked improvements in repetitive thinking processes. In a study of social phobia comparing ATT with relaxation training, both interventions produced improvement but no significant between-group differences emerged (McEvoy & Perini, 2009). In a study of individuals with probable generalized anxiety disorder, ATT did not show significant effects across all measures (Stewart et al., 2021).

Of the two studies with coronary heart disease patients, one reported significant reductions in anxiety, depression, and worry (Dammen et al., 2022), while the other found, based on qualitative themes, that ATT was perceived as beneficial (Tunheim et al., 2025). In trials comparing ATT with cognitive therapy, disorder-specific symptoms improved in both conditions, but ATT showed stronger effects on self-focused attention and fear of negative evaluation (Donald et al., 2014).

In the study contrasting ATT with progressive muscle relaxation (Sharpe et al., 2010), the ATT group exhibited significant decreases in both self-focused attention and attentional bias toward pain-related words. Filler-task comparison studies (Callinan et al., 2015; Nassif & Wells, 2014) reported reductions in intrusive thoughts and increases in attentional flexibility. In work comparing ATT with attention deployment tasks, ATT produced stronger results across all measures (Taraban

et al., 2017). In a study using non-instructed auditory material consisting of the same sounds, Stroop performance improved significantly following ATT (Ferne et al., 2019).

Studies comparing ATT with mindfulness-based conditions reported significant effects on specific indices (Fergus et al., 2014; Fergus & Wheless, 2018; McEvoy et al., 2017). Some research found no group differences, although all groups showed improvements (Haukaas et al., 2018; Watson & Purdon, 2008). In a health-anxiety sample, an intervention focusing attention on bodily sensations unexpectedly produced stronger effects than ATT (Schwind et al., 2016).

In trials using wait-list control groups, ATT was generally more effective, although some studies did not yield statistically significant differences (Moritz et al., 2011). In a sample with alcohol use disorder, significant improvements were reported in worry, the cognitive dimension of anxiety sensitivity, attentional control, and metacognitive beliefs (Erdoğan-Yıldırım et al., 2025). EEG studies indicated that ATT affected alpha and beta waves (Knowles & Wells, 2018), while fMRI research reported decreased activation in attention-related regions, particularly the anterior cingulate cortex (Jahn et al., 2023; Kowalski et al., 2020; Müller et al., 2025). Studies examining the impact of the number of sessions or doses suggested that four sessions produced stronger and more enduring effects than a single session (Barth, 2019; Heitland et al., 2020). In studies including follow-up assessments, treatment gains were largely maintained.

Assessment of risk of bias in the studies: RoB 2 evaluations indicated that most studies had a high risk of bias. The main sources of bias were lack of blinding, reliance on self-report measures, and missing data. By contrast, studies using computer-based performance tasks and neuroimaging methods showed lower risk of bias.

Discussion

Research encompassing different samples and study designs demonstrates that ATT is, overall, an effective intervention. Findings show that ATT yields promising outcomes in areas such as attentional control, cognitive flexibility, and reduction of symptom severity in the treatment of psychological disorders, and produces favorable changes in certain cognitive variables in healthy samples. However, variability in samples, comparison conditions, and measurement tools indicates that caution is warranted when generalizing these results. Early studies pointed to significant reductions particularly in anxiety and depressive symptoms (Papageorgiou & Wells, 1998), and small-scale as well as case-based research

has reported similarly strong effects. Nonetheless, studies with no control group or very small samples (e.g., Carter & Wells, 2018; Levaux et al., 2011) are clearly limited in establishing the definitive effectiveness of ATT.

Examination of sample distribution shows a clear predominance of female participants, and some studies involve only one gender, suggesting that gender should be treated more systematically as a variable in future research. Clinical studies indicate consistent positive outcomes for diagnoses such as social phobia, hypochondriasis, and major depressive disorder (Donald et al., 2014; Müller et al., 2025; Papageorgiou & Wells, 1998). The effectiveness of ATT for specific symptoms such as tics and hallucinations (e.g., Carter & Wells, 2018; Schaich et al., 2020) supports its adaptability to different clinical domains. At the same time, the findings suggest that ATT acts less on any single diagnosis and more on transdiagnostic mechanisms such as attentional control, rumination, worry, and self-focused attention (Wells, 2009).

Studies comparing ATT with other interventions show that, under some conditions, the technique can produce effects comparable to or stronger than mindfulness-based approaches, cognitive-behavioral techniques, and relaxation training (e.g., Fergus & Wheless, 2018; McEvoy et al., 2017). However, other studies report that ATT does not differ significantly from relaxation training or wait-list control conditions (e.g., McEvoy & Perini, 2009; Moritz et al., 2011), indicating that its impact may vary depending on context and the outcomes assessed.

With regard to measurement tools, the literature largely relies on self-report symptom scales. Nevertheless, the small number of studies using neurocognitive methods such as EEG and fMRI are important in demonstrating that ATT influences attentional orienting processes and underlying neural mechanisms (Jahn et al., 2023; Knowles & Wells, 2018; Müller et al., 2025). The fact that the Self-Focused Attention Scale has been used in only a few studies suggests that this key mechanism should be evaluated more comprehensively in future research.

ATT appears to be particularly effective on the mechanisms that constitute the cognitive attentional syndrome—worry, rumination, threat monitoring, and self-focused attention. Studies with anxiety and depression samples report significant reductions in these processes (Fergus et al., 2014; Papageorgiou & Wells, 2000), and short-term effects on post-traumatic intrusive thoughts have also been observed (Nassif & Wells, 2014). These findings indicate that ATT, as a transdiagnostic intervention, can effectively target cognitive processes common across psychopathologies.

Although follow-up assessments are limited, they

generally reveal positive results, with gains largely maintained over periods of 1–6 months (Baumeister et al., 2024; Snuggerud et al., in press). However, there is a clear need for longer-term follow-up studies. Risk-of-bias assessments show that many studies are at high risk, mainly because of the widespread use of self-report measures and the lack of blinding. Poor reporting of randomization procedures and the potential for selective reporting also restrict the reliability of current findings.

Overall, ATT emerges as an effective and rapidly acting technique that can be delivered in individual and group formats and even in online applications. Its applicability across various psychopathologies is promising. Nevertheless, to obtain stronger evidence regarding ATT, there is a need for better designed, low-bias, large-sample studies with diverse clinical populations, well-specified comparison conditions, and extended follow-up periods.