ETHEREAL FLOW

Explore the Full Evidence

The science informing Ethereal Flow's Personalised Sleep Protocol

The website introduces six areas of research that inform the scientific thinking behind Ethereal Flow. This evidence guide goes deeper, bringing together peer-reviewed reviews, meta-analyses and research studies so you can explore the evidence for yourself.

The research below supports the scientific principles and mechanisms we draw from. It does not mean that Ethereal Flow itself has been clinically validated, or that every finding applies equally to every person.

Flow Codex™ uses this wider evidence base alongside your assessment to build a Personalised Sleep Protocol specifically for you. The precise interpretation, selection and sequencing logic within Flow Codex™ remains proprietary.

Why the Mind Stays Switched On

CORE SCIENTIFIC TRUTH

Being physically tired does not guarantee that the mind is ready for sleep. Pre-sleep cognitive activity — including worry, planning, problem-solving, monitoring and sleep-interfering thoughts — is strongly associated with insomnia and difficulty initiating sleep.

The evidence is broader than diagnosed insomnia. Research in healthy and non-clinical populations also links everyday stress, worry, rumination and heightened mental activity before bed with aspects of poorer or delayed sleep.

Pre-sleep cognitive activity in adults: A systematic review

Lemyre et al. (2020) | Sleep Medicine Reviews | Systematic review

Read the original research →

What the research found. This review examined the nature of pre-sleep thinking, its relationship with sleep onset and insomnia, and attempts to manipulate it. It found that insomnia is associated with more sleep-interfering thoughts, worry, monitoring and cognitive arousal, while planning and problem-solving commonly appear in pre-sleep thinking.

Why it matters. It gives strong direct evidence that what the mind is doing before sleep is relevant to understanding why some people struggle to switch off.

The association between worry and rumination with sleep in non-clinical populations: a systematic review and meta-analysis

Clancy et al. (2020) | Health Psychology Review | Systematic review and meta-analysis

Read the original research →

What the research found. Looking specifically beyond clinical populations, this review found that greater worry and rumination were consistently associated with poorer sleep quality, shorter sleep duration and taking longer to fall asleep.

Why it matters. It shows that the link between a busy, repetitive mind and sleep is not confined to people with a clinical insomnia diagnosis.

Cognitive factors and processes in models of insomnia: A systematic review

Tang et al. (2023) | Journal of Sleep Research | Systematic review

Read the original research →

What the research found. Across nine scientific models of insomnia developed over four decades, researchers found substantial overlap in cognitive processes, including worry, rumination, negatively toned thinking and heightened cognitive or emotional arousal.

Why it matters. It strengthens the wider scientific case that cognition matters while keeping the explanation balanced: there is no single cause of poor sleep.

Daily stress, presleep arousal, and sleep in healthy young women: a daily life computerized sleep diary and actigraphy study

Winzeler et al. (2014) | Sleep Medicine | 145 healthy young women | 14 nights

Read the original research →

What the research found. Higher daily stress was consistently associated with greater mental and physical arousal before bed. Cognitive arousal helped explain the relationship between day-to-day stress and poorer perceived sleep quality.

Why it matters. It connects the science to ordinary life: everyday stress can travel into the period before sleep as heightened mental and physical arousal.

A cognitive model of insomnia

Harvey (2002) | Behaviour Research and Therapy | Foundational cognitive model

Read the original research →

What the research found. This influential model describes how worry about sleep can become part of a self-reinforcing cycle involving negatively toned thinking, arousal, monitoring and stronger concern about not sleeping.

Why it matters. It provides a foundational explanation for why changing the response to recurring night-time thoughts can matter, rather than simply demanding that thoughts disappear.

The influence of pre-sleep cognitive arousal on sleep onset processes

Wuyts et al. (2012) | International Journal of Psychophysiology | Controlled laboratory study | Healthy volunteers

Read the original research →

What the research found. In a controlled sleep-laboratory experiment, researchers deliberately increased mental activity immediately before bedtime. Participants subsequently took longer to fall asleep on objective measurement, with changes also observed in brain and physiological activity.

Why it matters. It adds controlled experimental evidence that heightened mental activity immediately before bed can influence the process of falling asleep.

Hyperarousal in insomnia disorder: Current evidence and potential mechanisms

Dressle & Riemann (2023) | Journal of Sleep Research | Contemporary review

Read the original research →

What the research found. This review examines cognitive-emotional, cortical and physiological hyperarousal. Evidence was particularly strong for sleep-related thoughts and worries and also supported differences in cortical arousal.

Why it matters. It helps explain why feeling physically tired does not necessarily mean every part of the sleep system has settled.

Assessing cognitive processes related to insomnia: A review and measurement guide for Harvey's cognitive model for the maintenance of insomnia

Hiller et al. (2015) | Sleep Medicine Reviews | Review

Read the original research →

What the research found. More than a decade after Harvey's model was proposed, this review examined the evidence and measurement of its individual cognitive processes and supported an important role for negative cognitive activity in persistent sleep difficulty.

Why it matters. It shows how the earlier cognitive model was subsequently examined rather than simply accepted as theory.

Does cognitive behaviour therapy for insomnia reduce repetitive negative thinking and sleep-related worry beliefs? A systematic review and meta-analysis

Ballesio et al. (2021) | Sleep Medicine Reviews | Systematic review and meta-analysis | 15 randomised trials

Read the original research →

What the research found. Across 15 randomised trials, CBT-I produced moderate-to-large reductions in worry, with stronger effects for sleep-related worry than general worry. Effects on rumination were smaller and were not reliably demonstrated.

Why it matters. It shows that sleep-related worry is not only associated with sleep difficulty; established sleep treatment can also modify this cognitive process.

Sleep-Related Arousal Versus General Cognitive Arousal in Primary Insomnia

Spiegelhalder et al. (2012) | Journal of Clinical Sleep Medicine | 182 people with insomnia + 54 healthy sleepers | Polysomnography

Read the original research →

What the research found. Using questionnaires and two nights of objective sleep-laboratory measurement, researchers found that sleep-related cognitive arousal was associated with greater difficulty initiating and maintaining sleep.

Why it matters. It suggests that the content and focus of night-time thinking can matter, not simply whether someone is generally a busy thinker.

Sleep Reactivity Amplifies the Impact of Pre-Sleep Cognitive Arousal on Sleep Disturbances

Shaif et al. (2026) | Journal of Sleep Research | Students without sleep disorders | 800 nights of data

Read the original research →

What the research found. Across 800 nights of data, days with more stress than usual were accompanied by greater pre-sleep cognitive arousal, longer sleep-onset latency and less total sleep.

Why it matters. It brings the evidence into a non-clinical population and shows why individual night-time patterns and responses to stress can differ.

What This Evidence Tells Us

Across systematic reviews, meta-analyses, laboratory experiments and real-world studies, a consistent picture emerges: the period before sleep is not cognitively neutral. Worry, rumination, sleep-focused monitoring, everyday stress and heightened mental activity can all be relevant to how easily sleep begins and how sleep is experienced.

Preparing Mind and Body for Sleep

CORE SCIENTIFIC TRUTH

Before asking the mind to engage with deeper cognitive or imagery work, reducing competing physical and physiological arousal can help create a more sleep-conducive state. Slow breathing and deliberate body relaxation are evidence-supported ways of influencing that state.

The evidence here does not treat relaxation as the whole answer to sleep difficulty. It supports a more specific role: breathing and body-settling techniques can influence autonomic activity, reduce physical tension and form a useful part of preparing mind and body for sleep.

Effects of voluntary slow breathing on heart rate and heart rate variability: A systematic review and a meta-analysis

Laborde et al. (2022) | Neuroscience & Biobehavioral Reviews | Systematic review and meta-analysis | 223 studies

Read the original research →

What the research found. This large systematic review and meta-analysis found that voluntary slow breathing increased vagally mediated heart-rate variability during breathing, immediately after a session and following multi-session interventions.

Why it matters. It provides strong physiological evidence that deliberate slow breathing can measurably influence autonomic regulation - one reason it can be useful when preparing the system to settle.

Slow breathing techniques before bedtime and the effects on sleep: A systematic review

Eide et al. (2026) | Sleep Medicine Reviews | Systematic review | 9 studies | 457 participants

Read the original research →

What the research found. This systematic review examined slow breathing practised before bedtime. Across studies using self-reported measures, slow breathing was associated with improvements in sleep quality and sleep duration; objective sleep findings were more mixed.

Why it matters. It provides direct sleep-specific evidence that slow breathing before bed can be a useful part of preparing for sleep.

The phenomenology of the pre-sleep state: The development of the pre-sleep arousal scale

Nicassio et al. (1985) | Behaviour Research and Therapy | Foundational pre-sleep arousal study

Read the original research →

What the research found. This foundational study examined both mental and physical arousal before sleep across college students, normal adult sleepers and people experiencing insomnia.

Higher levels of both cognitive and physical pre-sleep arousal were associated with greater sleeping difficulty and taking longer to fall asleep.

Why it matters. It supports an important distinction: preparing for sleep is not only about quieting thoughts. Physical tension and physiological arousal are also part of the pre-sleep state.

Age Differences in the Role of Cognitive Versus Somatic Arousal in Sleep Outcomes

Shoji, McCrae & Dautovich (2014) | Behavioral Sleep Medicine | 100 community-dwelling adults | 14 consecutive days

Read the original research →

What the research found. Researchers followed younger and older adults for 14 consecutive days, separately measuring mental and physical arousal before sleep alongside their sleep each night. Pre-sleep arousal was significantly related to sleep outcomes, with the relationship differing according to age and whether the arousal was cognitive or physical.

Why it matters. It adds real-world evidence that the state we bring into bedtime matters, and that pre-sleep arousal is not the same for everyone. Both mental and physical activation can form part of the picture.

Progressive muscle relaxation technique improves sleep quality and mental health: A systematic review and meta-analysis of randomized controlled trials

Donato et al. (2026) | Journal of Psychosomatic Research | Systematic review and meta-analysis | 31 RCTs | 2,277 adults

Read the original research →

What the research found. This systematic review and meta-analysis found that progressive muscle relaxation significantly improved sleep-quality measures across randomised controlled trials.

Why it matters. It strengthens the evidence that deliberately reducing physical tension can be a useful sleep-supportive component when preparing the body for rest.

The effects of progressive muscle relaxation on sleep quality in adults: a systematic review and meta-analysis of randomized controlled trials

Li et al. (2026) | Frontiers in Public Health | Systematic review and meta-analysis | 14 RCTs | 957 adults

Read the original research →

What the research found. This systematic review and meta-analysis combined 14 randomised controlled trials involving 957 adults. Progressive muscle relaxation was associated with significantly improved subjective sleep quality, adding to a growing body of evidence that structured physical relaxation can support sleep.

Why it matters. This strengthens the evidence for deliberately releasing physical tension as one useful part of preparing the mind and body for sleep.

Behavioral and Psychological Treatments for Chronic Insomnia Disorder in Adults

American Academy of Sleep Medicine (2021) | Systematic review, meta-analysis + clinical practice guideline | 121 eligible studies

Read the original research →

What the research found. The American Academy of Sleep Medicine reviewed a large body of research into behavioural and psychological approaches to sleep. The evidence supports relaxation therapy as one recognised approach that can contribute to improving sleep, including measures such as sleep quality and treatment response.

Why it matters. Relaxation does not need to do everything on its own to be useful. The evidence supports its role as one component that can help settle the system and prepare the mind and body for sleep.

What This Evidence Tells Us

Taken together, the evidence supports a clear role for state preparation. Slow breathing can measurably influence autonomic regulation; physical and somatic arousal are relevant to the pre-sleep state; and structured relaxation techniques have evidence for supporting sleep outcomes. This is why breathing and body settling are used as preparation rather than treated as the entire solution: the aim is to reduce competing arousal and create a more suitable state for the work that follows.

Changing the Response

CORE SCIENTIFIC TRUTH

Difficult night-time thoughts do not necessarily have to be eliminated. Cognitive and behavioural sleep research shows that beliefs, reactions and ways of responding to thoughts are modifiable.

The evidence in this section supports a specific principle: changing the way someone responds to recurring thoughts, worries and sleep-related beliefs can be relevant to changing the wider night-time pattern.

Components and Delivery Formats of Cognitive Behavioral Therapy for Chronic Insomnia in Adults: A Systematic Review and Component Network Meta-Analysis

Furukawa et al. (2024) | JAMA Psychiatry | Systematic review and component network meta-analysis | 241 randomised trials | 31,452 adults

Read the original research →

What the research found. This major systematic review analysed 241 randomised trials involving more than 31,000 adults to identify which components of cognitive behavioural therapy for insomnia were associated with better outcomes. Cognitive restructuring - working differently with unhelpful thoughts and beliefs - was one of the key components associated with improved sleep outcomes, including subjective sleep quality.

Why it matters. It provides strong evidence for a central principle: improving sleep is not always about trying to stop thoughts altogether. Changing how we respond to recurring thoughts and beliefs can be an important part of changing the night-time pattern.

Changes in dysfunctional beliefs about sleep after cognitive behavioral therapy for insomnia: A systematic literature review and meta-analysis

Thakral et al. (2020) | Sleep Medicine Reviews | Systematic review and meta-analysis | 16 RCTs | 1,134 CBT-I participants + 830 controls

Read the original research →

What the research found. This systematic review and meta-analysis combined 16 randomised controlled trials involving almost 2,000 adults. Cognitive behavioural therapy for insomnia produced substantial changes in dysfunctional beliefs and attitudes about sleep, showing that established patterns of thinking around sleep can be changed.

Why it matters. It provides direct evidence for the principle behind changing the response: the thoughts and beliefs surrounding sleep are not necessarily fixed. Evidence-based cognitive approaches can help people develop different ways of thinking about and responding to sleep.

The European Insomnia Guideline: An update on the diagnosis and treatment of insomnia 2023

Riemann et al. (2023) | Journal of Sleep Research | European Sleep Research Society / European Insomnia Network guideline

Read the original research →

What the research found. The 2023 European Insomnia Guideline reviewed the contemporary evidence for treating chronic insomnia and recommends cognitive behavioural therapy for insomnia as the first-line treatment for adults. CBT-I combines behavioural approaches with cognitive strategies that work with the thoughts, beliefs and responses surrounding sleep.

Why it matters. It establishes that working with the way people think about and respond to sleep is part of mainstream, evidence-based sleep science - not simply an attempt to distract the mind or force thoughts away.

The Attempted Suppression of Presleep Cognitive Activity in Insomnia

Harvey (2003) | Cognitive Therapy and Research | Experimental study | 60 participants

Read the original research →

What the research found. In this experimental study, people with insomnia and good sleepers were asked either to suppress a personally relevant thought before sleep or to allow their thoughts to come and go without trying to control them. Those instructed to suppress the thought reported taking longer to fall asleep and poorer sleep quality. The effect was seen in both groups.

Why it matters. It provides direct evidence that trying to force unwanted thoughts away is not necessarily the most helpful response at bedtime. How we respond to a recurring thought can matter as much as the fact that the thought is there.

Change in Dysfunctional Beliefs About Sleep in Behavior Therapy, Cognitive Therapy, and Cognitive-Behavioral Therapy for Insomnia

Eidelman et al. (2016) | Behavior Therapy | Randomised controlled trial | 188 adults

Read the original research →

What the research found. In this randomised controlled trial, 188 adults received behavioural therapy, cognitive therapy or combined cognitive-behavioural therapy for sleep. Dysfunctional beliefs about sleep changed significantly during treatment, and those changes were maintained at 6- and 12-month follow-up. Greater changes in sleep-related beliefs were associated with greater improvements in symptoms and sleep-related impairment.

Why it matters. It provides direct evidence that established beliefs and reactions surrounding sleep are not necessarily fixed. They can change, and those changes can form part of a meaningful improvement in the night-time pattern.

Challenging beliefs for quality sleep: A systematic review of maladaptive sleep beliefs and treatment outcomes following cognitive behavioral therapy for insomnia

Nielson et al. (2023) | Sleep Medicine Reviews | Systematic review | 17 studies

Read the original research →

What the research found. This systematic review brought together 17 studies examining changes in maladaptive beliefs about sleep during cognitive behavioural therapy for insomnia. Across the evidence, reductions in unhelpful sleep-related beliefs were associated with improvements in overall insomnia severity.

Why it matters. It adds to the evidence that the beliefs and responses surrounding sleep are not fixed. Changing the way someone thinks about and responds to sleep can form an important part of changing the wider night-time pattern.

What This Evidence Tells Us

Across large-scale reviews, clinical guidelines, controlled research and longer-term treatment studies, the evidence supports a consistent principle: sleep-related thoughts and beliefs are modifiable, and the way people respond to them can form part of meaningful change. The aim is not simply to force the mind to become blank, but to develop a different response to the thoughts, worries and beliefs that can keep the night-time loop active.

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